



COUNCIL OF STATE AND TERRITORIAL EPIDEMIOLOGISTS

2019–2020 Enteric Disease Capacity Assessment Report



OUTBREAK INVESTIGATION





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Table of Contents

Acknowledgments	2
Executive Summary	4
Introduction	5
Methods	6
Results	8
Profile of responding jurisdictions	8
Enteric disease epidemiology capacity	10
Enteric disease surveillance	18
Communication and coordination on enteric diseases	28
Enteric disease investigation and response capacity	29
Waterborne enteric diseases	36
Council to Improve Foodborne Outbreak Response products	42
Discussion	45
Conclusion	51
References	52
Appendix A: List of Tables and Figures	53
Appendix B: Data Tables	57
Appendix C: Assessment Tool	108

Executive Summary



In 2019, the Council of State and Territorial Epidemiologists (CSTE), in collaboration with the Centers for Disease Control and Prevention (CDC), initiated an assessment process to better understand the existing capacity within state, territorial, and local health departments to conduct enteric disease epidemiology activities. This 2019–2020 assessment was an extension of prior CSTE epidemiology capacity assessments reported in 2002 and 2011 that focused on food safety but was expanded to focus more broadly on enteric diseases, to include those transmitted by water. The assessment was disseminated to all states, territories, and the District of Columbia in late 2019 and early 2020. Notably, the COVID-19 pandemic had a tremendous and ongoing impact on state, tribal, local, and territorial public health systems just after the assessment was deployed. Readers are advised that the enteric disease epidemiology capacities described in this report may have been considerably altered in the short term (and perhaps longer) due to the responsibilities of epidemiologists and other public health professionals in confronting the pandemic.

A total of 44 states and the District of Columbia participated in the 2019–2020 assessment. Responding jurisdictions reported a total of 436 full-time equivalents (FTEs) working on enteric disease epidemiology activities at the state, regional, and local levels, a substantial decrease from the 787 FTEs reported in the 2011 assessment. Respondents reported needing an additional 413 FTEs, or a 95% increase over current staffing, at the state, regional, and local levels, to reach their ideal capacity for enteric disease programs. Public health agencies were identified as the agencies primarily responsible for detecting and responding to both waterborne enteric and non-enteric disease cases and outbreaks in most jurisdictions. Despite having the responsibility for waterborne enteric disease surveillance and outbreak response, most jurisdictions (81%) did not have dedicated FTEs

and just 210 FTEs working on these activities total were enumerated across all responding jurisdictions.

Capacity to undertake surveillance activities for both enteric disease cases and outbreaks was characterized as ranging from substantial to full for a variety of epidemiology activities, although this range still indicated significant gaps in capacity. The predominant barriers reported by jurisdictions for both routine and outbreak surveillance were lack of adequate numbers of staff and lack of epidemiology capacity. Use of electronic databases for tracking cases and outbreaks was high among responding jurisdictions, however, only half of responding jurisdictions had systems capable of sharing data between the systems used to track cases and outbreaks. Continued investment in broader public health data modernization efforts will support the integration of epidemiology data sources to allow for more efficient and timely use of case data for public health action during outbreak investigations.

This report provides an assessment of the status of the nation's enteric disease epidemiology capacity in 2019–2020. Respondents reported overall significantly lower numbers of FTEs at all education levels in state, regional, and local public health agencies than were reported in the 2011 assessment. CSTE strongly recommends increasing the total number of staff working in enteric disease epidemiology programs, including dedicated staffing to support waterborne disease surveillance and outbreak response. Additional federal investments are needed to enhance the current infrastructure for enteric disease epidemiology programs at state, tribal, local, and territorial public health agencies. Additional resources are necessary to address gaps in staffing, training, technology, resource development, and partnerships and communication to effectively prevent, detect, and respond to enteric disease illnesses and outbreaks, which cause substantial public health impact in the United States.

Introduction



Enteric diseases are caused by viruses, bacteria and parasites that typically enter the body through the mouth by ingesting contaminated food and water, by contact with animals or their environments, or by contact with feces of an infected person (CDC, 2022). Among enteric diseases, those caused by contaminated food are a common cause of illness in the United States, affecting one in six Americans annually (CDC, 2018a). Of the estimated 48 million who get sick from a foodborne illness each year, 128,000 are hospitalized and 3,000 die. There are also an estimated 2.3 million waterborne enteric illnesses each year in the United States, with 10,900 hospitalizations, and 131 deaths (Collier et al., 2021). When outbreaks occur, they can cause large numbers of people to become ill. Prevention of illnesses relies not only on measures to prevent initial cases, but also effective surveillance to detect cases so that they can be rapidly investigated, and control measures can be implemented. Outbreak investigations require effective collaboration of many organizations to identify the source of the outbreak and to prevent additional illnesses.

In 2019, the Council of State and Territorial Epidemiologists (CSTE), in collaboration with the Centers for Disease Control and Prevention (CDC), initiated the Enteric Disease Capacity Assessment (EDCA) to better understand the existing capacity within state, territorial, and local health departments to conduct enteric disease epidemiology activities. The assessment focused on jurisdictional epidemiology capacity to detect and investigate cases and outbreaks of enteric diseases. For the purposes of the assessment, “enteric diseases” included those arising from exposure to contaminated food, water, persons, animals, or other environmental contacts. The 2019–2020 assessment was an extension of prior CSTE epidemiology capacity assessments conducted in 2002 and 2011 that focused on food safety. As governmental epidemiology programs increasingly view food safety through the wider lens of enteric diseases, CSTE likewise expanded its assessment

to assess enteric disease epidemiology capacity more broadly, to include waterborne enteric diseases. The goal of the 2019–2020 assessment was to characterize the epidemiology capacity of enteric disease epidemiology programs reflected through this broader approach.

As with all assessments that capture information at a specific point in time, the data described in this report are limited to the time in which they were collected, largely late 2019. Notably, the COVID-19 pandemic had a tremendous and ongoing impact on state, tribal, local, and territorial public health systems just after the assessment was deployed. Readers are advised that the enteric disease epidemiology capacities described in this report may have been considerably altered in the short term (and perhaps longer) due to the responsibilities of epidemiologists and other public health staff in confronting the pandemic.



Assessment tool development

The assessment tool was developed in conjunction with the EDCA Workgroup supported by CSTE staff and a consultant beginning in January 2019. The workgroup reviewed and compared questions from the previous two food safety capacity assessments conducted in 2002 and 2011, which were initially grouped into topic areas used in the 2011 survey. The workgroup developed the current assessment based on the prior questions while also considering the evolution of food safety programs and changes in information technology and laboratory science since the previous assessments. For these reasons, the workgroup determined that focusing the assessment on enteric diseases more broadly would better reflect how state and federal food safety programs were increasingly organized. The workgroup also decided for the first time to include a separate section on waterborne enteric disease capacity to compare with foodborne enteric disease capacity.

While some question-types or subjects remained constant across the prior and current assessments, changes in wording and scope made direct analysis of data across the three assessments problematic. Other questions were modified or omitted either because they were no longer relevant or covered issues that were addressed by other food safety programs. Some questions related to laboratory capacity and CDC Integrated Food Safety Centers of Excellence were omitted to reduce the burden on responding jurisdictions because other organizations were surveying on these issues. Finally, new questions were added to address current or emerging issues in enteric diseases.

The resulting assessment tool is available in Appendix C. The assessment was divided into the following areas:

- A. Jurisdiction and Respondent Information
- B. Personnel Capacity and Training
- C. Communication and Coordination
- D. Enteric Disease Surveillance Capacity
- E. Investigation and Response Capacity
- F. Legal Issues and Data Sharing
- G. Council to Improve Foodborne Outbreak Response Products
- H. Waterborne Enteric Diseases
- I. Other Comments

In addition to Area I (“Other Comments”), the last question in each topic area was an open-ended question inviting respondents to provide additional information about that topic.

Capacity assessment deployment

The EDCA tool was deployed online using the web-based application Qualtrics. The respondents were state epidemiologists or their designee responsible for enteric disease activities, with support from other agency personnel. The assessment was piloted in August 2019 in five states (Georgia, Minnesota, Nebraska, New Hampshire, and Washington). Based on feedback during the pilot period, the workgroup made minor revisions to the assessment tool. The final assessment was deployed to all states, territories, and the District of Columbia from September to October 2019. Pilot sites were also asked to review and confirm their original responses due to the modifications of the pilot assessment. CSTE staff provided follow-up reminders via email and telephone calls to jurisdictions that did not complete the assessment by the response deadline. Data collection was substantially completed by January 2020, although some jurisdictions provided data up until August 2020 due to capacity constraints arising from COVID-19.

Data analysis

Assessment data were analyzed using Microsoft Excel and Qualtrics. The number and percentage for each survey question's response were calculated based on either the total number of jurisdictions responding to a question or the total number of responses to a question based on the information being solicited. Response data from three assessment questions (E-8a, E-8b, and F-6) were ultimately excluded from the analysis due to errors in the online administration of those questions that resulted in incomplete or inconsistent data.

Results



Profile of responding jurisdictions

A total of 46 jurisdictions responded to the assessment, including 44 states, one U.S. territory, and the District of Columbia. Although one territory submitted an assessment, it was to report that it did not conduct any enteric disease epidemiology activities and the submission was excluded from analysis.

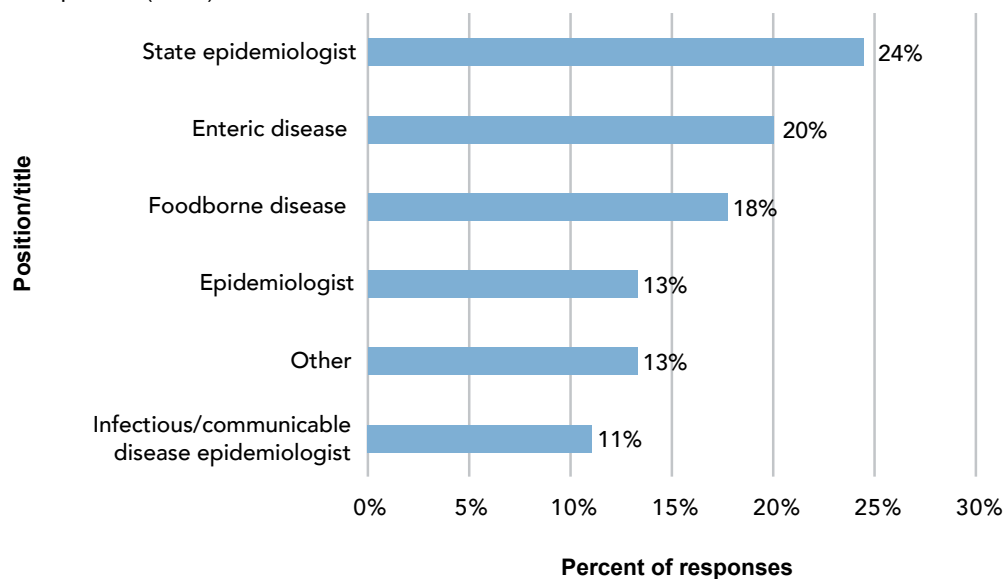
Staff participating in the enteric disease capacity assessment

The primary person completing the assessment for each jurisdiction was asked to provide their

title, which was categorized and summarized in Figure 1¹. The primary person who completed the assessment was most frequently the state epidemiologist, deputy, or equivalent (24%), the enteric disease epidemiologist (20%), or the foodborne disease epidemiologist (18%). (See Table 1 in the Appendix.) In addition to the primary respondent, a variety of personnel participated in completing their jurisdictions' EDCA submission, including foodborne/enteric disease epidemiologists (32% of jurisdictions), other infectious disease/communicable disease staff (21%), the state epidemiologist (13%), environmental health staff (11%), and other participants (9%) such as the public health laboratory, waterborne disease epidemiologists, and state veterinary staff. (See Table 2 in the Appendix.)

Figure 1 Respondents – title categories

% of responses (n=45)



¹ Throughout the report, values displayed in the figures are raw and values referenced in text and displayed in tables are rounded.

Organizational structure of enteric disease programs

The described organizational structure of enteric disease surveillance and investigation programs varied among jurisdictions. Nearly half (43%) of responding jurisdictions indicated that enteric disease surveillance and investigation is a shared state and local health department responsibility whereby a local health department responds to localized outbreaks and the state coordinates multi-county, multi-region, or multi-state outbreaks. About equal numbers of respondents indicated that enteric disease activities are conducted by one central state office (17%) or by regional state offices coordinated by a central state office (15%). Together these approaches indicating central control/coordination of enteric disease activities represent a third of respondents (32%). Nine percent (9%) of responding jurisdictions indicated that independent local health departments take the lead but rely on state guidance for similar approaches statewide. Only 4% identified local health departments that act independently, with considerable variation in practice. Eleven percent (11%) identified other hybrid organizational structures based on function (e.g., surveillance centralized) or jurisdiction size (e.g., larger

municipalities functioning more independently with smaller ones relying on state support). (See Table 3 in the Appendix.)

Sources of legal authority

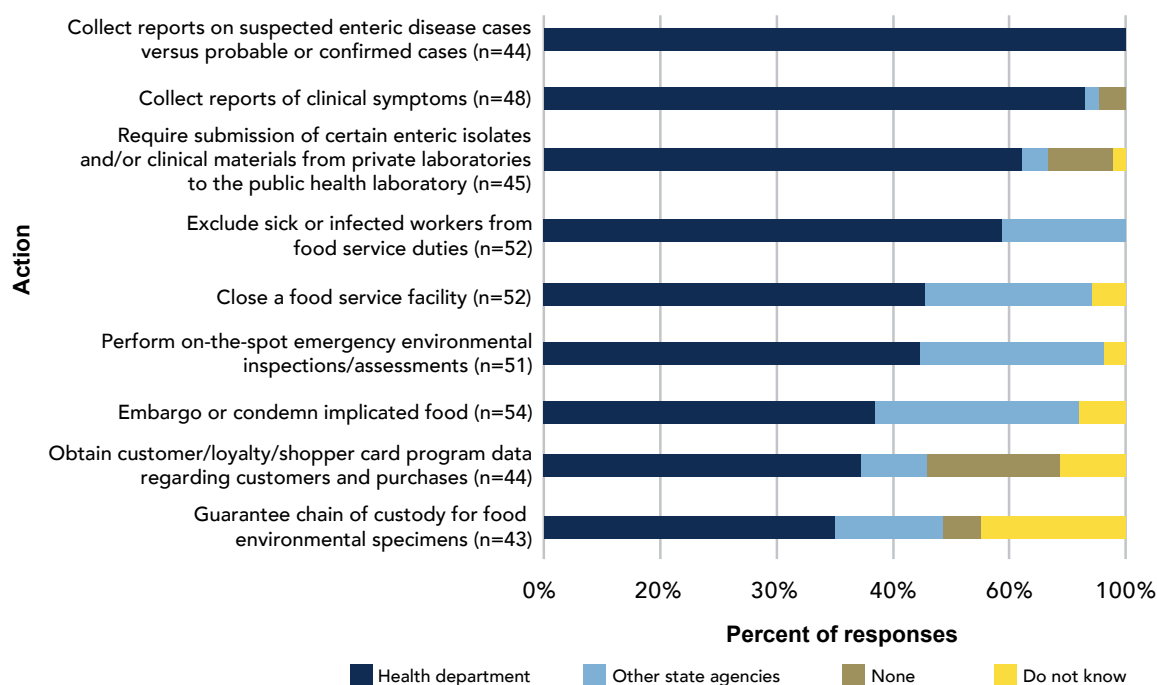
Respondents were asked to identify whether their jurisdictions have express legal authority (e.g., in statute or regulation) authorizing various activities related to enteric diseases and the agency or agencies authorized to act. The assessment sought to identify the sources of authority for health departments as well as those of other agencies involved in enteric disease activities.

Health department authority

Half or more of responding jurisdictions reported having all of the listed legal authorizations assessed (Figure 2). All (100%) reported that health departments have explicit legal authority to collect reports on suspected enteric disease cases versus probable or confirmed cases. Nearly all (93%) of health departments have authority to collect reports of clinical symptoms and 82% reported having health department mandates that require submission of certain enteric isolates and/or clinical materials from private laboratories to the public health laboratory.

Figure 2 Express legal authority for selected enteric disease action

Percentage of responses by action



Most responding jurisdictions reported that the state health department had legal authority to undertake certain food safety measures, including:

- Excluding sick or infected workers from food service duties (79%)
- Performing on-the-spot emergency environmental inspections/assessments (65%)
- Closing a food service facility (65%)
- Embargoing or condemning implicated food (57%)

About half of responding jurisdictions reported having express authority to obtain customer/loyalty/shopper card program data regarding customers and purchases (55%) and to guarantee chain of custody for food environmental specimens (50%). (See Table 4 in the Appendix.)

Authorization of other state agencies

No jurisdiction reported that other state agencies have legal authority to collect reports on suspected enteric disease cases versus probable or confirmed cases. The legal authorizations most frequently reported for other state agencies were:

- Embargoing or condemning implicated food (35%)
- Performing on-the-spot emergency environmental inspections/assessments (31%)
- Closing a food service facility (29%)
- Excluding sick or infected workers from food service duties (21%)

Enteric disease epidemiology capacity

Participants were asked to provide the total composite number of staff (expressed as full-time equivalents [FTEs]) working in enteric disease programs by the highest epidemiology education or training levels. The education/training levels identified were doctorate, professional, master's, bachelor's, nursing, and other types of education/training.

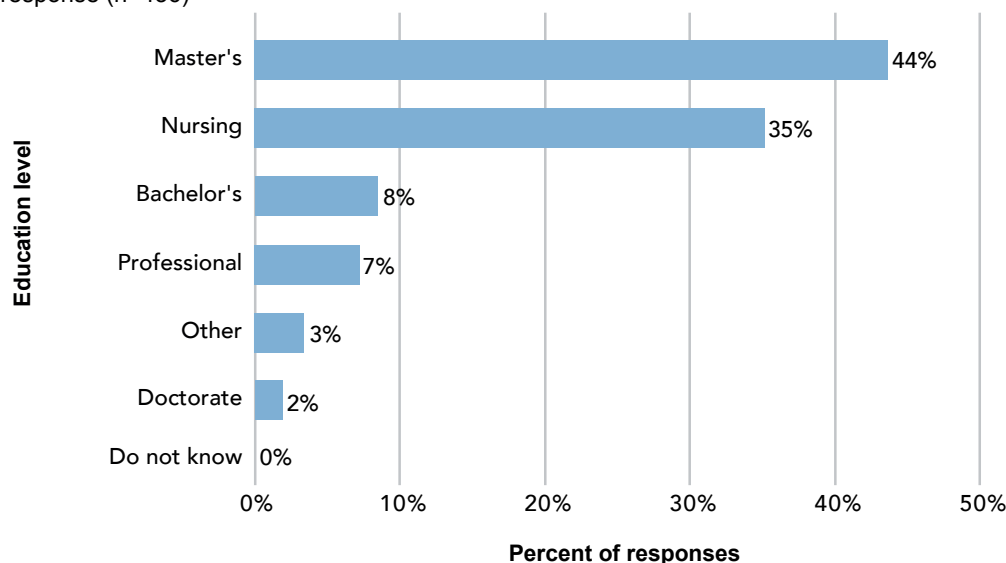
Staffing and education/training levels

Respondents reported a total of 436 FTEs working as foodborne illness/enteric disease epidemiologists at the state (195 FTEs, 45% of total), regional (51 FTEs, 12%), and local (191 FTEs, 44%) health department levels. (See Table 5 in the Appendix.)

FTEs working in enteric disease epidemiology programs across all levels of government were most likely to have a Master of Public Health (MPH) degree or other master's degree (44%) or be a Registered Nurse (RN) or hold another type of nursing degree (35%) (Figure 3). Fewer FTEs had bachelor's-level training (8%) or a professional degree (7%). Respondents identified only a small number of FTEs with doctoral-level education (2%). (See Table 6 in the Appendix.)

Figure 3 Current enteric disease total full-time equivalents capacity by education level

% response (n=436)



Responses also indicated that state health departments had a greater percentage of enteric disease epidemiology staff with doctoral, professional, or master's level training than did local or regional health departments. Conversely, local health departments had a greater percentage of enteric disease epidemiology staff with RN or other nursing degrees than did state or regional health departments (Table 1). (See also Table 7 in the Appendix.)

Staffing trends

Respondents were asked to identify trends in staffing for enteric disease activities in the three years prior to the EDCA (January 1, 2016–December 31, 2018). Participants reported that staffing levels stayed about the same for state, regional, and local health departments (Figure 4). At the state health department level, 29% of

jurisdictions reported staffing stayed about the same, 15% reported it increased, and 6% reported it decreased. At the regional/district health department level, 10% reported staffing stayed about the same, 6% reported it decreased, and 3% indicated they did not know; no respondent indicated that staffing increased during that time. At the local health department level, 18% indicated that staffing stayed about the same, 4% reported it decreased, and 9% indicated they did not know; no respondent indicated that staffing increased during the three-year period. (See Table 8 in the Appendix.)

Ideal staffing and education/training levels

Jurisdictions were asked to estimate the total number of additional FTE staff needed above their current personnel count by highest epidemiology

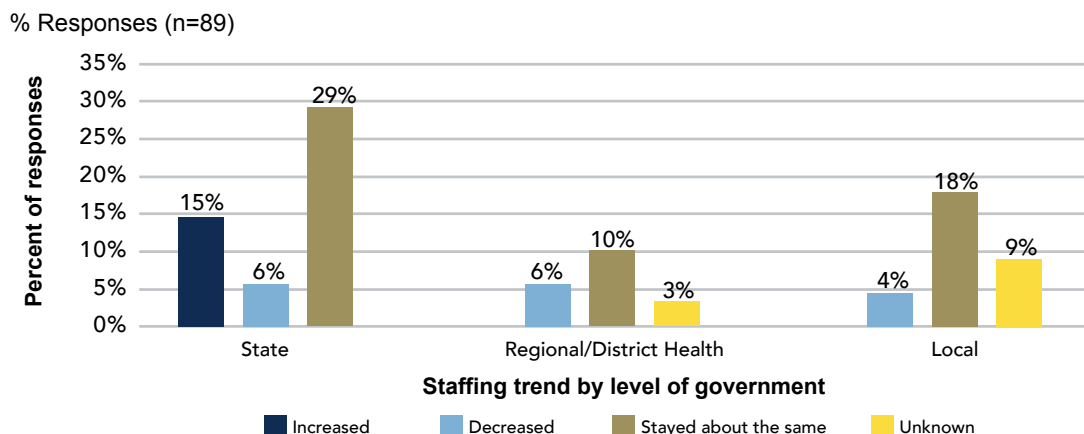
Table 1 Enteric disease full-time equivalent (FTE)* epidemiology capacity by government and education levels

Education Level	Total Current FTEs at State Health Department	Total Current FTEs at Regional/District Health Department	Total Current FTEs at Local Health Department	Totals by Education Level n=436
PhD, DrPH, other doctoral degree in epidemiology, or some epidemiological training at the doctoral level	6.4 1%	1.0 <1%	0.8 <1%	8.2 2%
Professional background (e.g., MD, DO, DVM, DDS) with dual degree in epidemiology or some epidemiological training at the doctoral level	16.5 4%	13.3 3%	2.0 <1%	31.7 7%
MPH, MSPH, MS, or other master's degree in epidemiology or some epidemiological training at the master's level	122.4 28%	32.5 7%	35.6 8%	190.5 44%
BA, BS, or other bachelor's degree in epidemiology or some epidemiological training at the bachelor's level	22.0 5%	0.0 0%	14.9 3%	36.9 8%
RN, BSN, or other nursing designation or degree	12.5 3%	3.7 1%	137.4 32%	153.6 35%
Other (specify)**	14.9 3%	0.1 <1%	0.0 0%	15.0 3%
Do not know	0.0 0%	0.3 <1%	0.0 0%	0.33 <1%
Totals by level of government: n=436 (% all responses)	194.6 45%	50.9 12%	190.6 44%	436.0 100%

*Respondents were asked to include part-time or partial FTEs in their responses resulting in fractions of persons whose positions are split between more than one program area.

**Other positions or educational backgrounds specifically identified included master's level dual-degreed staff (e.g., MPH and another master's degree); non-epidemiology degrees at the doctoral, master's, and bachelor's levels; administrative staff; student interviewers/interns, and CDC Public Health Associate Program (PHAP) fellows.

PhD: Doctor of Philosophy; DrPH: Doctor of Public Health; MD: Doctor of Medicine; DO: Doctor of Osteopathy; DVM: Doctor of Veterinary Medicine; DDS: Doctor of Dental Surgery; MPH: Master of Public Health; MSPH: Master of Science in Public Health; MS: Master of Science; BA: Bachelor of Arts; BS: Bachelor of Science; RN: Registered Nurse; BSN: Bachelor of Science in Nursing.

Figure 4 Staffing Trends in Enteric Diseases Epidemiology

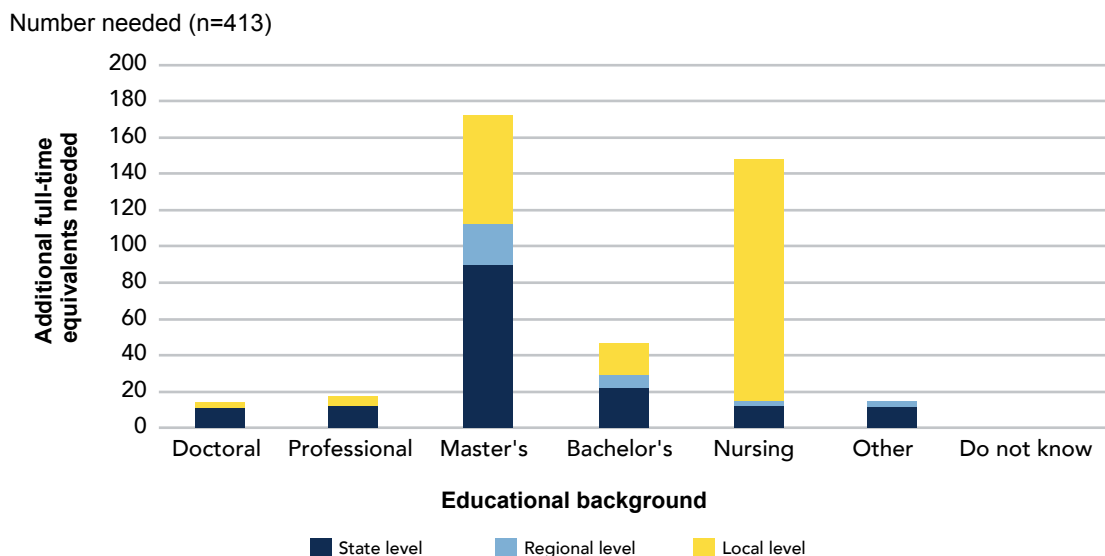
education or training levels to reach their *ideal* enteric disease program capacity. Respondents were also asked to identify other educational backgrounds and levels needed for their enteric disease epidemiology activities.

Respondents reported needing a total of 413 additional FTEs or a 95% increase over current staffing at the state, regional, and local levels to reach their ideal capacity for enteric disease programs (Figure 5). (See Table 9 in the Appendix.)

Local health departments had the greatest need for additional staff (218 FTEs), which represents a 114% increase over the current local enteric

disease epidemiology program staff level, followed by state health departments, which needed 161 additional FTEs (83% more than current levels). The need for an additional 35 FTEs (69% more than current levels) was identified at the regional level. (See Table 10 in the Appendix.)

The greatest overall need identified in terms of educational/training levels was for persons with an MPH or other master's-level training (172 FTEs; 42%), followed by persons with a nursing degree (148 FTEs; 36%), bachelor's degree (46 FTEs; 11%), professional degree (18 FTEs; 4%), and doctorate (14 FTEs; 3%). (See Table 11 in the Appendix.)

Figure 5 Additional full-time equivalents needed for ideal enteric disease epidemiology capacity

Barriers to staffing

Jurisdictions reported barriers to both recruiting and retaining staff for enteric disease epidemiology activities.

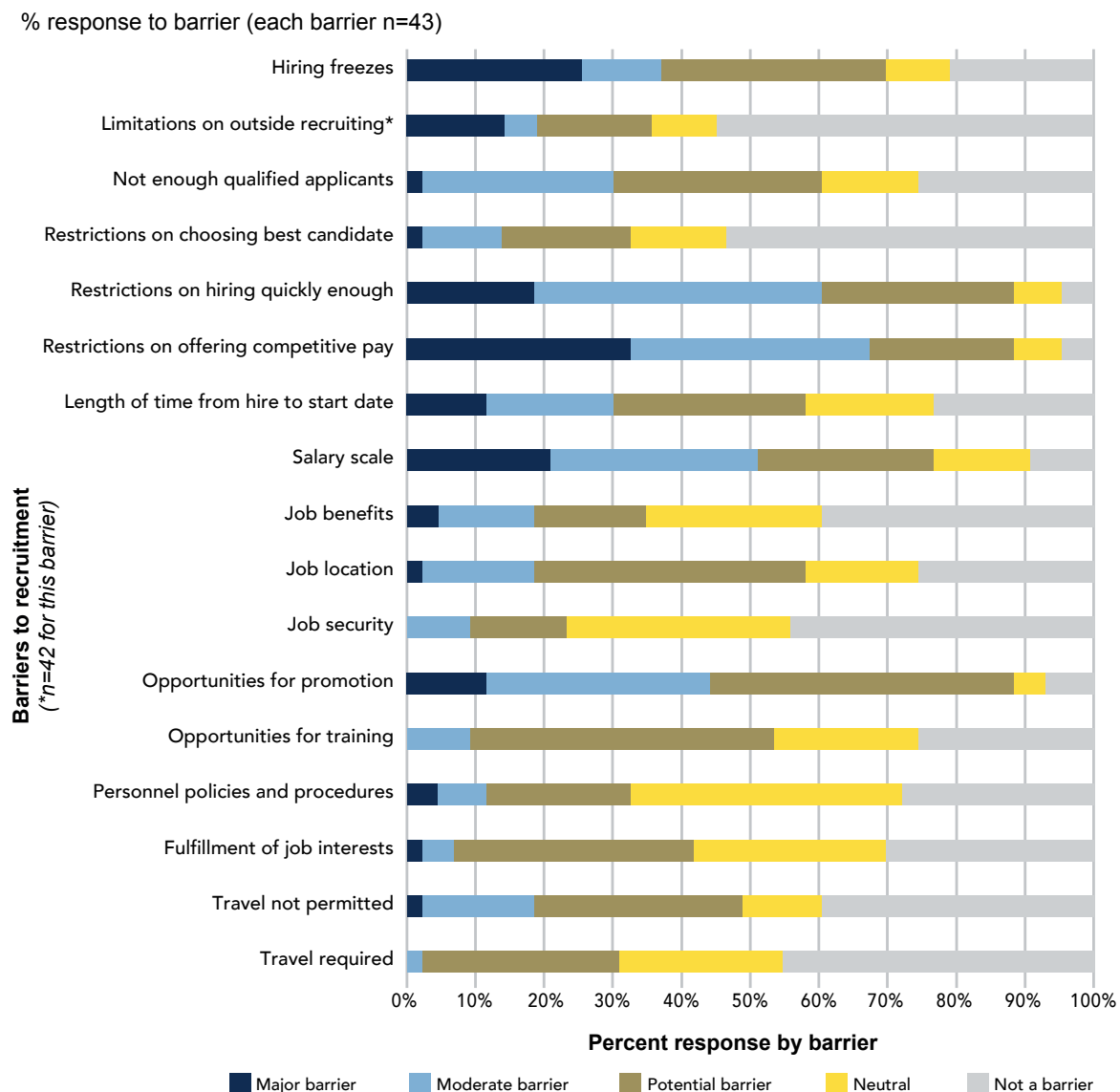
Barriers to recruiting enteric disease staff

Participants were asked to classify typical barriers they encounter in recruiting staff for enteric disease epidemiology positions (Figure 6). Barriers were rated as a major, moderate, or potential barrier; neutral; or not a barrier.

The most significant barriers to recruitment reported were restrictions on offering competitive

pay, restrictions on hiring quickly enough, and salary scale, which were reported as major or moderate barriers by 67%, 60%, and 51% of respondents, respectively. Several other factors were also identified as barriers by more than half of the jurisdictions when considering potential to be barrier. Six of the factors assessed were primarily identified as not being significant barriers: limitations recruiting outside the agency or jurisdiction (55%); restrictions on choosing the best candidate (53%); job benefits (40%); job security (44%); travel not permitted (40%); and travel required (45%). (See Table 12 in the Appendix.)

Figure 6 Barriers to recruiting staff for enteric disease epidemiology positions



Barriers to retaining enteric disease staff

Respondents were asked to classify typical barriers to retaining staff for enteric disease epidemiology positions using the scale provided in the assessment tool: major, moderate, or potential barrier; neutral; or not a barrier (Figure 7).

The most significant barriers reported for retaining enteric disease staff were opportunities for promotion, restrictions on merit raises, and salary scale, which were reported as major or moderate barriers by 73%, 58%, and 57% of respondents, respectively. Several other factors were also identified as barriers by more than half of the jurisdictions when considering potential to be barrier. Five of the factors assessed were primarily identified as not being significant barriers: job benefits (41%); job security (41%); travel not permitted (43%); travel required (47%); and

restrictions on travel outside the jurisdiction (40%). (See Table 13 in the Appendix.)

Training methods, frequency, and barriers

Respondents were asked to identify the types and frequency of training provided to epidemiology staff for various enteric disease surveillance and response activities (Figure 8). Respondents were permitted to pick more than one frequency for each type of training. Training as needed was the most frequently identified response for all training types. Training at orientation was the next most frequently listed response in eight of the nine identified types of training. (See Table 14 in the Appendix.)

Training methods used and preferences

Respondents were asked to identify the current methods used to provide enteric disease

Figure 7 Barriers to retaining enteric disease epidemiology staff

% response to barrier (each barrier n=44)

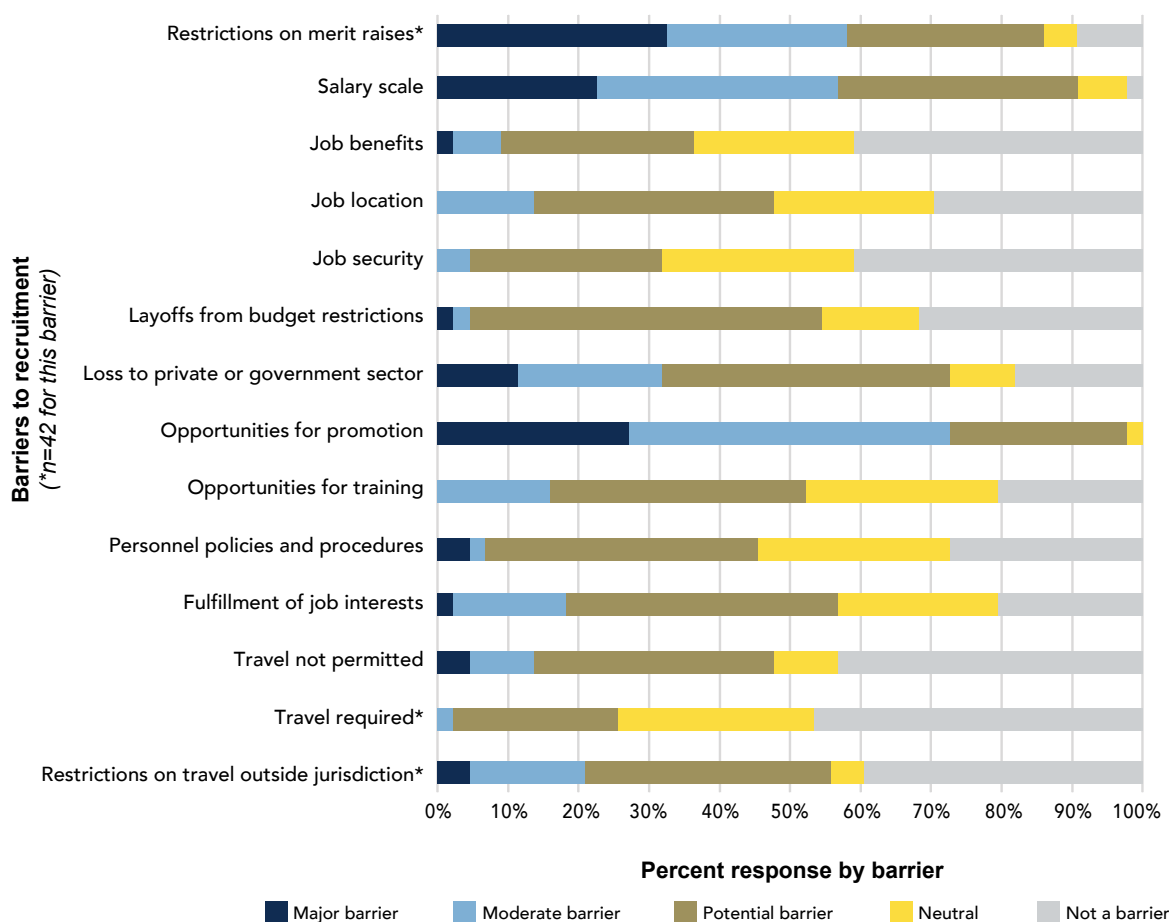
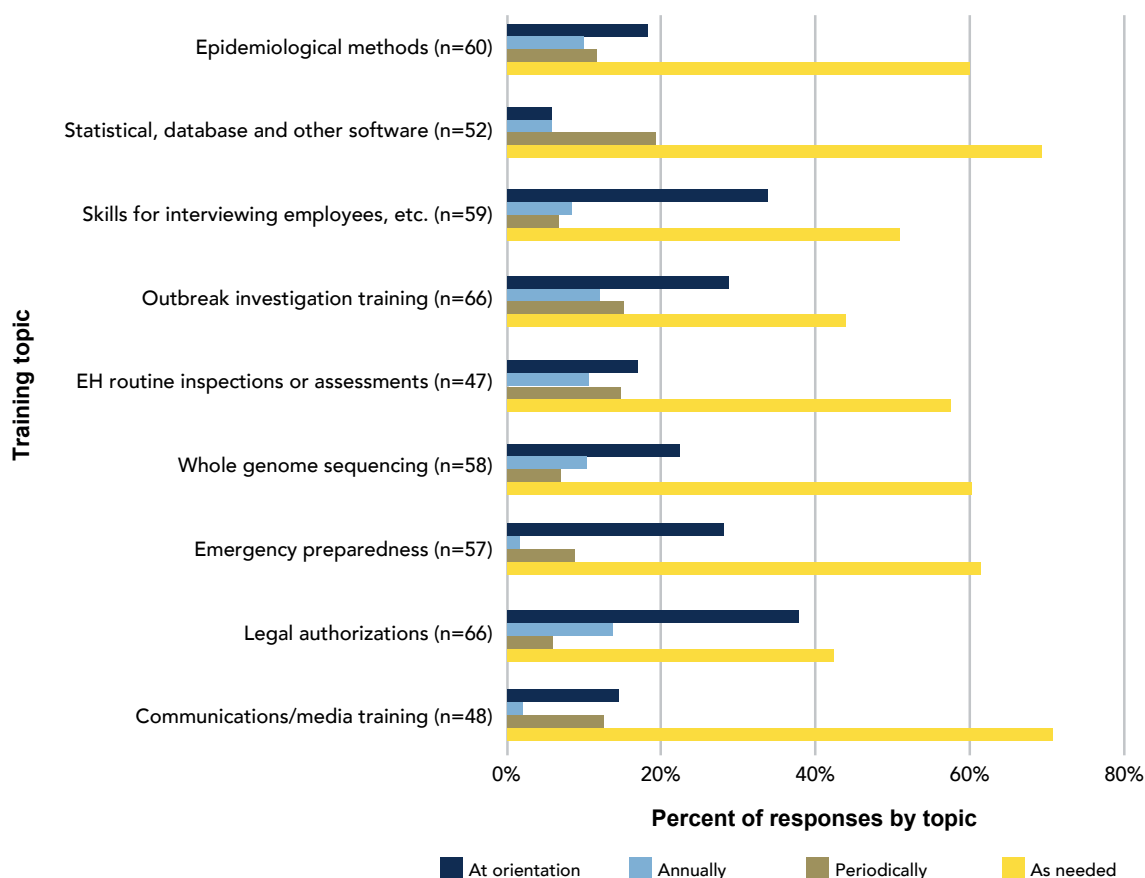


Figure 8 Training types and frequency

% of responses by training type (n varies)



epidemiology or related training in their jurisdictions. They were also asked to indicate additional or preferred methods of training desired by staff, as well as methods not preferred. (See Table 15 in the Appendix.)

Among the current training methods used, in-person training that is provided in-house by the agency was the predominant method of training (24%). This was followed closely by web-based live webinars (21%) and web-based, self-paced stand-alone learning (21%). In-person trainings provided in state (16%) or out of state (15%) were also used in addition to other methods.

