DEVELOPMENT OF TARGET RANGES FOR SELECTED PERFORMANCE MEASURES IN THE CIFOR *GUIDELINES*

CIFOR

Council to Improve Foodborne Outbreak Response

Detect • Investigate • Control • Prevent

ACKNOWLEDGEMENTS

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INTRODUCTION AND BACKGROUND

The CIFOR *Guidelines* for Foodborne Disease Outbreak Response were developed as a comprehensive source of information on foodborne disease investigation and control for state and local health departments. The Guidelines included measurable indicators of effective surveillance for enteric diseases and for response to outbreaks by state and local public health officials. The performance indicators were intended to be used by agencies to evaluate the performance of their foodborne disease surveillance and control programs. However, the Guidelines stopped short of providing specific targets for individual metrics, to avoid their use as a score card enabling cross-agency comparisons.

Since publication of the *Guidelines* in 2009, funders and public health leaders have placed more emphasis on health agency performance, accountability and transparency. Therefore, the Council to Improve Foodborne Outbreak Response (CIFOR) identified a need to develop target values to help state and local public health agencies demonstrate their performance and effectiveness conducting foodborne disease surveillance and outbreak control activities. Given the distributed public health system, with multiple independent jurisdictions, performance targets will also provide a framework for communicating best practices for surveillance activities and create clear performance expectations that will increase the likelihood of compliance.

This project was developed in response to a request for proposals by the Council of State and Territorial Epidemiologists (CSTE) on behalf of CIFOR. The overall project goals were to develop a set of core indicators feasible for all states to measure and explanations of how to do so and why. These were to be based on the performance indicators in Chapter 8 of the CIFOR Guidelines and on indicators developed and used by the Centers for Disease Control and Prevention (CDC) Foodborne Diseases Centers for Outbreak Response Enhancement (FoodCORE). The project was intended to provide justifications for the specific target values, based on public health importance.

To accomplish these goals, the project included six objectives:

1. Review FoodCORE metrics, including core and optional metrics, and metrics from other states and initiatives collecting similar data.

2. Create a subset of performance measures based on importance and feasibility of implementation, including metrics for epidemiology, laboratory, and environmental health programs. Performance measures were to be focused primarily on the state level, with some applicable to local programs.

3. Develop definitions of terms and a methodology for measuring target values.

4. Develop recommended targets for each performance measure using information and data from the CIFOR Guidelines, the Enteric Disease Investigation Timeline Study (EDITS), FoodCORE, CDC's National Outbreak Reporting system (NORS), and published literature. Tiered responses were developed in conjunction with the project work group.

5. Identify states to provide feedback on selected performance measures, their recommended targets, and a second iteration of the metrics.

6. Revise Chapter 8 of the CIFOR Guidelines, incorporating the new metrics and associated language.

METHODS

Selection of performance measures, definitions and measurement methods

At the start of the project, an Excel spreadsheet was created to enable side-by-side comparisons of CIFOR Guidelines metrics (from Chapter 8), FoodCORE metrics, and Public Health Emergency Preparedness (PHEP) goals. The textbox below provides an example of the comparison process.

Sample Metric Comparison

CIFOR Indicator: Reported cases with specified foodborne illnesses interviewed.
Related CIFOR metric: Percent reported cases for which food history was obtained.
Related FoodCore metric: Percent *Salmonella*, STEC, and Listeria (SSL) cases with exposure history obtained.

Based on the FoodCORE experience, the FoodCORE metric was adapted to replace the existing CIFOR metric in the revised CIFOR *Guidelines* Chapter 8. The proposed metric was changed to "% of confirmed cases with exposure history obtained."

This new performance measure was identified as a candidate for developing target ranges, because collecting exposure histories is a prerequisite for any cluster or outbreak investigation. In addition, it is widely recognized that interviewing cases as early as possible improves the completeness and reliability of the exposure information obtained. Although not all state and local agencies routinely interview all confirmed cases to obtain detailed exposure information, the CIFOR *Guidelines* identifies this as a model practice for routine surveillance (4.2.10.3, Case interviews). CDC's *Listeria* initiative requests routine interview with a standardized exposure questionnaire for all confirmed cases of Listeria infection.

The performance measure was determined to be feasible, based on the availability of the data needed to calculate the measure. In order to calculate the measure two definitions were used. A *confirmed case* was defined as a reported case with confirmed *Salmonella*, Shiga toxin- producing *E. coli* (STEC) or *Listeria* infection. An *exposure history* was defined as an interview (of any format) assessing exposures prior to illness onset. The assessment should go beyond assessing high risk settings and prevention education to ascertain food consumption/preference, or other exposure data.