The additional or preferred training methods identified the most were in-person training provided in state (25%) and training provided in-house by the agency (22%). Methods respondents indicated they

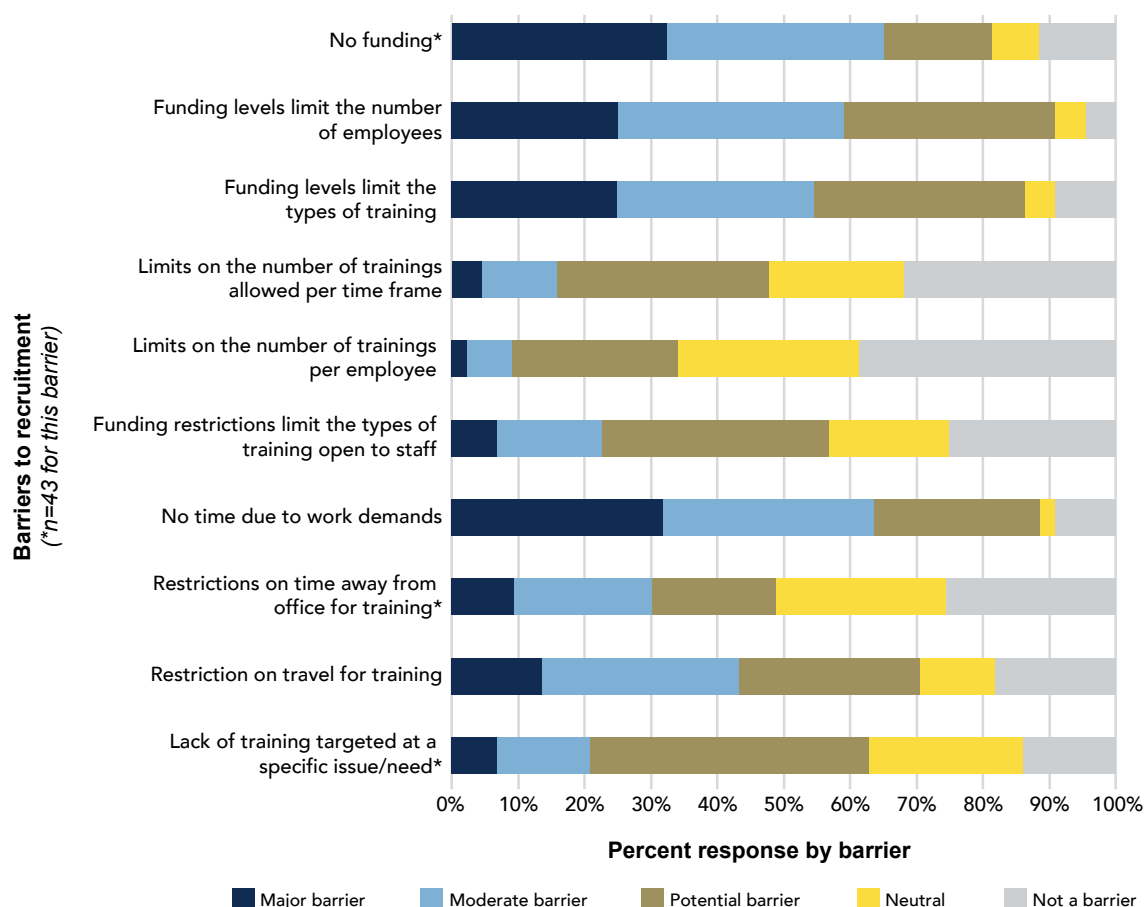
did *not* prefer were web-based self-paced (28%), in-person out of state (24%), and web-based live webinars (20%).

Funding for training

Jurisdictions were asked to indicate all the applicable methods their agencies use to fund training activities (Table 16). They indicated that about a quarter of the funding for training activities comes from each of three sources: cooperative agreement funds (29%), grant funds (26%), and scholarships from outside sources (22%). To a lesser extent, 13% of funding for training comes from agency budgets not derived from the above types of funding sources. For those jurisdictions that do *not* fund training for staff, 8% allow staff time to attend training, and 2% allow staff to use personal leave time to attend. (See Table 16 in the Appendix.)

Figure 9 Barriers to training

% response to barrier (each barrier n=44)

**Barriers to training**

Respondents were asked to classify barriers to training staff for enteric disease surveillance and investigation using the scale provided in the assessment tool: major, moderate, or potential barrier; neutral; or not a barrier (Figure 9).

Factors identified as major or moderate barriers by more than half of respondents were lack of funding (65%), lack of time due to work demands (64%), and funding levels limiting the number of employees to receive training (59%) and the type

of training (e.g., only offered in one format such as web-based) (55%). Other barriers included funding restrictions limiting the types of training staff can receive (e.g., epidemiology staff cannot attend environmental health training), restrictions on travel for training, and lack of training targeted at a specific issue/need. Limits on the number of trainings an employee may participate in and limits on the number of trainings allowed per year were the least significant barriers but still reported as potential barriers to training by some respondents. (See Table 17 in the Appendix.)

Student Interview Teams

Respondents were asked to describe their jurisdictions' use of student interview teams (SITs)—teams of two or more students to supplement staff capacity—to identify and investigate enteric disease events in two scenarios: for routine detection and surveillance for enteric disease and during outbreak investigation and response. (See Table 18 in Appendix.)

Using student interview teams

During routine (non-outbreak) detection and surveillance for enteric disease cases, 38% of respondents indicated that they have not used SITs and have no plans to do so. However, this was closely followed by jurisdictions that indicated they currently have an SIT (36%). Ten percent (10%) of responding jurisdictions noted that they have used SITs in the past and would use them again. Equal numbers of jurisdictions indicated that they have not used SITs but have plans to do so (5%) or that they have used SITs and do not plan to use them again (5%).

In an outbreak investigation and response scenario, 40% of responding jurisdictions indicated that they currently have an SIT. A quarter (25%) indicated that they have not used SITs and have no plans to use them. Fifteen percent (15%) have an SIT for surge capacity. Another 8% indicated that they have used SITs in the past and would use them again, while 5% have used SITs and do not plan to use them again. One jurisdiction (3%) has not used SITs but has plans to do so.

Student interview team capacity

Jurisdictions reporting that they have used or are currently using SITs were asked to estimate the percentage of enteric disease epidemiological program interviewing capacity the student teams provide. More than a third (34%) indicated that SITs make up less than 10% of their interviewing capacity. However, about a quarter of jurisdictions (24%) use student teams for more than 50% of their interviewing capacity. Twenty-one percent (21%) noted that SITs account for 11% to 20% of their capacity. (See Table 19 in Appendix.)

Supervising student interview teams

For jurisdictions indicating current or past use of SITs, respondents were asked to identify enteric disease program staff responsibilities in managing the SITs. Responsibilities were generally evenly distributed among recruiting and hiring, training, supervising, evaluating, and identifying projects/activities for SIT members. (See Table 20 in Appendix.)

Jurisdictions were asked to estimate how many hours per week enteric disease staff spend supervising SITs in the activities identified above. Most of the responses (79%) indicated that staff spent one to five hours per week supervising student teams in the identified activities. Only 11% of responses indicated 5-10 hours per week of supervision time. (See Table 21 in Appendix.)

Enteric disease surveillance

Data sources

Respondents were asked to identify all the sources of data used by their jurisdictions to detect and investigate enteric disease cases and outbreaks during the prior three years (January 1, 2016–December 31, 2018). For each response, respondents indicated how often each type of data was used using the following pull-down menu options: often used, sometimes used, rarely used, or never used.

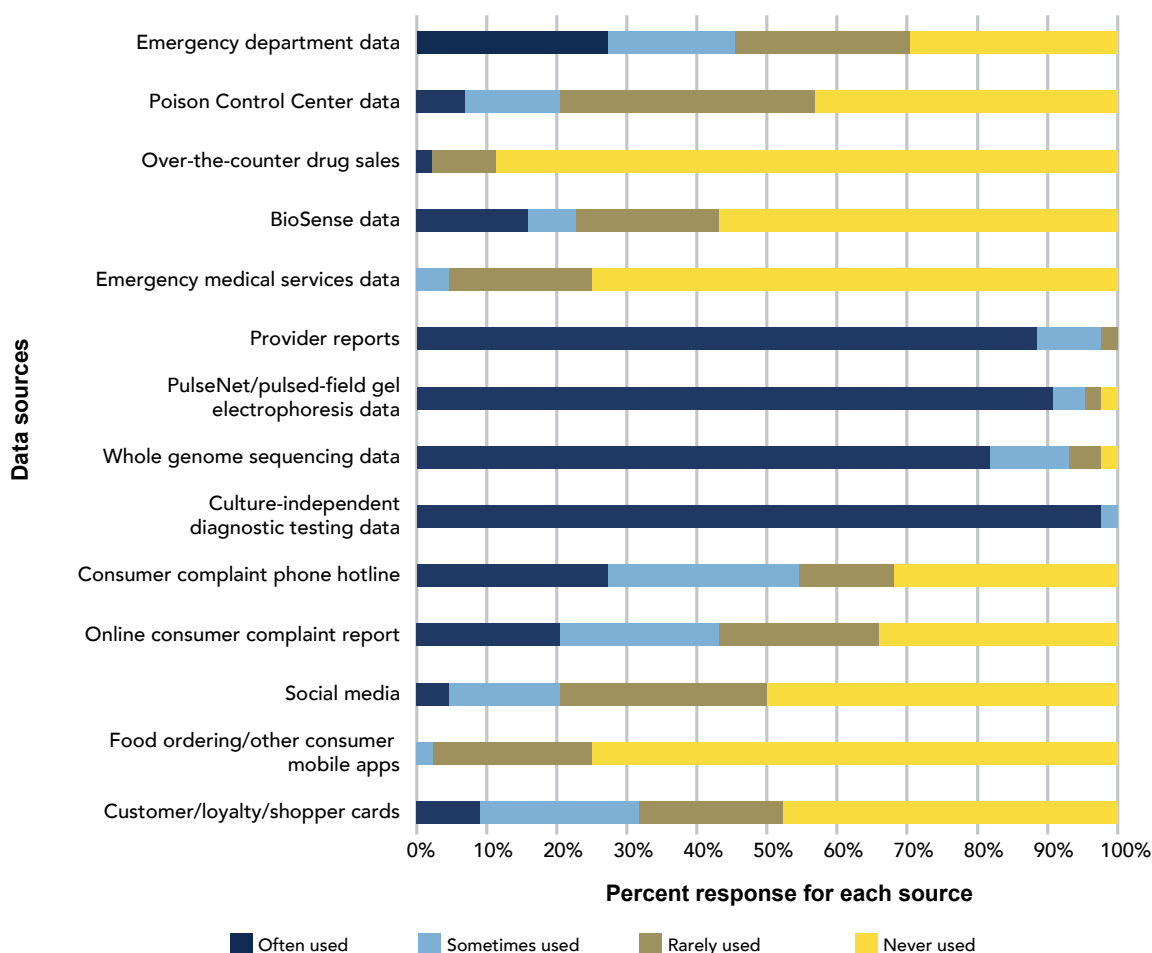
Routine surveillance (non-outbreak)

Respondents indicated that provider and laboratory data were the most-used sources for routine

surveillance/non-outbreak enteric disease activities (Figure 10). Provider reports were listed as often used by 89% of the respondents, PulseNet/pulsed-field gel electrophoresis (PFGE) data by 91%, whole genome sequencing (WGS) data by 82%, and culture-independent diagnostic testing (CIDT) data by 98%. All other data sources listed were reported as never used by the largest number of respondents. However, emergency department data and consumer complaint data were used sometimes or often by around 50% of responding jurisdictions. Data from sentinel sources beyond emergency department chief complaint data were most frequently reported as rarely or never used, including Poison Control Center data, over-the-counter drug sales data, BioSense data, and emergency medical services data. (See Table 22 in the Appendix.)

Figure 10 Past data sources in routine surveillance/non-outbreak scenarios

% response by data source (n=44)



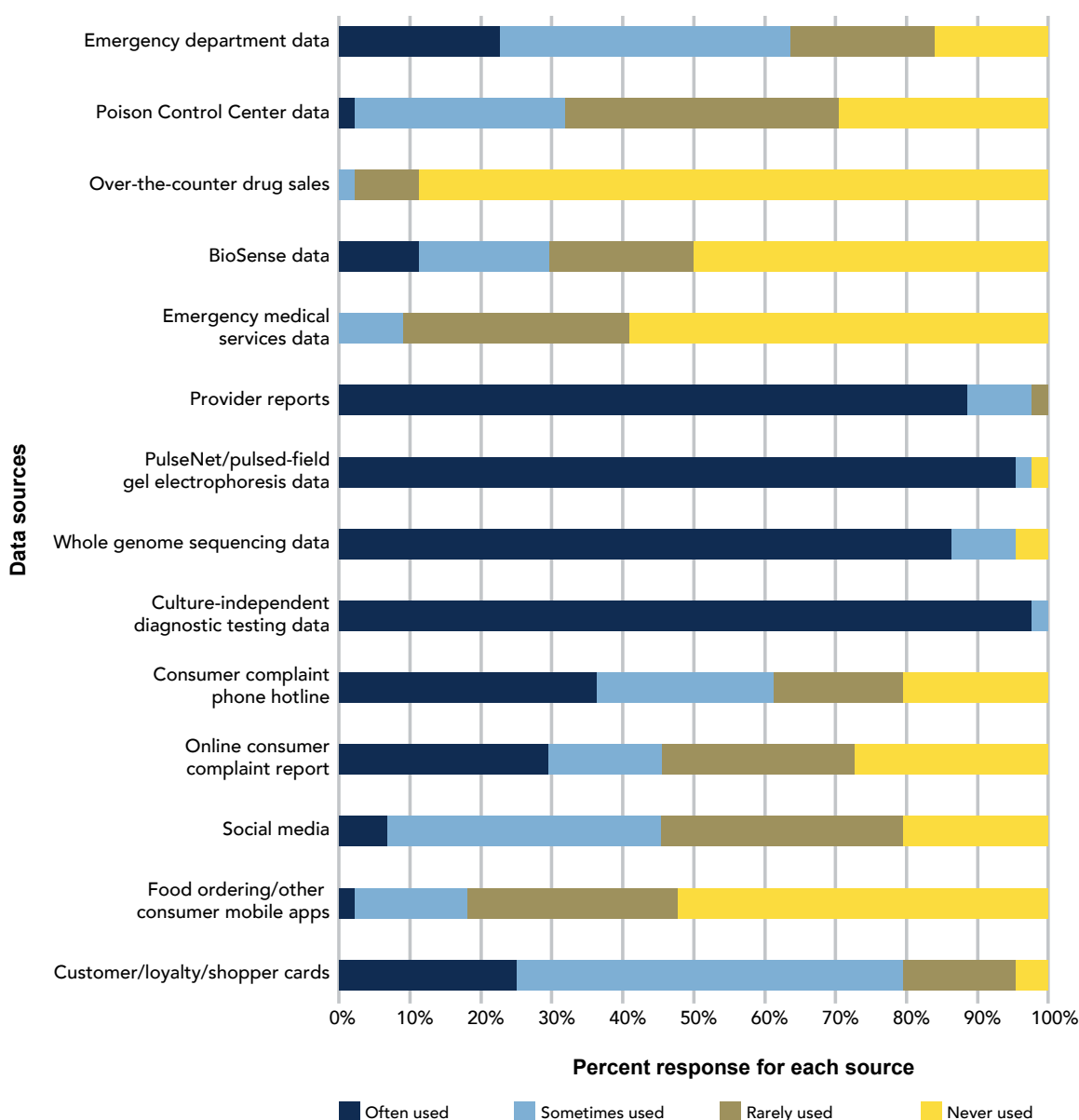
During an outbreak/investigation

Respondents indicated that provider and laboratory data were the most-used sources during an enteric disease outbreak or investigation (Figure 11). Their use was the same as or greater than routine surveillance activities. Provider reports were listed as often used by 89% of the respondents, PulseNet/PFGE data by 95%, WGS data by 86%, and CIDT data by 98%. The use of several data sources increased during an outbreak, including

emergency department chief complaint data, shopper cards, social media, food ordering/ other consumer mobile apps, and consumer complaint data. Data from sentinel sources beyond emergency department chief complaint data (e.g., Poison Control Center data, over-the-counter drug sales data, BioSense data, and emergency medical services data) were reported as mostly rarely or never used. (See Table 23 in the Appendix.)

Figure 11 Past data sources during outbreak/investigation scenarios

% by data source (n=44 each)



Using Alternative Data Sources

Respondents were asked if their jurisdictions sought or used any of several specified data types as part of an enteric disease outbreak investigation. Use of customer loyalty card, shopper card, or mobile application data was reported by 91% of those responding to the question. (See Table 24 in Appendix.) The next most frequently used alternative data sources were debit/credit cards (62%). Only a third or less of respondents reported using other alternative data sources, such as meal delivery application data (37%) or online shopping data (28%).

Mechanisms to access alternative data

For those jurisdictions that had used the alternative data sources described above, respondents were asked to indicate all of the mechanisms used to access the information. (See Table 25 in Appendix.) Of the two thirds of respondents that indicated using customer loyalty card, shopper card, or mobile application data during an enteric disease outbreak, the most common way to access the data was by obtaining verbal consent from individual customers or getting a signed release from individual customers. More than a third of respondents indicated that obtaining customer loyalty card, shopper card, or mobile application data was legally authorized by law (statute or regulation). Of the approximately one third of jurisdictions that reported using debit and credit card data, obtaining customer consent either verbally or in writing was the most common way to gain access to the data. Data from meal delivery systems/applications and online shopping were—at least at the time of the assessment administration in 2019—not frequently used.

Barriers to using alternative data

Respondents were asked to indicate any barriers they had encountered while trying to access or use these alternative data sources by rating barriers as major, moderate, potential, neutral, or not a barrier. (See Tables 26–30 in Appendix.) The barriers identified were working with local establishments; working with corporate/headquarters offices; convincing individuals to release their data; convincing companies to release an individual's data even with individual's consent; confidentiality concerns regarding name, phone numbers, etc.; other (please specify); have not used or attempted to use the descriptive alternative/other data; and do not know.

- **Customer/loyalty/shopper cards and apps**

None of the listed barriers were classified as a major barrier by the highest percentage of responses for that barrier. For example, the “working with local establishments” barrier was seen foremost as a potential barrier by respondents (34%) and next as neutral (26%). All of the listed barriers were identified foremost as potential barriers for accessing customer shopping card and app data. Respondents next identified all of the barriers as moderate barriers (except for “working with local establishments,” which was neutral).

- **Debit and credit card data**

None of the listed barriers were classified as a major barrier by the highest percentage of responses for that barrier. One barrier—convincing individuals to release their data—was identified primarily as a moderate barrier by about a third (36%) of respondents. All of the remaining listed barriers were identified foremost as potential barriers for accessing credit card and debit card records.

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Using Alternative Data Sources *(cont)*

▪ *Meal delivery data and apps*

None of the listed barriers were classified as a major barrier by the highest percentage of responses for that barrier. All of the listed barriers were identified foremost as potential barriers for accessing meal delivery data and applications. Two barriers were tied as potential and moderate barriers: convincing companies to release an individual's data even with individual's consent and confidentiality concerns regarding name, phone numbers, etc. With the exception of the tie responses listed above, respondents next identified all of the barriers as moderate barriers.

▪ *Online shopping data*

None of the listed barriers were classified as a major barrier by the highest percentage of responses for that barrier. One barrier—convincing companies to release an individual's data even with individual's consent—was a tie as a moderate and neutral barrier. Another barrier—confidentiality concerns regarding name, phone numbers, etc.—was reported primarily as a neutral barrier. The remaining barriers were identified foremost as potential barriers for accessing online shopping data.

▪ *Using other alternative data*

Respondents identified only two barriers to working with other types of alternative data: potential barriers to working with local establishments and potential barrier to working with corporate/headquarters offices. Other respondents indicated that they have not used or attempted to use alternative/other data.

Databases used

Jurisdictions reported using multiple databases and systems to conduct routine surveillance and to manage outbreaks.

Use of electronic databases

Respondents were asked to describe their jurisdictions' use of electronic database(s) for cases and outbreaks of enteric diseases by choosing all applicable options (Figure 12). For case surveillance, 66% of respondents indicated that they use a module within a surveillance system (e.g., Maven, CDC-developed NEDSS Base System). The next most frequent response (34%) was use of a "homegrown" (i.e., custom) system to maintain records.

For outbreaks, two responses were tied for the greatest percentage of use: 50% of respondents reported using a module within a surveillance system and 50% reported using an "off-the-shelf" or customizable free license/nonprofit system (e.g., REDCap, Epi Info) to maintain records. The next most frequent response (41%) was use of a "homegrown" (i.e., custom) system to maintain records. (See Table 31 in the Appendix.)

Types of information recorded in databases

Respondents were asked to identify all the types of information their jurisdiction collects about reported enteric disease cases. (See Table 32 in the Appendix.) Between 90% and 100% of responding jurisdictions identified recording the following information in their databases:

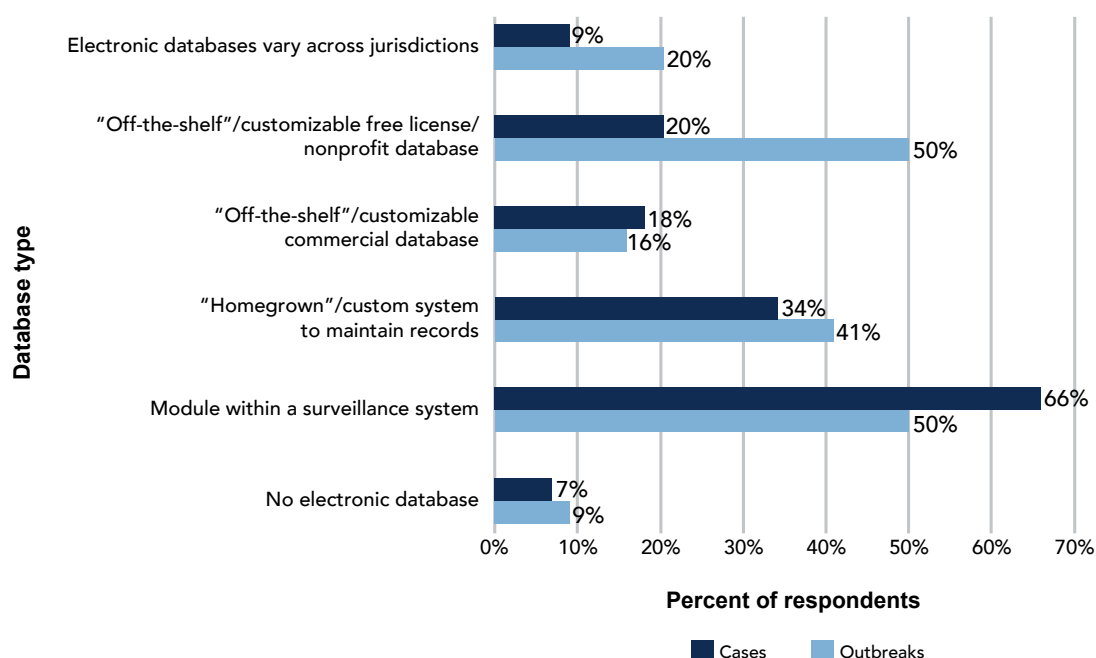
- Laboratory results
- Clinical signs and symptoms
- Animal contact
- History of contact with water
- Travel history
- Case addresses and other geographic data
- Water consumption description
- Day care attendance
- Other epidemiologic risk factors (e.g., prior illness, condition, hospitalization, medication)

Half (50%) or more also record the following information in addition to the types listed above:

- Places of work
- School attendance
- Food history (three- or five-day)
- Other environmental exposures (e.g., contaminated surfaces)

Figure 12 Use of electronic databases

% of respondents (Cases n=44; Outbreaks=44)



Data formats and data sharing for enteric disease outbreak investigations

Respondents were asked to identify all the formats used for keeping records of enteric disease outbreak investigations in their jurisdictions. The top three formats identified by respondents were National Outbreak Reporting System (NORS) (98%), electronic database at the state level (91%), and a non-database summary document(s) at the state level (e.g., spreadsheet, paper copy, etc.) (59%). (See Table 33 in the Appendix.)

Respondents were also asked if their jurisdictions' enteric disease case database shares data with its outbreak investigation database. Just over half (51%) of respondents responded yes; 49% responded no. (See Table 34 in the Appendix.) For those jurisdictions indicating "yes" to the above, respondents were asked if the jurisdiction uses the same system for both databases. Almost all (95%) jurisdictions use the same system for both databases. (See Table 35 in the Appendix.)

Jurisdictions were also asked to identify all the types of software with statistical components used in their enteric disease epidemiology program. The top three types of software with statistical

components identified were Excel (98%), SAS (80%), and Epi Info (64%). The next most frequently identified programs were ArcGIS (50%), REDCap (32%), SaTScan (18%), R/RStudio (16%), SPSS (11%), and Stata (2%). (See Table 36 in the Appendix.)

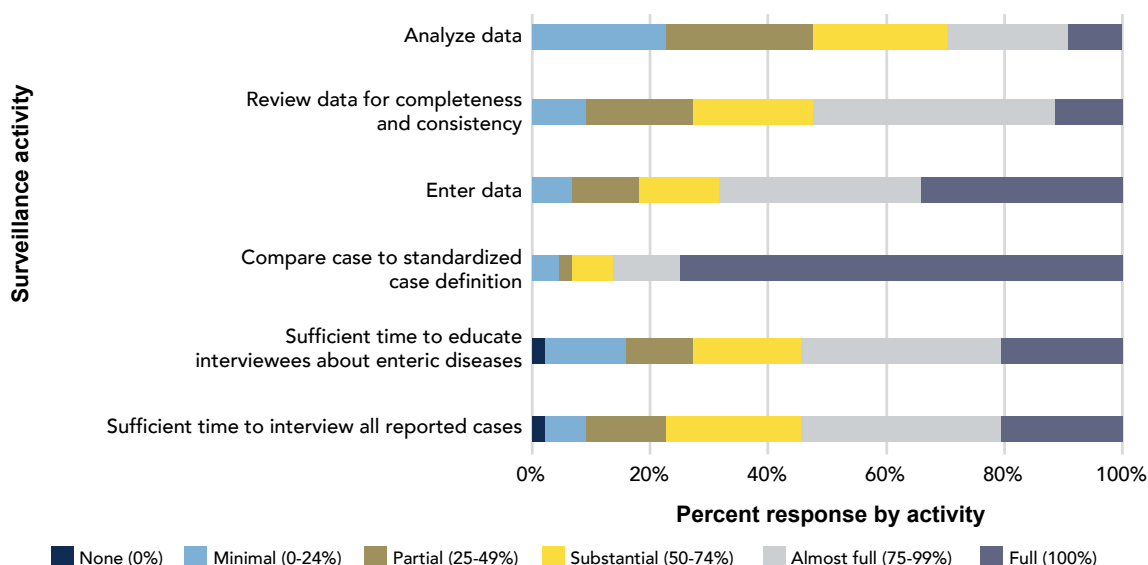
Capacity to undertake surveillance activities

Respondents were asked to describe their jurisdiction's capacity to undertake specified epidemiology activities for routine enteric disease surveillance (not during an outbreak) and during an outbreak. They were asked to characterize their capacity on the following scale: none (0%), minimal (0–24%), partial (25–49%), substantial (50–74%), almost full (75–99%), or full (100%). There was an error in the survey design with overlapping "none" and "minimal (0-24)" response options. It is assumed that jurisdictions with no capacity most likely selected the "none" option rather than the "minimal (0-24)" option.

For conducting routine surveillance (non-outbreak), the greatest capacity was reported for comparing a case to a standardized case definition, with 75%

Figure 13 Capacity for surveillance — routine/non-outbreak scenario

% response by activity (n=44 for each)

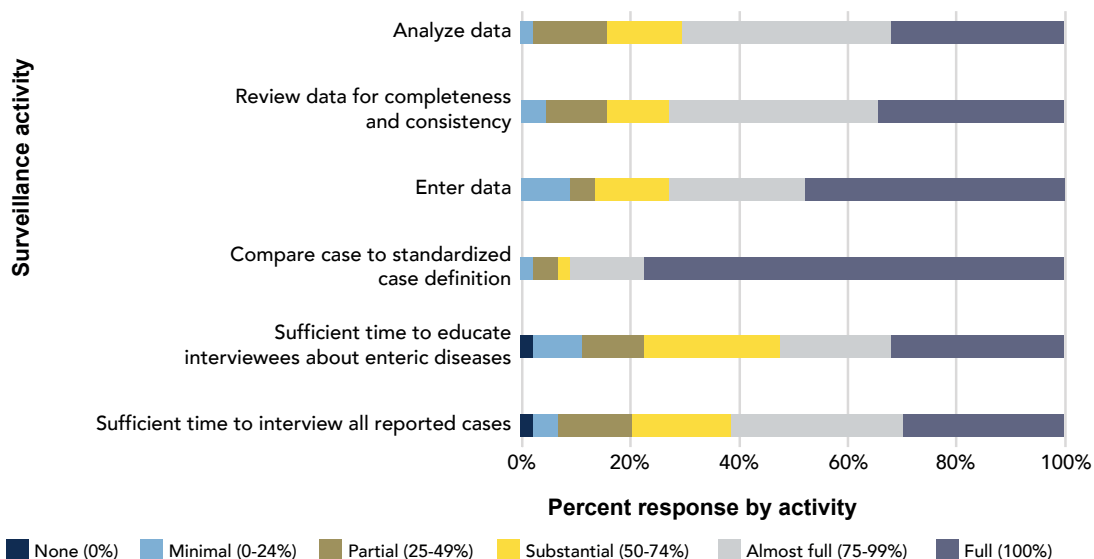


of responding jurisdictions reporting full capacity (Figure 13). Respondents primarily reported having substantial to full capacity for all other surveillance activities, except for analyzing data, which had the greatest variability in responses with similar numbers of jurisdictions reporting partial (25%), substantial (23%), minimal (23%), and almost full (20%) capacity. (See Table 37 in the Appendix.)

For activities during an outbreak or investigation, the greatest capacity was again reported for comparing a case to a standardized case definition, with 77% of responding jurisdictions reporting full capacity (Figure 14). Respondents primarily reported having substantial to full capacity for all other surveillance activities. (See Table 38 in the Appendix.)

Figure 14 Capacity for surveillance — during outbreak/investigation scenario

% response by activity (n=44 for each)



Surveillance for specified pathogens

Respondents were asked to identify whether their jurisdictions conduct routine surveillance (not during an outbreak) and/or surveillance during an outbreak for specific pathogens/illnesses (Figure 15).

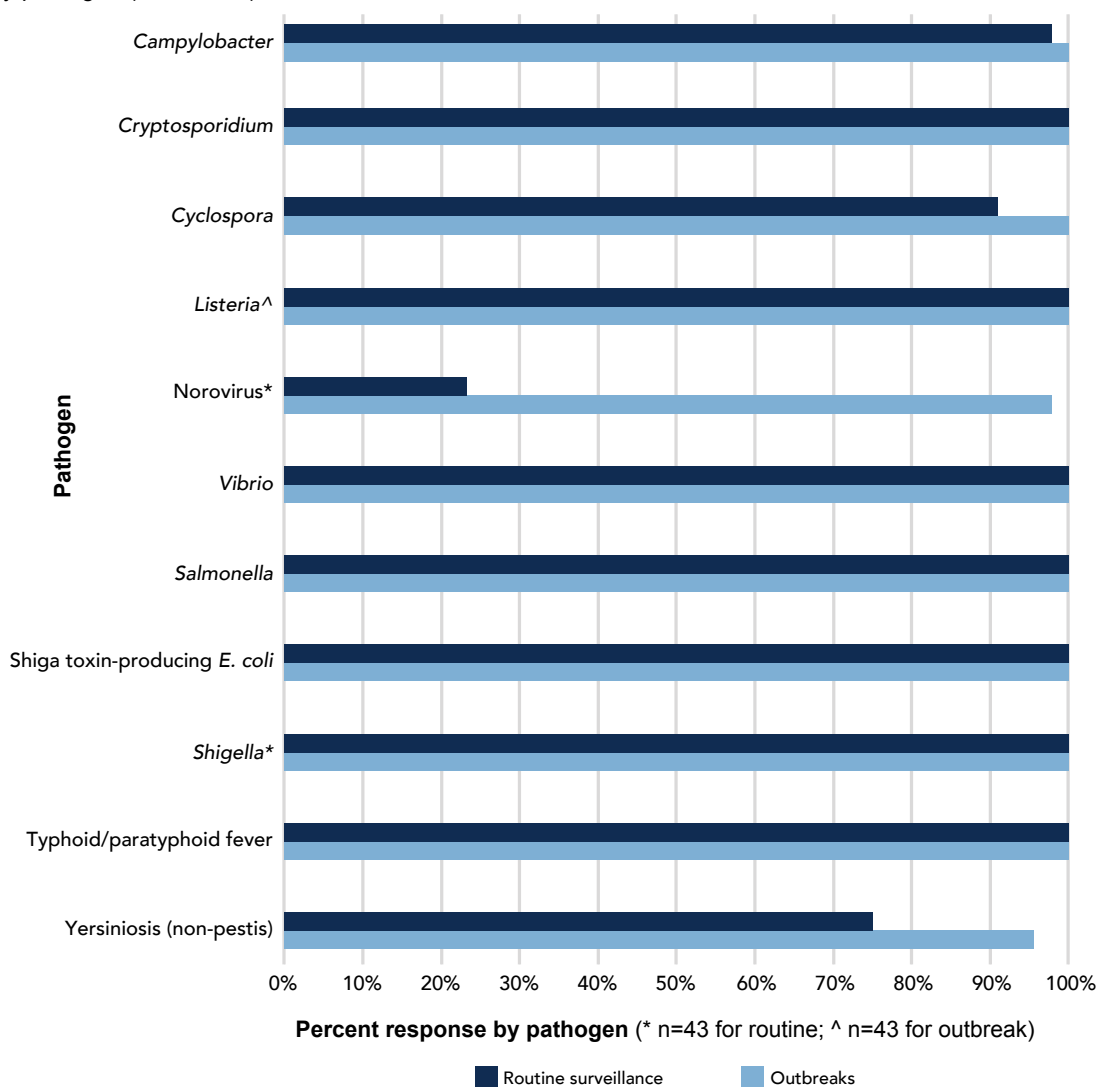
As a matter of routine surveillance (not during an outbreak), all jurisdictions responding to this question reported routine surveillance for *Cryptosporidium*, *Listeria*, *Salmonella*, Shiga toxin-producing *E. coli*, *Shigella*, typhoid/paratyphoid fever, and *Vibrio*. Nearly all responding jurisdictions (98%) routinely surveil for *Campylobacter*. Routine

surveillance for *Cyclospora* was reported by 91% of jurisdictions. Three quarters (75%) of responding jurisdictions routinely surveil for yersiniosis (non-pestis). Finally, only 23% of jurisdictions perform routine surveillance for norovirus. (See Table 39 in the Appendix.)

During an outbreak or investigation, all (100%) jurisdictions responding to this question reported conducting surveillance during an outbreak for all of the listed pathogens, *except* for norovirus (98%) and yersiniosis (non-pestis) (95%). (See Table 40 in the Appendix.)

Figure 15 Surveillance for specified pathogens

% by pathogen (n=44 each)



Barriers to surveillance

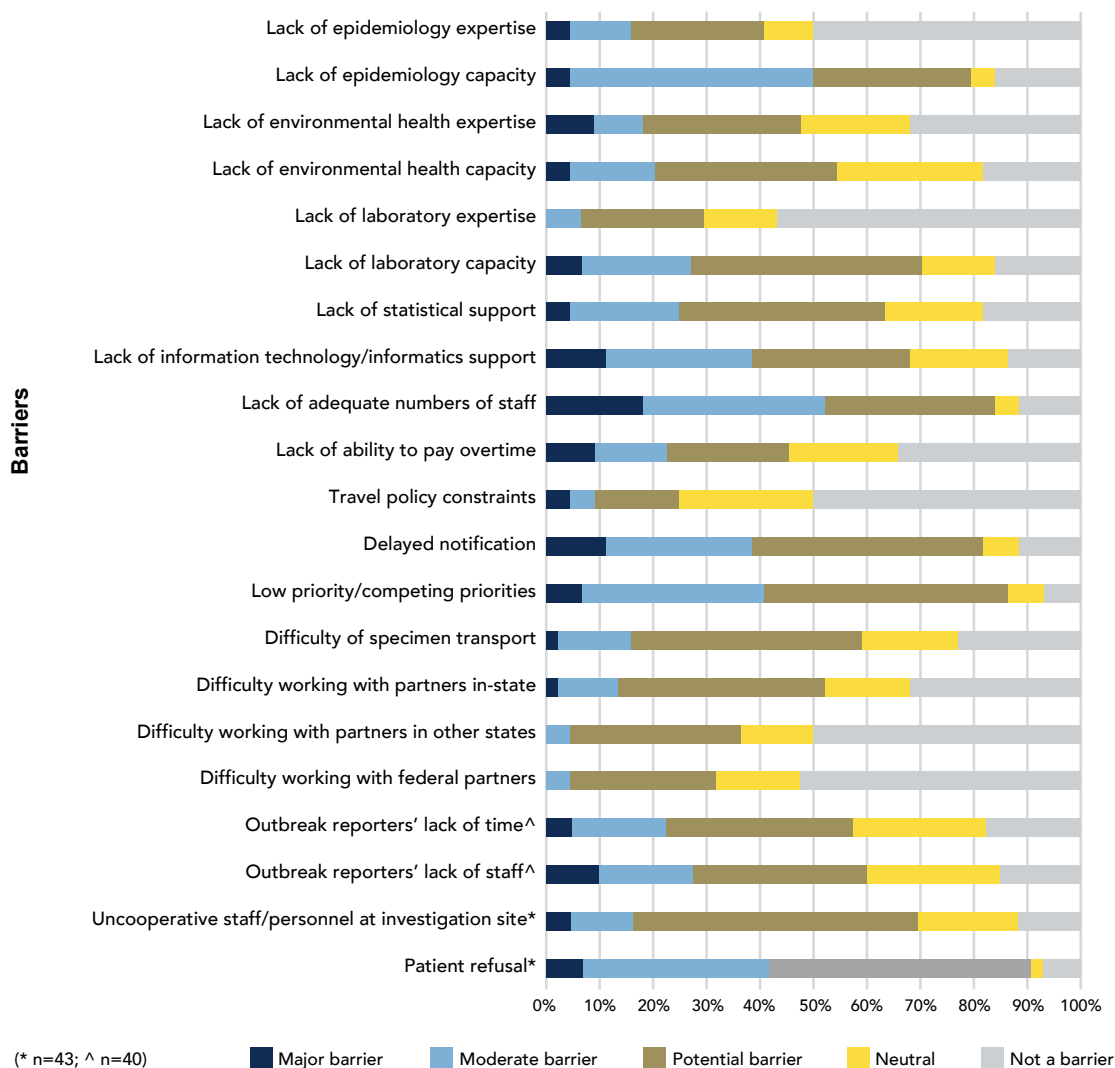
Respondents were asked to identify barriers to conducting routine enteric disease surveillance (not during an outbreak) and/or surveillance during an outbreak during the last three years (January 1, 2016–December 31, 2018). Participants used a scale of major barrier, moderate barrier, potential barrier, neutral, or not a barrier to characterize each factor assessed.

When conducting routine surveillance not involving an outbreak, two factors were reported as major or moderate barriers by more than half

of responding jurisdictions: lack of adequate numbers of staff (52%) and lack of epidemiology capacity (50%) (Figure 16). Additional factors identified as barriers when also considering potential to be a barrier included outbreak reporters' lack of time, outbreak reporters' lack of staff, uncooperative staff/personnel at investigation site, patient refusal, delayed notification, low priority/competing priorities, and lack of laboratory capacity. The factors reported least as barriers were epidemiology and laboratory expertise, travel policy constraints, and difficulty working with federal partners and those in other states. (See Table 41 in the Appendix.)

Figure 16 Barriers to surveillance — routine/non-outbreak scenario

% by barrier (n=44 each)

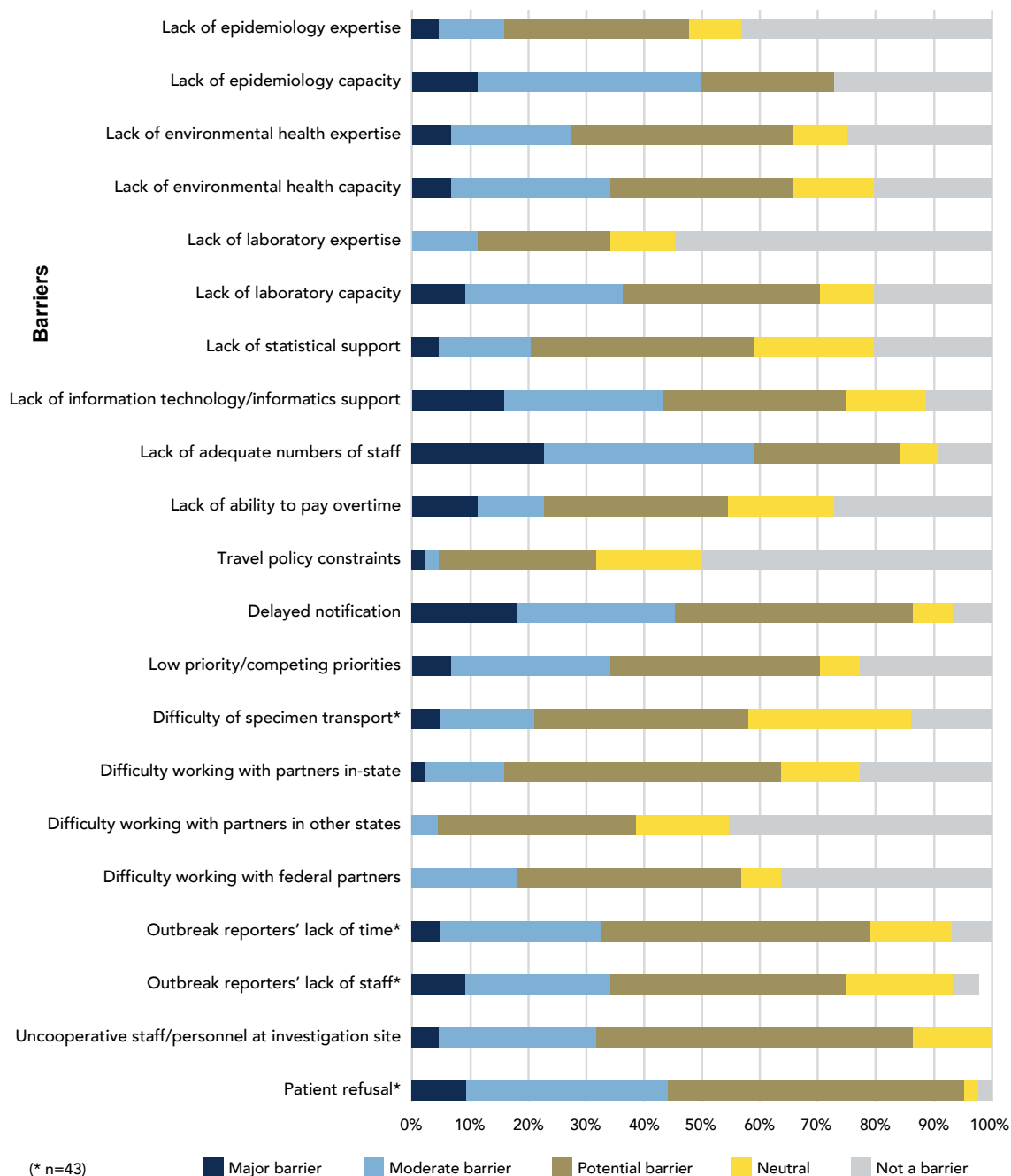


During an outbreak, the same two factors were reported as major or moderate barriers by more than half of responding jurisdictions: lack of epidemiology capacity (59%) and lack of adequate numbers of staff (50%) (Figure 17). When also considering potential, nearly all of the factors assessed were identified as barriers, with the

exception of three factors that more than half of responding jurisdictions reported as neutral or not a barrier: lack of epidemiology expertise, lack of laboratory expertise, and difficulty working with partners in other states. (See Table 42 in the Appendix.)

Figure 17 Barriers to surveillance — outbreak/investigation scenario

% by barrier (n=44 each)



Legal Requirements for Sharing Data

Respondents were asked about their jurisdictions' legal requirements for sharing data about individuals and businesses.

Identifying sources of authority

- **Sharing individual data**

Overall, the most frequently identified source of legal authority to share individual data was statutory (39%), followed by policy (19%) and regulation (14%). Memoranda of understanding/agreements were identified by 3% of respondents, with other sources of authority identified by 6%. Notably, 18% of respondents reported not knowing the sources of legal authority related to sharing individual data. (See Table 43 in the Appendix.)

- **Sharing business data**

Overall, the most frequently identified source of legal authority to share business data was statutory (37%), followed by policy (20%) and regulation (12%). Memoranda of understanding/agreements were identified by 2% of respondents, with other sources of authority identified by 8%. Significantly, 22% of respondents reported not knowing the sources of legal authority related to sharing business data. (See Table 44 in the Appendix.)

- **Legal foundation**

Statutes provide the legal foundation that authorizes executive branch agencies to act and generally adopt regulations, policies, and other agreements. It follows that respondents would identify statutes as the primary source of their authorization for enteric disease surveillance and investigations.

- **Agencies able to share data**

The EDCA tool identified the following agencies as those potentially eligible to receive non-identifying and identifying information, depending on a jurisdiction's laws: state, local, and regional/district health departments; other state agencies in the same jurisdiction; specific federal agencies involved in food safety; other federal agencies; health agencies in other states; and other agencies in other states. The sections below summarize EDCA responses about sharing information with other agencies and jurisdictions.

Sharing non-identifying information

- **About an individual**

Respondents were asked if their jurisdictions authorized the sharing of non-identifying information about an individual in the course of an enteric disease investigation with the agencies specified above. All (100%) or nearly all (99% to 87%) responding jurisdictions indicated authorization to share non-identifying information about an individual with state, regional, and local health departments and other agencies in the jurisdiction; federal agencies; and health and other agencies in other states. (See Table 45 in the Appendix.)

- **About a business**

Respondents were asked if their jurisdictions authorized the sharing of non-identifying information about a business in the course of an enteric disease investigation with the specified agencies. All (100%) or nearly all (97% to 88%) jurisdictions responding to the question indicated authorization to share the specified data with the same agencies. (See Table 46 in the Appendix.)

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Legal Requirements for Sharing Data *(cont)*

Sharing identifiable information

▪ *About an individual*

Respondents were asked to identify the one statement that best described how their laws, regulations, and/or policies restrict the sharing or release of identifying information about individuals associated with cases and outbreaks of enteric disease. More than half of respondents (58%) reported that their jurisdictions allow identifiers to be shared with other agencies if there is a legitimate purpose. Nineteen percent (19%) of respondents indicated that identifying information is not shared with other agencies. Seven percent (7%) allow identifying data to be shared but only after administrative approvals. (See Table 47 in the Appendix.)

▪ *About a business*

Respondents were asked to identify the one statement that best described how their laws, regulations, and/or policies restrict the sharing or release of identifying information about businesses associated with cases and outbreaks of enteric disease. As with individual data, more than half of respondents (58%) reported that their jurisdictions allow identifiers to be shared with other agencies if there is a legitimate purpose. Other respondents reported that identifying information can be shared but only after administrative approvals (12%). Identifying information about a business may be subject to freedom of information (FOI) requests: 12% indicated that identifying information may be released or made publicly available without a request, while 4% reported that information can be released by request. None of the respondents reported that they are not permitted to share identifying information about a business with other agencies. (See Table 48 in the Appendix.)

Communication and coordination on enteric diseases

Interacting with other agencies

Respondents were asked to characterize the extent of interactions between epidemiology personnel and each of the listed disciplines/agencies in two scenarios: under routine surveillance/non-outbreak conditions and during outbreaks/investigations. The range of responses available were: constant (every two weeks or less); frequent (monthly or less); sporadic (quarterly or less); as needed during outbreaks; none; and do not know.

During routine surveillance (non-outbreak)

Respondents reported constant contact most frequently with the public health laboratory (91%), local/regional health departments (76%), and environmental health (44%). Respondents reported primarily sporadic contact with state departments of agriculture (53%), clinical laboratories (39%), and

information technology/informatics (34%). For CDC, respondents reported primarily constant contact (36%), followed by sporadic (32%) and frequent (30%) contact. Respondents noted primarily sporadic contact with the United States Department of Agriculture-Food Safety and Inspection Service (USDA-FSIS) (66%) and the Food and Drug Administration (FDA) (57%). (See Table 49 in the Appendix.)

During an outbreak or investigation

Reported frequency of contact changes during an outbreak or investigation, although the agencies/organizations with which jurisdictions are in most frequent contact is not significantly different. Respondents reported constant contact most frequently with the public health laboratory (84%), local/regional health departments (76%), and environmental health (67%). Respondents reported contact primarily as needed during outbreaks with clinical laboratories (48%) and state departments of agriculture (42%). For information technology / informatics, contact was also primarily as needed during outbreaks (23%) but was closely followed

by constant contact (20%). For CDC, respondents reported primarily constant contact (50%) and as needed during outbreaks (43%) next most frequently. Respondents reported primarily as needed during outbreaks contact with USDA-FSIS (59%) and FDA (55%). (See Table 50 in the Appendix.)

Barriers to interacting with other agencies

Respondents were asked to classify barriers to quickly communicating with other agencies and/or partners when conducting enteric disease surveillance and response activities. Six types of agencies/partners were assessed in this question: state agencies, local/regional agencies, federal agencies, clinicians/clinical facilities, public health laboratories, and others. Respondents were asked to classify barriers for each type of agency/partner as a major, moderate, or potential barrier, neutral, or not a barrier.

Overall, responding jurisdictions did not identify significant existing barriers to communicating with the identified agencies and partners. Most found that the factors assessed (listed in the adjacent text box) were either potential or not barriers. (See Tables 51–56 in the Appendix.) While significant barriers were not identified, the most notable potential barriers identified are described here.

Public health laboratories—Two technology-related barriers received a moderate designation by nearly a quarter of respondents: systems cannot communicate at all (23%), and systems do not communicate consistently (23%). (See Table 53 in the Appendix.)

Federal agencies—Three barriers were foremost reported as a potential barrier: technology issues in which systems cannot communicate at all (40%); systems do not communicate consistently (40%); and uncertainty regarding the types and amounts of information to share and with whom (47%). (See Table 54 in the Appendix.)

Clinicians/clinical facilities—Five barriers were foremost reported as a potential barrier: do not know person or office to contact after hours (50%); do not know person or office to contact at all (44%); do not have current/correct contact information (43%); uncertainty regarding the types and amounts of information to share and with whom (43%); and technology issues—systems do not communicate consistently (33%). (See Table 55 in the Appendix.)

Barriers to Interacting with Other Agencies—List of Options

- Do not know person or office to contact at all
- Do not know person or office to contact after hours
- Do not have current/correct contact information
- Do not have dedicated staff responsible for keeping contact information current
- Technology issues—systems cannot communicate at all
- Technology issues—systems do not communicate consistently
- Funding limitations to sending alerts
- Uncertainty regarding the types and amounts of information to share and with whom
- Other barriers (specify)

Others (restaurants, etc.)—Four barriers were foremost reported as a potential barrier: do not know person or office to contact after hours (49%); do not have current/correct contact information (47%); do not know person or office to contact at all (43%); and do not have dedicated staff responsible for keeping contact information current (30%). (See Table 56 in the Appendix.)

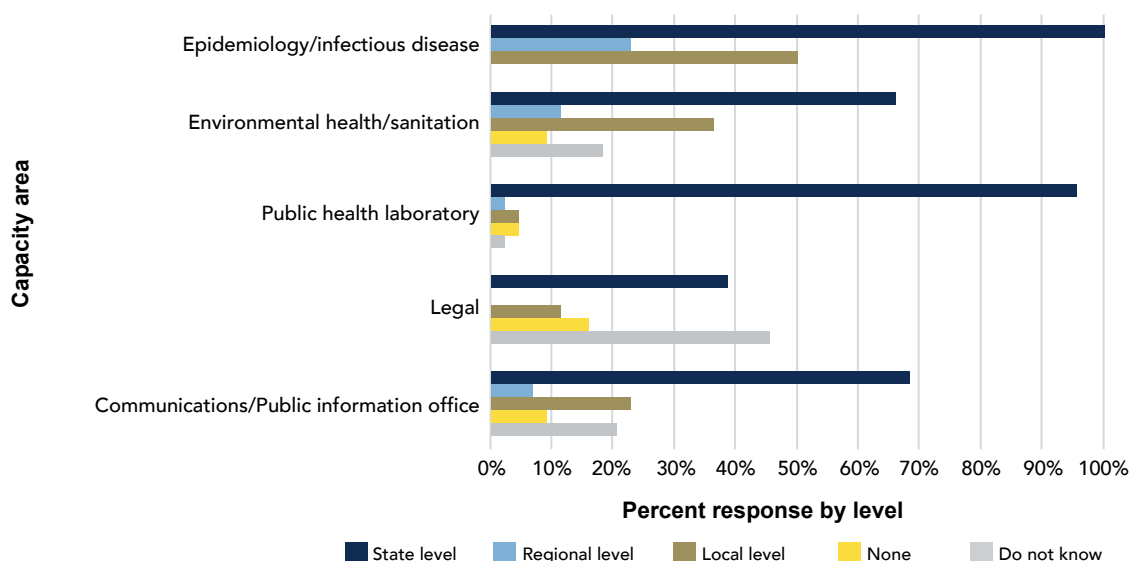
Enteric disease investigation and response capacity

After-hours communication capacity

Respondents were asked to identify all the applicable program areas that have after-hours response capability to assist in investigating enteric disease outbreak reports (Figure 18). For nearly all program areas identified, the state level was identified as having the most after-hours communications capacity. The local level generally had the next highest level of capacity. Epidemiology/infectious disease after-hours capacity was 100% for all states responding to the question, with the local level at 50%, and regional level at 23%. Public health laboratory after-hours capacity was primarily at the state level with 95% reporting capacity and just 5% and 2% reporting capacity at the local and regional level, respectively. Communications/public information capacity was 68% at the state

Figure 18 After-hours communication capacity

% all states (n=44 for each level)



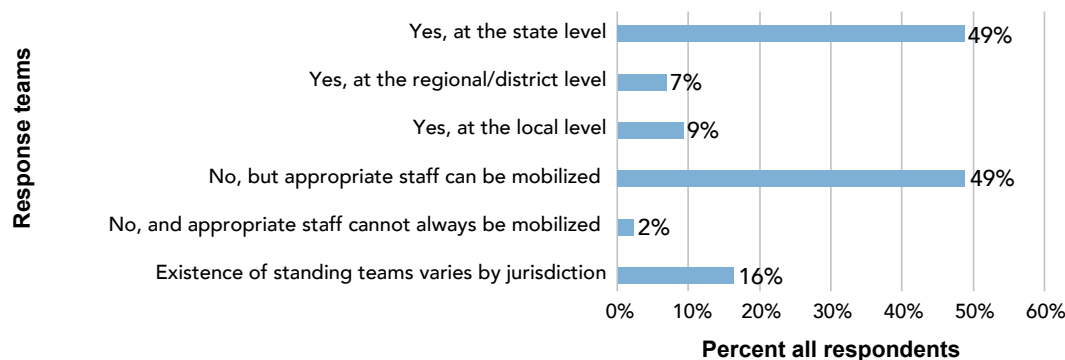
level, 23% at the local level, and 7% at the regional level. However, 20% of respondents indicated they did not know, or their jurisdiction had none (9%). Environmental health/sanitation after-hours capacity was reported as 66% at the state level, 36% at the local level, and 11% at the regional level. Another 18% of respondents indicated they did not know, and 9% indicated none. For legal after-hours support, 39% of respondents indicated capacity at the state level, 11% at the local level, and none (0%) at the regional level. The highest percentage of respondents (45%) indicated they did not know, and 16% indicated none. (See Table 57 in the Appendix.)

Enteric disease outbreak response teams

Respondents were asked to identify all of the levels in their jurisdiction that had a standing enteric disease outbreak response team with multiple responses permitted per jurisdiction. (Figure 19). The same percentage of respondents indicated that an enteric disease outbreak response team existed at the state level (49%) as those who specified that no standing response team existed but that appropriate staff can mobilize for enteric disease outbreak responses (49%). A small number of respondents noted that standing enteric disease

Figure 19 Standing enteric disease outbreak response teams

% all respondents (n=43)



outbreak response teams existed at the local (9%) and regional/district (7%) levels. Sixteen percent (16%) indicated that the existence of response teams varied by jurisdiction. Only one respondent noted that standing enteric disease outbreak response teams did not exist in their jurisdiction and that appropriate staff could not always be mobilized for a response. Respondents also noted in comments that the existence of rapid response teams was not necessarily limited to enteric disease outbreaks. (See Table 58 in the Appendix.)

Profession types on enteric disease outbreak response teams

Respondents were asked to identify all of the applicable profession types that typically comprise an enteric disease outbreak response team at the state, regional/district, and local levels (Table 2). Across all levels of government, nearly half (49%) of outbreak response team members identified worked at the state level, 25% worked at the local level, and 10% at the regional level. Twelve percent (12%) of respondents indicated there was no standing enteric disease outbreak response team.

- At the state level, the professions most represented on enteric disease outbreak response teams were epidemiologists (24%), public health laboratorians (23%), environmental health specialists (21%), and public information officers (18%).
- At the regional level, the most represented professions were epidemiologists and environmental health specialists (tied at 31%), public health nurses (17%), and public information officers (14%).
- At the local level, the most represented professions were public health nurses (28%), environmental health specialists (26%), public information officers (20%), and epidemiologists (19%).

The professions most represented across all levels of government were epidemiologists and environmental health specialists (tied at 20%), public information officers (17%), and public health nurses and public health laboratorians (tied at 12%). (See also Table 59 in the Appendix.)

Table 2 Profession types on enteric disease outbreak response teams

	Profession Type	State Level n=180 (% state)	Regional Level n=36 (% regional)	Local Level n=94 (% local)	None n=44 (% none)	Unknown n=15 (% unknown)	Prof Type Totals (n=369)
n=72	Epidemiologist	43 24%	11 31%	18 19%	0 0%	0 0%	72 20%
n=46	Public health laboratorian	41 23%	1 3%	2 2%	1 2%	1 7%	46 12%
n=74	Environmental health specialist (in health department and/or other agencies)	38 21%	11 31%	24 26%	0 0%	1 7%	74 20%
n=46	Public health nurse	7 4%	6 17%	26 28%	5 11%	2 13%	46 12%
n=35	Health educator	5 3%	2 6%	4 4%	19 43%	5 33%	35 9%
n=33	Health informatics specialist	12 7%	0 0%	1 1%	16 36%	4 27%	33 9%
n=62	Public information officer/ communications	33 18%	5 14%	19 20%	3 7%	2 13	62 17%
n=1	Other (please specify)*	1 <1%	0 0%	0 0%	0 0%	0 0%	1 <1%
	Level of government totals: n=369 (% responses by level)	180 49%	36 10%	94 25%	44 12%	15 4%	369 100%

*Other response provided was inclusion of a public health veterinarian on a state level team.

Past enteric disease outbreaks

Respondents were asked to indicate the number of enteric disease outbreak investigations that could be attributed to the specified pathogens for the year 2018 (Figure 20). There was an error in the survey design with overlapping “none” and “0–24” response options. It is assumed that jurisdictions with zero outbreaks most likely selected the “none” option rather than the “0–24” option. (See Table 60 in the Appendix.)

Norovirus was the only pathogen for which respondents reported 100 or more associated investigations (15% of all jurisdictions reporting norovirus investigations). *Salmonella* was the next most frequently reported pathogen, with 5% of jurisdictions reporting 50–74 investigations and another 5% reporting 25–49 investigations. The most frequently reported number of identified outbreaks by pathogen reported by jurisdictions

was 0–24 investigations (Figure 25). The pathogens with the highest attributed numbers in the 0–24 range were:

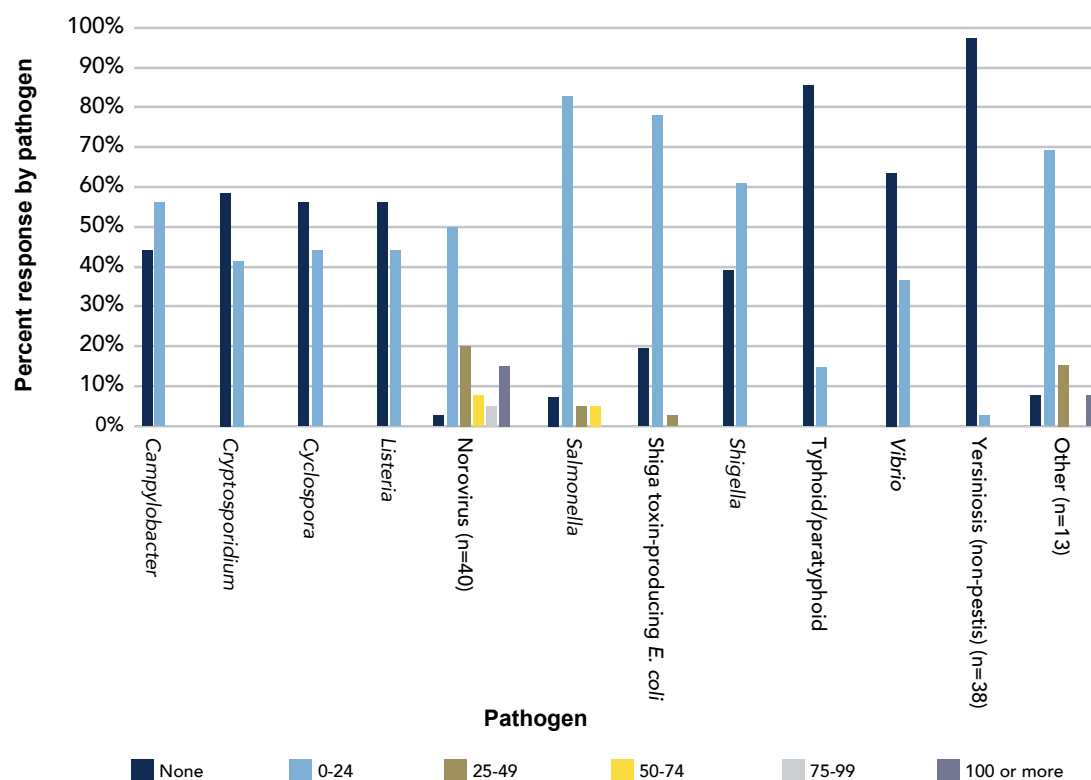
- *Salmonella* (83% of respondents)
- Shiga toxin-producing *E. coli* (78% of respondents)
- *Shigella* (61% of respondents)
- *Campylobacter* (56% of respondents)
- Norovirus (50% of respondents)

Also notable in the 0–24 range were *Cyclospora* and *Listeria* (tied at 44%) and *Cryptosporidium* at 41% of responding jurisdictions.

Responding jurisdictions most frequently reported that no outbreaks were identified for the following pathogens: yersiniosis (non-pestis) (97%); typhoid/paratyphoid fever (85%); *Vibrio* (63%); *Cryptosporidium* (59%); *Cyclospora* (56%); and *Listeria* (56%).

Figure 20 Enteric disease outbreaks by pathogen (2018)

% by pathogen (n=41)



Sample collection

Stool sample collection

Respondents were asked to indicate if their jurisdictions collect stool samples from specified persons and settings: exposed persons and persons who do not handle food, and employees and persons who handle food. (See Table 61 in the Appendix.) Respondents reported similar information for the two groups of people (exposed/non-food handlers and employees/food handlers) under the same circumstances:

- Stool samples are most frequently collected from both groups during outbreak investigations (exposed persons, 81%; employees, 83%).
- More than half of respondents reported that stool samples are taken in cluster investigations (exposed, 60%; employees, 55%).

- For single cases of public health importance, more than half reported that samples are collected from exposed persons (57%), and fewer than half reported collecting samples from employees (45%).

Food sample collection

Respondents were asked if their jurisdictions collect food samples in the specified situations. Nearly all jurisdictions reported collecting food samples during outbreaks (93%). Most (62%) reported collecting them for cluster investigations. Just over half (52%) reported collecting food samples for single cases of public health importance. (See Table 62 in the Appendix.)

Commercial Product Tracing Activities

During enteric disease outbreaks, health departments may trace commercially distributed foods from the point of sale to help evaluate whether that food is the source of the outbreak (i.e., informational product tracing). Respondents were asked to indicate which of the listed activities their health departments perform for informational product tracing. (See Table 63 in the Appendix.)

- Nearly all jurisdictions (93%) provide traceback information to federal agencies (CDC, FDA, or USDA).
- High percentages of jurisdictions also:
 - Select/prioritize case exposures for traceback (88%)
 - Work with regulatory agencies to collect invoices (86%)
 - Visit a local food service establishment to collect invoices (77%)
- About half of jurisdictions help federal agencies interpret product tracing results (49%).

Respondents reported that, during the three-year period from January 1, 2016, through December 31, 2018, their agencies conducted product tracing activities as part of an enteric disease outbreak investigation. (See Table 64 in the Appendix.)

- Just over half of the jurisdictions conducted a combined 10 or fewer product traces: 1 to 5 (30%) and 6 to 10 (26%).
- Four jurisdictions (9%) conducted 11 to 15 traces, and 8 (19%) conducted more than 15.
- One jurisdiction (2%) did not conduct any tracing activities. Five respondents (12%) indicated they did not know.

Enteric disease exclusion policies

Respondents were asked about their jurisdictions' policies regarding the exclusion of persons with enteric diseases for specific pathogens from sensitive settings (health care, food service, and day care). Figure 21 summarizes the percentages of jurisdictions with exclusion policies by pathogen and setting.

Table 3 summarizes additional information on the percentages of jurisdictions with an exclusion policy for a specific pathogen in one of the three settings. (See also Table 65 in the Appendix.) At least some of the jurisdictions reported having exclusion policies for all settings for all specified pathogens. The

pathogens for which 90% or more of the jurisdictions reported exclusion policies in all three settings are typhoid/paratyphoid fever, Shiga toxin-producing *E. coli*, and *Shigella*. For food service settings, 93% of jurisdictions also reported having exclusion policies for *Salmonella*. Exclusion policies for the other pathogens assessed were also common in all three settings (Table 3). Most jurisdictions did not have health care, food service, or day care exclusion policies for yersiniosis (non-pestis) and *Listeria*. Some jurisdictions reported having exclusion policies for all three settings for additional pathogens and conditions including hepatitis A, *Giardia*, and diarrhea. (See Tables 66-68 in the Appendix.)

Figure 21 Summary of exclusion policies by pathogen and setting

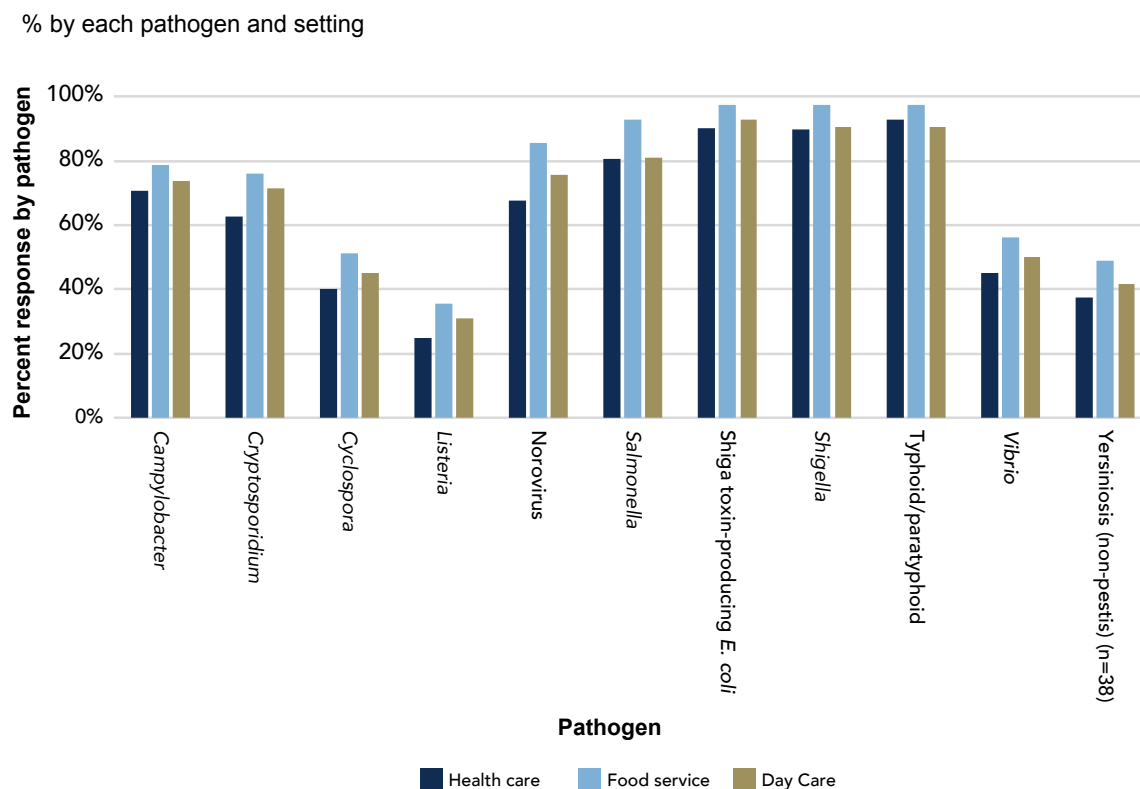


Table 3 Summary of jurisdictions with exclusion policies by pathogen and setting
(Pathogens are listed alphabetically; percentages of jurisdictions with policies in parentheses)

Jurisdictions with Exclusion Policies	Health Care	Food Service	Day Care
90% or more	- Shiga toxin-producing <i>E. coli</i> (90%) <i>Shigella</i> (90%) - Typhoid/paratyphoid fever (93%)	<i>Salmonella</i> (93%) - Shiga toxin-producing <i>E. coli</i> (98%) <i>Shigella</i> (98%) - Typhoid/paratyphoid fever (98%)	- Shiga toxin-producing <i>E. coli</i> (93%) <i>Shigella</i> (90%) - Typhoid/paratyphoid fever (90%)
50% to 89%	<i>Campylobacter</i> (71%) <i>Cryptosporidium</i> (63%) - Norovirus (68%) <i>Salmonella</i> (80%)	<i>Campylobacter</i> (79%) <i>Cryptosporidium</i> (76%) <i>Cyclospora</i> (51%) - Norovirus (86%) <i>Vibrio</i> (56%)	<i>Campylobacter</i> (74%) <i>Cryptosporidium</i> (71%) - Norovirus (76%) <i>Salmonella</i> (81%) <i>Vibrio</i> (50%)
49% or less	<i>Cyclospora</i> (40%) <i>Listeria</i> (25%) <i>Vibrio</i> (45%) - Yersiniosis (non-pestis) (38%)	<i>Listeria</i> (36%) - Yersiniosis (non-pestis) (49%)	<i>Cyclospora</i> (45%) <i>Listeria</i> (31%) - Yersiniosis (non-pestis) (41%)

Return criteria

Respondents were asked to identify the return criteria for persons excluded from each of the specified settings: health care, food service, and day care. Respondents chose from the following options to identify the return criteria for each of the specified pathogens:

- As soon as the diarrheal illness has resolved
- 24 hours after any diarrheal illness has resolved
- 48 hours after any diarrheal illness has resolved
- 72 hours after any diarrheal illness has resolved
- Single negative test
- Two or more negative tests
- After treatment with antibiotics
- Other

Table 4 summarizes the most frequently identified return criteria by pathogen and setting. (See also Table 69 in the Appendix.) Reported return

criteria by jurisdiction, setting, and pathogen were variable. No jurisdictions reported using criteria that relied upon a single negative test. If negative testing was required for return to the setting, at least two tests were required. The pathogens most frequently reported to require two or more negative tests in all three settings were typhoid/paratyphoid fever, Shiga toxin-producing *E. coli*, and *Shigella*. For food service settings, 53% of jurisdictions also reported requiring two negative tests for *Salmonella*. When negative tests were not required, return criteria were based on resolution of diarrhea, which may also require a certain amount of time to pass after symptom resolution (Table 4). About half of jurisdictions primarily required that persons with norovirus wait 48 hours after resolution of diarrhea before returning to health care, food service, or day care settings. (See Tables 70-72 in the Appendix.)

Table 4 Summary of most frequent return criteria by setting and pathogen
Categorized by criteria with highest percentage of response for each setting and pathogen

Criteria	Health Care	Food Service	Day Care
As soon as the diarrheal illness is resolved	▪ <i>Cryptosporidium</i> (45%) ▪ <i>Cyclospora</i> (52%) ▪ <i>Listeria</i> (48%) ▪ <i>Vibrio</i> (57%) ▪ Yersiniosis (non-pestis) (50%)	▪ <i>Cyclospora</i> (44%) ▪ <i>Vibrio</i> (47%) ▪ Yersiniosis (non-pestis) (38%) (tie with 24 hours after resolved)	▪ <i>Cryptosporidium</i> (43%) (tie with 24 hours after resolved) ▪ <i>Cyclospora</i> (52%) ▪ <i>Listeria</i> (40%) (tie with 24 hours after resolved) ▪ <i>Vibrio</i> (48%) ▪ Yersiniosis (non-pestis) (46%)
24 hours after any diarrheal illness has resolved	▪ <i>Campylobacter</i> (43%)	▪ <i>Campylobacter</i> (51%) ▪ <i>Cryptosporidium</i> (45%) ▪ <i>Listeria</i> (48%) ▪ Yersiniosis (non-pestis) (38%) (tie with as soon as resolved)	▪ <i>Campylobacter</i> (46%) ▪ <i>Cryptosporidium</i> (43%) (tie with as soon as resolved) ▪ <i>Listeria</i> (40%) (tie with as soon as resolved)
48 hours after any diarrheal illness has resolved	▪ Norovirus (52%)	▪ Norovirus (54%)	▪ Norovirus (53%)
72 hours after any diarrheal illness has resolved			
Single negative test			
Two or more negative tests	▪ <i>Salmonella</i> (43%) ▪ Shiga toxin-producing <i>E. coli</i> (87%) ▪ <i>Shigella</i> (68%) ▪ Typhoid/paratyphoid fever (79%)	▪ <i>Salmonella</i> (53%) ▪ Shiga toxin-producing <i>E. coli</i> (90%) ▪ <i>Shigella</i> (79%) ▪ Typhoid/paratyphoid fever (71%)	▪ <i>Salmonella</i> (34%) ▪ Shiga toxin-producing <i>E. coli</i> (87%) ▪ <i>Shigella</i> (67%) ▪ Typhoid/paratyphoid fever (77%)
After treatment with antibiotics			

Waterborne enteric diseases

Consistent with the goal of considering enteric diseases more broadly, the EDCA included specific questions about waterborne enteric diseases.

Agencies responsible for waterborne diseases

Jurisdictions were asked to identify the agencies responsible for addressing waterborne enteric and non-enteric diseases.

Waterborne enteric diseases

Respondents were asked to indicate the agency primarily responsible for detecting and responding to waterborne enteric disease cases and outbreaks in the specified water sources. The health department was identified as the agency with

primary responsibility for detecting and responding to waterborne enteric diseases in drinking/tap water (81%), bottled water (86%), treated recreational water (84%), and untreated recreational water (79%). Environment agencies were the next most frequently cited agency type with responsibility but only by 14% of respondents or fewer for each water type. (See Table 73 in the Appendix.)

Waterborne non-enteric diseases

Respondents were asked to indicate the agency primarily responsible for detecting and responding to waterborne non-enteric disease cases and outbreaks in the specified water sources. The health department was identified by the responding jurisdictions as the agency principally responsible for detecting and responding to waterborne non-enteric diseases in drinking/tap water (72%), bottled water (71%), treated recreational water (74%), and untreated recreational water (67%). Environment

agencies were the next most frequently cited agency type. Where the case/outbreak involved untreated recreational water, two respondents noted that the natural resources department has the lead; however, for most others it was primarily the health or environment departments. (See Table 74 in the Appendix.)

Differences in waterborne enteric versus non-enteric disease activities

Respondents were asked to describe any differences between detecting and responding to waterborne enteric versus non-enteric diseases in their jurisdictions. Comments were analyzed and categorized according to common themes. Some respondents indicated that epidemiologic activities were the same for enteric and non-enteric waterborne diseases and were the responsibility of the health agency. However, multiple respondents noted that different divisions within the health department can be activated (e.g., epidemiology, environmental health). Respondents also noted that the department of health may have jurisdiction over detecting a waterborne disease case/outbreak, but another agency (e.g., environment, natural resources, agriculture) may have the mandate/authority to direct the response. Additionally, the nature of the pathogen involved can dictate the divisions and/or agencies responsible. The deciding factor can be whether the pathogen is harmful to human health or not (health department versus environment department). Whether or not the pathogen is infectious can also determine the

lead agency. A jurisdiction's response may also be dictated by its capacity.

Sources of authority for waterborne enteric disease epidemiology activities

Respondents were asked to identify the sources of legal authority in their jurisdictions to conduct waterborne enteric disease surveillance and response activities (Figure 22). The highest percentage of responses (41%) identified state statutes that grant general authority for public health activities as the source of authority for waterborne enteric disease activities. State agency regulations that grant general authority for public health activities was the next most frequently cited source of authority (24%). About 8% identified state statutes that expressly authorize waterborne enteric disease investigations; 14% indicated state agency regulations that expressly authorize waterborne enteric disease investigations. (See Table 75 in the Appendix.)

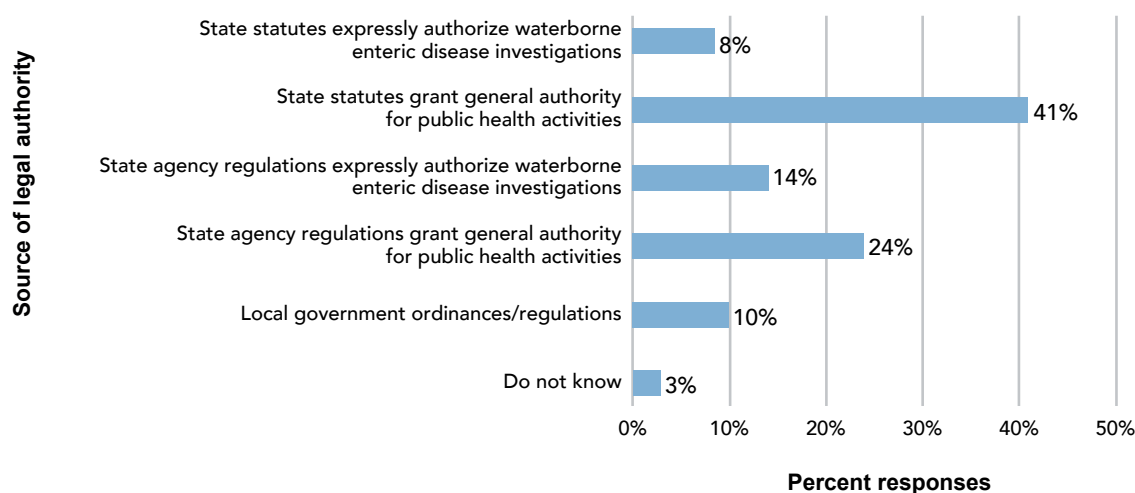
Waterborne enteric disease epidemiology capacity

Positions involved in waterborne enteric disease epidemiology

Respondents were asked to identify which health department position types were involved in waterborne enteric disease surveillance and response. Across health department positions at all

Figure 22 Waterborne enteric disease investigation source of legal authority

% responses (n=71)



levels, state health departments were reported to have the largest number of position types involved in waterborne enteric disease activities (55%), followed by local health departments (31%), and then regional/district health departments (14%). Environmental health/sanitarians (24%) and epidemiologists (24%) were the two most frequently reported position types (Figure 23). The next most frequently identified positions were public information officers/communications (19%), public health nurses (16%), and public health laboratorians (14%). (See Table 76 in the Appendix.)

Total composite FTEs working on waterborne enteric diseases

Respondents were asked to provide the total composite number of staff (expressed as FTEs) working in waterborne enteric disease programs by highest epidemiology education or training levels for the following: doctorate, professional, master's, bachelor's, nursing, and other types of education/training. Respondents reported a total of 210 FTEs currently working on waterborne enteric disease issues (Table 5). (See also Table 77 in the Appendix.)

The reported number of FTEs was greater at the local health department level (n=105, 50%) than at other levels. Persons working in waterborne enteric disease epidemiology were most likely to be an RN or hold another type of nursing degree (n=103, 49%) or have an MPH or other master's degree (n=86, 41%). Respondents identified only a small number of FTEs with a bachelor's, professional, or doctoral degree or with other training. (See Tables 77-79 in the Appendix.)

Full-time/exclusive waterborne enteric disease staff

Respondents were asked if their jurisdictions have staff members who work full-time and exclusively on waterborne enteric diseases. Most respondents (81%) reported that their jurisdictions do not have staff who work full-time on waterborne diseases. Of those reporting full-time waterborne disease staff, 9% indicated that staff focus on both waterborne enteric and non-enteric diseases, 5% indicated staff focus only on waterborne enteric diseases, and 5% indicated staff focus only on waterborne non-enteric diseases. (See Table 80 in the Appendix.)