Measurement methods were also specified: (1) determine the number of confirmed cases reported (the denominator of the metric), (2) determine the number of confirmed cases with exposure history obtained (the numerator of the metric), and (3) divide the numerator by the denominator and multiply by 100 to calculate a standardized rate. Reporting the numbers of cases assessed allows simple, year-to-year comparisons for the agency and reporting rates enables comparisons across agencies.

METHODS

A total of 20 performance measures were selected for the development of target ranges based on public health importance and feasibility of implementation (See Table 1). The selected performance measures address four key components of the public health food safety system: the surveillance system evaluated; follow up on complaints, cases and isolates; complaint/cluster investigations; and outbreak summaries and reporting to NORS. The selected performance measures encompass roles for epidemiology, laboratory practice, and environmental health, and include activities at both state and local levels.

Table 1. CIFOR performance measures chosen for target range development, by category of activity			
SURVEILLANCE SYSTEM	**INDIVIDUAL ITEMS/ FOLLOW-UPS**	**INVESTIGATIONS**	**OUTBREAKS/ REPORTING**
Foodborne illness complaint reporting system			
	Foodborne illness complaint rate	Outbreaks detected from complaints	Foodborne illness outbreak rate
	Confirmed cases with exposure history obtained	Outbreak case exposure assessments	NORS form completion
	Isolate submissions to public health laboratory	Outbreak clinical specimen collections	Outbreak etiology reported to NORS
	PFGE subtyping of isolates	Outbreak clinical specimen testing	Outbreak vehicle reported to NORS
	Isolate submission interval	Cluster or complaint investigation interval	Outbreak contributing factor reported to NORS
	Isolate subtyping interval	Multistate outbreak investigation interviews	
	PHEP *E. coli* O157 and *Listeria* subtyping interval	Cluster source identification	

There are three performance measures related to foodborne illness complaints. These are important because approximately 75% of all foodborne outbreaks are detected through complaint systems, and the organization of the complaint system has been shown to affect the likelihood of detecting an outbreak.

Six performance measures relate to surveillance and follow-up of confirmed cases. Five of these address the submission of isolates to the public health laboratory and subtyping of isolates by pulsed field gel electrophoresis (PFGE). These are important because submission of PFGE patterns to PulseNet is an important means of detecting outbreaks caused by *Salmonella*, Shiga toxin-producing *E. Coli* (STEC), and *Listeria*. In particular, most multistate outbreaks caused by these agents are detected through PulseNet.

Six performance measures relate to cluster and outbreak investigations. These include measures related to exposure assessments and collection of clinical specimens, as well as outcome measures related to investigations' timeliness and their effectiveness identifying a source. These are important because collecting clinical specimens may be necessary to identify the etiologic agent, and detailed exposure assessments are necessary to identify the vehicle, or source of transmission. Identifying the agent and vehicle are necessary to guide control measures, identify others potentially at risk of exposure, and guide the development of measures to prevent future outbreaks. Increasing the speed and effectiveness of outbreak investigations may reduce the number of persons exposed.

Four measures relate to the completeness of reporting outbreak findings to NORS. These are important for attributing foodborne outbreaks to particular food items, food handling practices, and food service settings. Such information is needed to guide policy makers, public health officials, and the food industry to prioritize food safety risks and develop measures to prevent future outbreaks.

A population-based foodborne illness outbreak rate was included to provide an overall basis of comparison among states. This rate is currently being reported by CDC in annual outbreak summaries and has been used by others to compare the relative effectiveness of state foodborne disease surveillance programs.

Development of target ranges for performance measures

Target ranges for the selected performance measures were based on available information. Ranges for *optimal* and *acceptable* performance were established for measures identified as model practices in the CIFOR Guidelines, where there was a sufficient knowledge base to justify a specified level of performance, or where compliance with an external standard formed the basis of the range. For performance measures where objective ranges could be identified but value judgments could not be justified, ranges of *high, middle* and *low* were established.

The workgroup felt it unnecessary to define levels as unacceptable, since values below the acceptable range would be implicitly unacceptable. Because there was considerable concern about assigning value judgments to ranges, most performance measures were assigned ranges of high (or low depending on the direction of the distribution) and middle values.

Justifications for target ranges for each of the 20 selected performance measures are detailed in Appendix 1. Most of the target ranges were derived from evaluations of surveillance data published in the peer-reviewed literature. In addition, results of Year 1 FoodCORE analyses, NORS data, and PHEP Guidance were used to establish target ranges. References are listed on Page 31.

Pilot states' evaluation of proposed target ranges

Reviewers in 13 states provided feedback on proposed target ranges for the 20 selected performance measures. The instructions and materials sent to reviewers comprise Appendix 1, and include the metric, definitions, measurement methods, and basis for determining the target range for each performance measure.