Figure 23 Health department positions in waterborne enteric disease epidemiology

% all responses (n=303)

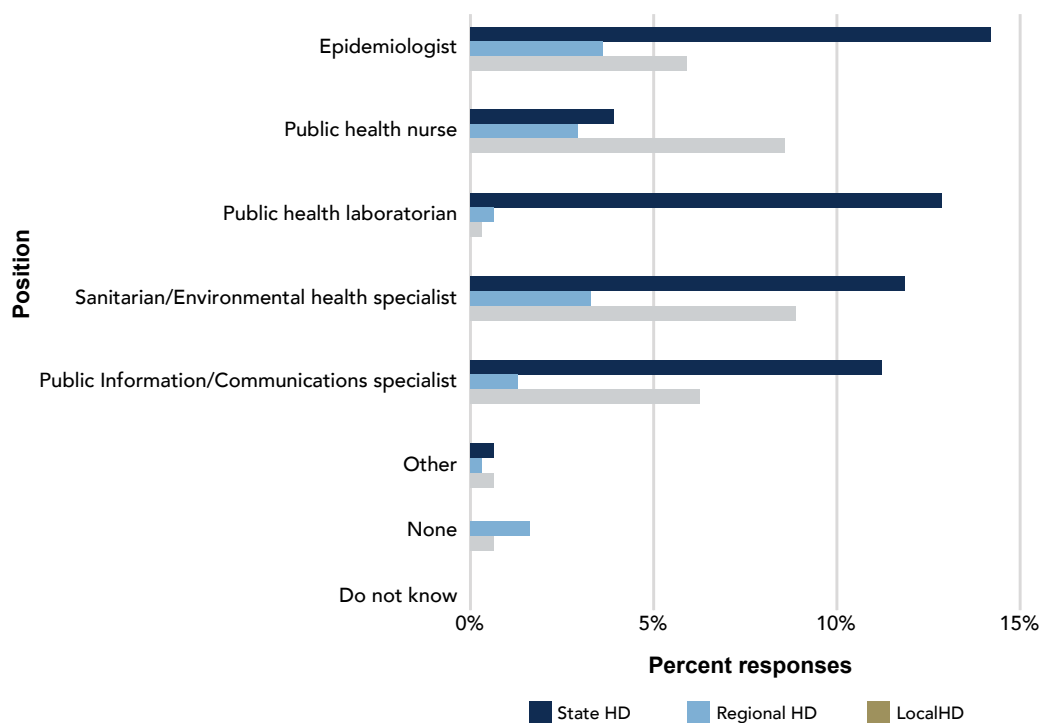


Table 5 Waterborne enteric disease full-time equivalents (FTEs)*—education level by setting

Education Level	State Health Department Level	Regional/District Health Department Level	Local Health Department Level	Other State Agency	Other Regional/Local Agency	Totals by Education n=210
PhD, DrPH, other doctoral degree in epidemiology, or some epidemiological training at the doctoral level	2.3 1%	0.0 0%	0.1 <1%	0.0 0%	0.1 <1%	2.4 1%
Professional background (e.g., MD, DO, DVM, DDS) with dual degree in epidemiology or some epidemiological training at the doctoral level	5.1 2%	<0.1 <1%	0.0 0%	<0.1 <1%	0.0 0%	5.1 2%
MPH, MSPH, MS, or other master's degree in epidemiology or some epidemiological training at the master level	28.2 13%	11.4 5%	17.7 8%	11.4 5%	17.7 8%	86.3 41%
BA, BS, or other bachelor's degree in epidemiology or some epidemiological training at the bachelor level	7.6 4%	0.5 <1%	0.8 <1%	0.5 <1%	0.8 <1%	10.2 5%
RN, BSN, or other nursing designation or degree	3.9 2%	1.5 1%	86.0 41%	1.5 1%	10.3 5%	103.2 50%
Other (specify)**	2.5 1%	0.0 0%	0.0 0%	0.0 0%	0.0 0%	2.5 1%
Do not know	0.0 0%	0.0 0%	0.0 0%	0.0 0%	0.0 0%	0.0 0%
*Totals by level/agency: n=210 (% level/agency)	49.5 24%	13.4 6%	104.5 50%	13.4 6%	28.8 14%	209.6 100%

*Respondents were asked to include part-time or partial FTEs in their responses, resulting in fractions of persons whose positions are split between more than one program area.

**Other positions or educational backgrounds specifically identified included master's level dual-degreed staff (e.g., MPH and another master's degree), MPH staff with an advanced practice nursing degree, MPH staff with a veterinary degree, and non-degreed administrative staff.

PhD: Doctor of Philosophy; DrPH: Doctor of Public Health; MD: Doctor of Medicine; DO: Doctor of Osteopathy; DVM: Doctor of Veterinary Medicine; DDS: Doctor of Dental Surgery; MPH: Master of Public Health; MSPH: Master of Science in Public Health; MS: Master of Science; BA: Bachelor of Arts; BS: Bachelor of Science; RN: Registered Nurse; BSN: Bachelor of Science in Nursing.

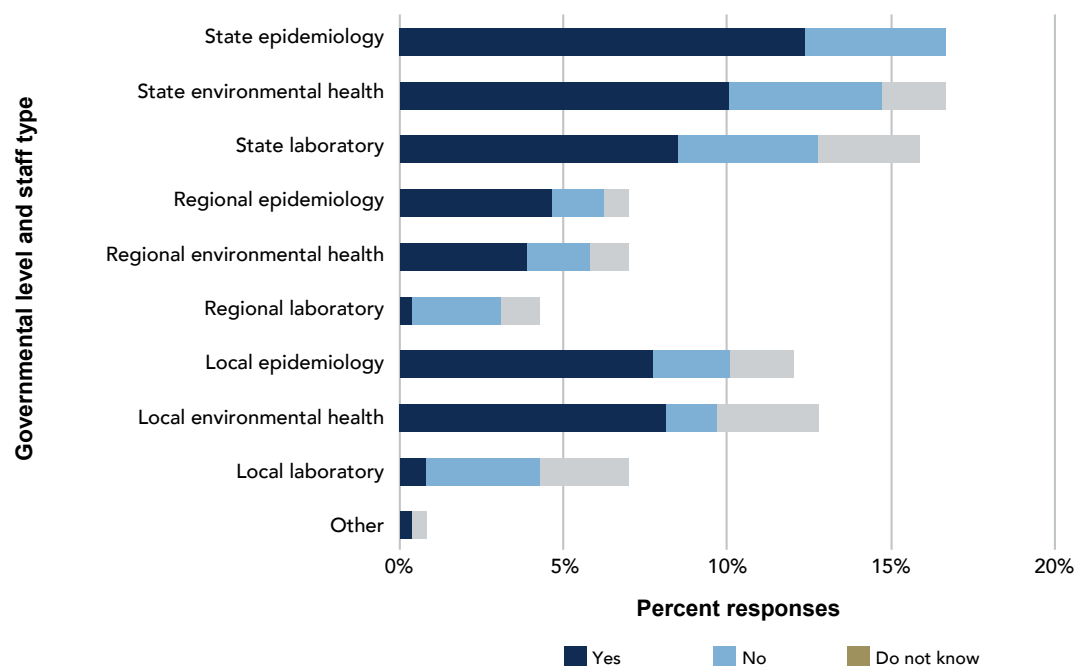
Waterborne enteric disease epidemiology training

Respondents were asked whether health agency staff receive training about detecting and responding to waterborne enteric disease cases and outbreaks (Figure 24). More than half of the respondents (57%) indicated they receive waterborne enteric disease training, 27% did not receive training, and 16% did not know. Of the jurisdictions receiving waterborne enteric disease

training, half (54%) of the trainings occurred at the state level, about a third were at the local level (29%), and less than a quarter were at the regional level (16%). Among all responses, epidemiology staff at the state (12%) and regional (5%) levels received the most training in their respective levels of government. Environmental health and epidemiology staff received the most training at the local level (8% each). (See Table 81 in the Appendix.)

Figure 24 Waterborne enteric disease epidemiology training

% by all responses



Communicating/coordinating with other agencies in waterborne enteric disease activities

Interactions in detecting and investigating waterborne enteric diseases

Respondents were asked to characterize the extent of the interactions between the health agency and the other listed agencies in detecting and investigating waterborne enteric disease cases and outbreaks (Figure 25). The range of response options was: constant (every two weeks or less); frequent (monthly or less); sporadic (quarterly or less); as needed during outbreaks; none; and do not know.

A majority of respondents reported constant contact with the state health department (53%). Constant contact was also reported with local health departments (38%) and regional health departments (27%); however, 36% of respondents indicated no contact with regional health departments, which may or may not be present in a jurisdiction depending on the structure of the public health system. For all other agencies, respondents primarily identified contacts as needed during outbreaks. (See Table 82 in the Appendix.)

Partnerships with other agencies

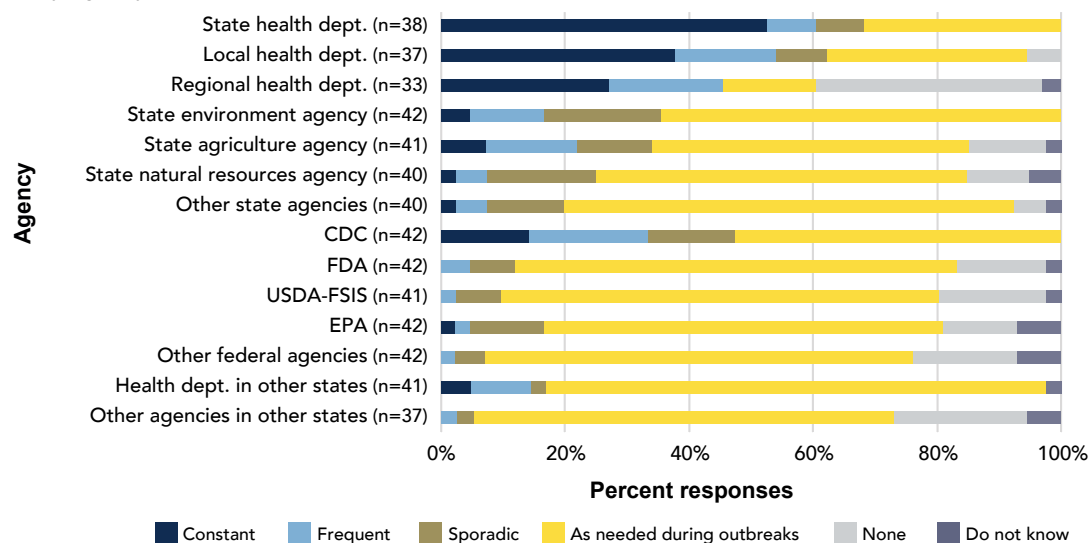
Respondents were also asked if their agency initiated and/or developed partnerships with any of the specified agencies to promote coordination for waterborne enteric disease surveillance and response (Figure 26). Respondents indicated at least some partnerships with all the identified agencies. The most frequent partnerships were within the state health department (92%), with the state environmental agency (69%), and with local health departments (74%). More than half of respondents reported partnerships with state agriculture agencies (54%) and federal agencies (55%). A third or more reported activities with health agencies in other states (40%), other state agencies (39%), and regional/district health departments (48%). A quarter (28%) reported partnerships with their state natural resources agency. (See Table 83 in the Appendix.)

Protocols for conducting waterborne enteric disease investigations

Respondents were asked if their jurisdiction has a written protocol for conducting waterborne enteric disease case/outbreak investigations. About

Figure 25 Coordination with other agencies on waterborne enteric disease activities

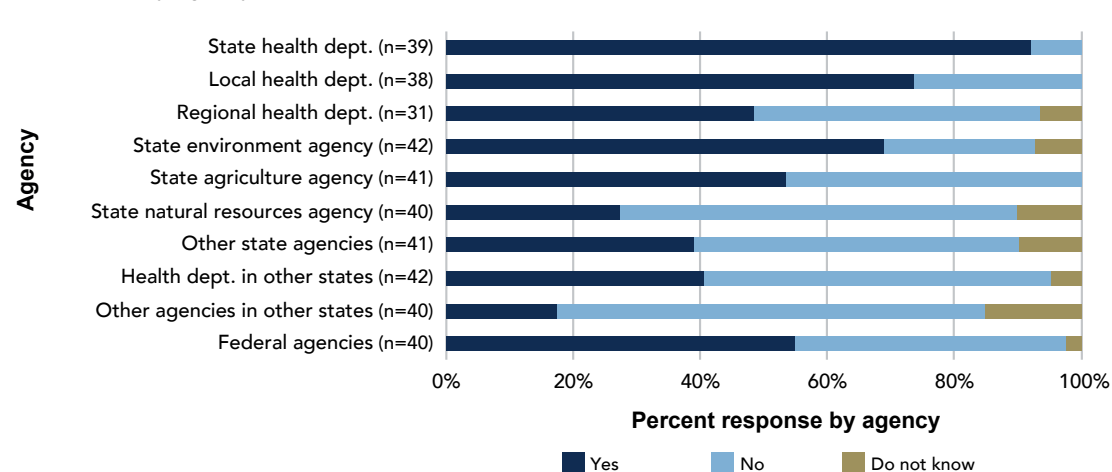
% by agency



CDC: Centers for Disease Control and Prevention; EPA: Environmental Protection Agency; FDA: Food and Drug Administration; USDA-FSIS: United States Department of Agriculture-Food Safety and Inspection Service.

Figure 26 Partnerships with other agencies on waterborne enteric disease activities

% response by agency



half of the jurisdictions reported having a written waterborne enteric disease investigation protocol (49%). (See Table 84 in the Appendix.)

Sharing protocol

For jurisdictions with a written waterborne enteric disease investigation protocol, respondents were asked to identify the agencies with which the protocol is shared. The protocol was

most frequently shared within the state health department and with local and regional health departments in that order. State environment, agriculture, other state agencies, and natural resources agencies were the next most frequent recipients. Federal agencies and agencies in other states were about equally likely to receive the protocol. (See Table 85 in the Appendix.)

Council to Improve Foodborne Outbreak Response products

In 2009, the Council to Improve Foodborne Outbreak Response (CIFOR) distributed its *Guidelines for Foodborne Disease Outbreak Response* to all states

(CIFOR, 2023). Since then, CIFOR has developed and distributed multiple products in addition to the *Guidelines*, all of which are designed to assist various actors in improving their responses to foodborne outbreaks (see Box 5). Some CIFOR products, like the *Guidelines*, have been updated one or more times.

Summary of CIFOR products*

CIFOR Guidelines – The CIFOR *Guidelines for Foodborne Disease Outbreak Response* (CIFOR *Guidelines*) are a comprehensive resource on foodborne disease investigation and control for public health agencies. The *Guidelines* address model practices for foodborne disease outbreaks and the roles of key organizations in foodborne disease outbreaks.

CIFOR Toolkit – The CIFOR Toolkit was developed to help jurisdictions in implementing the *Guidelines*. It includes worksheets and ideas to help agencies identify which recommendations work best for their jurisdictions.

Industry Guidelines – The CIFOR *Foodborne Illness Response Guidelines for Owners, Operators and Managers of Food Establishments* (Industry Guidelines) are voluntary recommendations for owners, operators, and managers of restaurants and other retail food establishments to explain and clarify their role in a foodborne illness outbreak investigation.

Complaint Systems – This series of documents includes guidelines, templates, and tools for implementing foodborne illness complaint systems in public health agencies.

Metrics Project – The Metrics Project developed standardized performance criteria and metrics to promote a common understanding of the key elements of surveillance, outbreak investigation, and control activities. They also facilitate staff training and program evaluation, identify specific areas for improvement, and help demonstrate program effectiveness.

Law Project – This series of documents analyzes laws related to foodborne disease surveillance and investigation and include tools to help agencies improve their legal preparedness to conduct surveillance for foodborne diseases and respond to outbreaks.

OUE Guidelines – The CIFOR *Outbreaks of Undetermined Etiology (OUE) Guidelines* provide universal recommendations for collecting, shipping, testing, and retaining foodborne outbreak specimens when an etiology is undetermined, even early in an investigation.

Clearinghouse – The Food Safety Clearinghouse is an online repository of food safety resources developed by state and local health departments, laboratories, academic institutions, non-governmental organizations, and governmental agencies to facilitate knowledge sharing across jurisdictions.

*Descriptions adapted from CIFOR (2023) and CDC (2018b) web pages.

Use of CIFOR products

The EDCA asked jurisdictions to identify which of the CIFOR products they use or have used (Figure 27). All or nearly all jurisdictions reported current or prior use of the *Guidelines* (100%) and the Toolkit (93%). Many reported use of the Metrics (41%) and the Outbreaks of Unknown Etiology (OUE) Guidelines (32%). A quarter or fewer of jurisdictions indicated use of the other products. (See Table 86 in the Appendix.)

Implementation of CIFOR products

Participants were asked to describe from among multiple options how their jurisdiction implemented the *Guidelines* and related products. The *Guidelines* (93%) and the Toolkit (86%) were cited as the most widely read and reviewed documents. These documents were also the most frequently cited as being distributed to health department staff (*Guidelines* 84%, Toolkit 65%). About half to one third of jurisdictions also reported reading and reviewing the Metrics (49%), OUE Guidelines (33%), and Clearinghouse (33%).

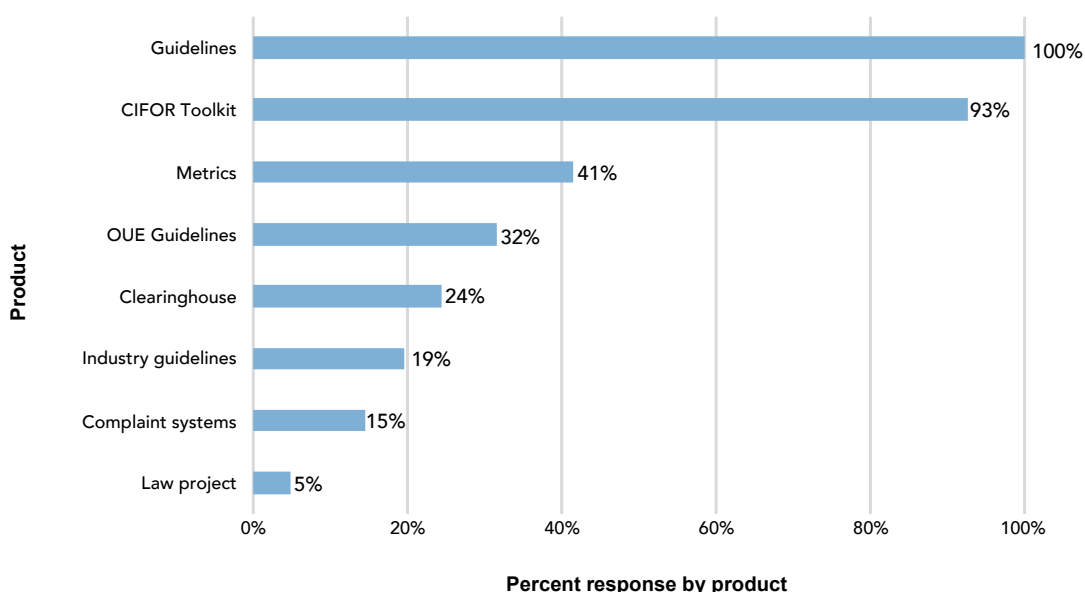
Respondents also reported equally frequent use of the performance indicators and metrics in the *Guidelines*, Toolkit, and Metrics (all at 40%) to assess performance internally. The *Guidelines* and Toolkit were also the most frequently reported to be used to identify recommendations for possible implementation (*Guidelines* 58%, Toolkit 51%) and from which at least some of the recommendations were implemented (*Guidelines* 63%, Toolkit 53%). (See Table 87 in the Appendix.)

Methods for accessing CIFOR products

Respondents were asked about their methods for accessing CIFOR products. More than three quarters (81%) of respondents indicated that they accessed the documents electronically. (See Table 88 in the Appendix.) Among those respondents that reported accessing the documents electronically, almost all (91%) read the documents online as needed. More than one third either download entire documents (40%) or download specific chapters (40%). Respondents were more likely to print specific chapters (26%) than print the entire document (11%). Respondents also reported that

Figure 27 Use of CIFOR products

% state responses by product (n=41)



OUE: Outbreaks of Unknown Etiology

they were more likely to use documents in the office (43%) than use them in the field (14%). (See Table 89 in the Appendix.)

Participants were asked about the potential to access CIFOR products via mobile applications. A third of respondents (33%) indicated that they would access CIFOR documents via a mobile app if one were available; 26% said they would not use an app; and 42% indicated they did not know. (See Table 90 in the Appendix.) Respondents who indicated they would use an app were then asked to identify the types of functions and information that would be useful in an app. The content identified included tables and/or charts of pathogens (75%), incubation periods (67%), and symptoms (58%). Format preferences included searchable PDF documents (67%) and interactive

graphics (50%). Other specific comments provided by respondents about content and features included basic analytical tools; specific CIFOR documents (e.g., OUE Guidelines); or selected features from CIFOR documents (e.g., tables of responsibilities for investigators from the *Guidelines*). Others mentioned incorporating features that would be useful for personnel in the field (e.g., time and temperature controls table/chart for environmental health inspectors). (See Table 91 in the Appendix.)

Of the 26% of participants who indicated that they would not use a mobile app for accessing CIFOR products, 78% indicated that they would not find such an app useful; 11% said organizational information technology policies would not allow the use of an app. (See Table 92 in the Appendix.)

Potential CIFOR products

Respondents were asked to identify other products or topics for potential new CIFOR products. The following items were identified:

- Webinars for agency staff members and other target audiences to learn about new products and ways to use them
- More in-depth information about CIFOR products at national conferences (e.g., Integrated Foodborne Outbreak Response and Management [InFORM] meetings, CSTE conference) beyond general announcements
- A best practices document on how to use the materials currently available
- A document about exclusions and return criteria

Discussion



This report describes the status of the nation's enteric disease epidemiology capacity in 2019-2020. The data were self-reported by the participating 44 states and the District of Columbia. Though it was not possible to conduct direct comparisons of data collected across the 2002 and 2011 food safety assessments and this enteric disease assessment (separately referred to as EDCA), where possible, the discussion identifies trends or changes in approach over time.

Profile of responding jurisdictions

Almost half of the responding jurisdictions indicated that the responsibility for surveillance and investigation of enteric disease was a shared responsibility between state and local health departments, a finding that was consistent with prior assessments (CSTE, 2002, p. 3) (CSTE, 2011, p. 21). As expected, this assessment confirmed that all state health departments have specific legal authorization to conduct infectious disease surveillance and investigation activities. The EDCA expanded the scope of inquiry into legal authority to include other state agencies that may have enteric disease-related legal authorizations in addition to those granted to the state health agency. The data showed that, although state health agencies have the broadest enteric disease-related legal authority, about a quarter to one third of jurisdictions reported that other state agencies also have some or nearly all the identified enteric disease authorizations, which may be determined by differences in how jurisdictions assign responsibilities across agencies and the legal authority given to each (e.g., surveillance, investigation, ordering mitigation, etc.).

Jurisdictions' authority to collect suspected case reports and clinical reports of symptoms and to require submission of isolates/clinical materials from private laboratories was consistent across all three assessments (CSTE, 2002, p. 11)

(CSTE, 2011, p. 37). However, the EDCA showed that the number of jurisdictions reporting the authority to take specific actions to respond to or mitigate conditions giving rise to enteric diseases appeared to have fluctuated or declined in some instances since 2002. These legal authorizations were related to performing on-the-spot emergency environmental inspections/assessments, embargoing or condemning implicated food, closing a food service facility, and excluding sick/infected workers from food handling. The reason for the differences among assessments may arise from variations in interpreting the question to involve only legal authority granted to the health agency as opposed to authority provided under state law, regardless of agency with authority. When EDCA responses for other agencies are included with health agency responses, the combined results reflect similar response rates as in the earlier assessments.

Enteric disease epidemiology capacity

A significant decrease in the total numbers of FTEs working in enteric disease epidemiology programs was reported for all education levels in state, regional, and local public health agencies compared to the 2011 assessment (426 FTEs in 2019-2020 vs. 787 in 2011) (CSTE, 2011, p. 19). The 2011 assessment showed an overall increase from the number of FTEs reported in the 2002 assessment (256 FTEs) (CSTE, 2002, p. 9, Table 9).² While the overall response rate to the question in the 2011 assessment (50 jurisdictions) was greater than that for the EDCA (45 jurisdictions), the differences in the response rates likely do not account for the degree of change reported in the recent assessment. Given that lack of staff capacity was the single most significant constraint to addressing enteric diseases, CSTE strongly recommends increasing the number of staff working in enteric disease epidemiology programs.

² The 2002 total FTEs of 265 was calculated by adding the number of responses listing the FTEs for foodborne disease programs in Table 9 (CSTE, 2002, p.9).

The EDCA results also point to the need for an additional 413 FTEs, or a 95% increase over 2019–2020 staffing, to reach the ideal capacity for enteric disease programs at the state, regional, and local levels, with the greatest need at the local level. Staff with master's or nursing degrees were in greatest demand; however, respondents identified a significant need for additional capacity over current numbers at all educational levels and with specific skill sets, including informatics, biostatistics, and master's level dual-degreed (e.g., MPH and another master's degree). Respondents also mentioned the need for non-degreed surveillance administrative staff, student interns, and CSTE fellows. This assessment also documented the use of student interview teams, which are a mechanism to supplement epidemiology capacity. Additionally, student interview teams provide students with exposure to public health practice and can foster an interest in enteric disease epidemiology, thereby potentially helping to draw professionals into the field as a career choice.

Respondents identified barriers to both recruiting and retaining staff for enteric disease epidemiology positions. Barriers related to hiring processes were listed more frequently, such as hiring freezes, restrictions on offering competitive pay, restrictions on hiring quickly enough, and salary scale. Other barriers frequently reported by respondents included a lack of funding for positions and caps on the number of FTEs allowed. Respondents identified aspects of the personnel system as barriers to retaining staff as well. Restrictions on merit raises were identified as a major barrier, while opportunities for promotion and salary scale were identified as moderate barriers. Though difficult to influence, options within the larger personnel system beyond the health department should be explored to address staffing shortages (e.g., exempting some positions from personnel caps, reclassifying positions to increase salaries, etc.).

In terms of staff training, in-person training was identified as the preferred method of training. Web-based, self-paced stand-alone learning and web-based live webinars were generally the least preferred training methods. Overall, lack of funding for training and lack of time to attend training due to work demands were identified as major barriers to training. Jurisdictions along with national partners and federal agencies should continue to identify mechanisms to support training for continuing education to maintain and increase competency of

enteric disease staff. Leaders in health departments should provide protected time for staff to participate in training, however, this is challenging to do in practice if staffing levels are not sufficient, reinforcing the critical finding from this assessment that additional enteric disease staffing is needed.

Enteric disease surveillance

Data from providers and laboratories were identified by respondents as the most frequently used sources of data for both routine surveillance and outbreak investigations. The use of some data sources increased during an outbreak, including emergency department chief complaint data, shopper cards, social media, food ordering/other consumer mobile apps, and consumer complaint data. Data from sentinel sources beyond emergency department chief complaint data were rarely used. The current assessment data are generally consistent with those in the 2011 assessment (p. 29), although the 2011 assessment did not explore online, shopper card, and social media sources. The EDCA revealed that enteric disease epidemiology programs continue to rely on foundational data sources from providers and laboratories for both routine surveillance and outbreak investigation activities.

There have been significant changes in consumers' food purchasing behavior since the 2011 assessment, requiring enteric disease epidemiology programs to cast a broader net to identify data that capture food purchasing and consumption activities (i.e., alternative data). Respondents reported high rates of using or requesting alternative data such as customer loyalty card, shopper card, or mobile application data (91%) and debit/credit card data (62%). Data from meal delivery systems/applications and online shopping were—at least at the time of the assessment administration—not frequently used. However, the COVID-19 pandemic has affected consumers' food purchasing habits in the near term and may signal longer-term changes in behavior. As such, consumers' use of online and mobile apps for ordering and purchasing food from grocery stores, restaurants, online sources, and meal delivery services may continue to grow. When asked to identify barriers to using alternative data, respondents did not identify significant widespread barriers, suggesting that barriers had not been significantly encountered or jurisdictions had not had enough experience using alternative data at the time of the assessment to have encountered

significant limitations. While provider and laboratory data will remain the foundation of enteric disease surveillance, jurisdictions should be prepared to make increased use of alternative data sources to account for accelerating changes in consumers' food purchasing behaviors.

Use of electronic databases for tracking cases and outbreaks remained high among responding jurisdictions. About 95% of jurisdictions reported using one or more electronic databases for case surveillance and outbreak investigations. This level of data system usage was consistent with the findings of the 2011 assessment (p. 23). Overall, the types of data collected and the percentage of states recording data remained about the same from 2011 (pp. 24–25). The format for keeping enteric disease outbreak investigation records (e.g., NORS, other electronic databases, etc.) has also remained consistent compared with 2011 (p. 24). About half of the jurisdictions (51%) reported that their jurisdictions' enteric disease case database shares data with its outbreak investigation database. Of those that do share, nearly all (96%) use the same systems for both purposes. Continued investment in broader public health data modernization efforts will support the integration of epidemiology data sources to allow for more efficient and timely use of case data for public health action during outbreak investigations.

While overall, jurisdictional capacity to undertake surveillance activities for both enteric disease cases and outbreaks was characterized as substantial to full for a variety of epidemiology activities, significant gaps in capacity were identified, specifically for analyzing routine surveillance data and capacity for a range of activities during outbreaks when workload and disease burden is higher. Most responding jurisdictions reported conducting routine surveillance for almost all the enteric disease pathogens specified in the assessment, except for norovirus, although most jurisdictions conduct surveillance for norovirus during an outbreak.

The predominant barriers reported by jurisdictions for both routine and outbreak surveillance were lack of adequate numbers of staff and lack of epidemiology capacity. There were several additional barriers identified as moderate or potential barriers suggesting that, although many jurisdictions can accomplish their surveillance responsibilities, the risks associated with any

one of the identified barriers to limit epidemiology programs from fully functioning are real. Within each jurisdiction, these barriers should be identified, and steps taken to proactively address them, where possible, including strategizing how to meet capacity needs when shortages arise.

Most public health agencies reported having sufficient legal authority to access and share information about individuals and businesses to conduct enteric disease surveillance activities. All or nearly all responding jurisdictions indicated that they are authorized to share non-identifying information about an individual and business with state, regional, and local health departments, other agencies in the jurisdiction, federal agencies, and health and other agencies in other states. More than half of respondents reported their jurisdiction allows identifying information about an individual (58%) or business (58%) to be shared with other agencies if there is a legitimate purpose as described in the jurisdiction's laws. The current data represent a change from those reported in the 2011 assessment (p. 38), in which 84% of respondents said that individual data could be shared for a legitimate purpose. Identifiable data on individuals are reportedly more restricted than in the prior assessment. However, identifiable business data are more easily shared with other agencies now (58%) than was reported in 2011 (4%); the data are less available to the public now (4%) than in 2011 (29%) (CSTE, 2011, p. 38). Legal authorization allowing for the sharing of information exists broadly in the responding jurisdictions but is conditioned upon administrative approval procedures or other requirements. Educating staff about the authorizations and conditions contained in their jurisdiction's data sharing and confidentiality laws is vital for the robust operation of an enteric disease program. This will help ensure that staff can use their authorizations to fully access and share data as legally allowed.

Communication and coordination

When conducting routine surveillance and responding to an outbreak, enteric disease epidemiology programs regularly interact with key agency and other partners, including regional and local health departments, public health laboratories, environmental health units, and the CDC. Communicating and coordinating with other units in the public health agency and other governmental and non-governmental entities is foundational to

recognizing and addressing an enteric disease outbreak. No significant or widespread barriers to communicating with agencies and other partners were identified during routine surveillance or outbreaks, although some potential barriers were identified.

Regarding relationships with food regulatory agencies, some of the same themes that emerged in the 2011 assessment continue to be important and require ongoing attention (CSTE, 2011, p. 43). While effective working relationships with key agencies and partners were reported, some commentors noted that communicating with federal regulatory agencies can sometimes be a challenge in terms of the reciprocal sharing of information. Because these federal regulatory agencies may be limited by statute or regulation in how much information they can share, state health agencies may need to explore federal agency mechanisms (e.g., FDA commissioning; FSIS Directive 2620.5) to gain access to data that may pertain to cases and outbreaks in their jurisdictions (CIFOR *Guidelines*, p. 36). Correspondingly, federal regulatory agencies should continue to regularly conduct outreach to state, tribal, local, and territorial public health agencies related to federal-state interaction in foodborne disease/enteric illness investigation and control.

Enteric disease investigation and response capacity

The capacity of epidemiology programs to provide after-hours communications and field outbreak response teams or other rapid response capacity has remained consistent since the 2011 assessment. All state health department epidemiology programs have after-hours communications capacity. An equal percentage of respondents indicated that standing enteric disease outbreak response teams exist at the state level (49%) as those who indicated no standing response teams but rapid mobilization of staff was possible as needed (49%). These results were consistent with the findings of the 2011 assessment (pp. 27–28) after accounting for differences in calculating totals.

While all states investigate enteric disease outbreaks caused by different pathogens, the percentage of outbreaks that could be attributed to a specific pathogen varied. An important tool in identifying the pathogen causing an enteric disease

outbreak is the collection of stool and food samples. Most jurisdictions reported that stool samples were collected from exposed persons/non-food handlers and employees/food handlers during outbreak and cluster investigations. Most jurisdictions also reported collecting food samples during outbreaks (93%) and cluster investigations (62%) and for single cases of public health importance (52%). Jurisdictions should analyze outbreaks that could not be attributed to a specific pathogen to determine if the investigation was limited due to staffing capacity, lack of or insufficient data, or other factors to identify opportunities for program improvement.

Most jurisdictions reported conducting at least some food tracing activities, but for many they occur infrequently. During the three-year period from January 1, 2016, through December 31, 2018, more than half of jurisdictions conducted a combined 10 or fewer product traces. As was suggested in the 2011 assessment (p. 42), one reason for the paucity of public health agency involvement in tracing activities was lack of staff. However, structural factors may also account for the continued low participation of public health agencies and number of tracebacks; these factors could include the types of organizational units housed in the agency, the authority vested in other state agencies (e.g., state agriculture departments), and the size of the state. Further exploration of factors impacting health department traceback activities may be useful to determine if there are other factors that specifically restrict public health agency activities.

Whether a jurisdiction has a policy for excluding persons sick with an enteric disease and allowing them to return depends on the pathogen and the setting involved (i.e., health care, food service, day care). Across all pathogen types, the food service setting had the most exclusion policies by pathogen, followed by day care and then health care. There was consistency across jurisdictions for some pathogens (typhoid/paratyphoid fever, Shiga toxin-producing *E. coli*, *Shigella*). For many pathogens and settings, the exclusion and return criteria reported by jurisdiction were highly variable. Even in food service, where both exclusion and return criteria can be affected by the policies set in the FDA Food Code (FDA 2023), reported jurisdictional approaches were variable, possibly due to variations in the version of the FDA Food Code or other requirements adopted by the

jurisdiction. Further evaluation of exclusion policies and return criteria to identify source(s) of policy requirements, rationale for the criteria, consistency of approach among jurisdictions, and associated outcomes is recommended to inform a more consistent and science-based national approach.

Waterborne enteric diseases

Public health agencies were reported as primarily responsible for detecting and responding to both waterborne enteric and non-enteric disease cases and outbreaks in most jurisdictions, but differences in responsibilities may be possible based on the involved pathogen and the organization of agency responsibilities. Written waterborne enteric disease investigation protocols are important mechanisms for sharing information and helping other agencies understand data needs and procedures used by health agencies in disease surveillance and investigation activities, however, only about half of the jurisdictions reported having a written protocol (49%). Jurisdictions should develop, maintain, and share written protocols for waterborne disease investigations.

Jurisdictions reported 210 FTEs working on waterborne enteric disease activities, although most jurisdictions did not have dedicated full-time staff. The number of reported FTEs working on waterborne enteric disease activities (210 FTEs) was about half of the total FTEs captured for all enteric disease activities (436 FTEs). While this seems to be a large percentage of staffing, most jurisdictions (81%) do not have staff that work full-time on waterborne diseases. Of those with full-time waterborne disease staff, 9% indicated that staff focus on both waterborne enteric and non-enteric diseases. Given the significant responsibility placed on health agencies to prevent, detect, and investigate waterborne diseases, additional dedicated staffing is needed to perform these activities adequately and effectively in jurisdictions.

While state health agencies were reported to have the largest number of position types involved in waterborne enteric disease activities, local health departments had more FTEs working on waterborne enteric diseases. Just over half (57%) of jurisdictions received training about waterborne enteric diseases, about half of which occurred at the state level. Training opportunities are important

at all governmental levels and should be increased, especially for local health departments where more staff work on waterborne disease issues.

Public health agencies at all levels reported some contact with other agencies in detecting and investigating waterborne enteric disease cases and outbreaks. The most frequent partnerships were within the state health department (92%), with the state environmental agency (69%), and with local health departments (74%), indicating that there is additional opportunity for jurisdictions to expand their partnerships with other state and federal agencies to enable and support effective waterborne enteric disease activities.

CIFOR products

CIFOR products have generally become more widely known and used since the 2011 assessment. The level of implementation reported by jurisdictions in the EDCA shows uptake of the products over time, especially the *Guidelines* and Toolkit documents. In the 2011 assessment (p. 35), 59% of responding states reported they planned to review their practices and performance against CIFOR performance indicators. Fewer than a quarter of respondents in 2011 reported planning to “implement the *Guidelines* by using the CIFOR Toolkit, incorporate the *Guidelines*, or compare their operating procedures against the *Guidelines*.” (p. 35). In the 2019-2020 EDCA, the *Guidelines* and the Toolkit have proven to be widely read, distributed, and used by public health agencies and other actors in food safety. All or nearly all jurisdictions report current or prior use of the *Guidelines* (100%) and the Toolkit (93%). Conversely, CIFOR products with lower rates of usage are those that are less well known, were created for a narrower purpose, apply to primarily non-governmental audiences, or are older. Some respondents noted that, while CIFOR products have been made available, they have been underutilized by enteric disease epidemiology staff. Respondents continue to cite the need for additional and ongoing marketing of the existing CIFOR products and alternative methods for delivering CIFOR content and training. In addition to regularly reviewing and updating current CIFOR products, additional topic areas or new products should be considered to meet the needs of the evolving landscape of enteric disease epidemiology.

Recommendations

- Funding to support personnel working in enteric disease epidemiology programs should be increased to address the significant unmet need in state, tribal, local, and territorial health departments.
- Jurisdictions should explore options within the larger personnel system to address staffing shortages (e.g., exempting some positions from personnel caps, reclassifying positions to increase salaries, etc.).
- Opportunities for training through a variety of methods should be increased and jurisdictions should provide staff with dedicated and protected time for training to enhance public health capacity.
- Jurisdictions should use the CIFOR Toolkit to identify gaps in capacity—staffing, technology, and understanding of legal authorizations—for enteric disease cases and outbreaks and identify actions needed to address capacity limitations.
- Federal investment in broader public health data modernization efforts should be continued and strengthened to support the integration of epidemiology data sources to allow for more efficient and timely use of case data for public health action during outbreak investigations.
- Jurisdictions should continue to explore and develop procedural, technical, and legal solutions for accessing alternative data sources to support enteric disease investigations in response to changes in consumers' food purchasing behaviors.
- Jurisdictions should analyze outbreak investigation authorizations, policies, and investigation results to identify factors that can impact success in limiting outbreaks and identifying the causative pathogen and tracing the source of outbreaks.
- Further evaluation of exclusion policies and return criteria should be conducted to identify source(s) of policy requirements, rationale for the criteria, consistency of approach among jurisdictions, and associated outcomes to inform a more consistent and science-based national approach.
- Jurisdictions and partners should continue efforts to further enhance communication and coordination of state and local health departments with state departments of agriculture and federal food regulatory agencies in collaborating on foodborne disease outbreak response.
- Funding to support personnel working in waterborne disease programs should be increased along with providing additional training, developing written investigation protocols, and developing and expanding partnerships to improve waterborne enteric disease capabilities.
- CIFOR products should continue to be maintained, updated, and actively promoted, while also exploring other modalities for delivering products' content, training, and the need to expand CIFOR products to meet the needs of the evolving landscape of enteric disease epidemiology.

Conclusion



This report provides an assessment of the status of the nation's enteric disease epidemiology capacity in 2019-2020. While overall, jurisdictional capacity to undertake surveillance activities for both enteric disease cases and outbreaks was characterized as substantial to full for a variety of epidemiology activities, significant gaps in capacity were identified and lack of staff capacity was reported as the single most significant constraint to conducting enteric disease activities. The significant decrease in FTEs working in enteric disease programs since 2011, along with the identified 413 additional FTEs needed, highlights the critical need to increase the number of staff working in enteric disease programs, to include dedicated staffing to support waterborne disease surveillance and outbreak response. In addition to increased staffing, increased opportunities for training, and development and maintenance of protocols and resources are all ongoing and continued needs, especially for waterborne enteric diseases. While provider and laboratory data

will remain the foundation of enteric disease surveillance, jurisdictions should be prepared to make increased use of alternative data sources to account for accelerating changes in consumers' food purchasing behaviors. Furthermore, continued investment in broader public health data modernization efforts is important to support the integration of epidemiology data sources to allow for more efficient and timely use of case data for public health action during outbreak investigations. Federal investments are needed to enhance the current infrastructure for enteric disease epidemiology programs at state, tribal, local, and territorial public health agencies. Additional resources are necessary to address gaps in staffing, training, technology, resource development, and partnerships and communication to effectively prevent, detect, and respond to enteric disease illnesses and outbreaks, which cause substantial public health impact in the United States.