In general, the performance measures were judged to be reasonable, although several reviewers questioned the implied value judgments inherent in the use of target ranges. For example, it was suggested that a state with a low rate of outbreaks may be judged to be performing poorly when, in fact, the low rate may reflect an exceptionally strong food safety system within the state. Because that level of analysis is beyond the scope of this project, and the ranges reflect observed distributions, no changes were made to accommodate that concern.

Many reviewers noted that foodborne complaint systems are maintained mostly by local health agencies, and state health departments may not have access to the local data needed to calculate performance for measures linked to complaint data.

For each of the 20 performance measures, performance was calculated by anywhere from one to nine states, with a median of seven states being able to calculate the measure. The distribution

of responses for each measure is included in Appendix 2, along with modifications to the performance measures and target ranges made in response to comments.

Five of the original performance measures were dropped because they were judged to be unfeasible (e.g., foodborne illness complaint rate), redundant (e.g., outbreak clinical specimen testing), self-evident (e.g., outbreak case exposure assessments), or premature (e.g., multistate outbreak investigation interviews). The performance measure on cluster and complaint investigation intervals was split into separate performance measures for cluster investigations and complaint investigations. For five of the performance measures related to pathogen-specific surveillance, separate target ranges were established for *Salmonella*, STEC, and *Listeria*; because these may not all be managed the same way in every state, evaluating them separately should provide more useful information.

Final selection of performance measures and target ranges

Table 2 lists the final selection of performance measures for the development of target ranges to be incorporated in Chapter 8 of the CIFOR *Guidelines*. It includes a complete description of the metric, definitions and detailed measurement methods, and justification for the metric's feasibility and application. All of the elements in Table 2 have been incorporated into the revised Chapter 8.

Table 3 lists the target ranges for each of the selected performance measures. The ranges have been separated from Table 2 to allow for additional review by state and local health agencies. This review process is important because, for most of these performance measures, the ranges were based on published data that reflected the performance of a few states over a limited time frame. Thus, as more current and comprehensive information becomes available, the target ranges can be refined to better reflect overall performance levels. In addition, these target ranges reflect performance that may change over time as the availability of resources changes or as new methods are introduced. Publishing the target ranges separately on the CIFOR website enables them to be updated regularly to reflect any system-wide changes.

Table 2. Performance Measures for Program Evaluation as Incorporated in Revised CIFOR *Guidelines*, Chapter 8

CIFOR performance measure	Measurement methods	Performance
1. Foodborne illness complaint reporting system: **Metric:** Agency maintains logs or databases for all complaints or referral reports from other sources alleging food-related illness, food-related injury or intentional food contamination, and routinely reviews data to identify clusters of illnesses requiring investigation. **Definitions:** Foodborne illness complaint: A report of illness experienced by one or more persons following exposure to a specific event or establishment. Foodborne illness complaint log: A paper registry of complaints that records information about the complaint and specific establishment. Foodborne illness complaint database: An electronic database that records information about the complaint and specific establishment in a searchable format. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.1 "Foodborne complaints investigated." FDA's Draft Voluntary National Retail Food Regulatory Program Standards, Standard 5, Part 1.d calls for programs to maintain logs or databases for all complaint or referral reports from other sources alleging food-related illness, injury, or intentional food contamination.	Determine if an agency has any complaint system in place and if it is used to review foodborne illness complaints. Determine if an agency has an electronic database that can be systematically reviewed to link complaints.	**Complaint system is: (select one)** Electronic database: System to log complaints: Not applicable:

CIFOR performance measure	Measurement methods	Performance
2. Outbreaks detected from complaints: **Metric:** Outbreaks detected from complaints: Number outbreaks detected as a result of foodborne illness complaints. Rate of outbreaks detected per 1,000 complaints received. **Definitions:** Outbreak detected from a complaint: A foodborne illness outbreak that was detected as a result of a foodborne illness complaint investigation. Foodborne illness outbreak: The occurrence of two or more similar illnesses resulting from ingestion of a common food. Foodborne illness complaint: A report of illness experienced by one or more persons following exposure to a specific event or establishment. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.1 "Foodborne complaints investigated." It provides a consistent expectation for the use of complaint data system. Reporting numbers will allow simple comparisons from year to year for the agency, and reporting rates will allow for comparisons across agencies.	Determine the number of foodborne illness complaints that were received during the year. This will be the denominator for the metric. Determine the number of foodborne illness outbreaks that were detected as a result of a foodborne illness complaint investigation during the year. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 1,000. This will convert the observed numbers into a standardized rate.	**Denominator** (No. complaints) **=** _____ **Numerator** (No. outbreaks detected from complaints) = _____ **Rate** (Num./Denom. x 1000)= _____