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Appendix A:

List of Figures and Tables



These tables match the report data tables in Appendix B with corresponding figures in the report text. Some data tables may be combined into one figure. Note also that not all data tables have a corresponding figure as indicated by “no figure”.

Appendix Data Table Number and Title	Related Report Figure or Table Number and Title
Table 1. Titles of Enteric Disease Capacity Assessment respondents	Figure 1. Respondents—title categories
Table 2. Other respondents contributing to Enteric Disease Capacity Assessment	No figure
Table 3. Organizational structure for enteric disease activities	No figure
Table 4. Express legal authority for select enteric disease actions	Figure 2. Express legal authority for selected enteric disease actions
Table 5. Current enteric disease total full-time equivalent (FTE) capacity by government level	No figure
Table 6. Current enteric disease total full-time equivalent (FTE) capacity by education level across all levels of government	Figure 3. Current enteric disease total full-time equivalents capacity by education level
Table 7. Current enteric disease full-time equivalent (FTE) epidemiology capacity by government and education levels	Table 7 also included in report text as Table 1
Table 8. Staffing trends in enteric disease epidemiology	Figure 4. Staffing trends in enteric disease epidemiology
Table 9. Additional full-time equivalents (FTEs) needed for ideal enteric disease epidemiology capacity	Figure 5. Additional full-time equivalents needed for ideal enteric disease epidemiology capacity
Table 10. Additional total full-time equivalents (FTEs) for ideal enteric disease epidemiology capacity by setting	No figure
Table 11. Additional total full-time equivalents (FTEs) for ideal enteric disease epidemiology capacity by education level	No figure
Table 12. Barriers to recruiting staff for enteric disease epidemiology positions	Figure 6. Barriers to recruiting staff for enteric disease epidemiology positions
Table 13. Barriers to retaining staff in enteric disease epidemiology positions	Figure 7. Barriers to retaining enteric disease epidemiology staff
Table 14. Types and frequency of training for enteric disease epidemiology staff	Figure 8. Training types and frequency
Table 15. Training methods used and preferences	No figure
Table 16. Funding for training activities	No figure
Table 17. Barriers to training	Figure 9. Barriers to training
Table 18. Use of student interview teams	No figure

Appendix Data Table Number and Title	Related Report Figure or Table Number and Title
Table 19. Interviewing capacity met by student interview teams	No figure
Table 20. Activities supervising student interview teams	No figure
Table 21. Hours/week supervising student interview teams	No figure
Table 22. Types of data sources used in the past—routine surveillance/non-outbreak scenario	Figure 10. Past data sources in routine surveillance/non-outbreak scenarios
Table 23. Types of data sources used in the past—during an outbreak/investigation scenario	Figure 11. Past data sources during outbreak/investigation scenarios
Table 24. Use of alternative data	No figure
Table 25. Mechanisms to access alternative data	No figure
Table 26. Barriers to using alternative data—customer/loyalty/shopper cards and apps	No figure
Table 27. Barriers to using alternative data—debit and credit cards	No figure
Table 28. Barriers to using alternative data—meal delivery data and apps	No figure
Table 29. Barriers to using alternative data—online shopping	No figure
Table 30. Barriers to using alternative data—other	No figure
Table 31. Use of electronic databases	Figure 12. Use of electronic databases
Table 32. Types of information recorded in databases about enteric disease cases	No figure
Table 33. Data formats for enteric disease outbreak investigation records	No figure
Table 34. Case database sharing data with investigation database	No figure
Table 35. Same systems used for case and investigation data	No figure
Table 36. Software used	No figure
Table 37. Capacity to undertake surveillance activities—routine surveillance/non-outbreak scenario	Figure 13. Capacity for surveillance—routine/non-outbreak scenario
Table 38. Capacity to undertake surveillance activities—during outbreak/investigation scenario	Figure 14. Capacity for surveillance—during outbreak/investigation scenario
Table 39. Surveillance for specified pathogens—routine surveillance/non-outbreak scenario	Figure 15. Surveillance for specified pathogens
Table 40. Surveillance for specified pathogens—during outbreak/investigation scenario	
Table 41. Barriers to surveillance and investigation—routine surveillance/non-outbreak scenario	Figure 16. Barriers to surveillance—routine/non-outbreak scenario
Table 42. Barriers to surveillance and investigation—during outbreak/investigation scenario	Figure 17. Barriers to surveillance—outbreak/investigation scenario
Table 43. Source of authority to share—individual data	No figure
Table 44. Source of authority to share—business data	No figure
Table 45. Authorized to share non-identifying individual data	No figure
Table 46. Authorized to share non-identifying business data	No figure

Appendix Data Table Number and Title	Related Report Figure or Table Number and Title
Table 47. Sharing identifiable information about individuals	No figure
Table 48. Sharing identifiable information about businesses	No figure
Table 49. Interactions among agencies—routine surveillance/non-outbreak scenario	No figure
Table 50. Interactions among agencies—during outbreak/investigation scenario	No figure
Table 51. Barriers to communicating with agencies and partners—state agencies	No figure
Table 52. Barriers to communicating with agencies and partners—local/regional agencies	No figure
Table 53. Barriers to communicating with agencies and partners—public health laboratories	No figure
Table 54. Barriers to communicating with agencies and partners—federal agencies	No figure
Table 55. Barriers to communicating with agencies and partners—clinicians/clinical facilities	No figure
Table 56. Barriers to communicating with agencies and partners—others (restaurants, etc.)	No figure
Table 57. After-hours communication capacity	Figure 18. After-hours communication capacity
Table 58. Standing enteric disease outbreak response teams	Figure 19. Standing enteric disease outbreak response teams
Table 59. Profession types on enteric disease outbreak response teams	Table 59 also included in report text as Table 2
Table 60. Past enteric disease outbreaks by pathogen	Figure 20. Enteric disease outbreaks by pathogen (2018)
Table 61. Stool sample collection	No figure
Table 62. Food sample collection	No figure
Table 63. Activities tracing commercially distributed foods	No figure
Table 64. Product tracing activities (January 1, 2016–December 31, 2018)	No figure
Table 65. Summary of jurisdictions with exclusion policies by pathogen and setting	Figure 21. Summary of exclusion policies by pathogen and setting Table 65 also included in report text as Table 3
Table 66. Exclusion policies—health care	No figure
Table 67. Exclusion policies—food service	No figure
Table 68. Exclusion policies—day care	No figure
Table 69. Summary of most frequent return criteria by setting and pathogen	Table 69 also included in report text as Table 4
Table 70. Return criteria—health care	No figure
Table 71. Return criteria—food service	No figure
Table 72. Return criteria—day care	No figure
Table 73. Agencies responsible for waterborne enteric diseases	No figure
Table 74. Agencies responsible for waterborne non-enteric diseases	No figure

Appendix Data Table Number and Title	Related Report Figure or Table Number and Title
Table 75. Legal authority for waterborne enteric disease activities	Figure 22. Waterborne enteric disease investigation source of legal authority
Table 76. Waterborne enteric disease epidemiology positions	Figure 23. Health department positions in waterborne enteric disease epidemiology
Table 77. Waterborne enteric disease full-time equivalents (FTEs)—education level by setting	Table 77 also included in report text as Table 5
Table 78. Current waterborne enteric disease total full-time equivalent (FTE) capacity by government level	No figure
Table 79. Current waterborne enteric disease total full-time equivalent (FTE) capacity by education level	No figure
Table 80. Full-time/exclusive waterborne enteric disease staff	No figure
Table 81. Staff training for waterborne enteric disease epidemiology activities	Figure 24. Waterborne enteric disease epidemiology training
Table 82. Communicating/coordinating with other agencies in waterborne enteric disease activities	Figure 25. Coordination with other agencies on waterborne enteric disease activities
Table 83. Partnerships with other agencies on waterborne enteric disease	Figure 26. Partnerships with other agencies on waterborne enteric disease activities
Table 84. Written waterborne enteric disease investigation protocols	No figure
Table 85. Sharing waterborne enteric disease investigation protocols	No figure
Table 86. Use of CIFOR products	Figure 27. Use of CIFOR products
Table 87. Implementation of CIFOR products	No figure
Table 88. Accessing CIFOR products electronically	No figure
Table 89. Electronic access methods for CIFOR products	No figure
Table 90. Accessing CIFOR products via mobile applications	No figure
Table 91. Functions in a CIFOR mobile app	No figure
Table 92. Reasons a CIFOR mobile app would not be useful	No figure

Appendix B: Data Tables



Note that some percentages in the data tables may not add to 100% due to rounding.

Profiles of responding jurisdictions

Table 1 Titles of Enteric Disease Capacity Assessment respondents

Title/Area	Variants	Counts	% of Responses n=45
State Epidemiologist	State Epidemiologist (n=7) State Epidemiologist/Environmental Health Officer Territorial Epidemiologist Acting State Epidemiologist Deputy State Epidemiologist	11	24%
Epidemiologist	Director, Division of Epidemiology Epidemiologist (n=4) Nurse Epidemiologist	6	13%
Foodborne	Foodborne and Enteric Disease Epidemiologist Foodborne and Waterborne Epidemiologist Foodborne Disease Epidemiologist Foodborne Disease Epidemiology Coordinator Foodborne Disease Program Coordinator Foodborne Disease Unit Supervisor Foodborne Illness Epidemiologist Foodborne/Waterborne Disease Epidemiology Specialist	8	18%
Enteric Disease	Director of Enteric Disease Surveillance and Outbreak Investigations Enteric and Waterborne Diseases Unit Supervisor Enteric Disease Coordinator Enteric Disease Epidemiologist Enteric Disease Surveillance Epidemiologist Enteric Disease Unit Manager Enteric Epidemiologist Enteric Surveillance Epidemiologist Enteric/Vector-borne/Zoonotic Disease Epidemiologist	9	20%
Infectious/ Communicable Disease	Chief, Disease Investigations Section, Infectious Diseases Branch Infectious Disease Epidemiologist Infectious Disease Epidemiology Unit Manager Senior Infectious Disease Epidemiologist Medical Director, Communicable Diseases	5	11%
Other	State Public Health Veterinarian Director of Surveillance Health Surveillance Epidemiologist Assistant Program Manager Epidemiology Investigation Program Manager Program Coordinator	6	13%
Totals:		45	100%

Table 2 Other respondents contributing to the Enteric Disease Capacity Assessment

Title/Position	Count	% of Responses n=106
Health officer	1	1%
Food safety program director	7	7%
The state epidemiologist(s)	14	13%
Foodborne/enteric disease epidemiologist	34	32%
Infectious disease/communicable disease staff	22	21%
Environmental health staff	12	11%
Attorney	3	3%
Agriculture agency staff	2	2%
No one else	1	1%
Other (please specify)*	10	9%
Totals:	106	100%

*Other positions identified included public health laboratory, waterborne epidemiologist, and state veterinary staff

Table 3 Organizational structure for enteric disease activities

Organizational Structure	Count	% of Responses n=46
One central state office	8	17%
Regional state offices coordinated by a central state office	7	15%
Regional state offices that act independently (with considerable variation in practice)	0	0%
Local health departments that are independent but rely on state guidance; generally similar approaches statewide	4	9%
Local health departments that act independently (with considerable variation in practice)	2	4%
Shared state and local health department responsibility: local health department responds to localized foodborne outbreaks, and the state coordinates multi-county, multi-region or multi-state outbreaks	20	43%
Other (please specify)*	5	11%
Totals:	46	100%

*Other hybrid organizational structures described were based on function (e.g., surveillance centralized) or jurisdiction size (e.g., large municipalities are more independent; smaller ones rely on the state).

Table 4 Express legal authority for select enteric disease actions

	Legal Authority	Health Department	Other State Agencies	None	Do Not Know	Totals by Authority
n=43	Collect reports on suspected enteric disease cases versus probable or confirmed cases	43 100%	0 0%	0 0%	0 0%	43 100%
n=44	Collect reports of clinical symptoms	41 93%	1 2%	2 5%	0 0%	44 100%
n=54	Perform onthespot emergency environmental inspections/assessments	35 65%	17 31%	0 0%	2 4%	54 100%
n=51	Embargo or condemn implicated food	29 57%	18 35%	0 0%	4 8%	51 100%
n=52	Close a food service facility	34 65%	15 29%	0 0%	3 6%	52 100%
n=52	Exclude sick or infected workers from food handling duties	41 79%	11 21%	0 0%	0 0%	52 100%
n=45	Require submission of certain enteric isolates and/or clinical materials from private laboratories to the public health laboratory	37 82%	2 4%	5 11%	1 2%	45 100%
n=48	Guarantee chain of custody for food environmental specimens	24 50%	9 19%	3 6%	12 25%	48 100%
n=44	Obtain customer/loyalty/shopper card program data regarding customers and purchases	24 55%	5 11%	10 23%	5 11%	44 100%
	Totals by agency: n=433 (% of all responses)	308 71%	78 18%	20 5%	27 6%	433 100%

Enteric disease epidemiology capacity

Table 5 Current enteric disease total full-time equivalent (FTE) capacity by government level

Government Level	Count (FTE)*	% of FTEs n=436
State	194.6	45%
Regional	50.9	12%
Local	190.6	44%
Government level FTE totals:	436.1	100%

*Respondents were asked to include part-time or partial FTEs in their responses, resulting in fractions of persons whose positions are split between more than one program area.

Table 6 Current enteric disease total full-time equivalent (FTE) capacity by education level across all levels of government

Education Level	Count (FTE)*	% of FTEs n=436
Doctorate	8.2	2%
Professional	31.7	7%
Master's	190.5	44%
Bachelor's	36.9	8%
Nursing	153.6	35%
Other	15.0	3%
Do not know	0.3	0%
Education level FTE totals:	436.0	100%

*Respondents were asked to include part-time or partial FTEs in their responses, resulting in fractions of persons whose positions are split between more than one program area.

Table 7 Current enteric disease full-time equivalent (FTE)* epidemiology capacity by government and education levels

Education Level	Total Current FTEs at State Health Department	Total Current FTEs at Regional/District Health Department	Total Current FTEs at Local Health Department	Totals by Education Level n=436
PhD, DrPH, other doctoral degree in epidemiology, or some epidemiological training at the doctoral level	6.4 1%	1.0 <1%	0.8 <1%	8.2 2%
Professional background (e.g., MD, DO, DVM, DDS) with dual degree in epidemiology or some epidemiological training at the doctoral level	16.5 4%	13.3 3%	2.0 <1%	31.7 7%
MPH, MSPH, MS, or other master's degree in epidemiology or some epidemiological training at the master level	122.4 28%	32.5 7%	35.6 8%	190.5 44%
BA, BS, or other bachelor's degree in epidemiology or some epidemiological training at the bachelor level	22.0 5%	0.0 0%	14.9 3%	36.9 8%
RN, BSN, or other nursing designation or degree	12.5 3%	3.7 1%	137.4 32%	153.6 35%
Other (specify)**	14.9 3%	0.1 <1%	0.0 0%	15.0 3%
Do not know	0.0 0%	0.3 <1%	0.0 0%	0.33 <1%
Totals by level of government: n=436 (% all responses)	194.6 45%	50.9 12%	190.6 44%	436.0 100%

* Respondents were asked to include part-time or partial FTEs in their responses, resulting in fractions of persons whose positions are split between more than one program area.

**Other positions or educational backgrounds specifically identified included master's level dual-degreed staff (e.g., MPH and another master's degree); non-epidemiology degrees at the doctoral, master's, and bachelor's levels; administrative staff; student interviewers/interns, and CDC Public Health Associate Program (PHAP) fellows.

PhD: Doctor of Philosophy; DrPH: Doctor of Public Health; MD: Doctor of Medicine; DO: Doctor of Osteopathy; DVM: Doctor of Veterinary Medicine; DDS: Doctor of Dental Surgery; MPH: Master of Public Health; MSPH: Master of Science in Public Health; MS: Master of Science; BA: Bachelor of Arts; BS: Bachelor of Science; RN: Registered Nurse; BSN: Bachelor of Science in Nursing.

Table 8 Staffing trends in enteric disease epidemiology
(January 1, 2016–December 31, 2018)

Trend	State Health Department Level	Regional/District Health Department Level	Local Health Department Level	Totals by Staffing n=89
Increased	13 15%	0 0%	0 0%	13 15%
Decreased	5 6%	5 6%	4 4%	14 16%
Stayed about the same	26 29%	9 10%	16 18%	51 57%
Unknown	0 0%	3 3%	8 9%	11 12%
Totals by level: n=89 (% by level)	44 49%	17 19%	28 31%	89 100%

Table 9 Additional full-time equivalents (FTEs)* needed for ideal enteric disease epidemiology capacity

Education Level	Additional FTEs at State Health Department Level	Additional FTEs at Regional/ District Health Department Level	Additional FTEs at Local Health Department Level	Totals by Education Level n=413
PhD, DrPH, other doctoral degree in epidemiology, or some epidemiological training at the doctoral level	11.2 3%	0.0 0%	3.1 1%	14.3 3%
Professional background (e.g., MD, DO, DVM, DDS) with dual degree in epidemiology or some epidemiological training at the doctoral level	12.6 3%	0.0 0%	5.1 1%	17.7 4%
MPH, MSPH, MS, or other master's degree in epidemiology or some epidemiological training at the master level	89.9 22%	22.5 5%	59.5 14%	171.9 42%
BA, BS, or other bachelor's degree in epidemiology or some epidemiological training at the bachelor level	22.5 5%	6.5 2%	17.5 4%	46.5 11%
RN, BSN, or other nursing designation or degree	12.6 3%	2.5 1%	133 32%	148.1 36%
Other (specify) (see below)	11.9 3%	3 1%	0.0 0%	14.9 4%
Do not know	0.0 0%	0.0 0%	0.0 0%	0.0 0%
Totals by level of government: n=413 (% all responses)	160.6 39%	34.5 8%	218.2 53%	413.3 100%

*Respondents were asked to include part-time or partial FTEs in their responses, resulting in fractions of persons whose positions are split between more than one program area.

PhD: Doctor of Philosophy; DrPH: Doctor of Public Health; MD: Doctor of Medicine; DO: Doctor of Osteopathy; DVM: Doctor of Veterinary Medicine; DDS: Doctor of Dental Surgery; MPH: Master of Public Health; MSPH: Master of Science in Public Health; MS: Master of Science; BA: Bachelor of Arts; BS: Bachelor of Science; RN: Registered Nurse; BSN: Bachelor of Science in Nursing.

Table 10 Additional total full-time equivalents (FTEs) for ideal enteric disease epidemiology capacity by government level

Government Level	Count (FTEs)*	% of Additional FTEs Needed n=413	Additional % of FTEs Needed Over Current Capacity**
State	160.6	39%	83%
Regional	34.5	8%	69%
Local	218.2	53%	114%
Government level FTE totals:	413.3	100%	95%

*Respondents were asked to include part-time or partial FTEs in their responses, resulting in fractions of persons whose positions are split between more than one program area.

**Percent additional needed is ideal FTE divided by current FTE (see Table 5).

Table 11 Additional total full-time equivalents (FTEs) for ideal enteric disease epidemiology capacity by education level

Education Level	Count (FTEs)*	% of Additional FTEs Needed n=413	Additional % FTEs Needed Over Current Capacity**
Doctorate	14.3	3%	174%
Professional	17.7	4%	56%
Master's	171.9	42%	90%
Bachelor's	46.5	11%	126%
Nursing	148.1	36%	96%
Other***	14.9	4%	99%
Do not know	0.0	0%	0%
Education level totals:	413.3	100%	95%

*Respondents were asked to include part-time or partial FTEs in their responses, resulting in fractions of persons whose positions are split between more than one program area.

**Percent additional needed is ideal FTE divided by current FTE (see Table 5).

*** Other positions or educational backgrounds identified include informatics, biostatistics, master's level dual degree (e.g., MPH and another master's degree), non-degreed surveillance administrative staff, student interns, and CSTE fellows.

Table 12 Barriers to recruiting staff for enteric disease epidemiology positions

Recruitment Barrier		Major Barrier	Moderate Barrier	Potential Barrier	Neutral	Not a Barrier	Total by Barrier
n=43	Hiring freezes	11 26%	5 12%	14 33%	4 9%	9 21%	43 100%
n=42	Limitations recruiting outside agency or jurisdiction	6 14%	2 5%	7 17%	4 10%	23 55%	42 100%
n=43	Not enough qualified applicants	1 2%	12 28%	13 30%	6 14%	11 26%	43 100%
n=43	Restrictions on choosing best candidate	1 2%	5 12%	8 19%	6 14%	23 53%	43 100%
n=43	Restrictions on hiring quickly enough	8 19%	18 42%	12 28%	3 7%	2 5%	43 100%
n=43	Restrictions on offering competitive pay	14 33%	15 35%	9 21%	3 7%	2 5%	43 100%
n=43	Length of time from hire to start date	5 12%	8 19%	12 28%	8 19%	10 23%	43 100%
n=43	Salary scale	9 21%	13 30%	11 26%	6 14%	4 9%	43 100%
n=43	Job benefits	2 5%	6 14%	7 16%	11 26%	17 40%	43 100%
n=43	Job location	1 2%	7 16%	17 40%	7 16%	11 26%	43 100%
n=43	Job security	0 0%	4 9%	6 14%	14 33%	19 44%	43 100%
n=43	Opportunities for promotion	5 12%	14 33%	19 44%	2 5%	3 7%	43 100%
n=43	Opportunities for training	0 0%	4 9%	19 44%	9 21%	11 26%	43 100%
n=43	Personnel policies and procedures	2 5%	3 7%	9 21%	17 40%	12 28%	43 100%
n=43	Fulfillment of job interests	1 2%	2 5%	15 35%	12 28%	13 30%	43 100%
n=43	Travel not permitted	1 2%	7 16%	13 30%	5 12%	17 40%	43 100%
n=42	Travel required	0 0%	1 2%	12 29%	10 24%	19 45%	42 100%
n=6	Other (please indicate)*	4 67%	1 17%	0 0%	0 0%	1 17%	6 100%

*Five respondents provided the following barriers, which all centered on funding and hiring: three respondents listed a lack of funding for positions as major barriers, and two respondents noted limits on the numbers of full-time equivalents permitted as, respectively, a major barrier and a moderate barrier.

Table 13 Barriers to retaining staff in enteric disease epidemiology positions

	Retention Barrier	Major Barrier	Moderate Barrier	Potential Barrier	Neutral	Not a Barrier	Total by Barrier
n=43	Restrictions on merit raises	14 33%	11 26%	12 28%	2 5%	4 9%	43 100%
n=44	Salary scale	10 23%	15 34%	15 34%	3 7%	1 2%	44 100%
n=44	Job benefits	1 2%	3 7%	12 27%	10 23%	18 41%	44 100%
n=44	Job location	0 0%	6 14%	15 34%	10 23%	13 30%	44 100%
n=44	Job security	0 0%	2 5%	12 27%	12 27%	18 41%	44 100%
n=44	Layoffs from budget restrictions	1 2%	1 2%	22 50%	6 14%	14 32%	44 100%
n=44	Loss to private or government sector	5 11%	9 20%	18 41%	4 9%	8 18%	44 100%
n=44	Opportunities for promotion	12 27%	20 45%	11 25%	1 2%	0 0%	44 100%
n=44	Opportunities for training	0 0%	7 16%	16 36%	12 27%	9 20%	44 100%
n=44	Personnel policies and procedures	2 5%	1 2%	17 39%	12 27%	12 27%	44 100%
n=44	Fulfillment of job interests	1 2%	7 16%	17 39%	10 23%	9 20%	44 100%
n=44	Travel not permitted	2 5%	4 9%	15 34%	4 9%	19 43%	44 100%
n=43	Travel required	0 0%	1 2%	10 23%	12 28%	20 47%	43 100%
n=43	Restrictions on travel outside jurisdiction	2 5%	7 16%	15 35%	2 5%	17 40%	43 100%
n=6	Other (please indicate)*	3 50%	1 17%	0 0%	0 0%	2 33%	6 100%

*Four respondents provided the following barriers: three focused on staff burnout and heavy workloads as a major barrier (two respondents) and a moderate barrier (one respondent); and one identified lack of professional development opportunities as a major barrier.

Table 14 Types and frequency of training for enteric disease epidemiology staff

	Training Topic	At Orientation	Annually	Periodically (every 2 to 5 years)	As Needed	Total by Topic
n=60	Epidemiological methods	11 18%	6 10%	7 12%	36 60%	60 100%
n=52	Statistical, database, and other software (e.g., Epi Info, ArcGIS, SAS, SaTScan)	3 6%	3 6%	10 19%	36 69%	52 100%
n=59	Skills for interviewing employees, food handlers, exposed persons, etc.	20 34%	5 8%	4 7%	30 51%	59 100%
n=66	Outbreak investigation training	19 29%	8 12%	10 15%	29 44%	66 100%
n=47	Environmental food facility routine regulatory inspections or environmental assessments	8 17%	5 11%	7 15%	27 57%	47 100%
n=58	Whole genome sequencing (WGS)	13 22%	6 10%	4 7%	35 60%	58 100%
n=57	Emergency preparedness (incident command and emergency operations center)	16 28%	1 2%	5 9%	35 61%	57 100%
n=66	Legal authorizations regarding reportable conditions, surveillance, and outbreak response	25 38%	9 14%	4 6%	28 42%	66 100%
n=48	Communications/media training	7 15%	1 2%	6 13%	34 71%	48 100%
n=3	Other (please specify)*	0 0%	1 33%	0 0%	2 67%	3 100%
Frequency totals: n=516 (% of all responses)		122 24%	45 9%	57 11%	292 57%	516 100%

* One respondent specified leadership training.

Table 15 Training methods used and preferences

Training Method	Training Method Currently Used n=164	Additional or Preferred Training Method by Staff n=79	Training Method Not Preferred by Staff n=25
Web-based, self-paced, stand-alone learning	35 21%	14 18%	7 28%
Web-based live webinar	35 21%	14 18%	5 20%
In-person provided in-house by the agency	39 24%	17 22%	1 4%
In-person provided somewhere in state	27 16%	20 25%	3 12%
In-person provided out of state	25 15%	14 18%	6 24%
Other (please specify)*	3 2%	0 0%	0 0%
None of the above	0 0%	0 0%	3 12%
Totals: (% response by use/preference)	164 100%	79 100%	25 100%

*Additional other methods identified by respondents were regional trainings, in-person peer-to-peer, and trainings provided at conferences.

Table 16 Funding for training activities

Funding Source	Count	% All Responses n=98
Budgeted agency funds	13	13%
Cooperative agreement funds	28	29%
Grant funds	25	26%
Scholarships from outside sources	22	22%
Agency does not fund training for staff but allows staff time to attend	8	8%
Agency does not fund training for staff but allows staff to use personal leave time to attend	2	2%
Totals:	98	100%

Table 17 Barriers to training

	Barrier	Major Barrier	Moderate Barrier	Potential Barrier	Neutral	Not a Barrier	Totals by Barrier
n=43	No funding	14 33%	14 33%	7 16%	3 7%	5 12%	43 100%
n=44	Funding levels limit the number of employees who may be trained	11 25%	15 34%	14 32%	2 5%	2 5%	44 100%
n=44	Funding levels limit the types of training available (e.g., web-based only, no in-person)	11 25%	13 30%	14 32%	2 5%	4 9%	44 100%
n=44	Limits on the number of trainings allowed per year (or any other time frame)	2 5%	5 11%	14 32%	9 20%	14 32%	44 100%
n=44	Limits on the number of trainings an employee may participate in	1 2%	3 7%	11 25%	12 27%	17 39%	44 100%
n=44	Funding restrictions limit the types of training staff can receive (e.g., epidemiology staff cannot attend environmental health training)	3 7%	7 16%	15 34%	8 18%	11 25%	44 100%
n=44	No time due to work demands	14 32%	14 32%	11 25%	1 2%	4 9%	44 100%
n=43	Restrictions on time away from office for training	4 9%	9 21%	8 19%	11 26%	11 26%	43 100%
n=44	Restriction on travel for training	6 14%	13 30%	12 27%	5 11%	8 18%	44 100%
n=43	Lack of training targeted at a specific issue/need	3 7%	6 14%	18 42%	10 23%	6 14%	43 100%
n=6	Other (indicate)*	4 67%	1 17%	0 0%	0 0%	1 17%	6 100%

*Five respondents provided the following barriers: two identified the shortage or lack of enteric disease staff available to provide training to other staff members as a major barrier; two mentioned restrictions on the number of staff permitted to be out of the office as a major or moderate barrier; and one respondent identified the geographic distribution of staff as a major barrier for training staff in-person together.

Table 18 Use of student interview teams

Use of Student Interview Teams	Detection/Surveillance n=39	Investigation/Response n=40
Currently have a student interview team	14 36%	16 40%
Have a student interview team for surge capacity	0 0%	6 15%
Have used student interview teams and do not plan to use them again	2 5%	2 5%
Have not used student interview teams but have plans to do so	2 5%	1 3%
Have not used student interview teams and have no plans to use them	15 38%	10 25%
Have used student interview teams in the past and would use them again	4 10%	3 8%
Other (please specify)*	2 5%	1 3%
Unknown	0 0%	1 3%
Totals: (% response by scenario)	39 100%	40 100%

*No other detail specified.

Table 19 Interviewing capacity met by student interview teams

Interviewing Capacity Met by Student Interview Teams	Count	% of Responses n=29
Less than 10%	10	34%
11%–20%	6	21%
21%–30%	3	10%
31%–40%	1	3%
41%–50%	2	7%
More than 50%	7	24%
Unknown	0	0%
Not applicable	(12*)	
Totals:	29	100%

*Not applicable answers were not counted in the total because respondents indicated they do not use student interview teams.

Table 20 Activities supervising student interview teams

Activities	Count	% of All Responses n=149
Identify project/activity for student interview teams	25	17%
Recruit and hire student interview teams	24	16%
Train student interview teams	28	19%
Supervise student interview teams	26	17%
Evaluate student interview teams	25	17%
Other (please specify)*	3	2%
Unknown	3	2%
Not applicable	15	10%
Totals:	149	100%

*Other responses included: supporting student applications and providing letters of reference and providing technical consultation to team activities.

Table 21 Hours/week supervising student interview teams

Activity	1–5 Hours/Week	5–10 Hours/Week	10–15 Hours/Week	15–20 Hours/Week	More than 20 Hours/Week	Unknown	Totals by Activity n=103
Identify project/activity for student interview teams	24 18%	1 1%	0 0%	0 0%	0 0%	0 0%	25 19%
Recruit and hire student interview teams	21 16%	3 2%	0 0%	0 0%	0 0%	0 0%	24 18%
Train student interview teams	22 17%	4 3%	1 1%	0 0%	0 0%	0 0%	27 21%
Supervise student interview teams	14 11%	4 3%	2 2%	3 2%	3 2%	0 0%	26 20%
Evaluate student interview teams	20 15%	2 2%	2 2%	0 0%	1 1%	0 0%	25 19%
Other (please specify)*	2 2%	0 0%	0 0%	0 0%	1 1%	0 0%	3 2%
Unknown	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
Not applicable	0 0%	0 0%	0 0%	0 0%	0 0%	1 1%	1 1%
Totals by time:	103 79%	14 11%	5 4%	3 2%	5 4%	1 1%	131 100%

*Other responses included: supporting student applications and letters of reference and providing technical consultation to team activities.

Enteric disease surveillance

Table 22 Types of data sources used in the past—routine surveillance/non-outbreak scenario

	Data Sources	Often Used	Sometimes Used	Rarely Used	Never Used	Totals by Source
n=44	Emergency department chief complaint data	12 27%	8 18%	11 25%	13 30%	44 100%
n=44	Poison Control Center data	3 7%	6 14%	16 36%	19 43%	44 100%
n=44	Over-the-counter drug sales	1 2%	0 0%	4 9%	39 89%	44 100%
n=44	BioSense data	7 16%	3 7%	9 20%	25 57%	44 100%
n=44	Emergency medical services (EMS) data	0 0%	2 5%	9 20%	33 75%	44 100%
n=44	Provider reports	39 89%	4 9%	1 2%	0 0%	44 100%
n=44	PulseNet/pulsed-field gel electrophoresis (PFGE) data	40 91%	2 5%	1 2%	1 2%	44 100%
n=44	Whole genome sequencing (WGS) data	36 82%	5 11%	2 5%	1 2%	44 100%
n=44	Culture-independent diagnostic testing (CIDT)	43 98%	1 2%	0 0%	0 0%	44 100%
n=44	Consumer complaint phone hotline	12 27%	12 27%	6 14%	14 32%	44 100%
n=44	Online consumer complaint report	9 20%	10 23%	10 23%	15 34%	44 100%
n=44	Social media	2 5%	7 16%	13 30%	22 50%	44 100%
n=44	Food ordering/other consumer mobile apps	0 0%	1 2%	10 23%	33 75%	44 100%
n=44	Customer/loyalty/shopper cards	4 9%	10 23%	9 20%	21 48%	44 100%
n=2	Other (please specify)*	1 50%	0 0%	0 0%	1 50%	2 100%

*Often used: Complaint calls - no hotline; Never used: Food ordering (not necessarily by mobile app)

Table 23 Types of data sources used in the past—during an outbreak/investigation scenario

	Data Sources	Often Used	Sometimes Used	Rarely Used	Never Used	Totals by Source
n=44	Emergency department chief complaint data	10 23%	18 41%	9 20%	7 16%	44 100%
n=44	Poison Control Center data	1 2%	13 30%	17 39%	13 30%	44 100%
n=44	Over-the-counter drug sales	0 0%	1 2%	4 9%	39 89%	44 100%
n=44	BioSense data	5 11%	8 18%	9 20%	22 50%	44 100%
n=44	Emergency medical services (EMS) data	0 0%	4 9%	14 32%	26 59%	44 100%
n=44	Provider reports	39 89%	4 9%	1 2%	0 0%	44 100%
n=44	PulseNet/pulsed-field gel electrophoresis (PFGE) data	42 95%	1 2%	0 0%	1 2%	44 100%
n=44	Whole genome sequencing (WGS) data	38 86%	4 9%	0 0%	2 5%	44 100%
n=44	Culture-independent diagnostic testing (CIDT)	43 98%	1 2%	0 0%	0 0%	44 100%
n=44	Consumer complaint phone hotline	16 36%	11 25%	8 18%	9 20%	44 100%
n=44	Online consumer complaint report	13 30%	7 16%	12 27%	12 27%	44 100%
n=44	Social media	3 7%	17 39%	15 34%	9 20%	44 100%
n=44	Food ordering/other consumer mobile apps	1 2%	7 16%	13 30%	23 52%	44 100%
n=44	Customer/loyalty/shopper cards	11 25%	24 55%	7 16%	2 5%	44 100%
n=2	Other (please specify)*	1 50%	1 50%	0 0%	0 0%	2 100%

*Often used: Complaint calls - no hotline; Never used: Food ordering (not necessarily by mobile app)

Table 24 Use of alternative data

	Alternative Data Sources	Yes	No	Do Not Know	Totals by Source
n=43	Customer/loyalty/shopper card or app	39 91%	3 7%	1 2%	43 100%
n=42	Debit/credit cards	26 62%	16 38%	0 0%	42 100%
n=43	Meal delivery app data	16 37%	26 60%	1 2%	43 100%
n=43	Online shopping	12 28%	29 67%	2 5%	43 100%
n=3	Other (please specify)*	1 33%	2 67%	0 0%	3 100%

*Other alternative data source was reservation apps.

Table 25 Mechanisms to access alternative data

	Mechanisms to Access Data	Customer / Loyalty / Shopper Card / Apps	Debit / Credit Cards	Meal Delivery Data / Apps	Online Shopping	Other	Totals by Mechanism
n=39	Legally authorized by law (statute or regulation) to access such data	14 36%	9 23%	8 21%	7 18%	1 3%	39 100%
n=7	Have a standing agreement with an establishment to access data for any outbreak	5 71%	1 14%	0 0%	0 0%	1 14%	7 100%
n=13	Obtain a signed agreement/release form with an establishment for each outbreak	9 69%	2 15%	1 8%	0 0%	1 8%	13 100%
n=25	Obtain a signed release from individual customers to access their data	13 52%	4 16%	3 12%	3 12%	2 8%	25 100%
n=53	Obtained verbal consent from individual customers to access their data	25 47%	15 28%	7 13%	4 8%	2 4%	53 100%
n=12	Other (please specify)	2 17%	4 33%	4 33%	1 8%	1 8%	12 100%
n=19	Do not know	3 16%	4 21%	4 21%	6 32%	2 11%	19 100%

*Other responses were for customer loyalty/shopper card/apps: information received through verbal consent of the establishment, information received from other agencies; for debit/credit cards: numbers may be provided by both the customer and the establishment; for meal delivery data/apps: information received from the restaurant/company directly sometimes during an inspection. No additional information was provided for some respondents who selected other.

Table 26 Barriers to using alternative data—customer/loyalty/shopper cards and apps

	Barrier	Major Barrier	Moderate Barrier	Potential Barrier	Neutral	Not a Barrier	Totals by Barrier
n=38	Working with local establishments	2 5%	8 21%	13 34%	10 26%	5 13%	38 100%
n=37	Working with corporate/headquarters offices	0 0%	12 32%	15 41%	7 19%	3 8%	37 100%
n=39	Convincing individuals to release their data	4 10%	10 26%	17 44%	3 8%	5 13%	39 100%
n=38	Convincing companies to release an individual's data even with individual's consent	4 11%	11 29%	13 34%	5 13%	5 13%	38 100%
n=38	Confidentiality concerns regarding name, phone numbers, etc.	1 3%	9 24%	17 44%	8 21%	3 8%	38 100%
n=1	Other (please specify)*	0 0%	0 0%	1 100%	0 0%	0 0%	1 100%
n=1	Have not used or attempted to use the descriptive alternative/other data	0 0%	0 0%	0 0%	0 0%	1 100%	1 100%
n=1	Do not know	0 0%	0 0%	0 0%	0 0%	1 100%	1 100%

*One respondent commented that the success of working with specific retailers, establishments, and/or corporate entities varies greatly from very easy to unable to access information.

Table 27 Barriers to using alternative data—debit and credit cards

	Barrier	Major Barrier	Moderate Barrier	Potential Barrier	Neutral	Not a Barrier	Totals by Barrier
n=27	Working with local establishments	3 11%	7 26%	8 30%	7 26%	2 7%	27 100%
n=26	Working with corporate/headquarters offices	2 8%	4 15%	14 54%	5 19%	1 4%	26 100%
n=25	Convincing individuals to release their data	5 20%	9 36%	6 24%	2 8%	3 12%	25 100%
n=25	Convincing companies to release an individual's data even with individual's consent	6 24%	5 20%	7 28%	4 16%	3 12%	25 100%
n=25	Confidentiality concerns regarding name, phone numbers, etc.	2 8%	7 28%	10 40%	5 20%	1 4%	25 100%
n=1	Other (please specify)*	0 0%	0 0%	1 100%	0 0%	0 0%	1 100%
n=5	Have not used or attempted to use the descriptive alternative/other data	2 40%	1 20%	1 20%	1 20%	0 0%	5 100%
n=1	Do not know	0 0%	0 0%	0 0%	0 0%	1 100%	1 100%

*One respondent commented that the success of working with specific retailers, establishments, and/or corporate entities varies greatly from very easy to unable to access information.

Table 28 Barriers to using alternative data—meal delivery data and apps

	Barrier	Major Barrier	Moderate Barrier	Potential Barrier	Neutral	Not a Barrier	Totals by Barrier
n=19	Working with local establishments	1 5%	6 32%	7 37%	3 16%	2 11%	19 100%
n=18	Working with corporate/headquarters offices	2 11%	5 28%	8 44%	1 6%	2 11%	18 100%
n=19	Convincing individuals to release their data	3 18%	5 26%	7 37%	1 5%	3 16%	19 100%
n=18	Convincing companies to release an individual's data even with individual's consent	0 0%	7 39%	7 39%	2 11%	2 11%	18 100%
n=18	Confidentiality concerns regarding name, phone numbers, etc.	1 6%	6 33%	6 33%	3 17%	2 11%	18 100%
n=1	Other (please specify)*	0 0%	0 0%	1 100%	0 0%	0 0%	1 100%
n=9	Have not used or attempted to use the descriptive alternative/other data	2 22%	0 0%	2 22%	3 33%	2 22%	9 100%
n=19	Do not know	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%

*One respondent commented that the success of working with specific retailers, establishments, and/or corporate entities varies greatly from very easy to unable to access information.