CIFOR performance measure	Measurement methods	Performance
3. Foodborne illness outbreak rate: **Metric:** Number foodborne outbreaks reported, all agents. Rate of outbreaks reported / 1,000,000 population. **Definitions:** Foodborne illness outbreak: The occurrence of two or more similar illnesses resulting from ingestion of a common food. Foodborne illness outbreak rate: The number of confirmed foodborne illness outbreaks within a jurisdiction during a year, divided by the population of the jurisdiction x 1,000,000. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.4 "Foodborne outbreaks investigated." It aggregates FoodCORE metrics for outbreak investigations across all pathogens. Reporting foodborne outbreaks is part of PHEP Performance Measure 13.3 Outbreak Investigation Reports. Reporting numbers will allow simple comparisons from year to year for the agency, and reporting rates will allow for comparisons across agencies.	Determine the population of the jurisdiction. This will be the denominator for the metric. Determine the number of foodborne illness outbreaks that were reported during the year. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 1,000,000. This will convert the observed numbers into a standardized rate.	**Denominator (**Population) **=** _____ **Numerator (**No. foodborne outbreaks reported) = _____ **Rate** (Num./Denom. x 1,000,000) = _____

CIFOR performance measure	Measurement methods	Performance
4. Confirmed cases with exposure history obtained: **Metric:** Number and % of confirmed cases with exposure history obtained. **Definitions:** Confirmed case: Case reported to local or state health department by clinical laboratory with confirmed *Salmonella*, Shiga toxin-producing *E. coli* (STEC) or *Listeria* infection. Exposure history: An interview (of any format) that assesses exposures prior to onset of illness. The assessment should go beyond assessment of high risk settings and prevention education to ascertain food consumption/preference or other exposure data. For STEC this should include disease-specific data elements identified by CSTE and for *Listeria* it should include completing the *Listeria* case form. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.2 "Reported cases with specified foodborne illness interviewed." It is consistent with FoodCORE common metrics for *Salmonella*, STEC, and *Listeria*. Reporting numbers will allow simple comparisons from year to year for the agency, and reporting rates will allow for comparisons across agencies.	Determine the number of confirmed cases reported. This will be the denominator for the metric. Determine the number of confirmed cases with exposure history obtained. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. This will convert the observed numbers into a standardized rate. Measure and report separately for confirmed *Salmonella*, *E. coli* (STEC) and *Listeria* cases.	**Denominator** (No. confirmed cases) = A. *Salmonella* B. *E. coli* (STEC) C. *Listeria* **Numerator** (No. cases with exposure history) = A. *Salmonella* B. *E. coli* (STEC) C. *Listeria* **Rate** (Num./Denom. x 100) = A. *Salmonella* B. *E. coli* (STEC) C. *Listeria*

CIFOR performance measure	Measurement methods	Performance
5. Isolate/CIDT-positive clinical specimen submissions to PHL: **Metric:** Isolate/CIDT-positive clinical specimen submissions to public health laboratory (PHL): Number and % of isolates from confirmed cases and clinical specimens from patients diagnosed by culture independent diagnostic test (CIDT), submitted to PHL. **Definitions:** Isolate: Primary isolates of *Salmonella*, Shiga toxin-producing *E. coli* (STEC) or *Listeria*, limited to first or representative isolate or sample for each case. PHL: State or local public health laboratory designated to serve as a reference laboratory for confirmation and subtyping of isolates for jurisdiction. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.3 "Isolates of specified foodborne pathogens submitted to PHL." It is consistent with FoodCORE common metrics for *Salmonella*, STEC, and *Listeria*. Reporting numbers will allow simple comparisons from year to year for the agency, and reporting rates will allow for comparisons across agencies.	Determine the number of confirmed cases reported. This will be the denominator for the metric. Determine the number of isolates and clinical specimens from patients diagnosed by culture independent diagnostic test (CIDT), submitted to the PHL. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. This will convert the observed numbers into a standardized rate. Measure and report separately for confirmed *Salmonella*, *E. coli* (STEC), and *Listeria* cases.	**Denominator** **(**No. confirmed cases) **=** A. *Salmonella* B. *E. coli* (STEC) C. *Listeria* **Numerator** **(**No. isolates/ CIDT-positive clinical specimens submitted) = A. *Salmonella* B. *E. coli* (STEC) C. *Listeria* **Rate** (Num./Denom. x 100) = A. *Salmonella* B. *E. coli* (STEC) C. *Listeria*

CIFOR performance measure	Measurement methods	Performance
6. <u>PFGE subtyping of isolates</u>: **Metric**: Number and % of isolates with PFGE information. **Definitions**: <u>Isolate</u>: Primary isolates of *Salmonella*, Shiga toxin-producing *E. coli* (STEC), or *Listeria*, limited to first or representative isolate or sample for each case. <u>PFGE</u>: Pulsed-field gel electrophoresis. **Feasibility**: This metric is associated with CIFOR Indicator 8.2.3 "Isolates of specified foodborne pathogens submitted to PHL." It is consistent with FoodCORE common metrics for *Salmonella*, STEC, and *Listeria*. Reporting numbers will allow simple comparisons from year to year for the agency, and reporting rates will allow for comparisons across agencies.	Determine the number of isolates submitted to the PHL. This will be the denominator for the metric. Determine the number of isolates with PFGE information. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. This will convert the observed numbers into a standardized rate. Measure and report separately for confirmed *Salmonella*, *E. coli* (STEC), and *Listeria* cases.	**Denominator** **(**No. isolates submitted) **=** A. *Salmonella* B. *E. coli* (STEC) C. *Listeria* **Numerator** **(**No. isolates with PFGE information) = A. *Salmonella* B. *E. coli* (STEC) C. *Listeria* **Rate** (Num./Denom. x 100)= A. *Salmonella* B. *E. coli* (STEC) C. *Listeria*

CIFOR performance measure	Measurement methods	Performance
7. Isolate/CIDT-positive clinical specimen submission interval: **Metric:** Median number days from collection of clinical specimen to receipt of isolate or clinical specimen from a patient diagnosed by CIDT, at PHL. **Definitions:** Isolate: Primary isolates of Salmonella, Shiga toxin-producing E. coli (STEC), or Listeria, limited to first or representative isolate or sample for each case. CIDT-positive clinical specimen: Clinical specimens forwarded to PHL for confirmation and isolation from patients diagnosed with Salmonella, Shiga toxin-producing E. coli (STEC) or Listeria by culture independent diagnostic test (CIDT). Isolate/CIDT-positive clinical specimen submission interval: The number of days from collection of the clinical specimen to receipt of the isolate or clinical specimen from a patient diagnosed by CIDT, at the PHL. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.3 "Isolates of specified foodborne pathogens submitted to PHL." It is consistent with FoodCORE common metrics for *Salmonella* and STEC. Median values likely reflect consistent general practices within the jurisdiction. Reporting median values will allow for comparisons across years within the agency and across agencies.	For each isolate or clinical specimen from a patient diagnosed by culture independent diagnostic test (CIDT), determine the date of specimen collection and the date of receipt at the PHL. Determine the number of calendar days between these dates, which is the isolate/CIDT-positive clinical specimen submission interval. Analyze the distribution of all known isolate/CIDT-positive clinical specimen submission intervals for the year. Report the median value for isolates/CIDT-positive clinical specimens with known isolate/CIDT-positive clinical specimen submission intervals. Determine the percentages of isolates/CIDT-positive clinical specimens with missing information for which an isolate submission interval cannot be determined. Measure and report separately for confirmed *Salmonella*, *E. coli* (STEC), and *Listeria* cases.	**% of isolates/CIDT-positive clinical specimens with missing information:** A. *Salmonella* B. *E. coli* (STEC) C. *Listeria* **Median interval for isolates/CIDT-positive clinical specimens with known isolates/CIDT-positive clinical specimen submission intervals:** A. *Salmonella* B. *E. coli* (STEC) C. *Listeria*

CIFOR performance measure	Measurement methods	Performance
8. Isolate subtyping interval: **Metric:** Median number days from receipt of isolate to availability of PFGE subtyping results. **Definitions:** Isolate: Primary isolates of *Salmonella*, Shiga toxin-producing *E. coli* (STEC), or *Listeria*, limited to first or representative isolate or sample for each case. Isolate subtyping interval: The number of days from receipt of the isolate at the PFGE laboratory to availability of PFGE subtyping results. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.3 "Isolates of specified foodborne pathogens submitted to PHL." It is consistent with FoodCORE common metrics for *Salmonella* and STEC. Median values likely reflect consistent general practices within the jurisdiction. Reporting median values will allow for comparisons across years within the agency and across agencies.	For each isolate, determine the date of receipt at the PFGE laboratory and the date of upload to PulseNet. Determine the number of calendar days between these dates, which is the isolate subtyping interval. Analyze the distribution of all known isolate subtyping intervals for the year. Determine the percentages of isolates with missing information for which an isolate subtyping interval cannot be determined. Report the median value for isolates with known isolate subtyping intervals. Measure and report separately for confirmed *Salmonella*, *E. coli* (STEC), and *Listeria* cases.	**% of isolates with missing information:** A. *Salmonella* B. *E. coli* (STEC) C. *Listeria* **Median interval for isolates with known isolate subtyping intervals:** A. *Salmonella* B. *E. coli* (STEC) C. *Listeria*