Table 29 Barriers to using alternative data—online shopping

	Barrier	Major Barrier	Moderate Barrier	Potential Barrier	Neutral	Not a Barrier	Totals by Barrier
n=16	Working with local establishments	0 0%	4 25%	6 38%	5 31%	1 6%	16 100%
n=16	Working with corporate/ headquarters offices	0 0%	6 38%	6 38%	3 19%	1 6%	16 100%
n=16	Convincing individuals to release their data	2 13%	3 19%	7 44%	3 19%	1 6%	16 100%
n=15	Convincing companies to release an individual's data even with individual's consent	0 0%	5 33%	3 20%	5 33%	2 13%	15 100%
n=15	Confidentiality concerns regarding name, phone numbers, etc.	1 7%	4 2%	4 27%	6 40%	0 0%	15 100%
n=1	Other (please specify)*	0 0%	0 0%	1 100%	0 0%	0 0%	1 100%
n=11	Have not used or attempted to use the descriptive alternative/other data	3 27%	0 0%	2 18%	4 36%	2 18%	11 100%
n=0	Do not know	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%

*One respondent commented that the success of working with specific retailers, establishments, and/or corporate entities varies greatly from very easy to unable to access information.

Table 30 Barriers to using alternative data—other

	Barrier	Major Barrier	Moderate Barrier	Potential Barrier	Neutral	Not a Barrier	Totals by Barrier
n=1	Working with local establishments	0 0%	0 0%	1 100%	0 0%	0 0%	1 100%
n=1	Working with corporate/ headquarters offices	0 0%	0 0%	1 100%	0 0%	0 0%	1 100%
n=0	Convincing individuals to release their data	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
n=0	Convincing companies to release an individual's data even with individual's consent	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
n=0	Confidentiality concerns regarding name, phone numbers, etc.	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
n=0	Other (please specify)	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%
n=4	Have not used or attempted to use the descriptive alternative/other data	2 50%	0 0%	0 0%	2 50%	0 0%	4 100%
n=0	Do not know	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%

Table 31 Use of electronic databases

Databases Used*	Cases (n=44)		Outbreaks (n=44)	
	Count	% of Case Responses	Count	% of Outbreak Responses
No electronic database	3	7%	4	9%
Use a module within a surveillance system (e.g., Maven, CDC-developed NEDSS Base System)	29	66%	22	50%
Use a “homegrown” (i.e., custom) system to maintain records	15	34%	18	41%
Use an “off-the-shelf” or customizable commercial database to maintain records (e.g., Maven)	8	18%	7	16%
Use an “off-the-shelf” or customizable free license/nonprofit database (e.g., REDCap, Epi Info) to maintain records	9	20%	22	50%
Use of electronic databases varies greatly across subordinate jurisdictions	4	9%	9	20%
Other (specify)**	0	0%	4	9%

*Jurisdictions could select more than one response option.

**Jurisdictions reported using Microsoft Excel or Microsoft Access for outbreak data management.

Table 32 Types of information recorded in databases about enteric disease cases

Information in Databases	Count	% of State Responses by Information Type n=44
Clinical signs and symptoms	43	98%
Laboratory results	44	100%
3-day food history	22	50%
5-day food history	24	55%
Animal contact	43	98%
Water consumption description	41	93%
History of contact with water	43	98%
Places of work	37	84%
School	34	77%
Day care	41	93%
Places of worship	4	9%
Volunteering	9	20%
Travel history	43	98%
Case addresses and other geographic data	42	95%
Other epidemiologic risk factors (e.g., prior illness, condition, hospitalization; medication use)	40	91%
Other environmental exposures (e.g., contaminated surfaces)	21	48%
Other (please specify)*	19	43%
Not applicable	0	0%

*Many other responses were provided. At least 5 respondents reported using a 7-day food history rather than a 3- or 5-day food history for some pathogens. Many of the other comments described additional exposure categories that were collected for enteric disease cases in the jurisdiction (e.g., sexual preferences, incarceration, drug use, large gatherings, pets and related exposures, occupation, specific questions based on pathogen, etc.).

Table 33 Data formats for enteric disease outbreak investigation records

Data Formats	Count	% Response by Data Format (n=44 each)
Electronic database at state level	40	91%
Electronic database at local level	10	23%
National Outbreak Reporting System (NORS)	43	98%
Non-database summary at state level (e.g., spreadsheet, paper copy, etc.)	26	59%
Non-database summary at local level (e.g., spreadsheet, paper copy, etc.)	6	14%
Other (please specify)*	2	5%

*Other formats included an in-house access database and a comment from one respondent that they were unsure of the record keeping practices of local agencies that investigate outbreaks.

Table 34 Case database sharing data with investigation database

	Count	% of State Responses (n=43)
Yes	22	51%
No	21	49%
Do not know	0	0%
Totals:	43	100%

Table 35 Same systems used for case and investigation data

	Count	% of State Responses (n=22)
Yes	21	95%
No	1	5%
Do not know	0	0%
Totals:	22	100%

Table 36 Software used

Software	Count	% of State Responses by Software Type (n=44)
ArcGIS	22	50%
Epi Info	28	64%
Excel	43	98%
REDCap	14	32%
R/RStudio	7	16%
SAS	35	80%
SaTScan	8	18%
SPSS	5	11%
Stata	1	2%
Other (please specify)*	5	11%

*Other software programs listed include Microsoft Access and Tableau.

Table 37 Capacity to undertake surveillance activities—
routine surveillance/non-outbreak scenario

Capacity*	None (0%)	Minimal (0–24%)	Partial (25–49%)	Substantial (50–74%)	Almost Full (75–99%)	Full (100%)	Totals by Capacity (n=44 each)
Sufficient time to interview all reported cases	1 2%	3 7%	6 14%	10 23%	15 34%	9 20%	44 100%
Sufficient time to educate interviewees about enteric diseases	1 2%	6 14%	5 11%	8 18%	15 34%	9 20%	44 100%
Compare case to standardized case definition	0 0%	2 5%	1 2%	3 7%	5 11%	33 75%	44 100%
Enter data	0 0%	3 7%	5 11%	6 14%	15 34%	15 34%	44 100%
Review data for completeness and consistency	0 0%	4 9%	8 18%	9 20%	18 41%	5 11%	44 100%
Analyze data	0 0%	10 23%	11 25%	10 23%	9 20%	4 9%	44 100%

*There was an error in the survey design with overlapping “none” and “minimal (0-24)” response options. It is assumed that jurisdictions with no capacity most likely selected the “none” option rather than the “minimal (0-24)” option.

Table 38 Capacity to undertake surveillance activities—during outbreak/investigation scenario

Capacity*	None (0%)	Minimal (0–24%)	Partial (25–49%)	Substantial (50–74%)	Almost Full (75–99%)	Full (100%)	Totals by Capacity (n=44 each)
Sufficient time to interview all reported cases	1 2%	2 5%	6 14%	8 18%	14 32%	13 30%	44 100%
Sufficient time to educate interviewees about enteric diseases	1 2%	4 9%	5 11%	11 25%	9 20%	14 32%	44 100%
Compare case to standardized case definition	0 0%	1 2%	2 5%	1 2%	6 14%	34 77%	44 100%
Enter data	0 0%	4 9%	2 5%	6 14%	11 25%	21 48%	44 100%
Review data for completeness and consistency	0 0%	2 5%	5 11%	5 11%	17 39%	15 34%	44 100%
Analyze data	0 0%	1 2%	6 14%	6 14%	17 39%	14 32%	44 100%

*There was an error in the survey design with overlapping “none” and “minimal (0-24)” response options. It is assumed that jurisdictions with no capacity most likely selected the “none” option rather than the “minimal (0-24)” option.

Table 39 Surveillance for specified pathogens—routine surveillance/non-outbreak scenario

	Pathogen	Yes	No	Totals by Pathogen
n=44	<i>Campylobacter</i>	43 98%	1 2%	44 100%
n=44	<i>Cryptosporidium</i>	44 100%	0 0%	44 100%
n=44	<i>Cyclospora</i>	40 91%	4 9%	44 100%
n=44	<i>Listeria</i>	44 100%	0 0%	44 100%
n=43	Norovirus	10 23%	33 77%	43 100%
n=44	<i>Salmonella</i>	44 100%	0 0%	44 100%
n=44	Shiga toxin-producing <i>E. coli</i>	44 100%	0 0%	44 100%
n=43	<i>Shigella</i>	43 100%	0 0%	43 100%
n=44	Typhoid/paratyphoid fever	44 100%	0 0%	44 100%
n=44	<i>Vibrio</i>	44 100%	0 0%	44 100%
n=44	Yersiniosis (non-pestis)	33 75%	11 25%	44 100%

Table 40 Surveillance for specified pathogens— during outbreak/investigation scenario

	Pathogen	Yes	No	Totals by Pathogen
n=44	<i>Campylobacter</i>	44 100%	0 0%	44 100%
n=44	<i>Cryptosporidium</i>	44 100%	0 0%	44 100%
n=44	<i>Cyclospora</i>	44 100%	0 0%	44 100%
n=43	<i>Listeria</i>	43 100%	0 0%	43 100%
n=44	Norovirus	43 98%	1 2%	44 100%
n=44	<i>Salmonella</i>	44 100%	0 0%	44 100%
n=44	Shiga toxin-producing <i>E. coli</i>	44 100%	0 0%	44 100%
n=44	<i>Shigella</i>	44 100%	0 0%	44 100%
n=44	Typhoid/paratyphoid fever	44 100%	0 0%	44 100%
n=44	<i>Vibrio</i>	44 100%	0 0%	44 100%
n=44	Yersiniosis (non-pestis)	42 95%	2 5%	44 100%

Table 41 Barriers to surveillance and investigation—routine surveillance/non-outbreak scenario

	Barriers	Major Barrier	Moderate Barrier	Potential Barrier	Neutral	Not a Barrier	Total
n=44	Lack of epidemiology expertise	2 5%	5 11%	11 25%	4 9%	22 50%	44 100%
n=44	Lack of epidemiology capacity	2 5%	20 45%	13 30%	2 5%	7 16%	44 100%
n=44	Lack of environmental health expertise	4 9%	4 9%	13 30%	9 20%	14 32%	44 100%
n=44	Lack of environmental health capacity	2 5%	7 16%	15 34%	12 27%	8 18%	44 100%
n=44	Lack of laboratory expertise	0 0%	3 7%	10 23%	6 14%	25 57%	44 100%
n=44	Lack of laboratory capacity	3 7%	9 20%	19 43%	6 14%	7 16%	44 100%
n=44	Lack of statistical support	2 5%	9 20%	17 39%	8 18%	8 18%	44 100%
n=44	Lack of information technology/ informatics support	5 11%	12 27%	13 30%	8 18%	6 14%	44 100%
n=44	Lack of adequate numbers of staff	8 18%	15 34%	14 32%	2 5%	5 11%	44 100%
n=44	Lack of ability to pay overtime	4 9%	6 14%	10 23%	9 20%	15 34%	44 100%
n=44	Travel policy constraints	2 5%	2 5%	7 16%	11 25%	22 50%	44 100%
n=44	Delayed notification	5 11%	12 27%	19 43%	3 7%	5 11%	44 100%
n=44	Low priority/competing priorities	3 7%	15 34%	20 45%	3 7%	3 7%	44 100%
n=44	Difficulty of specimen transport	1 2%	6 14%	19 43%	8 18%	10 23%	44 100%
n=44	Difficulty working with partners in state	1 2%	5 11%	17 39%	7 16%	14 32%	44 100%
n=44	Difficulty working with partners in other states	0 0%	2 5%	14 32%	6 14%	22 50%	44 100%
n=44	Difficulty working with federal partners	0 0%	2 5%	12 27%	7 16%	23 52%	44 100%
n=40	Outbreak reporters' lack of time	2 5%	7 18%	14 35%	10 25%	7 18%	40 100%
n=40	Outbreak reporters' lack of staff	4 10%	7 18%	13 33%	10 25%	6 15%	40 100%
n=43	Uncooperative staff/personnel at investigation site	2 5%	5 12%	23 53%	8 19%	5 12%	43 100%
n=43	Patient refusal	3 7%	15 35%	21 49%	1 2%	3 7%	43 100%
n=0	Other (specify)	0 0%	0 0%	0 0%	0 0%	0 0%	0 100%

Table 42 Barriers to surveillance and investigation—during outbreak/investigation scenario

	Barriers	Major Barrier	Moderate Barrier	Potential Barrier	Neutral	Not a Barrier	Total
n=44	Lack of epidemiology expertise	2 5%	5 11%	14 32%	4 9%	19 43%	44 100%
n=44	Lack of epidemiology capacity	5 11%	17 39%	10 23%	0 0%	12 27%	44 100%
n=44	Lack of environmental health expertise	3 7%	9 20%	17 39%	4 9%	11 25%	44 100%
n=44	Lack of environmental health capacity	3 7%	12 27%	14 32%	6 14%	9 20%	44 100%
n=44	Lack of laboratory expertise	0 0%	5 11%	10 23%	5 11%	24 55%	44 100%
n=44	Lack of laboratory capacity	4 9%	12 27%	15 34%	4 9%	9 20%	44 100%
n=44	Lack of statistical support	2 5%	7 16%	17 39%	9 20%	9 20%	44 100%
n=44	Lack of information technology /informatics support	7 16%	12 27%	14 32%	6 14%	5 11%	44 100%
n=44	Lack of adequate numbers of staff	10 23%	16 36%	11 25%	3 7%	4 9%	44 100%
n=44	Lack of ability to pay overtime	5 11%	5 11%	14 32%	8 18%	12 27%	44 100%
n=44	Travel policy constraints	1 2%	1 2%	12 27%	8 18%	22 50%	44 100%
n=44	Delayed notification	8 18%	12 27%	18 41%	3 7%	3 7%	44 100%
n=44	Low priority/competing priorities	3 7%	12 27%	16 36%	3 7%	10 23%	44 100%
n=43	Difficulty of specimen transport	2 5%	7 16%	16 37%	12 28%	6 14%	43 100%
n=44	Difficulty working with partners in state	1 2%	6 14%	21 48%	6 14%	10 23%	44 100%
n=44	Difficulty working with partners in other states	0 0%	2 5%	15 34%	7 16%	20 45%	44 100%
n=44	Difficulty working with federal partners	0 0%	8 18%	17 39%	3 7%	16 36%	44 100%
n=43	Outbreak reporters' lack of time	2 5%	12 28%	20 47%	6 14%	3 7%	43 100%
n=43	Outbreak reporters' lack of staff	4 9%	11 26%	18 42%	8 19%	2 5%	43 100%
n=44	Uncooperative staff/ personnel at investigation site	2 5%	12 27%	24 55%	6 14%	0 0%	44 100%
n=43	Patient refusal	4 9%	15 35%	22 51%	1 2%	1 2%	43 100%
n=0	Other (specify)	0 0%	0 0%	0 0%	0 0%	0 0%	0 100%

Table 43 Source of authority to share—individual data

	Agency	Statute	Regulation	MOU/MOA	Policy	Other	Do Not Know	Totals by Agency
n=44	State health department	20 45%	9 20%	1 2%	5 11%	4 9%	5 11%	44 100%
n=45	Local health departments	22 49%	9 20%	1 2%	6 13%	3 7%	4 9%	45 100%
n=31	Regional/district health departments	11 35%	6 19%	2 6%	4 13%	3 10%	5 16%	31 100%
n=47	Other state agencies in your state	15 32%	6 13%	7 15%	9 19%	1 2%	9 19%	47 100%
n=46	Centers for Disease Control and Prevention (CDC)	19 41%	6 13%	0 0%	11 24%	2 4%	8 17%	46 100%
n=44	Food and Drug Administration (FDA)	17 39%	5 11%	1 2%	10 23%	4 9%	7 16%	44 100%
n=43	United States Department of Agriculture-Food Safety and Inspection Service (USDA-FSIS)	17 39%	5 12%	0 0%	9 21%	4 9%	8 19%	43 100%
n=42	Environmental Protection Agency (EPA)	17 40%	5 12%	0 0%	7 17%	2 5%	11 26%	42 100%
n=43	Other federal agencies	16 37%	5 12%	2 5%	8 19%	2 5%	10 23%	43 100%
n=46	Health agencies in other states	16 35%	5 11%	1 2%	11 24%	3 7%	10 22%	46 100%
n=37	Other agencies in other states	14 38%	4 11%	0 0%	8 22%	2 5%	9 24%	37 100%
	Totals by source: n=468 (% response by source)	184 39%	65 14%	15 3%	88 19%	30 6%	86 18%	468 100%

MOU: Memorandum of understanding; MOA: Memorandum of agreement

Table 44 Source of authority to share—business data

	Agency	Statute	Regulation	MOU/MOA	Policy	Other	Do Not Know	Totals by Agency
n=45	State health department	19 42%	8 18%	0 0%	8 18%	4 9%	6 13%	45 100%
n=45	Local health departments	19 42%	8 18%	1 2%	8 18%	4 9%	5 11%	45 100%
n=35	Regional/district health departments	14 40%	4 11%	1 3%	6 17%	3 9%	7 20%	35 100%
n=48	Other state agencies in your state	15 31%	4 8%	4 8%	11 23%	3 6%	11 23%	48 100%
n=47	Centers for Disease Control and Prevention (CDC)	17 36%	6 13%	0 0%	10 21%	4 9%	10 21%	47 100%
n=49	Food and Drug Administration (FDA)	17 35%	6 12%	2 4%	10 20%	5 10%	9 18%	49 100%
n=47	United States Department of Agriculture-Food Safety and Inspection Service (USDA-FSIS)	17 36%	6 13%	0 0%	9 19%	5 11%	10 21%	47 100%
n=42	Environmental Protection Agency (EPA)	15 36%	4 10%	0 0%	8 19%	2 5%	13 31%	42 100%
n=42	Other federal agencies	15 36%	4 10%	0 0%	8 19%	2 5%	13 31%	42 100%
n=44	Health agencies in other states	16 36%	4 9%	0 0%	9 20%	3 7%	12 27%	44 100%
n=37	Other agencies in other states	14 38%	3 8%	0 0%	7 19%	2 5%	11 30%	37 100%
	Totals by source: n=481 (% response by source)	178 37%	57 12%	8 2%	94 20%	37 8%	107 22%	481 100%

MOU: Memorandum of understanding; MOA: Memorandum of agreement

Table 45 Authorized to share non-identifying individual data

	Agency	Yes	No	Totals by Agency
n=40	State health department	40 100%	0 0%	40 100%
n=37	Local health departments	37 100%	0 0%	37 100%
n=24	Regional/district health departments	22 92%	2 8%	24 100%
n=39	Other state agencies in your state	38 97%	1 3%	39 100%
n=42	Centers for Disease Control and Prevention (CDC)	42 100%	0 0%	42 100%
n=42	Food and Drug Administration (FDA)	39 93%	3 7%	42 100%
n=42	United States Department of Agriculture-Food Safety and Inspection Service (USDA-FSIS)	39 93%	3 7%	42 100%
n=37	Environmental Protection Agency (EPA)	34 92%	3 8%	37 100%
n=35	Other federal agencies	33 94%	2 6%	35 100%
n=38	Health agencies in other states	38 100%	0 0%	38 100%
n=30	Other agencies in other states	26 87%	4 13%	30 100%

Table 46 Authorized to share non-identifying business data

	Agency	Yes	No	Totals by Agency
n=40	State health department	40 100%	0 0%	40 100%
n=38	Local health departments	38 100%	0 0%	38 100%
n=25	Regional/district health departments	25 100%	0 0%	25 100%
n=37	Other state agencies in your state	37 100%	0 0%	37 100%
n=40	Centers for Disease Control and Prevention (CDC)	39 98%	1 2%	40 100%
n=40	Food and Drug Administration (FDA)	39 98%	1 2%	40 100%
n=40	United States Department of Agriculture-Food Safety and Inspection Service (USDA-FSIS)	39 98%	1 2%	40 100%
n=35	Environmental Protection Agency (EPA)	33 94%	2 6%	35 100%
n=34	Other federal agencies	32 94%	2 6%	34 100%
n=37	Health agencies in other states	37 100%	0 0%	37 100%
n=33	Other agencies in other states	29 88%	4 12%	33 100%

Table 47 Sharing identifiable information about individuals

Conditions for Sharing	Count	% of Responses n=43
Identifiers are not shared with other agencies	8	19%
Identifiers may be shared with other agencies but only after administrative approval(s)	3	7%
Identifiers may be shared with other agencies if there is a legitimate purpose	25	58%
Other (specify)*	6	14%
Do not know	1	2%
Totals:	43	100%

*Respondents generally selected other when their approach to sharing identifiable information fell between not sharing at all and sharing for legitimate purposes, typically due to restrictions on agencies with which information can be shared or specific requirements that must be met in order to share information.

Table 48 Sharing identifiable information about businesses

Conditions for Sharing	Count	% of Responses n=43
Identifiers are not shared with other agencies	0	0%
Identifiers may be shared with other agencies but only after administrative approval(s)	5	12%
Identifiers may be shared with other agencies if there is a legitimate purpose	25	58%
Identifying information can be released after request for information is received	2	4%
Identifying information can be made available/publicly released without request	5	12%
Other (specify)*	3	7%
Do not know	3	7%
Totals:	43	100%

*Other responses were jurisdictions that released information under multiple circumstances (e.g., legitimate purpose and request for information) or under different circumstances based upon agency review, sometimes after consultation with legal counsel.

Communication and coordination on enteric diseases

Table 49 Interactions among agencies—routine surveillance/non-outbreak scenario

	Agency	Constant (multiple times/week)	Frequent (every 2 weeks)	Sporadic (monthly or less)	None	Do Not Know	Totals by Agency
n=43	Environmental health	19 44%	10 23%	12 28%	2 5%	0 0%	43 100%
n=44	Public health laboratory	40 91%	4 9%	0 0%	0 0%	0 0%	44 100%
n=44	Information technology/ informatics	11 25%	12 27%	15 34%	4 9%	2 5%	44 100%
n=42	Local/regional health departments	32 76%	3 7%	3 7%	4 9%	0 0%	42 100%
n=43	State department of agriculture	6 14%	5 12%	23 53%	8 19%	1 2%	43 100%
n=44	Centers for Disease Control and Prevention (CDC)	16 36%	13 30%	14 32%	1 2%	0 0%	44 100%
n=44	Food and Drug Administration (FDA)	2 5%	8 18%	25 57%	9 20%	0 0%	44 100%
n=44	United States Department of Agriculture-Food Safety and Inspection Service (USDA-FSIS)	1 2%	2 5%	29 66%	11 25%	1 2%	44 100%
n=44	Clinical laboratories	13 30%	10 23%	17 39%	3 7%	1 2%	44 100%
n=3	Other (specify)*	1 33%	1 33%	1 33%	0 0%	0 0%	3 100%

*Other responses included: Professional organizations - Sporadic; State food safety agency - Frequent; Department of Business & Professional Regulation / Agency for Healthcare Administration - Constant

Table 50 Interactions among agencies—during outbreak/investigation scenario

	Agency	Constant (multiple times/week)	Frequent (every 2 weeks)	Sporadic (monthly or less)	None	Do not Know	As Needed During Outbreaks	Totals by Agency
n=43	Environmental health	29 67%	0 0%	1 2%	1 2%	0 0%	12 28%	43 100%
n=44	Public health laboratory	37 84%	0 0%	0 0%	0 0%	0 0%	7 16%	44 100%
n=44	Information technology/ informatics	9 20%	6 14%	7 16%	9 20%	3 7%	10 23%	44 100%
n=42	Local/regional health departments	32 76%	0 0%	2 5%	3 7%	0 0%	5 12%	42 100%
n=43	State department of agriculture	15 35%	4 9%	1 2%	3 7%	2 5%	18 42%	43 100%
n=44	Centers for Disease Control and Prevention (CDC)	22 50%	3 7%	0 0%	0 0%	0 0%	19 43%	44 100%
n=44	Food and Drug Administration (FDA)	9 20%	4 9%	6 14%	1 2%	0 0%	24 55%	44 100%
n=44	United States Department of Agriculture-Food Safety and Inspection Service (USDA-FSIS)	7 16%	4 9%	6 14%	1 2%	0 0%	26 59%	44 100%
n=44	Clinical laboratories	11 25%	4 9%	4 9%	2 5%	2 5%	21 48%	44 100%
n=3	Other (specify)*	1 33%	1 33%	0 0%	0 0%	0 0%	1 33%	3 100%

*Other responses included: Professional organizations - Frequent; State food safety agency - As needed during outbreaks; Department of Business & Professional Regulation / Agency for Healthcare Administration - Constant.

Table 51 Barriers to communicating with agencies and partners—state agencies

	Barrier	Major Barrier	Moderate Barrier	Potential Barrier	Neutral	Not a Barrier	Totals by Barrier
n=43	Do not know person or office to contact at all	0 0%	2 5%	7 16%	2 5%	32 74%	43 100%
n=43	Do not know person or office to contact after hours	3 7%	3 7%	14 33%	4 9%	19 44%	43 100%
n=43	Do not have current/correct contact information	0 0%	3 7%	14 33%	5 12%	21 49%	43 100%
n=43	Do not have dedicated staff responsible for keeping contact information current	4 9%	5 12%	9 21%	5 12%	20 47%	43 100%
n=43	Technology issues—systems cannot communicate at all	2 5%	5 12%	14 33%	5 12%	17 40%	43 100%
n=43	Technology issues—systems do not communicate consistently	4 9%	5 12%	12 28%	8 19%	14 33%	43 100%
n=42	Funding limitations to sending alerts	1 2%	0 0%	5 12%	5 12%	31 74%	42 100%
n=42	Uncertainty regarding the types and amounts of information to share and with whom	0 0%	3 7%	14 33%	3 7%	22 52%	42 100%
n=0	Other barriers (specify)	0 0%	0 0%	0 0%	0 0%	0 0%	0 100%

Table 52 Barriers to communicating with agencies and partners—local/regional agencies

	Barrier	Major Barrier	Moderate Barrier	Potential Barrier	Neutral	Not a Barrier	Totals by Barrier
n=40	Do not know person or office to contact at all	0 0%	0 0%	9 23%	3 8%	28 70%	40 100%
n=39	Do not know person or office to contact after hours	0 0%	5 13%	11 28%	2 5%	21 54%	39 100%
n=39	Do not have current/correct contact information	0 0%	4 10%	13 33%	3 8%	19 49%	39 100%
n=40	Do not have dedicated staff responsible for keeping contact information current	2 5%	5 13%	10 25%	1 3%	22 55%	40 100%
n=40	Technology issues—systems cannot communicate at all	0 0%	6 15%	11 28%	4 10%	19 48%	40 100%
n=39	Technology issues—systems do not communicate consistently	1 3%	8 21%	6 15%	6 15%	18 46%	39 100%
n=39	Funding limitations to sending alerts	0 0%	0 0%	4 10%	7 18%	28 72%	39 100%
n=39	Uncertainty regarding the types and amounts of information to share and with whom	0 0%	1 3%	13 33%	3 8%	22 56%	39 100%
n=0	Other barriers (specify)	0 0%	0 0%	0 0%	0 0%	0 0%	0 100%

Table 53 Barriers to communicating with agencies and partners—public health laboratories

	Barrier	Major Barrier	Moderate Barrier	Potential Barrier	Neutral	Not a Barrier	Totals by Barrier
n=44	Do not know person or office to contact at all	0 0%	1 2%	5 11%	2 5%	36 82%	44 100%
n=44	Do not know person or office to contact after hours	1 2%	1 2%	10 23%	3 7%	29 66%	44 100%
n=43	Do not have current/correct contact information	3 7%	1 2%	10 23%	5 12%	24 56%	43 100%
n=44	Do not have dedicated staff responsible for keeping contact information current	4 9%	1 2%	8 18%	3 7%	28 64%	44 100%
n=43	Technology issues—systems cannot communicate at all	1 2%	10 23%	12 28%	3 7%	17 40%	43 100%
n=43	Technology issues—systems do not communicate consistently	1 2%	10 23%	13 30%	4 9%	15 35%	43 100%
n=42	Funding limitations to sending alerts	1 2%	0 0%	5 12%	6 14%	30 71%	42 100%
n=43	Uncertainty regarding the types and amounts of information to share and with whom	0 0%	1 2%	9 21%	4 9%	29 67%	43 100%
n=0	Other barriers (specify)	0 0%	0 0%	0 0%	0 0%	0 0%	0 100%

Table 54 Barriers to communicating with agencies and partners—federal agencies

	Barrier	Major Barrier	Moderate Barrier	Potential Barrier	Neutral	Not a Barrier	Totals by Barrier
n=44	Do not know person or office to contact at all	1 2%	4 9%	12 27%	3 7%	24 55%	44 100%
n=43	Do not know person or office to contact after hours	4 9%	5 12%	16 37%	1 2%	17 40%	43 100%
n=43	Do not have current/correct contact information	0 0%	6 14%	15 35%	2 5%	20 47%	43 100%
n=44	Do not have dedicated staff responsible for keeping contact information current	3 7%	4 9%	15 34%	3 7%	19 43%	44 100%
n=42	Technology issues—systems cannot communicate at all	2 5%	7 17%	17 40%	2 5%	14 33%	42 100%
n=42	Technology issues—systems do not communicate consistently	2 5%	7 17%	17 40%	2 5%	14 33%	42 100%
n=42	Funding limitations to sending alerts	1 2%	0 0%	6 14%	5 12%	30 71%	42 100%
n=43	Uncertainty regarding the types and amounts of information to share and with whom	1 2%	3 7%	20 47%	2 5%	17 40%	43 100%
n=0	Other barriers (specify)	0 0%	0 0%	0 0%	0 0%	0 0%	0 100%

Table 55 Barriers to communicating with agencies and partners—clinicians/clinical facilities

	Barrier	Major Barrier	Moderate Barrier	Potential Barrier	Neutral	Not a Barrier	Totals by Barrier
n=43	Do not know person or office to contact at all	1 2%	4 9%	19 44%	2 5%	17 40%	43 100%
n=42	Do not know person or office to contact after hours	3 7%	9 21%	21 50%	4 10%	5 12%	42 100%
n=42	Do not have current/correct contact information	4 10%	4 10%	18 43%	3 7%	13 31%	42 100%
n=43	Do not have dedicated staff responsible for keeping contact information current	4 9%	6 14%	12 28%	4 9%	17 40%	43 100%
n=42	Technology issues—systems cannot communicate at all	3 7%	6 14%	18 43%	4 10%	11 26%	42 100%
n=42	Technology issues—systems do not communicate consistently	4 10%	9 21%	14 33%	4 10%	11 26%	42 100%
n=41	Funding limitations to sending alerts	1 2%	0 0%	7 17%	7 17%	26 63%	41 100%
n=42	Uncertainty regarding the types and amounts of information to share and with whom	1 2%	1 2%	18 43%	4 10%	18 43%	42 100%
n=0	Other barriers (specify)	0 0%	0 0%	0 0%	0 0%	0 0%	0 100%

Table 56 Barriers to communicating with agencies and partners—others (restaurants, etc.)

	Barrier	Major Barrier	Moderate Barrier	Potential Barrier	Neutral	Not a Barrier	Totals by Barrier
n=42	Do not know person or office to contact at all	2 5%	3 7%	18 43%	7 17%	12 29%	42 100%
n=43	Do not know person or office to contact after hours	5 12%	5 12%	21 49%	7 16%	5 12%	43 100%
n=43	Do not have current/correct contact information	5 12%	4 9%	20 47%	5 12%	9 21%	43 100%
n=43	Do not have dedicated staff responsible for keeping contact information current	7 16%	4 9%	13 30%	7 16%	12 28%	43 100%
n=40	Technology issues—systems cannot communicate at all	3 8%	3 8%	10 25%	12 30%	12 30%	40 100%
n=40	Technology issues—systems do not communicate consistently	4 10%	2 5%	10 25%	13 33%	11 28%	40 100%
n=41	Funding limitations to sending alerts	2 10%	0 0%	5 12%	11 27%	23 56%	41 100%
n=42	Uncertainty regarding the types and amounts of information to share and with whom	3 7%	3 7%	13 31%	7 17%	16 38%	42 100%
n=0	Other barriers (specify)	0 0%	0 0%	0 0%	0 0%	0 0%	0 100%

Enteric disease investigation and response capacity

Table 57 After-hours communication capacity

	Capacity	State Level n=44	Regional Level n=44	Local Level n=44	None n=44	Do Not Know n=44	Total by All Capacity Areas n=293
n=76	Epidemiology/ infectious disease	44 100%	10 23%	22 50%	0 0%	0 0%	76 26%
n=62	Environmental health/ sanitation	29 66%	5 11%	16 36%	4 9%	8 18%	62 21%
n=48	Public health laboratory	42 95%	1 2%	2 5%	2 5%	1 2%	48 16%
n=49	Legal	17 39%	0 0%	5 11%	7 16%	20 45%	49 17%
n=56	Communications/ public information office	30 68%	3 7%	10 23%	4 9%	9 20%	56 19%
n=2	Other (list)*	1 2%	0 0%	1 2%	0 0%	0 0%	2 1%
Totals by level: n=293 (% of all responses by level)		163 56%	19 6%	56 19%	17 6%	38 13%	293 100%

*Other response provided: Public health preparedness.

Table 58 Standing enteric disease outbreak response teams

Response Teams*	Count	% of Respondents n=43
Yes, at the state level	21	49%
Yes, at the regional/district level	3	7%
Yes, at the local level	4	9%
No, but appropriate staff can be mobilized for enteric disease outbreak responses	21	49%
No, and appropriate staff cannot always be mobilized for enteric disease outbreak responses	1	2%
Existence of standing teams varies by jurisdiction	7	16%
Other (please specify)**	4	9%

*Respondents could select more than one option.

**Respondents noted in other comments that the existence of rapid response teams is not necessarily limited to enteric disease outbreaks.

Table 59 Profession types on enteric disease outbreak response teams

	Profession Type	State Level n=180 (% state)	Regional Level n=36 (% regional)	Local Level n=94 (% local)	None n=44 (% none)	Unknown n=15 (% unknown)	Profession Type Totals n=369
n=72	Epidemiologist	43 24%	11 31%	18 19%	0 0%	0 0%	72 20%
n=46	Public health laboratorian	41 23%	1 3%	2 2%	1 2%	1 7%	46 12%
n=74	Environmental health specialist (in health or another agency)	38 21%	11 31%	24 26%	0 0%	1 7%	74 20%
n=46	Public health nurse	7 4%	6 17%	26 28%	5 11%	2 13%	46 12%
n=35	Health educator	5 3%	2 6%	4 4%	19 43%	5 33%	35 9%
n=33	Health informatics specialist	12 7%	0 0%	1 1%	16 36%	4 27%	33 9%
n=62	Public information officer/ communications	33 18%	5 14%	19 20%	3 7%	2 13%	62 17%
n=1	Other (please specify)*	1 < 1%	0 0%	0 0%	0 0%	0 0%	1 < 1%
	Level of government totals: n=369 (% responses by level)	180 49%	36 10%	94 25%	44 12%	15 4%	369 100%

Other response provided was inclusion of a public health veterinarian on a state level team.

Table 60 Past enteric disease outbreaks by pathogen

Pathogen		Number of Investigations in 2018*						Totals by Pathogen
		None	0–24	25–49	50–74	75–99	100 or More	
n=41	<i>Campylobacter</i>	18 44%	23 56%	0 0%	0 0%	0 0%	0 0%	41 100%
n=41	<i>Cryptosporidium</i>	24 59%	17 41%	0 0%	0 0%	0 0%	0 0%	41 100%
n=41	<i>Cyclospora</i>	23 56%	18 44%	0 0%	0 0%	0 0%	0 0%	41 100%
n=41	<i>Listeria</i>	23 56%	18 44%	0 0%	0 0%	0 0%	0 0%	41 100%
n=40	Norovirus	1 3%	20 50%	8 20%	3 8%	2 5%	6 15%	40 100%
n=41	<i>Salmonella</i>	3 7%	34 83%	2 5%	2 5%	0 0%	0 0%	41 100%
n=41	Shiga toxin-producing <i>E. coli</i>	8 20%	32 78%	1 2%	0 0%	0 0%	0 0%	41 100%
n=41	<i>Shigella</i>	16 39%	25 61%	0 0%	0 0%	0 0%	0 0%	41 100%
n=41	Typhoid/paratyphoid fever	35 85%	6 15%	0 0%	0 0%	0 0%	0 0%	41 100%
n=41	<i>Vibrio</i>	26 63%	15 37%	0 0%	0 0%	0 0%	0 0%	41 100%
n=38	Yersiniosis (non-pestis)	37 97%	1 3%	0 0%	0 0%	0 0%	0 0%	38 100%
n=13	Other (specify)**	1 8%	9 69%	2 15%	0 0%	0 0%	1 8%	13 100%
Totals for ranges: n=460 (% of all responses)		215 47%	218 47%	13 3%	5 1%	2 0.4%	7 2%	460 100%

*There was an error in the survey design with overlapping “none” and “0-24” response options. It is assumed that jurisdictions with zero outbreaks most likely selected the “none” option rather than the “0-24” option.

**Some jurisdictions provided data for other outbreaks including for *C. perfringens*, sapovirus, *S. aureus*, hepatitis A, botulism, *Giardia*, other pathogens, and outbreaks of unknown etiology.

Table 61 Stool sample collection

Scenario	Exposed Persons/ Non-food Service Workers		Employees/ Food Service Workers	
	Count	% of State Responses n=42 each	Count	% of State Responses n=42 each
Outbreaks	34	81%	35	83%
Clusters	25	60%	23	55%
Single cases of public health importance	24	57%	19	45%
None of the above	4	10%	2	5%
Other (specify)*	4	10%	4	10%
Total responses: (% of total responses)	91 100%		83 100%	

* No additional information specified.

Table 62 Food sample collection

Scenario	Count	% of State Responses n=42 each
Outbreaks	39	93%
Clusters	26	62%
Single cases of public health importance	22	52%
None of the above	1	2%
Other (specify)*	2	5%
Total responses: (% of total responses)	90 100%	

*No additional information specified.

Table 63 Activities tracing commercially distributed foods

Activity	Count	% of State Responses n=43 each
Selecting/prioritizing case exposures for traceback	38	88%
Visiting a local food service establishment to collect invoices	33	77%
Work with regulatory agencies to have them collect invoices	37	86%
Provide traceback information to federal agencies	40	93%
Help federal agencies interpret product tracing results	21	49%
Do not conduct any tracing activities	0	0%
Do not know	0	0%
Other (please specify)*	2	5%
Total responses: (% of total responses)	171 100%	

*One respondent noted that they perform all in-jurisdiction traceback activities directly. Another respondent noted that the health agency does not perform traceback activities, which are performed by the environmental agency.

Table 64 Product tracing activities
(January 1, 2016–December 31, 2018)

Number of Traces	Count	% of Responses n=43
None	0	0%
1 to 5	13	30%
6 to 10	11	26%
11 to 15	4	9%
More than 15	8	19%
Did not conduct any tracing activities	1	2%
Do not know	5	12%
Other (Please specify)*	1	2%
Totals:	43	100%

*One respondent noted that the health agency does not perform traceback activities, which are performed by the environmental agency. The environmental agency conducted 1- 5 traces during the timeframe.

Table 65 Summary of jurisdictions with exclusion policies by pathogen and setting
(Pathogens are listed alphabetically; percentages of jurisdictions with policies in parentheses.)

Jurisdictions with Exclusion Policies	Health Care	Food Service	Day Care
90% or more	- Shiga toxin-producing <i>E. coli</i> (90%) <i>Shigella</i> (90%) - Typhoid/paratyphoid fever (93%)	<i>Salmonella</i> (93%) - Shiga toxin-producing <i>E. coli</i> (98%) <i>Shigella</i> (98%) - Typhoid/paratyphoid fever (98%)	- Shiga toxin-producing <i>E. coli</i> (93%) <i>Shigella</i> (90%) - Typhoid/paratyphoid fever (90%)
50% to 89%	<i>Campylobacter</i> (71%) <i>Cryptosporidium</i> (63%) - Norovirus (68%) <i>Salmonella</i> (80%)	<i>Campylobacter</i> (79%) <i>Cryptosporidium</i> (76%) <i>Cyclospora</i> (51%) - Norovirus (86%) <i>Vibrio</i> (56%)	<i>Campylobacter</i> (74%) <i>Cryptosporidium</i> (71%) - Norovirus (76%) <i>Salmonella</i> (81%) <i>Vibrio</i> (50%)
49% or less	<i>Cyclospora</i> (40%) <i>Listeria</i> (25%) <i>Vibrio</i> (45%) - Yersiniosis (non-pestis) (38%)	<i>Listeria</i> (36%) - Yersiniosis (non-pestis) (49%)	<i>Cyclospora</i> (45%) <i>Listeria</i> (31%) - Yersiniosis (non-pestis) (41%)

Table 66 Exclusion policies—health care

	Pathogen	Yes	No	Totals by Pathogen
n=41	<i>Campylobacter</i>	29 71%	12 29%	41 100%
n=40	<i>Cryptosporidium</i>	25 63%	15 37%	40 100%
n=40	<i>Cyclospora</i>	16 40%	24 60%	40 100%
n=40	<i>Listeria</i>	10 25%	30 75%	40 100%
n=40	Norovirus	27 68%	13 32%	40 100%
n=41	<i>Salmonella</i>	33 80%	8 20%	41 100%
n=41	Shiga toxin-producing <i>E. coli</i>	37 90%	4 10%	41 100%
n=40	<i>Shigella</i>	36 90%	4 10%	40 100%
n=41	Typhoid/paratyphoid fever	38 93%	3 7%	41 100%
n=40	<i>Vibrio</i>	18 45%	22 55%	40 100%
n=40	Yersiniosis (non-pestis)	15 38%	25 62%	40 100%
n=11	Other (please specify)*	11 100%	0 0%	11 100%
Total responses: n=455 (% of all responses)		295 65%	160 35%	455 100%

*Jurisdictions also reported having exclusion policies for additional pathogens and conditions including hepatitis A, *Giardia*, and diarrhea.