CIFOR performance measure	Measurement methods	Performance
9. PHEP *E. coli* O157 and *Listeria* subtyping interval: **Metric:** PHEP *E. coli* O157 and *Listeria* subtyping interval: % of PFGE subtyping data results for *E. coli* O157:H7 and *Listeria* submitted to the PulseNet national database within four working days of isolate receipt at the PFGE laboratory. **Definitions:** PHEP: Public Health Emergency Preparedness Cooperative Agreement. PHEP specifies performance measures regarding public health surveillance and investigation of specified agents. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.3 "Isolates of specified foodborne pathogens submitted to PHL," but entirely incorporates existing PHEP performance measures for PFGE subtyping of *E. coli* O157:H7 (PHEP 12.14) and *L. monocytogenes* (PHEP 12.15).	Determine the number of isolates submitted to the public health laboratory. Determine the number of isolates for which PFGE subtyping was performed. This will be the denominator for the metric. Determine the number of number of primary patterns from subtyped isolates uploaded to PulseNet. Determine the number of results from PFGE subtyped isolates that were submitted to PulseNet within four working days of receipt at the PFGE laboratory. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100.	**Denominator** (No. isolates subtyped by PFGE) **=** _____ **Numerator** (No. isolates subtyped within 4 days) = _____ **Rate** (Num./Denom. x 100) = _____

CIFOR performance measure	Measurement methods	Performance
10. Outbreak clinical specimen collections: **Metric:** Outbreak clinical specimen collections: Number and % of outbreak investigations with clinical specimens collected and submitted to PHL from two or more people. **Definitions:** Foodborne illness outbreak: The occurrence of two or more similar illnesses resulting from ingestion of a common food. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.4 "Foodborne outbreaks investigated." It extends FoodCORE metrics to investigations for all pathogens.	Determine the number of foodborne illness outbreaks that were investigated. This will be the denominator for the metric. Determine the number of outbreaks for which clinical specimens were collected and submitted to the PHL from two or more people. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100.	**Denominator** **(**No. outbreaks) **=** _____ **Numerator** **(**No. outbreaks with clinical specimens collected) = _____ **Rate** (Num./Denom. x 100) = _____

CIFOR performance measure	Measurement methods	Performance
11. Cluster investigation interval: **Metric:** Median number days from initiation of investigation to identification of source. **Definitions:** Cluster: Two or more isolates with a matching molecular subtype pattern identified in a period of two weeks. Cluster investigation interval: The number of days from the initiation of an investigation to the identification of source, for clusters with a source identified. Initiation of an investigation: Steps taken to investigate the possible source of a cluster of cases after it is determined that they may represent a common source outbreak. This goes beyond routine follow-up of individual cases. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.5 "Case clusters investigated." It aggregates FoodCORE metrics for investigations across all pathogens.	Determine the number of clusters that were detected by the public health laboratory. Determine the number and % of clusters where a source was identified. For each cluster for which a source was identified, determine the date at which the investigation was initiated and the date at which the source was identified. Determine the number of calendar days between these dates, which is the cluster investigation interval. Analyze the distribution of all known cluster investigation intervals for the year. Report the median value for investigations with known cluster investigation intervals.	**Percentage of clusters with source identified:** _____ **Median interval for cluster with known investigation intervals:** _____

CIFOR performance measure	Measurement methods	Performance
12. Complaint investigation interval: **Metric:** Median number days from initiation of investigation to implementation of intervention. **Definitions:** Foodborne illness complaint: A report of illness experienced by one or more persons following exposure to a specific event or establishment. Complaint investigation interval: The number of days from the initiation of an investigation to the initial intervention. Initiation of an investigation: Steps taken to investigate the possible source of a complaint after it is determined that it may represent a common source outbreak. This goes beyond routine follow-up of individual complaints. Intervention: A public health action taken to control an identified hazard. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.1 "Foodborne complaints investigated." It aggregates FoodCORE metrics for investigations across all pathogens.	Determine the number of foodborne illness complaints that were investigated. Determine the number and percentage of foodborne complaint investigations that led to an intervention. For each complaint investigation that led to an intervention, determine the date at which the investigation was initiated and the date at which an intervention was initiated. Determine the number of calendar days between these dates, which is the complaint investigation interval. Analyze the distribution of all complaint investigation intervals for the year. Report the median value for complaint investigation intervals.	**% of complaint investigations with interventions:** _____ **Median interval for complaints with known isolate investigation intervals:** _____