Table 67 Exclusion policies—food service

	Pathogen	Yes	No	Totals by Pathogen
n=42	<i>Campylobacter</i>	33 79%	9 21%	42 100%
n=42	<i>Cryptosporidium</i>	32 76%	10 24%	42 100%
n=41	<i>Cyclospora</i>	21 51%	20 49%	41 100%
n=42	<i>Listeria</i>	15 36%	27 64%	42 100%
n=42	Norovirus	36 86%	6 14%	42 100%
n=42	<i>Salmonella</i>	39 93%	3 7%	42 100%
n=42	Shiga toxin-producing <i>E. coli</i>	41 98%	1 2%	42 100%
n=42	<i>Shigella</i>	41 98%	1 2%	42 100%
n=42	Typhoid/paratyphoid fever	41 98%	1 2%	42 100%
n=41	<i>Vibrio</i>	23 56%	18 44%	41 100%
n=41	Yersiniosis (non-pestis)	20 49%	21 51%	41 100%
n=11	Other (please specify)*	11 100%	0 0%	11 100%
Total responses: n=470 (% of all responses)		353 75%	117 25%	470 100%

*Jurisdictions also reported having exclusion policies for additional pathogens and conditions including hepatitis A, *Giardia*, and diarrhea.

Table 68 Exclusion policies—day care

	Pathogen	Yes	No	Totals by Pathogen
n=42	<i>Campylobacter</i>	31 74%	11 26%	42 100%
n=42	<i>Cryptosporidium</i>	30 71%	12 29%	42 100%
n=42	<i>Cyclospora</i>	19 45%	23 55%	42 100%
n=42	<i>Listeria</i>	13 31%	29 69%	42 100%
n=41	Norovirus	31 76%	10 24%	41 100%
n=42	<i>Salmonella</i>	34 81%	8 19%	42 100%
n=42	Shiga toxin-producing <i>E. coli</i>	39 93%	3 7%	42 100%
n=42	<i>Shigella</i>	38 90%	4 10%	42 100%
n=42	Typhoid/paratyphoid fever	38 90%	4 10%	42 100%
n=40	<i>Vibrio</i>	20 50%	20 50%	40 100%
n=41	Yersiniosis (non-pestis)	17 41%	24 59%	41 100%
n=10	Other (please specify)*	10 100%	0 0%	10 100%
	Total responses: n=468 (% of all responses)	320 68%	148 32%	468 100%

*Jurisdictions also reported having exclusion policies for additional pathogens and conditions including hepatitis A, *Giardia*, and diarrhea.

Table 69**Summary of most frequent return criteria by setting and pathogen**

Categorized by criteria with highest percentage of response for each setting and pathogen

Criteria	Health Care	Food Service	Day Care
As soon as the diarrheal illness is resolved	▪ <i>Cryptosporidium</i> (45%) ▪ <i>Cyclospora</i> (52%) ▪ <i>Listeria</i> (48%) ▪ <i>Vibrio</i> (57%) ▪ Yersiniosis (non-pestis) (50%)	▪ <i>Cyclospora</i> (44%) ▪ <i>Vibrio</i> (47%) ▪ Yersiniosis (non-pestis) (38%) (tie with 24 hours after resolved)	▪ <i>Cryptosporidium</i> (43%) (tie with 24 hours after resolved) ▪ <i>Cyclospora</i> (52%) ▪ <i>Listeria</i> (40%) (tie with 24 hours after resolved) ▪ <i>Vibrio</i> (48%) ▪ Yersiniosis (non-pestis) (46%)
24 hours after any diarrheal illness has resolved	▪ <i>Campylobacter</i> (43%)	▪ <i>Campylobacter</i> (51%) ▪ <i>Cryptosporidium</i> (45%) ▪ <i>Listeria</i> (48%) ▪ Yersiniosis (non-pestis) (38%) (tie with as soon as resolved)	▪ <i>Campylobacter</i> (46%) ▪ <i>Cryptosporidium</i> (43%) (tie with as soon as resolved) ▪ <i>Listeria</i> (40%) (tie with as soon as resolved)
48 hours after any diarrheal illness has resolved	▪ Norovirus (52%)	▪ Norovirus (54%)	▪ Norovirus (53%)
72 hours after any diarrheal illness has resolved			
Single negative test			
Two or more negative tests	▪ <i>Salmonella</i> (43%) ▪ Shiga toxin-producing <i>E. coli</i> (87%) ▪ <i>Shigella</i> (68%) ▪ Typhoid/paratyphoid fever (79%)	▪ <i>Salmonella</i> (53%) ▪ Shiga toxin-producing <i>E. coli</i> (90%) ▪ <i>Shigella</i> (79%) ▪ Typhoid/paratyphoid fever (71%)	▪ <i>Salmonella</i> (34%) ▪ Shiga toxin-producing <i>E. coli</i> (87%) ▪ <i>Shigella</i> (67%) ▪ Typhoid/paratyphoid fever (77%)
After treatment with antibiotics			

Table 70 Return criteria—health care

	Pathogen	As Soon as Diarrhea Resolved	24 Hours After Diarrhea Resolved	48 Hours After Diarrhea Resolved	72 Hours After Diarrhea Resolved	Single Negative Test	Two or More Negative Tests	After Antibiotic Treatment	Other	Totals by Pathogen
n=35	<i>Campylobacter</i>	14 40%	15 43%	3 9%	0 0%	1 3%	1 3%	0 0%	1 3%	35 100%
n=33	<i>Cryptosporidium</i>	15 45%	13 39%	4 12%	0 0%	1 3%	0 0%	0 0%	0 0%	33 100%
n=27	<i>Cyclospora</i>	14 52%	8 30%	2 7%	0 0%	0 0%	0 0%	2 7%	1 4%	27 100%
n=21	<i>Listeria</i>	10 48%	7 33%	3 14%	0 0%	0 0%	0 0%	0 0%	1 5%	21 100%
n=33	Norovirus	6 18%	7 21%	17 52%	3 9%	0 0%	0 0%	0 0%	0 0%	33 100%
n=37	Salmonella	8 22%	8 22%	2 5%	0 0%	1 3%	16 43%	0 0%	2 5%	37 100%
n=38	Shiga toxin-producing <i>E. coli</i>	2 5%	0 0%	0 0%	0 0%	1 3%	33 87%	0 0%	2 5%	38 100%
n=38	<i>Shigella</i>	4 11%	2 5%	0 0%	0 0%	4 11%	26 68%	0 0%	2 5%	38 100%
n=39	Typhoid/paratyphoid fever	0 0%	0 0%	0 0%	0 0%	1 3%	31 79%	0 0%	7 18%	39 100%
n=28	<i>Vibrio</i>	16 57%	7 25%	3 11%	0 0%	0 0%	2 7%	0 0%	0 0%	28 100%
n=26	Yersiniosis (non-pestis)	13 50%	7 27%	3 12%	0 0%	1 4%	1 4%	0 0%	1 4%	26 100%
n=9	Other (please specify)*	1 11%	0 0%	1 11%	0 0%	0 0%	0 0%	0 0%	7 78%	9 100%
	Totals by criteria: n=364 (% of all responses)	103 28%	74 20%	38 10%	3 1%	10 3%	110 30%	2 1%	24 7%	364 100%

*Jurisdictions also reported having return criteria for additional pathogens and conditions including hepatitis A (n=6) and for infectious diarrhea in general. One jurisdiction noted that in the context of a norovirus outbreak, 72 hours after resolution of symptoms are required for return to setting. One jurisdiction requires three negative stools for typhoid fever.

Table 71 Return criteria—food service

	Pathogen	As Soon as Diarrhea Resolved	24 Hours After Diarrhea Resolved	48 Hours After Diarrhea Resolved	72 Hours After Diarrhea Resolved	Single Negative Test	Two or More Negative Tests	After Antibiotic Treatment	Other	Totals by Pathogen
n=39	<i>Campylobacter</i>	13 33%	20 51%	3 8%	0 0%	1 3%	1 3%	0 0%	1 3%	39 100%
n=38	<i>Cryptosporidium</i>	14 37%	17 45%	5 13%	0 0%	1 3%	0 0%	0 0%	1 3%	38 100%
n=32	<i>Cyclospora</i>	14 44%	13 41%	3 9%	0 0%	0 0%	0 0%	1 3%	1 3%	32 100%
n=25	<i>Listeria</i>	8 32%	12 48%	3 12%	0 0%	0 0%	1 4%	0 0%	1 4%	25 100%
n=39	Norovirus	6 15%	7 18%	21 54%	4 10%	0 0%	0 0%	0 0%	1 3%	39 100%
n=40	<i>Salmonella</i>	4 10%	9 23%	2 5%	0 0%	1 3%	21 53%	0 0%	3 8%	40 100%
n=41	Shiga toxin-producing <i>E. coli</i>	1 2%	0 0%	0 0%	0 0%	1 2%	37 90%	0 0%	2 5%	41 100%
n=42	<i>Shigella</i>	2 5%	1 2%	1 2%	0 0%	3 7%	33 79%	0 0%	2 5%	42 100%
n=42	Typhoid/paratyphoid fever	0 0%	0 0%	0 0%	0 0%	0 0%	30 71%	0 0%	12 29%	42 100%
n=32	<i>Vibrio</i>	15 47%	11 34%	3 9%	0 0%	0 0%	3 9%	0 0%	0 0%	32 100%
n=29	Yersiniosis (non-pestis)	11 38%	11 38%	3 10%	0 0%	1 3%	2 7%	0 0%	1 3%	29 100%
n=9	Other (please specify)*	1 11%	0 0%	1 11%	0 0%	0 0%	0 0%	0 0%	7 78%	9 100%
	Totals by criteria: n=408 (% of all responses)	89 22%	101 25%	45 11%	4 1%	8 2%	128 31%	1 0.3%	32 8%	408 100%

*Jurisdictions also reported having return criteria for additional pathogens and conditions including hepatitis A (n=6) and for infectious diarrhea in general. One jurisdiction noted that in the context of a norovirus outbreak, 72 hours after resolution of symptoms are required for return to setting. One jurisdiction requires three negative stools for typhoid fever.

Table 72 Return criteria—day care

	Pathogen	As Soon as Diarrhea Resolved	24 Hours After Diarrhea Resolved	48 Hours After Diarrhea Resolved	72 Hours After Diarrhea Resolved	Single Negative Test	Two or More Negative Tests	After Antibiotic Treatment	Other	Totals by Pathogen
n=37	<i>Campylobacter</i>	14 38%	17 46%	3 8%	0 0%	0 0%	2 5%	0 0%	1 3%	37 100%
n=37	<i>Cryptosporidium</i>	16 43%	16 43%	5 14%	0 0%	0 0%	0 0%	0 0%	0 0%	37 100%
n=31	<i>Cyclospora</i>	16 52%	11 35%	3 10%	0 0%	0 0%	0 0%	1 3%	0 0%	31 100%
n=25	<i>Listeria</i>	10 40%	10 40%	3 12%	0 0%	0 0%	1 4%	0 0%	1 4%	25 100%
n=36	Norovirus	5 14%	9 25%	19 53%	3 8%	0 0%	0 0%	0 0%	0 0%	36 100%
n=38	<i>Salmonella</i>	10 26%	12 32%	2 5%	0 0%	0 0%	13 34%	0 0%	1 3%	38 100%
n=39	Shiga toxin-producing <i>E. coli</i>	1 3%	1 3%	0 0%	0 0%	0 0%	34 87%	0 0%	3 8%	39 100%
n=39	Shigella	2 5%	3 8%	1 3%	0 0%	5 13%	26 67%	0 0%	2 5%	39 100%
n=39	Typhoid/ paratyphoid fever	0 0%	1 3%	0 0%	0 0%	0 0%	30 77%	1 3%	7 18%	39 100%
n=29	<i>Vibrio</i>	14 48%	10 34%	3 10%	0 0%	0 0%	2 7%	0 0%	0 0%	29 100%
n=28	Yersiniosis (non-pestis)	13 46%	10 36%	3 11%	0 0%	0 0%	1 4%	0 0%	1 4%	28 100%
n=9	Other (please specify)*	1 11%	0 0%	1 11%	0 0%	0 0%	0 0%	0 0%	7 78%	9 100%
	Totals by criteria: n=387 (% of all responses)	102 26%	100 26%	43 11%	3 1%	5 1%	109 28%	2 1%	23 6%	387 100%

*Jurisdictions also reported having return criteria for additional pathogens and conditions including hepatitis A (n=6) and for infectious diarrhea in general. One jurisdiction noted that in the context of a norovirus outbreak, 72 hours after resolution of symptoms are required for return to setting. One jurisdiction requires three negative stools for typhoid fever.

Waterborne enteric diseases

Table 73 Agencies responsible for waterborne enteric diseases

	Water Type	Health	Environment	Agriculture	Natural Resources	Other	None	Do Not Know	Totals by Water Type
n=43	Drinking water/tap	35 81%	5 12%	0 0%	0 0%	2 5%	0 0%	1 2%	43 100%
n=42	Bottled water	36 86%	3 7%	0 0%	0 0%	1 2%	0 0%	2 5%	42 100%
n=43	Treated recreational	36 84%	6 14%	0 0%	0 0%	0 0%	0 0%	1 2%	43 100%
n=43	Untreated recreational	34 79%	6 14%	0 0%	0 0%	2 5%	0 0%	1 2%	43 100%
n=0	Other (please specify)	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	0 100%

Table 74 Agencies responsible for waterborne non-enteric diseases

	Water Type	Health	Environment	Agriculture	Natural Resources	Other	None	Do Not Know	Totals by Water Type
n=43	Drinking water/tap	31 72%	8 19%	0 0%	0 0%	0 0%	0 0%	4 9%	43 100%
n=42	Bottled water	30 71%	4 10%	0 0%	0 0%	1 2%	0 0%	7 17%	42 100%
n=43	Treated recreational	32 74%	6 14%	0 0%	0 0%	0 0%	0 0%	5 12%	43 100%
n=43	Untreated recreational	29 67%	7 16%	0 0%	2 5%	0 0%	0 0%	5 12%	43 100%
n=2	Other (please specify)*	2 100%	0 0%	0 0%	0 0%	0 0%	0 0%	0 0%	2 100%

*Other water types listed were man-made or premise plumbing, such as water systems that can result in legionellosis outbreaks.

Table 75 Legal authority for waterborne enteric disease activities

Source of Authority	Count	% of Responses n=71
State statutes that expressly authorize waterborne enteric disease investigations	6	8%
State statutes that grant general authority for public health activities	29	41%
State agency regulations that expressly authorize waterborne enteric disease investigations	10	14%
State agency regulations that grant general authority for public health activities	17	24%
Local government ordinances/regulations	7	10%
Other (please specify)	0	0%
Do not know	2	3%
Totals:	71	100%

Table 76 Waterborne enteric disease epidemiology positions

	Position	State Health Department Level	Regional/ District Health Department Level	Local Health Department Level	Totals by Position	Totals All Responses n=303
n=72	Epidemiologist	43 60%	11 15%	18 25%	72 100%	72 24%
n=47	Public health nurse	12 26%	9 19%	26 55%	47 100%	47 16%
n=42	Public health laboratorian	39 93%	2 5%	1 2%	42 100%	42 14%
n=73	Sanitarian/environmental health	36 49%	10 14%	27 37%	73 100%	73 24%
n=57	Public information officer/ communications	34 60%	4 7%	19 33%	57 100%	57 19%
n=5	Other (please specify)*	2 40%	1 20%	2 40%	5 100%	5 2%
n=7	None	0 0%	5 71%	2 29%	7 100%	7 2%
n=0	Do not know	0 0%	0 0%	0 0%	0 100%	0 0%
	Totals by level: n=303 (% of level)	166 55%	42 14%	95 31%	303 100%	303 100%

*Other position types listed included public health veterinarian (state health department level), student workers (state health department level), and health officer (local level). No additional detail was specified for the other response provided at the regional/district level.

Table 77 Waterborne enteric disease full-time equivalents (FTEs) *—education level by setting

Education Level	State Health Department Level	Regional/District Health Department Level	Local Health Department Level	Other State Agency	Other Regional/Local Agency	Totals by Education n=210
PhD, DrPH, other doctoral degree in epidemiology, or some epidemiological training at the doctoral level	2.3 1%	0.0 0%	0.1 <1%	0.0 0%	0.1 <1%	2.4 1%
Professional background (e.g., MD, DO, DVM, DDS) with dual degree in epidemiology or some epidemiological training at the doctoral level	5.1 2%	<0.1 <1%	0.0 0%	<0.1 <1%	0.0 0%	5.1 2%
MPH, MSPH, MS, or other master's degree in epidemiology or some epidemiological training at the master level	28.2 13%	11.4 5%	17.7 8%	11.4 5%	17.7 8%	86.3 41%
BA, BS, or other bachelor's degree in epidemiology or some epidemiological training at the bachelor level	7.6 4%	0.5 <1%	0.8 <1%	0.5 <1%	0.8 <1%	10.2 5%
RN, BSN, or other nursing designation or degree	3.9 2%	1.5 1%	86.0 41%	1.5 1%	10.3 5%	103.2 50%
Other (specify)**	2.5 1%	0.0 0%	0.0 0%	0.0 0%	0.0 0%	2.5 1%
Do not know	0.0 0%	0.0 0%	0.0 0%	0.0 0%	0.0 0%	0.0 0%
*Totals by level/agency: n=210 (% level/agency)	49.5 24%	13.4 6%	104.5 50%	13.4 6%	28.8 14%	209.6 100%

*Respondents were asked to include part-time or partial FTEs in their responses, resulting in fractions of persons whose positions are split between more than one program area.

**Other positions or educational backgrounds specifically identified included master's level dual-degreed staff (e.g., MPH and another master's degree), MPH staff with an advanced practice nursing degree, MPH staff with a veterinary degree, and non-degreed administrative staff.

PhD: Doctor of Philosophy; DrPH: Doctor of Public Health; MD: Doctor of Medicine; DO: Doctor of Osteopathy; DVM: Doctor of Veterinary Medicine; DDS: Doctor of Dental Surgery; MPH: Master of Public Health; MSPH: Master of Science in Public Health; MS: Master of Science; BA: Bachelor of Arts; BS: Bachelor of Science; RN: Registered Nurse; BSN: Bachelor of Science in Nursing.

Table 78 Current waterborne enteric disease total full-time equivalents (FTEs) capacity by government level or agency

Government Level or Agency	Count (FTEs)	% of FTEs n=210
State health	49.5	24%
Regional health	13.4	6%
Local health	104.5	50%
Other state agency	13.4	6%
Other regional/local agency	28.8	14%
Totals:	209.6	100%

Table 79 Current waterborne enteric disease total full-time equivalents (FTEs) capacity by education level

Education Level	Count (FTEs)	% of FTEs n=210
Doctorate	2.4	1%
Professional	5.1	2%
Master's	86.3	41%
Bachelor's	10.2	5%
Nursing	103.2	49%
Other	2.5	2%
Do not know	0	0%
Education level totals:	209.6	100%

Table 80 Full-time/exclusive waterborne enteric disease staff

Waterborne Enteric Disease Staffing	Count	% of Responses n=43
Yes, focusing only on waterborne enteric diseases	2	5%
Yes, focusing only on waterborne non-enteric diseases	2	5%
No	35	81%
Do not know	0	0%
Yes, focusing on both waterborne enteric and non-enteric diseases	4	9%
Totals:	43	100%

Table 81 Staff training for waterborne enteric disease epidemiology activities

Staff and Level of Government	Yes	No	Do Not Know	Total n=258	% "Yes" by Level of Govt n=147
State epidemiology	32 12%	11 4%	0 0%	43 17%	80 54%
State environmental health	26 10%	12 5%	5 2%	43 17%	
State laboratory	22 9%	11 4%	8 3%	41 16%	
Regional epidemiology	12 5%	4 2%	2 1%	18 7%	23 16%
Regional environmental health	10 4%	5 2%	3 1%	18 7%	
Regional laboratory	1 <1%	7 3%	3 1%	11 4%	
Local epidemiology	20 8%	6 2%	5 2%	31 12%	43 29%
Local environmental health	21 8%	4 2%	8 3%	33 13%	
Local laboratory	2 1%	9 3%	7 3%	18 7%	
Other (please specify)*	1 <1%	0 0%	1 <1%	2 1%	1 1%
Totals by response:	147 57%	69 27%	42 16%	258 100%	147 100%

*Other staff identified that receive training in waterborne enteric diseases are preparedness staff at the state, regional, and local levels.

Table 82 Communicating/coordinating with other agencies in waterborne enteric disease activities

	Agency	Constant (every 2 weeks)	Frequent (monthly or less)	Sporadic (quarterly or less)	As Needed During Outbreaks	None	Do Not Know	Totals by Agency
n=38	State health department	20 53%	3 8%	3 8%	12 32%	0 0%	0 0%	38 100%
n=37	Local health departments	14 38%	6 16%	3 8%	12 32%	2 5%	0 0%	37 100%
n=33	Regional/district health departments	9 27%	6 18%	0 0%	5 15%	12 36%	1 3%	33 100%
n=42	State environment agency	2 5%	5 12%	8 19%	27 64%	0 0%	0 0%	42 100%
n=41	State agriculture agency	3 7%	6 15%	5 12%	21 51%	5 12%	1 2%	41 100%
n=40	State natural resources agency	1 3%	2 5%	7 18%	24 60%	4 10%	2 5%	40 100%
n=40	Other state agencies	1 3%	2 5%	5 13%	29 73%	2 5%	1 3%	40 100%
n=42	Centers for Disease Control and Prevention (CDC)	6 14%	8 19%	6 14%	22 52%	0 0%	0 0%	42 100%
n=42	Food and Drug Administration (FDA)	0 0%	2 5%	3 7%	30 71%	6 14%	1 2%	42 100%
n=41	United States Department of Agriculture-Food Safety and Inspection Service (USDA-FSIS)	0 0%	1 2%	3 3%	29 71%	7 17%	1 2%	41 100%
n=42	Environmental Protection Agency (EPA)	1 2%	1 2%	5 12%	27 64%	5 12%	3 7%	42 100%
n=42	Other federal agencies	0 0%	1 2%	2 5%	29 69%	7 17%	3 7%	42 100%
n=41	Health agencies in other states	2 5%	4 10%	1 2%	33 80%	0 0%	1 2%	41 100%
n=37	Other agencies in other states	0 0%	1 3%	1 3%	25 68%	8 22%	2 5%	37 100%
n=4	Other (please specify)*	0 0%	0 0%	0 0%	2 50%	2 50%	0 0%	4 100%

* No additional detail specified.

Table 83 Partnerships with other agencies on waterborne enteric disease

	Agency	Yes	No	Do Not Know	Totals by Agency
n=39	State health department	36 92%	3 8%	0 0%	39 100%
n=38	Local health departments	28 74%	10 26%	0 0%	38 100%
n=31	Regional/district health departments	15 48%	14 45%	2 6%	31 100%
n=42	State environment agency	29 69%	10 24%	3 7%	42 100%
n=41	State agriculture agency	22 54%	19 46%	0 0%	41 100%
n=40	State natural resources agency	11 28%	25 63%	4 10%	40 100%
n=41	Other state agencies	16 39%	21 51%	4 10%	41 100%
n=42	Health agencies in other states	17 40%	23 55%	2 5%	42 100%
n=40	Other agencies in other states	7 18%	27 68%	6 15%	40 100%
n=40	Federal agencies	22 55%	17 43%	1 3%	40 100%
n=4	Other (please specify)*	1 25%	3 75%	0 0%	4 100%
	Total all responses: % all responses	204 51%	172 43%	22 6%	398 100%

* The other agency type identified for partnership was municipal water utilities.

Table 84 Written waterborne enteric disease investigation protocols

	Count	% of Responses n=43
Yes	21	49%
No	22	51%
Do not know	0	0%
Totals:	43	100%

Table 85 Sharing waterborne enteric disease investigation protocols

Agency	Yes	No	Do Not Know	Total n=192
State health department	20 10%	0 0%	0 0%	20 10%
Local health departments	15 8%	4 2%	0 0%	19 10%
Regional/district health departments	12 6%	4 2%	1 1%	17 10%
State environment agency	11 6%	8 4%	0 0%	19 10%
State agriculture agency	10 5%	9 5%	0 0%	19 10%
State natural resources agency	6 3%	12 6%	0 0%	18 9%
Other state agencies	9 5%	10 5%	0 0%	19 10%
Health agencies in other states	9 5%	10 5%	0 0%	19 10%
Other agencies in other states	6 3%	12 6%	0 0%	18 9%
Federal agencies	7 4%	11 6%	1 1%	19 10%
Other (please specify)*	4 2%	1 1%	0 0%	5 3%
Totals:	109 57%	81 42%	2 1%	192 100%

*One other agency type was identified for sharing waterborne enteric disease investigation protocols: State Public Health Laboratory. Two respondents noted that their protocol is available online publicly and one noted it is available upon request.

Council to Improve Foodborne Outbreak Response (CIFOR) products

Table 86 Use of CIFOR products

Product	Count	% of State Responses by Product n=41 each
<i>Guidelines</i>	41	100%
CIFOR Toolkit	38	93%
Metrics	17	41%
Outbreaks of Unknown Etiology Guidelines	13	32%
Clearinghouse	10	24%
Industry Guidelines	8	20%
Complaint Systems	6	15%
Law Project	2	5%

Table 87 Implementation of CIFOR products
n=43 (% of state responses)

Action	Guidelines	Toolkit	Industry Guidelines	Complaint Systems	Law Project	Metrics	OUE Guidelines	Clearinghouse
Read/reviewed the product	40 93%	37 86%	9 21%	10 23%	2 5%	21 49%	14 33%	14 33%
Distributed the product to health department staff	36 84%	28 65%	2 5%	3 7%	1 2%	7 16%	4 9%	0 0%
Compared operating procedures with other jurisdictions	8 19%	11 26%	1 2%	4 9%	1 2%	5 12%	1 2%	2 5%
Used performance indicators/metrics in product to assess our performance internally	17 40%	17 40%	1 2%	4 9%	2 5%	17 40%	1 2%	1 2%
Used product to identify recommendations for possible implementation	25 58%	22 51%	0 0%	4 9%	1 2%	7 16%	3 7%	1 2%
Implemented at least some recommendations from the product	27 63%	23 53%	1 2%	2 5%	1 2%	5 12%	2 5%	1 2%
Have not read/reviewed product	0 0%	0 0%	13 30%	8 19%	15 35%	3 7%	8 19%	7 16%
Have not implemented the product or any recommendations or metrics	1 2%	2 5%	10 23%	8 19%	10 23%	7 16%	7 16%	6 14%
Product not relevant	0 0%	0 0%	3 7%	1 2%	0 0%	0 0%	0 0%	0 0%
Other (please specify)*	0 0%	0 0%	1 2%	1 2%	0 0%	0 0%	0 0%	0 0%
Have not used this product	2 5%	2 5%	12 28%	11 26%	16 37%	9 21%	10 23%	9 21%
Do not know	0 0%	1 2%	2 5%	2 5%	4 9%	2 5%	3 7%	3 7%

OUE: Outbreaks of Unknown Etiology

*One respondent noted that the Industry Guidelines and Complaint Systems resources may be used by environmental health staff rather than by epidemiology staff.

Table 88 Accessing CIFOR products electronically

	Count	% of State Responses n=43
Yes	35	81%
No	8	19%
Totals:	43	100%

Table 89 Electronic access methods for CIFOR products

Access Methods	Count	% of Responses Indicating Accessing Products Electronically n=35
Read online as needed	32	91%
Download entire document	14	40%
Download specific chapters	14	40%
Print entire document	4	11%
Print specific chapters	9	26%
Use documents in the office	15	43%
Use documents in the field	5	14%

Table 90 Accessing CIFOR products via mobile applications

	Count	% of Responses n=43
Yes	14	33%
No	11	26%
Do not know	18	42%
Totals:	43	100%

Table 91 Functions in a CIFOR mobile app

Functions	Count	% of Responses n=12
Table/chart of pathogens	9	75%
Table/chart of symptoms	7	58%
Table/chart of incubation periods	8	67%
Searchable PDFs	8	67%
Interactive graphics	6	50%
Other responses provided (multiple responses per respondent)*	3	25%

*Other responses included: basic analytical tools; items useful for environmental health staff in the field during inspections (e.g., time and temperature controls table/chart); CIFOR Outbreaks of Unknown Etiology (OUE) Guidelines; tables of responsibilities for investigator from the *Guidelines*

Table 92 Reasons a CIFOR mobile app would not be useful

Reasons	Count	% of Responses n=9
Would not find useful	7	78%
Organizational IT policies would not permit use on agency device	1	11%
Other (specify)*	1	11%
Totals:	9	100%

*One respondent noted lack of time to download the app.

Appendix C: Assessment Tool



CSTE 2019 Enteric Disease Epidemiology Capacity Assessment

Thank you for participating in the 2019 *Enteric Disease Epidemiology Capacity Assessment*. The Council of State and Territorial Epidemiologists (CSTE), in collaboration with the Centers for Disease Control and Prevention (CDC), is conducting this enteric disease (ED) epidemiology capacity assessment to better understand existing capacity within state, territorial, and local health departments. Before beginning the assessment, please read the important background information and instructions below.

Background:

This 2019 assessment is a continuation and extension of prior CSTE epidemiology capacity assessments in 2001 and 2010 that focused on food safety. As governmental epidemiology programs increasingly view food safety through the wider lens of enteric disease, CSTE is likewise expanding this epidemiology capacity assessment to address enteric disease epidemiology capacity, including waterborne enteric diseases. The goal of the 2019 assessment is to begin reflecting this integrated approach to enteric disease epidemiology.

About the assessment:

This assessment focuses on your jurisdiction's epidemiology capacity to detect and investigate cases and outbreaks of enteric diseases. Unless otherwise specified, for the purposes of this assessment, "enteric diseases" include those arising from exposure to contaminated food, water, persons, animals, or other environmental contacts. The assessment is divided into the following sections:

- A. Jurisdiction and Respondent Information
- B. Personnel Capacity and Training
- C. Communication and Coordination
- D. Enteric Disease Surveillance Capacity
- E. Investigation and Response Capacity
- F. Legal Issues and Data Sharing
- G. CIFOR Products
- H. Waterborne Enteric Diseases
- I. Other Comments

Instructions: We estimate it will take you 45 minutes to complete the online assessment form. You should also allow 1 to 2 hours to gather information offline before you begin the online form.

Please consider the following tips to help to complete the assessment as efficiently as possible:

1. Download and print the Word version of the assessment tool to preview the questions.
2. Review all the questions and compile any needed information to answer the questions before accessing the online assessment tool.
3. We encourage you to collaborate with your colleagues and partners to complete portions of the assessment that may pertain to others within your health department and other agencies and laboratory partners outside of the health department.
4. To save time, have all the prepared answers to the assessment with you when you begin the online assessment tool. **Reminder, only electronic submissions will be accepted.**
5. **You can complete this assessment in multiple sittings.** Your responses will be saved if you exit before you reach the end of the assessment. When you are ready to submit the assessment, click the arrow after you finish the last question and before you exit the assessment.
6. Lastly, please complete the assessment to the best of your ability and knowledge. If you are unable to answer a question, please indicate your inability to answer as directed by each question.

If you have any additional questions, please feel free to contact _____ at _____.

AREA A: Jurisdiction and Respondent Information

1. Please enter your jurisdiction: [indicate from pull down list]
2. Please enter your name and title (please do not include abbreviations). Please provide your contact information in case we need to contact you to clarify your answer
Name: [fill-in blank space]
Title: [fill-in blank space]
Email Address: [fill-in blank space]
Phone Number: [fill-in blank space]
3. Who else participated in completing this survey? Indicate all that apply to the extent you know.
 - ☐ Health officer
 - ☐ Food safety program director
 - ☐ The state epidemiologist(s)
 - ☐ Foodborne/enteric disease epidemiologist
 - ☐ Infectious disease/communicable disease staff
 - ☐ Environmental health staff
 - ☐ Attorney
 - ☐ Agriculture agency staff partners
 - ☐ No one else
 - ☐ Other (please specify) [fill-in blank space]

4. Which of the following best describes how responsibility for enteric disease surveillance and investigation is structured in your jurisdiction (please choose one):
- ☐ One central state office
 - ☐ Regional state offices coordinated by a central state office
 - ☐ Regional state offices that act independently (with considerable variation in practice)
 - ☐ Local health departments that are independent but rely on state guidance; generally similar approaches statewide
 - ☐ Local health departments that act independently (with considerable variation in practice)
 - ☐ Shared state and local health department responsibility: local health department responds to localized foodborne outbreaks and the state coordinates multi-county, multi-region, or multi-state outbreaks
 - ☐ Other (please specify) [fill-in blank space]

Please note, if there are issues, concerns, or ideas that you would like to raise which have not been addressed in the assessment instrument, there are open spaces for other comments at the end of each topic area and in Area J.

AREA B: Personnel Capacity and Training

1. **Current epidemiology personnel:** Please provide the total composite number of staff working in enteric diseases by highest epidemiology education or training levels as indicated, to the extent you know. If a person holds dual degrees of equivalent levels (e.g., RN and MPH) please list this person in the “Other” row and briefly describe the dual degrees.

If an employee spends 50% of his/her time on enteric diseases, count that employee as 0.5 FTE. For example, if there are 3 employees working at 0.5 FTE each at the local health department level, count that as 1.5 total FTEs at the local health department level. If there are more than 10 composite FTEs, please enter >10. If a response is not applicable to your jurisdiction, please enter “999” in the space.

	Total Current FTEs at State Health Department Level	Total Current FTEs at Regional/ District Health Department Level	Total Current FTEs at Local Health Department Level
PhD, DrPH, other doctoral degree in epidemiology, or some epidemiological training at the doctoral level			
Professional background (e.g., MD, DO, DVM, DDS) with dual degree in epidemiology or some epidemiological training at the doctoral level			
MPH, MSPH, MS, or other master’s degree in epidemiology or some epidemiological training at the master’s level			
BA, BS, or other bachelor’s degree in epidemiology or some epidemiological training at the bachelor’s level			
RN, BSN, or other nursing designation or degree			
Other (specify) [fill-in]			
Do not know			

2. **Personnel needs for ideal capacity:** Using the same composite FTE method as above, please provide the total number of additional staff needed above current personnel count by highest epidemiology education or training levels to reach **ideal enteric disease program capacity**. If staff is needed with educational backgrounds not currently captured in the table (e.g., statistics, informatics), please note these in the “Other” row and briefly describe the educational backgrounds and education levels sought.

If there are more than 10 composite FTEs needed, please enter >10. If a response is not applicable to your jurisdiction, please enter “999” in the space.

	Ideal Total FTEs at State Health Department Level	Ideal Total FTEs at Regional/District Health Department Level	Ideal Total FTEs at Local Health Department Level
PhD, DrPH, other doctoral degree in epidemiology, or some epidemiological training at the doctoral level			
Professional background (e.g., MD, DO, DVM, DDS) with dual degree in epidemiology or some epidemiological training at the doctoral level			
MPH, MSPH, MS, or other master’s degree in epidemiology or some epidemiological training at the master’s level			
BA, BS, or other bachelor’s degree in epidemiology or some epidemiological training at the bachelor’s level			
RN, BSN, or other nursing designation or degree			
Other (specify)) [fill-in]			
Do not know			

3. In the last three years (January 1, 2016 through December 31, 2018), has staffing for enteric disease surveillance and investigation activities (choose one per row):

	Increased	Decreased	Stayed About the Same	Unknown	Not Applicable
State Health Department level	☐	☐	☐	☐	☐
Regional/District Health Department level	☐	☐	☐	☐	☐
Local Health Department level	☐	☐	☐	☐	☐

4. Describe your jurisdiction’s use of student interview teams (2 or more students) to supplement staff capacity to identify and investigate enteric disease events (choose one per column):

	Detection/Surveillance	Investigation/Response
Currently have a student interview team	☐	☐
Have a student interview team for surge capacity	☐	☐
Have used student interview teams and do not plan to use them again	☐	☐
Have not used student interview teams but have plans to do so	☐	☐
Have not used student interview teams and have no plans to use them	☐	☐
Other (please specify) [fill-in blank space]	☐	☐
Unknown	☐	☐
Not applicable	☐	☐

4a. If you have used or are currently using student interview teams, please estimate the percentage of enteric disease epidemiological program **interviewing** capacity met by the student teams (choose one response):

- ☐ Less than 10%
- ☐ 11%–20%
- ☐ 21%–30%
- ☐ 31%–40%
- ☐ 41%–50%
- ☐ More than 50%
- ☐ Unknown
- ☐ Not applicable

4b. If student interview teams are/have been used, please indicate enteric disease program staff responsibilities in utilizing student interview teams (check all that apply). For each activity chosen, please also estimate amount of staff time for each using the pull-down menu.

Pull-down menu options: 1–5 hours/week; 5–10 hours/week; 10–15 hours/week; 15–20 hours/week; more than 20 hours/week; unknown

	Activity	Hours/Week of Staff Time
Identify project/activity for student interview teams	☐	[pull down menu]
Recruit and hire student interview teams	☐	[pull down menu]
Train student interview teams	☐	[pull down menu]
Supervise student interview teams	☐	[pull down menu]
Evaluate student interview teams	☐	[pull down menu]
Other (please specify) [fill-in blank space]		[pull down menu]
Unknown	☐	[pull down menu]
Not applicable	☐	[pull down menu]

For the following and future questions related to identifying barriers to specified activities, please use the following definitions when considering your response:

Major barrier – An event that occurred (or if it were to occur) completely barred an action.

Moderate barrier – An event that occurred (or if it were to occur) significantly delayed or nearly barred an action.

Potential barrier – An event that, if it were to occur, could delay or potentially bar an action.

Neutral – An event that occurred (or if it were to occur) impacted an action but ultimately did not affect the outcome.

Not a barrier – An event or potential event that has not or would not impact an action.