CIFOR performance measure	Measurement methods	Performance
13. <u>Cluster source identification:</u> **Metric:** Number and % of clusters with more than five cases in which a source was identified. **Definitions:** <u>Cluster</u>: Two or more isolates with a matching molecular subtype pattern identified in a period of two weeks. <u>Cluster source identification</u>: The number of identified clusters for which a specific food transmission setting, meal, food item or ingredient was identified, leading the cluster to be considered an outbreak. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.5 "Case clusters investigated."	Determine the number of clusters that include five or more cases. This will be the denominator for the metric. Determine the number of clusters for which a source was identified that include five or more cases. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100.	**Denominator** **(**No. clusters with ≥ 5 cases) **=** _____ **Numerator** (No. clusters with ≥ 5 cases with source identified) = _____ **Rate** (Num./Denom. x 100) = _____

CIFOR performance measure	Measurement methods	Performance
14. Outbreak etiology reported to NORS: **Metric:** Number and % of outbreaks for which etiology was identified and reported to NORS. **Definitions:** Foodborne illness outbreak: The occurrence of two or more similar illnesses resulting from ingestion of a common food. NORS form: National Outbreak Reporting System, Foodborne Disease Outbreaks and Enteric Disease Outbreaks Transmitted by Contact with Persons, Animals, or Environmental Sources, or by an Unknown Mode; NORS Form (CDC 52.13 Form). Etiology identified: For most etiologic agents CDC considers an outbreak to have a confirmed etiology if there are two or more lab-confirmed cases (*MMWR* 2000, Vol. 49/SS-1, App. B). Etiology may be suspected based on characteristic combinations of clinical symptoms, incubation periods, and duration of illness. **Feasibility:** This metric is associated with CIFOR Indicator 8.3.1 "Etiology of outbreak identified." This metric will require improved investigation and documentation by many agencies.	Determine the number of foodborne outbreaks that were investigated. This will be the denominator for the metric. Determine the number of outbreaks for which an etiology was identified and reported to NORS. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100.	**Denominator** **(**No. outbreaks) **=** _____ **Numerator** **(**No. with etiology reported to NORS) = _____ **Rate** (Num./Denom. x 100) = _____

CIFOR performance measure	Measurement methods	Performance
15. Outbreak vehicle reported to NORS: **Metric:** Number and % of outbreaks for which a vehicle was identified and reported to NORS. **Definitions:** Foodborne illness outbreak: The occurrence of two or more similar illnesses resulting from ingestion of a common food. NORS form: National Outbreak Reporting System, Foodborne Disease Outbreaks and Enteric Disease Outbreaks Transmitted by Contact with Persons, Animals, or Environmental Sources, or by an Unknown Mode; NORS Form (CDC 52.13 Form). Vehicle identified: A specific food item or ingredient was confirmed or suspected to be the source of the outbreak based on one of the following: (1) Statistical evidence from epidemiological investigation, (2) Laboratory evidence (e.g., identification of agent in food), (3) Compelling supportive information, (4) Other data (e.g., same phage type found on farm that supplied eggs), (5) Specific evidence lacking but prior experience makes it a likely source. **Feasibility:** This metric is associated with CIFOR Indicator 8.3.2 "Vehicle of outbreak identified." This metric will require improved investigation and documentation by many agencies.	Determine the number of foodborne outbreaks that were investigated. This will be the denominator for the metric. Determine the number of outbreaks for which a vehicle was identified and reported to NORS. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100.	**Denominator** **(**No. outbreaks) **=** _____ **Numerator** **(**No. with vehicle reported to NORS) = _____ **Rate** (Num./Denom. x 100) = _____

CIFOR performance measure	Measurement methods	Performance
16. Outbreak contributing factor reported to NORS: **Metric:** Number and % of outbreaks for which contributing factors were identified and reported to NORS. **Definitions:** Foodborne illness outbreak: The occurrence of two or more similar illnesses resulting from ingestion of a common food. NORS form: National Outbreak Reporting System, Foodborne Disease Outbreaks and Enteric Disease Outbreaks Transmitted by Contact with Persons, Animals, or Environmental Sources, or by an Unknown Mode; NORS Form (CDC 52.13 Form). Contributing factor identified: Contributing factors (CFs) are defined as the food safety practices and behaviors which most likely contributed to a foodborne illness outbreak. A CF should be identified only if the investigator has strong evidence that it actually occurred in the investigated outbreak; just because a factor has been cited in similar outbreaks in the past does not mean it was involved in the investigated outbreak. **Feasibility:** This metric is associated with CIFOR Indicator 8.3.3 "Contributing factor identified." This metric will require improved investigation and documentation by many agencies.	Determine the number of foodborne outbreaks that were investigated. This will be the denominator for the metric. Determine the number of outbreaks for which a contributing factor was identified and reported to NORS. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100.	**Denominator** **(**No. outbreaks) **=** _____ **Numerator** **(**No. with contributing factors reported to NORS) = _____ **Rate** (Num./Denom. x 100) = _____