5. Identify any of the following issues that are barriers to **recruiting** staff for enteric disease epidemiology activities (check one column for each barrier):

	Major Barrier	Moderate Barrier	Potential Barrier	Neutral	Not a Barrier	Total by Barrier
Hiring freezes	☐	☐	☐	☐	☐	☐
Limitations recruiting outside agency or jurisdiction	☐	☐	☐	☐	☐	☐
Not enough qualified applicants	☐	☐	☐	☐	☐	☐
Restrictions on choosing best candidate	☐	☐	☐	☐	☐	☐
Restrictions on hiring quickly enough	☐	☐	☐	☐	☐	☐
Restrictions on offering competitive pay	☐	☐	☐	☐	☐	☐
Length of time from hire to start date	☐	☐	☐	☐	☐	☐
Salary scale	☐	☐	☐	☐	☐	☐
Job benefits	☐	☐	☐	☐	☐	☐
Job location	☐	☐	☐	☐	☐	☐
Job security	☐	☐	☐	☐	☐	☐
Opportunities for promotion	☐	☐	☐	☐	☐	☐
Opportunities for training	☐	☐	☐	☐	☐	☐
Personnel policies and procedures	☐	☐	☐	☐	☐	☐
Fulfillment of job interests	☐	☐	☐	☐	☐	☐
Travel not permitted	☐	☐	☐	☐	☐	☐
Travel required	☐	☐	☐	☐	☐	☐
Other (please specify) [fill-in blank space]						

6. Identify if any of the following issues are barriers to **retaining** enteric disease epidemiology staff (check one column for each barrier):

	Major Barrier	Moderate Barrier	Potential Barrier	Neutral	Not a Barrier	Total by Barrier
Restrictions on merit raises	☐	☐	☐	☐	☐	☐
Salary scale	☐	☐	☐	☐	☐	☐
Job benefits	☐	☐	☐	☐	☐	☐
Job location	☐	☐	☐	☐	☐	☐
Job security	☐	☐	☐	☐	☐	☐
Layoffs from budget restrictions	☐	☐	☐	☐	☐	☐
Loss to private or government sector	☐	☐	☐	☐	☐	☐
Opportunities for promotion	☐	☐	☐	☐	☐	☐
Opportunities for training	☐	☐	☐	☐	☐	☐
Personnel policies and procedures	☐	☐	☐	☐	☐	☐
Fulfillment of job interests	☐	☐	☐	☐	☐	☐
Travel not permitted	☐	☐	☐	☐	☐	☐
Travel required	☐	☐	☐	☐	☐	☐
Restrictions on travel outside jurisdiction	☐	☐	☐	☐	☐	☐
Other (please specify) [fill-in blank space]						

7. Identify the types and frequency of training provided to epidemiology staff regarding the following enteric disease surveillance and response activities (check all that apply):

	At Orientation	Annually	Periodically (every 2 to 5 years)	As Needed
Epidemiological methods	☐	☐	☐	☐
Statistical, database, and other software (e.g., Epi Info, ArcGIS, SAS, SaTScan)	☐	☐	☐	☐
Skills for interviewing employees, food handlers, exposed persons, etc.	☐	☐	☐	☐
Outbreak investigation training	☐	☐	☐	☐
Environmental food facility routine regulatory inspections or environmental assessments	☐	☐	☐	☐
Whole genome sequencing (WGS)	☐	☐	☐	☐
Emergency preparedness (incident command and emergency operations center)	☐	☐	☐	☐
Legal authorizations regarding reportable conditions, surveillance, and outbreak response	☐	☐	☐	☐
Communications/media training	☐	☐	☐	☐
Other (please specify) [fill-in blank space]	[fill-in blank]	[fill-in blank]	[fill-in blank]	[fill-in blank]

8. Indicate the methods currently used to provide enteric disease epidemiology or related training in your jurisdiction. Also indicate additional or preferred methods of training desired by staff, as well as methods *not* preferred. (choose all that apply)

	Training Methods Currently Used	Additional or Preferred Training Methods by Staff	Training Method <i>not</i> Preferred by Staff
Web-based, self-paced, stand-alone learning	☐	☐	☐
Web-based live webinar	☐	☐	☐
In-person provided in-house by the agency	☐	☐	☐
In-person provided somewhere in state	☐	☐	☐
In-person provided out of state	☐	☐	☐
Other (please specify) [fill-in blank space]	[fill-in blank]	[fill-in blank]	[fill-in blank]
None of the above	☐	☐	☐

9. Indicate how your agency funds training activities (choose all that apply):

- ☐ Budgeted agency funds
- ☐ Cooperative agreement funds
- ☐ Grant funds
- ☐ Scholarships from outside sources
- ☐ Agency does not fund training for staff but allows staff time to attend
- ☐ Agency does not fund training for staff but allows staff to use personal leave time to attend

10. Indicate barriers to training for enteric disease surveillance and investigation (check all that apply):

	Major Barrier	Moderate Barrier	Potential Barrier	Neutral	Not a Barrier
No funding	☐	☐	☐	☐	☐
Funding levels limit the number of employees who may be trained	☐	☐	☐	☐	☐
Funding levels limit the types of training available (e.g., web-based only, no in-person)	☐	☐	☐	☐	☐
Limits on the number of trainings allowed per year (or any other time frame)	☐	☐	☐	☐	☐
Limits on the number of trainings an employee may participate in	☐	☐	☐	☐	☐
Funding restrictions limit the types of training staff can receive (e.g., epidemiology staff cannot attend environmental health training)	☐	☐	☐	☐	☐
No time due to work demands	☐	☐	☐	☐	☐
Restrictions on time away from office for training	☐	☐	☐	☐	☐
Restriction on travel for training	☐	☐	☐	☐	☐
Lack of training targeted at a specific issue/need	☐	☐	☐	☐	☐
Other (indicate) [fill-in blank space]	☐	☐	☐	☐	☐

11. If you have any other information or comments to share related to personnel capacity and training issues, please provide them in the space below.

[fill-in blank space]

AREA C: Communication and Coordination

1. Do the following program areas have after-hours response capability to assist in investigating enteric disease outbreak reports (check all that apply):

	State Level	Regional Level	Local Level	None	Do Not Know
Epidemiology/infectious disease	☐	☐	☐	☐	☐
Environmental health/sanitation	☐	☐	☐	☐	☐
Public health laboratory	☐	☐	☐	☐	☐
Legal	☐	☐	☐	☐	☐
Communications/public information office	☐	☐	☐	☐	☐
Other (list) [fill-in blank space]	☐	☐	☐	☐	☐

2. Please characterize the extent of the interactions between epidemiology and each of the following disciplines/agencies when conducting enteric disease surveillance and investigation activities.

Select from the pull-down options: Constant (every 2 weeks or less); Frequent (monthly or less); Sporadic (quarterly or less); As needed during outbreaks; None; Do Not Know

	Routine surveillance / Non-outbreak setting	During an outbreak / Investigation
Environmental health	[select from pull-down menu]	[select from pull-down menu]
Public health laboratory	[select from pull-down menu]	[select from pull-down menu]
IT/informatics	[select from pull-down menu]	[select from pull-down menu]
Local/regional health departments	[select from pull-down menu]	[select from pull-down menu]
State department of agriculture	[select from pull-down menu]	[select from pull-down menu]
CDC	[select from pull-down menu]	[select from pull-down menu]
FDA	[select from pull-down menu]	[select from pull-down menu]
USDA-FSIS	[select from pull-down menu]	[select from pull-down menu]
Clinical laboratories	[select from pull-down menu]	[select from pull-down menu]
Other (specify) [fill-in blank]	[select from pull-down menu]	[select from pull-down menu]

3. Identify barriers to quickly communicating with the following agencies and/or partners when conducting enteric disease surveillance and response activities (check all that apply).

Select from the pull-down options: Major Barrier; Moderate Barrier; Potential Barrier; Neutral; Not a Barrier

	State Agencies	Local/ Regional Agencies	Federal Agencies	Clinicians / Clinical Facilities	Laboratories	Others (Restaurants, etc.)
Do not know person or office to contact at all	[pull down]	[pull down]	[pull down]	[pull down]	[pull down]	[pull down]
Do not know person or office to contact after hours	[pull down]	[pull down]	[pull down]	[pull down]	[pull down]	[pull down]
Do not have current/correct contact information	[pull down]	[pull down]	[pull down]	[pull down]	[pull down]	[pull down]
Do not have dedicated staff responsible for keeping contact information current	[pull down]	[pull down]	[pull down]	[pull down]	[pull down]	[pull down]
Technology issues—systems cannot communicate at all	[pull down]	[pull down]	[pull down]	[pull down]	[pull down]	[pull down]
Technology issues—systems do not communicate consistently	[pull down]	[pull down]	[pull down]	[pull down]	[pull down]	[pull down]
Funding limitations to sending alerts	[pull down]	[pull down]	[pull down]	[pull down]	[pull down]	[pull down]
Uncertainty regarding the types and amounts of information to share and with whom	[pull down]	[pull down]	[pull down]	[pull down]	[pull down]	[pull down]
Other barriers (specify) [fill-in blank space]	[pull down]	[pull down]	[pull down]	[pull down]	[pull down]	[pull down]

4. If you have any other information or comments to share related to communication and coordination issues, please provide them in the space below.

[fill-in blank space]

AREA D: Enteric Disease Surveillance Capacity

1. During the last three years (January 1, 2016 through December 31, 2018), which of the following data sources has your jurisdiction used to detect and investigate cases and outbreaks of enteric diseases? (Check all that apply for each column.) For each response, indicate the frequency at which each type of data is utilized using the following pull-down menu options:

Pull-down options: Often used; Sometimes used; Rarely used; Never used

	Routine Surveillance / Non-Outbreak setting	During an Outbreak / Investigation
Emergency department chief complaint data	[pull down menu]	[pull down menu]
Poison Control Center data	[pull down menu]	[pull down menu]
Over-the-counter drug sales	[pull down menu]	[pull down menu]
BioSense data	[pull down menu]	[pull down menu]
Emergency medical services (EMS) data	[pull down menu]	[pull down menu]
Provider reports	[pull down menu]	[pull down menu]
PulseNet/pulsed-field gel electrophoresis (PFGE) data	[pull down menu]	[pull down menu]
Whole genome sequencing (WGS) data	[pull down menu]	[pull down menu]
Culture-independent diagnostic testing (CIDT)	[pull down menu]	[pull down menu]
Consumer complaint phone hotline	[pull down menu]	[pull down menu]
Online consumer complaint report	[pull down menu]	[pull down menu]
Social media	[pull down menu]	[pull down menu]
Food ordering/other consumer mobile apps	[pull down menu]	[pull down menu]
Customer/loyalty/shopper cards	[pull down menu]	[pull down menu]
Other (please specify) [fill-in blank space]	[pull down menu]	[pull down menu]

2. Which of the following best describes your jurisdiction's use of electronic database(s) for cases and outbreaks of enteric diseases? (Check all that apply for each column.)

	Cases	Outbreaks
No electronic database	☐	☐
Use a module within a surveillance system (e.g., Maven, CDC-developed NEDSS Base System)	☐	☐
Use a "homegrown" (i.e., custom) system to maintain records	☐	☐
Use an "off-the-shelf" or customizable commercial database to maintain records (e.g., Maven)	☐	☐
Use an "off-the-shelf" or customizable free license/nonprofit database (e.g., REDCap, Epi Info) to maintain records	☐	☐
Use of electronic databases varies greatly across subordinate jurisdictions	☐	☐
Other (specify) [fill-in blank space]	☐	☐

3. Across the databases your jurisdiction uses, identify if your jurisdiction currently records the following types of information about reported enteric disease **cases**: (check all that apply):

- ☐ Clinical signs and symptoms
- ☐ Laboratory results
- ☐ 3-day food history
- ☐ 5-day food history
- ☐ Animal contact
- ☐ Water consumption description
- ☐ History of contact with water
- ☐ Places of work
- ☐ School
- ☐ Day care
- ☐ Places of worship
- ☐ Volunteering
- ☐ Travel history
- ☐ Case addresses and other geographic data
- ☐ Other epidemiologic risk factors
(e.g., prior illness, condition or hospitalization; medication use)
- ☐ Other environmental exposures (e.g., contaminated surfaces)
- ☐ Other (specify) [fill-in blank space]
- ☐ Not applicable

4. Which of the following formats do you use for keeping records of enteric disease **outbreak investigations** in your jurisdiction (check all that apply):

- ☐ Electronic database at state level
- ☐ Electronic database at local/regional level
- ☐ NORS
- ☐ Non-database summary at state level (e.g., spreadsheet, paper copy, etc.)
- ☐ Non-database summary at local level (e.g., spreadsheet, paper copy, etc.)
- ☐ Other (specify) [fill-in blank space]

5. Does your enteric disease case database share data with your outbreak investigation database?

- ☐ Yes
- ☐ No
- ☐ Do not know

5a. If yes, are you using the same system for both databases?

- ☐ Yes
- ☐ No
- ☐ Do not know

6. Identify the software with statistical components you use in your enteric disease epidemiology program (check all that apply):

- ☐ ArcGIS
- ☐ Epi Info
- ☐ Excel
- ☐ REDCap
- ☐ R/RStudio
- ☐ SAS
- ☐ SaTScan
- ☐ SPSS
- ☐ Stata
- ☐ Other (specify) [fill-in blank space]

For the remaining questions in this section, the following definitions should be kept in mind:

Routine surveillance – Is intended to refer to surveillance activities conducted before or outside of an outbreak scenario

Surveillance during an outbreak – Surveillance that takes place once an outbreak has been identified

7. Which of the following best describes your capacity to do the following activities for routine enteric disease surveillance (not during an outbreak) and during an outbreak?

Select from the pull-down options: None (0%), Minimal (0–24%), Partial (25–49%), Substantial (50–74%), Almost full (75–99%) or Full (100%)

	Routine Surveillance / Non-Outbreak	During an Outbreak
Sufficient time to interview all reported cases	[select from pull-down menu]	[select from pull-down menu]
Sufficient time to educate interviewees about enteric diseases	[select from pull-down menu]	[select from pull-down menu]
Compare case to standardized case definition	[select from pull-down menu]	[select from pull-down menu]
Enter data	[select from pull-down menu]	[select from pull-down menu]
Review data for completeness and consistency	[select from pull-down menu]	[select from pull-down menu]
Analyze data	[select from pull-down menu]	[select from pull-down menu]

8. Does your jurisdiction conduct routine surveillance (not during an outbreak) and/or surveillance during an outbreak for the following pathogens/illnesses?

	Routine Surveillance / Non-Outbreak	During an Outbreak
<i>Campylobacter</i>	Yes or No	Yes or No
<i>Cryptosporidium</i>	Yes or No	Yes or No
<i>Cyclospora</i>	Yes or No	Yes or No
<i>Listeria</i>	Yes or No	Yes or No
Norovirus	Yes or No	Yes or No
<i>Salmonella</i>	Yes or No	Yes or No
Shiga toxin-producing <i>E. coli</i>	Yes or No	Yes or No
<i>Shigella</i>	Yes or No	Yes or No
Typhoid/paratyphoid fever	Yes or No	Yes or No
<i>Vibrio</i>	Yes or No	Yes or No
Yersiniosis (non-pestis)	Yes or No	Yes or No

9. During the last three years (January 1, 2016 through December 31, 2018), identify if any of the following issues are barriers to conducting routine enteric disease surveillance (not during an outbreak) and/or surveillance during an outbreak:

Select from the pull-down options: Major Barrier; Moderate Barrier; Potential Barrier; Neutral; Not a Barrier

	Routine Surveillance / Non-Outbreak	During an Outbreak
Lack of epidemiology expertise	[pull-down]	[pull-down]
Lack of epidemiology capacity	[pull-down]	[pull-down]
Lack of environmental health expertise	[pull-down]	[pull-down]
Lack of environmental health capacity	[pull-down]	[pull-down]
Lack of laboratory expertise	[pull-down]	[pull-down]
Lack of laboratory capacity	[pull-down]	[pull-down]
Lack of statistical support	[pull-down]	[pull-down]
Lack of information technology/informatics support	[pull-down]	[pull-down]
Lack of adequate numbers of staff	[pull-down]	[pull-down]
Lack of ability to pay overtime	[pull-down]	[pull-down]
Travel policy constraints	[pull-down]	[pull-down]
Delayed notification	[pull-down]	[pull-down]
Low priority/competing priorities	[pull-down]	[pull-down]
Difficulty of specimen transport	[pull-down]	[pull-down]
Difficulty working with partners in state	[pull-down]	[pull-down]
Difficulty working with partners in other states	[pull-down]	[pull-down]
Difficulty working with federal partners	[pull-down]	[pull-down]
Outbreak reporters' lack of time	[pull-down]	[pull-down]
Outbreak reporters' lack of staff	[pull-down]	[pull-down]
Uncooperative staff/personnel at investigation site	[pull-down]	[pull-down]
Patient refusal	[pull-down]	[pull-down]
Other (specify)	[pull-down]	[pull-down]

10. If you have any other information or comments to share related to enteric disease surveillance capacity, please provide them in the space below.

[fill-in blank space]

AREA E: Investigation and Response Capacity

1. Does your agency have a standing enteric disease outbreak response team(s)? (check all that apply):

- ☐ Yes, at the state level
- ☐ Yes, at the regional/district level
- ☐ Yes, at the local level
- ☐ No, but appropriate staff can be mobilized for enteric disease outbreak responses
- ☐ No, and appropriate staff cannot always be mobilized for enteric disease outbreak responses
- ☐ Existence of standing teams varies by jurisdiction
- ☐ Other (specify) [fill-in blank space]

2. Which of the following professionals typically comprise an enteric disease outbreak response team at the state, regional/district, and local level (check all that apply):

	State Level	Regional Level	Local Level	None	Unknown
Epidemiologist	☐	☐	☐	☐	☐
Laboratorian	☐	☐	☐	☐	☐
Environmental health specialist (in health department and/or other agencies)	☐	☐	☐	☐	☐
Public health nurse	☐	☐	☐	☐	☐
Health educator	☐	☐	☐	☐	☐
Health informatics specialist	☐	☐	☐	☐	☐
Public information officer/communications	☐	☐	☐	☐	☐
Other (please specify) [fill-in blank space]	☐	☐	☐	☐	☐

3. Of the enteric disease outbreak investigations conducted by your jurisdiction in **2018**, indicate the number range of outbreaks that have been attributed to each of the following:

	Number of Investigations					
	None	0–24	25–49	50–74	75–99	100 or More
<i>Campylobacter</i>	☐	☐	☐	☐	☐	☐
<i>Cryptosporidium</i>	☐	☐	☐	☐	☐	☐
<i>Cyclospora</i>	☐	☐	☐	☐	☐	☐
<i>Listeria</i>	☐	☐	☐	☐	☐	☐
Norovirus	☐	☐	☐	☐	☐	☐
<i>Salmonella</i>	☐	☐	☐	☐	☐	☐
Shiga toxin-producing <i>E. coli</i>	☐	☐	☐	☐	☐	☐
<i>Shigella</i>	☐	☐	☐	☐	☐	☐
Typhoid/paratyphoid fever	☐	☐	☐	☐	☐	☐
<i>Vibrio</i>	☐	☐	☐	☐	☐	☐
Yersiniosis (non-pestis)	☐	☐	☐	☐	☐	☐
Other (specify)	[fill-in blank]					

4. Do you collect **stool samples** from the following persons in the following instances? (check all that apply)

	Exposed Persons/ Non-food Handlers	Employees/ Food Handlers
Outbreaks	☐	☐
Clusters	☐	☐
Single cases of public health importance	☐	☐
None of the above	☐	☐
Other (specify) [fill-in blank space]	☐	☐

5. Do you collect **food samples** in the following instances? (check all that apply):

- ☐ Outbreaks
- ☐ Clusters
- ☐ Single cases of public health importance
- ☐ None of the above
- ☐ Other (specify) [fill-in blank space]

6. Indicate if your agency has a policy regarding the exclusion of persons with enteric disease from sensitive settings for the following pathogens and settings (check all that apply).

	Health Care	Food Service	Day Care
<i>Campylobacter</i>	Yes or No	Yes or No	Yes or No
<i>Cryptosporidium</i>	Yes or No	Yes or No	Yes or No
<i>Cyclospora</i>	Yes or No	Yes or No	Yes or No
<i>Listeria</i>	Yes or No	Yes or No	Yes or No
Norovirus	Yes or No	Yes or No	Yes or No
<i>Salmonella</i>	Yes or No	Yes or No	Yes or No
Shiga toxin-producing <i>E. coli</i>	Yes or No	Yes or No	Yes or No
<i>Shigella</i>	Yes or No	Yes or No	Yes or No
Typhoid/paratyphoid fever	Yes or No	Yes or No	Yes or No
<i>Vibrio</i>	Yes or No	Yes or No	Yes or No
Yersiniosis (non-pestis)	Yes or No	Yes or No	Yes or No
Other (specify)	Yes or No	Yes or No	Yes or No

7. Please upload a copy of your agency's exclusion policy/policies in the space provided.

(You will have the opportunity to upload documents here.)

8. For the following pathogens, please indicate using the pull-down menu the **return criteria for persons excluded from sensitive settings**: The pull-down menu options are:

- As soon as the diarrheal illness is resolved
- 24 hours after any diarrheal illness has resolved
- 48 hours after any diarrheal illness has resolved
- 72 hours after any diarrheal illness has resolved
- Single negative culture – [If chosen, a secondary drop-down menu “Acceptable labs for clearance” will appear (See 8a below)]
- Two or more negative cultures – [If chosen, see the secondary drop-down menu as above (see 8b below)]
- After treatment with antibiotics
- Other [specify in blank space]

	Health Care Return Cleared	Food Service Return Cleared	Day Care Return Cleared
<i>Campylobacter</i>	[pull-down]	[pull-down]	[pull-down]
<i>Cryptosporidium</i>	[pull-down]	[pull-down]	[pull-down]
<i>Cyclospora</i>	[pull-down]	[pull-down]	[pull-down]
<i>Listeria</i>	[pull-down]	[pull-down]	[pull-down]
Norovirus	[pull-down]	[pull-down]	[pull-down]
<i>Salmonella</i>	[pull-down]	[pull-down]	[pull-down]
Shiga toxin-producing <i>E. coli</i>	[pull-down]	[pull-down]	[pull-down]
<i>Shigella</i>	[pull-down]	[pull-down]	[pull-down]
Typhoid/paratyphoid fever	[pull-down]	[pull-down]	[pull-down]
<i>Vibrio</i>	[pull-down]	[pull-down]	[pull-down]
Yersiniosis (non-pestis)	[pull-down]	[pull-down]	[pull-down]
Other (specify)	[pull-down]	[pull-down]	[pull-down]

8a. If the “single negative culture” option was chosen as a return criterion above, please indicate for the following pathogens the acceptable lab testing for clearance using the following secondary drop-down menu choices:

- CIDT only at a clinical lab
- CIDT or culture at any lab (clinical or public health)
- CIDT or culture at public health lab
- Culture only at public health lab
- Other [specify in blank space]

	Health Care Return Cleared	Food Service Return Cleared	Day Care Return Cleared
<i>Campylobacter</i>	[pull-down]	[pull-down]	[pull-down]
<i>Cryptosporidium</i>	[pull-down]	[pull-down]	[pull-down]
<i>Cyclospora</i>	[pull-down]	[pull-down]	[pull-down]
<i>Listeria</i>	[pull-down]	[pull-down]	[pull-down]
Norovirus	[pull-down]	[pull-down]	[pull-down]
<i>Salmonella</i>	[pull-down]	[pull-down]	[pull-down]
Shiga toxin-producing <i>E. coli</i>	[pull-down]	[pull-down]	[pull-down]
<i>Shigella</i>	[pull-down]	[pull-down]	[pull-down]
Typhoid/paratyphoid fever	[pull-down]	[pull-down]	[pull-down]
<i>Vibrio</i>	[pull-down]	[pull-down]	[pull-down]
Yersiniosis (non-pestis)	[pull-down]	[pull-down]	[pull-down]
Other (specify)	[pull-down]	[pull-down]	[pull-down]

8b. If the “two or more negative cultures” option was chosen as a return criterion above, please indicate for the following pathogens the acceptable lab testing for clearance using the following secondary drop-down menu choices:

- CIDT only at a clinical lab
- CIDT or culture at any lab (clinical or public health)
- CIDT or culture at public health lab
- Culture only at public health lab
- Other [specify in blank space]

9. During enteric disease outbreaks, state and local health departments may be asked to help trace back **commercially distributed foods** from the point of sale to help evaluate whether that food is the likely cause of the outbreak (i.e., informational product tracing). Indicate which of the following activities your health agency performs for informational product tracing in this circumstance: (check all that apply)

- ☐ Selecting/prioritizing case exposures for traceback
- ☐ Visiting a food service establishment to collect invoices
- ☐ Working with regulatory agencies to have them collect invoices
- ☐ Providing traceback information to federal agencies (CDC, FDA, or USDA)
- ☐ Helping federal agencies interpret product tracing results
- ☐ Do not conduct any tracing activities
- ☐ Do not know
- ☐ Other (specify) [fill-in space]

10. How many times in the preceding three years (January 1, 2016 through December 31, 2018) has your agency conducted any product tracing activities as part of an enteric disease outbreak investigation?

- ☐ None
- ☐ 1 to 5
- ☐ 6 to 10
- ☐ 11 to 15
- ☐ >15
- ☐ Did not conduct any tracing activities
- ☐ Do not know
- ☐ Other (specify) [fill-in space]

11. If you have any other information or comments to share related to investigation and response capacity, please provide them in the space below.

[fill-in blank space]

AREA F: Legal Issues and Data Sharing

1. Please indicate if express legal authority (statute or regulation) exists in your jurisdiction to perform the following activities for reported cases of enteric diseases and the agency or agencies with the legal authority. (check all that apply)

	Health Department	Other State Agencies	None	Do Not Know
Collect reports on suspected enteric disease cases versus probable or confirmed cases	☐	☐	☐	☐
Collect reports of clinical symptoms	☐	☐	☐	☐
Perform onthespot emergency environmental inspections/assessments	☐	☐	☐	☐
Embargo or condemn implicated food	☐	☐	☐	☐
Close a food service facility	☐	☐	☐	☐
Exclude sick or infected workers from food handling duties	☐	☐	☐	☐
Require submission of certain enteric isolates and/or clinical materials from private laboratories to the public health laboratory	☐	☐	☐	☐
Guarantee chain of custody for food environmental specimens	☐	☐	☐	☐
Obtain customer/loyalty/shopper card program data regarding customers and purchases	☐	☐	☐	☐

2. Indicate if you are authorized to share **non-identifying information about an individual** related to enteric disease investigations with the following agencies and, if so, indicate the source(s) of authority: (check all that apply)

	Source of Authority						
	Authorized to share?	Statute	Regulation	MOU / MOA	Policy	Other	Do Not Know
State health department	Yes/No	☐	☐	☐	☐	☐	☐
Local health departments	Yes/No	☐	☐	☐	☐	☐	☐
Regional/district health departments	Yes/No	☐	☐	☐	☐	☐	☐
Other state agencies in your state	Yes/No	☐	☐	☐	☐	☐	☐
CDC	Yes/No	☐	☐	☐	☐	☐	☐
FDA	Yes/No	☐	☐	☐	☐	☐	☐
USDA-FSIS	Yes/No	☐	☐	☐	☐	☐	☐
EPA	Yes/No	☐	☐	☐	☐	☐	☐
Other federal agencies	Yes/No	☐	☐	☐	☐	☐	☐
Health agencies in other states	Yes/No	☐	☐	☐	☐	☐	☐
Other agencies in other states	Yes/No	☐	☐	☐	☐	☐	☐

3. Indicate if you are authorized to share **non-identifying information about a business entity** related to enteric disease investigations with the following agencies and, if so, indicate the source(s) of authority: (check all that apply)

	Source of Authority						
	Authorized to share?	Statute	Regulation	MOU / MOA	Policy	Other	Do Not Know
State health department	Yes/No	☐	☐	☐	☐	☐	☐
Local health departments	Yes/No	☐	☐	☐	☐	☐	☐
Regional/district health departments	Yes/No	☐	☐	☐	☐	☐	☐
Other state agencies in your state	Yes/No	☐	☐	☐	☐	☐	☐
CDC	Yes/No	☐	☐	☐	☐	☐	☐
FDA	Yes/No	☐	☐	☐	☐	☐	☐
USDA-FSIS	Yes/No	☐	☐	☐	☐	☐	☐
EPA	Yes/No	☐	☐	☐	☐	☐	☐
Other federal agencies	Yes/No	☐	☐	☐	☐	☐	☐
Health agencies in other states	Yes/No	☐	☐	☐	☐	☐	☐
Other agencies in other states	Yes/No	☐	☐	☐	☐	☐	☐

4. Indicate which of the following best describes how laws, regulations, and/or policies in your jurisdiction restrict the sharing or release of **identifying information about individuals** associated with cases and outbreaks of enteric disease (check one):
- ☐ No Identifiers are not shared with other agencies
 - ☐ Identifiers may be shared with other agencies but only after administrative approval(s)
 - ☐ Identifiers may be shared with other agencies if there is a legitimate purpose
 - ☐ Other (specify) [fill-in blank space]
 - ☐ Do not know
5. Indicate which of the following best describes how laws, regulations, and/or policies in your jurisdiction restrict the sharing or release of **identifying information about business entities** associated with cases and outbreaks of enteric disease (check one):
- ☐ Identifiers are not shared with other agencies
 - ☐ Identifiers may be shared with other agencies but only after administrative approval(s)
 - ☐ Identifiers may be shared with other agencies if there is a legitimate purpose
 - ☐ Identifying information can be released after request for information (FOI) is received
 - ☐ Identifying information can be made available/publicly released without request
 - ☐ Other (specify) [fill-in blank space]
 - ☐ Do not know
6. Regarding your jurisdiction's laws (e.g., statutes and regulations), identify if there are any major gaps or ambiguities that pose significant problems in accessing and sharing information about enteric disease outbreaks (check all that apply):
- ☐ Accessing information about an individual's case
 - ☐ Accessing information about implicated businesses
 - ☐ Sharing information with the public or media
 - ☐ Sharing information across other state/local agencies
 - ☐ Sharing information with federal agencies
 - ☐ Conducting coordinated responses across counties
 - ☐ Conducting coordinated responses with other states
 - ☐ Conducting coordinated responses with federal agencies
 - ☐ Other (please list) [fill-in blank space]
 - ☐ None
 - ☐ Do not know

The last three questions in this section relate to the use of alternative/other potential sources of data for enteric disease outbreak investigations, including data from customer/loyalty/shopper cards or apps, debit/credit cards, meal delivery data, and online shopping.

7. Have you sought or used any of the following types of data as part of an enteric disease outbreak investigation?

	Yes	No	Do Not Know
Customer/loyalty/shopper card or app			
Debit/credit cards			
Meal delivery data/apps			
Online shopping			
Other (please specify) [fill-in space]			

8. If you have used the alternative/other data sources described above, indicate the mechanisms used to access the information: (check all that apply)

	Customer / Loyalty / Shopper Card / Apps	Debit / Credit Cards	Meal Delivery Data / Apps	Online Shopping	Other (specify in 8a)
Legally authorized by law (statute or regulation) to access such data	☐	☐	☐	☐	☐
Have a standing agreement with an establishment to access data for any outbreak	☐	☐	☐	☐	☐
Obtain a signed agreement/release form with an establishment for each outbreak	☐	☐	☐	☐	☐
Obtain a signed release from individual customers to access their data	☐	☐	☐	☐	☐
Obtained verbal consent from individual customers to access their data	☐	☐	☐	☐	☐
Other (please specify)	☐	☐	☐	☐	☐
Do not know	☐	☐	☐	☐	☐

8a. If other alternative sources of data are used, please identify them in the blank space below and specify the mechanisms used to access that information:

[fill-in blank space]

9. Indicate any barriers you encountered while trying to access or use alternative/other data sources described above: (check all that apply)

Select from the *pull-down options*: Major Barrier; Moderate Barrier; Potential Barrier; Neutral; Not a Barrier

	Customer / Loyalty / Shopper Card / Apps	Debit / Credit Cards	Meal Delivery Data / Apps	Online Shopping	Other (specify in 8a)
Working with local establishments	[pull down menu]	[pull down menu]	[pull down menu]	[pull down menu]	[pull down menu]
Working with corporate/headquarters offices	[pull down menu]	[pull down menu]	[pull down menu]	[pull down menu]	[pull down menu]
Convincing individuals to release their data	[pull down menu]	[pull down menu]	[pull down menu]	[pull down menu]	[pull down menu]
Convincing companies to release an individual's data even with individual's consent	[pull down menu]	[pull down menu]	[pull down menu]	[pull down menu]	[pull down menu]
Confidentiality concerns regarding name, phone numbers, etc.	[pull down menu]	[pull down menu]	[pull down menu]	[pull down menu]	[pull down menu]
Other (please specify)*	[pull down menu]	[pull down menu]	[pull down menu]	[pull down menu]	[pull down menu]
Have not used or attempted to use the descriptive alternative/other data	[pull down menu]	[pull down menu]	[pull down menu]	[pull down menu]	[pull down menu]
Do not know	[pull down menu]	[pull down menu]	[pull down menu]	[pull down menu]	[pull down menu]

- 9a. If other alternative sources of data are used, please identify them in the blank space below and specify the type and degree of barrier(s) encountered:

[fill-in blank space]

10. If you have any other information or comments to share related to legal issues and data sharing, please provide them in the space below.

[fill-in blank space]

AREA G: CIFOR Products

1. Indicate if your agency uses/has used Council to Improve Foodborne Outbreak Response (CIFOR) products: (check all that apply)

- ☐ CIFOR Guidelines
- ☐ CIFOR Toolkit
- ☐ CIFOR Industry Guidelines
- ☐ CIFOR Complaint Systems
- ☐ Law Project
- ☐ Metrics
- ☐ Outbreaks of Undetermined Etiology (OUE) Guidelines
- ☐ CIFOR Clearinghouse

2. Which of the following describes how your jurisdiction has implemented the CIFOR Guidelines and related products? (check all that apply for each product):

	<i>Guidelines</i>	<i>Toolkit</i>	<i>Industry Guidelines</i>	<i>Complaint Systems</i>	<i>Law Project</i>	<i>Metrics</i>	<i>OUE Guidelines</i>	<i>Clearinghouse</i>
Read/reviewed the product	☐	☐	☐	☐	☐	☐	☐	☐
Distributed the product to health department staff	☐	☐	☐	☐	☐	☐	☐	☐
Compared operating procedures with other jurisdictions	☐	☐	☐	☐	☐	☐	☐	☐
Used performance indicators/metrics in product to assess our performance internally	☐	☐	☐	☐	☐	☐	☐	☐
Used product to identify recommendations for possible implementation	☐	☐	☐	☐	☐	☐	☐	☐
Implemented at least some recommendations from the product	☐	☐	☐	☐	☐	☐	☐	☐
Have not read/reviewed product	☐	☐	☐	☐	☐	☐	☐	☐
Have not implemented the product or any recommendations or metrics	☐	☐	☐	☐	☐	☐	☐	☐
Product not relevant	☐	☐	☐	☐	☐	☐	☐	☐
Other (please specify) [fill-in space]	☐	☐	☐	☐	☐	☐	☐	☐
Have not used this product	☐	☐	☐	☐	☐	☐	☐	☐
Do not know	☐	☐	☐	☐	☐	☐	☐	☐

3. Do you access the CIFOR Guidelines and related products electronically?

- ☐ Yes
- ☐ No

3a. If yes, how do you access them? (check all that apply)

- ☐ Read online as needed
- ☐ Download entire document
- ☐ Download specific chapters
- ☐ Print entire document
- ☐ Print specific chapters
- ☐ Use documents in the office
- ☐ Use documents in the field

4. Would you access CIFOR products via a dedicated mobile application?

- ☐ Yes
- ☐ No
- ☐ Do not know

4a. If yes, identify in the space provided what functions would be useful (e.g., table/chart of pathogens, symptoms, incubation periods, searchable PDFs, interactive graphics):

[fill-in blank space]

4b. If no, why not? (check all that apply)

- ☐ Would not find useful
- ☐ Organizational IT policies would not permit use on agency device
- ☐ Other (specify) [fill-in blank space]

5. What other products or issues should CIFOR address in the future?

[fill-in blank space]

6. If you have any other information or comments to share related to CIFOR products, please provide them in the space below.

[fill-in blank space]

AREA H: Waterborne Enteric Diseases

This section focuses specifically on waterborne enteric diseases, unless otherwise noted.

1. Indicate the agency primarily responsible for detecting and responding to **waterborne enteric disease** cases and outbreaks in the following circumstances: (check one column per row)

	Health	Environment	Agriculture	Natural Resources	Other	None	Do Not Know
Drinking water/tap	☐	☐	☐	☐	☐	☐	☐
Bottled water	☐	☐	☐	☐	☐	☐	☐
Treated recreational	☐	☐	☐	☐	☐	☐	☐
Untreated recreational	☐	☐	☐	☐	☐	☐	☐
Other (please specify) [fill-in]	☐	☐	☐	☐	☐	☐	☐

2. Indicate the agency primarily responsible for detecting and responding to **waterborne non-enteric disease** cases and outbreaks in the following circumstances: (check one column per row)

	Health	Environment	Agriculture	Natural Resources	Other	None	Do Not Know
Drinking water/tap	☐	☐	☐	☐	☐	☐	☐
Bottled water	☐	☐	☐	☐	☐	☐	☐
Treated recreational	☐	☐	☐	☐	☐	☐	☐
Untreated recreational	☐	☐	☐	☐	☐	☐	☐
Other (please specify) [fill-in]	☐	☐	☐	☐	☐	☐	☐

3. In the space provided, please identify any differences between detecting and responding to waterborne enteric versus non-enteric diseases in your jurisdiction.

[fill-in blank space]

4. Which health department positions are involved in waterborne enteric disease surveillance and response? (check all that apply)

	State Health Department level	Regional/District Health Department level	Local Health Department level
Epidemiologist	☐	☐	☐
Public health nurse	☐	☐	☐
Public health laboratories	☐	☐	☐
Environmental health/sanitarian	☐	☐	☐
Public information officer/communications	☐	☐	☐
Other (please specify) [fill-in space]	☐	☐	☐
None	☐	☐	☐
Do not know	☐	☐	☐

5. Please provide the total composite number of staff working in **waterborne enteric diseases** by highest epidemiology education or training levels as indicated, to the extent you know. If a person holds dual degrees of equivalent levels (e.g., RN and MPH) please list this person in the “Other” row and briefly describe the dual degrees.

If an employee spends 50% of his/her time on **waterborne enteric diseases**, count that employee as 0.5 FTE. For example, if there are 3 employees working at 0.5 FTE each at the local health department level, count that as 1.5 total FTEs at the local health department level. If there are more than 10 composite FTEs, please enter >10. If a response is not applicable to your jurisdiction, please enter “999” in the space.

	State Health Department	Regional/District Health Department	Local Health Department	Other State Agency	Other Regional/Local Agency
PhD, DrPH, other doctoral degree in epidemiology, or some epidemiological training at the doctoral level	☐	☐	☐	☐	☐
Professional background (e.g., MD, DO, DVM, DDS) with dual degree in epidemiology or some epidemiological training at the doctoral level	☐	☐	☐	☐	☐
MPH, MSPH, MS, or other master's degree in epidemiology or some epidemiological training at the master's level	☐	☐	☐	☐	☐
BA, BS, or other bachelor's degree in epidemiology or some epidemiological training at the bachelor's level	☐	☐	☐	☐	☐
RN, BSN, or other nursing designation or degree	☐	☐	☐	☐	☐
Other (specify) [fill-in space]	☐	☐	☐	☐	☐
Do not know	☐	☐	☐	☐	☐

6. Do you have any staff members who work **full-time and exclusively** on waterborne diseases? (indicate the following):
- ☐ Yes, focusing only on waterborne **enteric** diseases
 - ☐ Yes, focusing only on waterborne **non-enteric** diseases
 - ☐ Yes, focusing on both waterborne enteric and non-enteric diseases
 - ☐ No
 - ☐ Do not know
7. What are the sources of legal authority to conduct waterborne enteric disease surveillance and response activities in your jurisdiction? (check all that apply) :
- ☐ State statutes that expressly authorize waterborne enteric disease investigations
 - ☐ State statutes that grant general authority for public health activities
 - ☐ State agency regulations that expressly authorize waterborne enteric disease investigations
 - ☐ State agency regulations that grant general authority for public health activities
 - ☐ Local government ordinances/regulations
 - ☐ Other (specify) [fill-in blank space]
 - ☐ Do not know

8. Indicate if training about detecting and responding to waterborne enteric disease cases and outbreaks is provided to the following types of health agency staff: (check all that apply)

	Yes	No	Do Not Know	Not Applicable
State epidemiology	☐	☐	☐	☐
State environmental health	☐	☐	☐	☐
State laboratory	☐	☐	☐	☐
Regional epidemiology	☐	☐	☐	☐
Regional environmental health	☐	☐	☐	☐
Regional laboratory	☐	☐	☐	☐
Local epidemiology	☐	☐	☐	☐
Local environmental health	☐	☐	☐	☐
Local laboratory	☐	☐	☐	☐
Other (please specify) [fill-in blank space]	☐	☐	☐	☐

9. What other governmental entities does your health agency coordinate/communicate with in detecting and investigating waterborne enteric disease cases and outbreaks: (check all that apply)

	Constant (every 2 weeks)	Frequent (monthly or less)	Sporadic (quarterly or less)	As Needed During Outbreaks	None	Do Not Know
State health department	☐	☐	☐	☐	☐	☐
Local health departments	☐	☐	☐	☐	☐	☐
Regional/district health departments	☐	☐	☐	☐	☐	☐
State environment agency	☐	☐	☐	☐	☐	☐
State agriculture agency	☐	☐	☐	☐	☐	☐
State natural resources agency	☐	☐	☐	☐	☐	☐
Other state agencies	☐	☐	☐	☐	☐	☐
CDC	☐	☐	☐	☐	☐	☐
FDA	☐	☐	☐	☐	☐	☐
USDA-FSIS	☐	☐	☐	☐	☐	☐
EPA	☐	☐	☐	☐	☐	☐
Other federal agencies	☐	☐	☐	☐	☐	☐
Health agencies in other states	☐	☐	☐	☐	☐	☐
Other agencies in other states	☐	☐	☐	☐	☐	☐
Other (please specify) [fill-in blank]	☐	☐	☐	☐	☐	☐

10. Does your jurisdiction have a written protocol for conducting waterborne enteric disease case/outbreak investigations?

- ☐ Yes
☐ No
☐ Do not know

10a. If yes, is it shared with the following:

	Yes	No	Do Not Know
State health department			
Local health departments			
Regional/district health departments			
State environment agency			
State agriculture agency			
State natural resources agency			
Other state agencies			
Health agencies in other states			
Other agencies in other states			
Federal agencies			
Other (please specify) [fill-in blank]			

11. Has your agency initiated and/or developed partnerships with the following agencies to promote coordination for waterborne enteric disease surveillance and response? (check all that apply)

	Yes	No	Do Not Know
State health department			
Local health departments			
Regional/district health departments			
State environment agency			
State agriculture agency			
State natural resources agency			
Other state agencies			
Health agencies in other states			
Other agencies in other states			
Federal agencies			
Other (please specify) [fill-in blank]			

12. If you have any other information or comments to share related to your jurisdiction's capacity to address waterborne enteric diseases, please provide them in the space below.

[fill-in blank space]

AREA I: Waterborne Enteric Diseases

If there are issues, concerns or ideas that you would like to raise which have not been addressed in the assessment instrument, please use the space provided for these comments.

[fill-in blank space]

Thank you for participating in the Enteric Disease Epidemiology Capacity Assessment. Please advance the page to submit your jurisdiction's responses. Upon submission, a response summary will be available for your records.