Table 3. Proposed Target Ranges for Selected Performance Measures for Program Evaluation as Incorporated in Revised CIFOR Guidelines, Chapter 8

CIFOR performance measure	Measurement methods	Target range
1. Foodborne illness complaint reporting system: **Metric:** Agency maintains logs or databases for all complaints or referral reports from other sources alleging food-related illness, food-related injury or intentional food contamination, and routinely reviews data to identify clusters of illnesses requiring investigation.	If an agency has any complaint system in place and it is used to review foodborne illness complaints, it will be considered acceptable. If an agency has an electronic database that can be systematically reviewed to link complaints, it will be considered preferable.	**Preferable:** Electronic database **Acceptable:** System to log complaints
2. Outbreaks detected from complaints: **Metric:** Outbreaks detected from complaints: Number outbreaks detected as a result of foodborne illness complaints. Rate of outbreaks detected per 1,000 complaints received.	Determine the number of foodborne illness complaints that were received during the year. This will be the denominator for the metric. Determine the number of foodborne illness outbreaks that were detected as a result of a foodborne illness complaint investigation during the year. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 1,000. This will convert the observed numbers into a standardized rate.	***Preferable:** > 20 outbreaks / 1,000 complaints **Acceptable:** 10-20 outbreaks / 1,000 complaints *Evidence base may not always support value judgment on range. Very low numbers of documented complaints could inflate the observed rate.
3. Foodborne illness outbreak rate: **Metric:** Number foodborne outbreaks reported, all agents. Rate of outbreaks reported per 1,000,000 population.	Determine the population of the jurisdiction. This will be the denominator for the metric. Determine the number of foodborne illness outbreaks that were reported during the year. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 1,000,000. This will convert the observed numbers into a standardized rate.	**Preferable:** > 6 outbreaks / 1,000,000 population **Acceptable:** 1-6 outbreaks / 1,000,000 population

CIFOR performance measure	Measurement methods	Target range
4. Confirmed cases with exposure history obtained: **Metric:** Number and % of confirmed cases with exposure history obtained.	Determine the number of confirmed cases reported. This will be the denominator for the metric. Determine the number of confirmed cases with exposure history obtained. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. This will convert the observed numbers into a standardized rate.	**A. *Salmonella*** **Preferable:** > 75% of cases **Acceptable**: 50-75% of cases **B. *E. coli* (STEC)** **Preferable:** > 75% of cases **Acceptable**: 50-75% of cases **C. *Listeria*** **Preferable:** > 75% of cases **Acceptable**: 50-75% of cases
5. Isolate/CIDT-positive clinical specimen submissions to PHL: **Metric:** Isolate/CIDT-positive clinical specimen submissions to public health laboratory (PHL): Number and % of isolates from confirmed cases and clinical specimens from patients diagnosed by culture independent diagnostic test (CIDT), submitted to PHL.	Determine the number of confirmed cases reported. This will be the denominator for the metric. Determine the number of isolates and clinical specimens from patients diagnosed by culture independent diagnostic test (CIDT), submitted to the PHL. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. This will convert the observed numbers into a standardized rate.	**A. *Salmonella*** **Preferable:** > 90% of isolates/ CIDT-positive clinical specimens **Acceptable**: 60-90% of isolates/ CIDT-positive clinical specimens **B. *E. coli* (STEC)** **Preferable:** > 90% of isolates/ CIDT-positive clinical specimens **Acceptable**: 60-90% of isolates/ CIDT-positive clinical specimens **C. *Listeria*** **Preferable:** > 90% of isolates/ CIDT-positive clinical specimens **Acceptable**: 60-90% of isolates/ CIDT-positive clinical specimens

CIFOR performance measure	Measurement methods	Target range
6. PFGE subtyping of isolates: **Metric:** No. and % of isolates with pulsed field gel electrophoresis (PFGE) information.	Determine the number of isolates submitted to the PHL. This will be the denominator for the metric. Determine the number of isolates with PFGE information. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. This will convert the observed numbers into a standardized rate.	**A.** *Salmonella* **Preferable:** > 90% of isolates **Acceptable**: 60-90% of isolates **B.** *E. coli* **(STEC)** **Preferable:** > 90% of isolates **Acceptable**: 60-90% of isolates **C.** *Listeria* **Preferable:** > 90% of isolates **Acceptable**: 60-90% of isolates
7. Isolate/CIDT-positive clinical specimen submission interval: **Metric:** Median number days from collection of clinical specimen to receipt of isolate or clinical specimen from a patient diagnosed by CIDT, at PHL.	For each isolate or clinical specimen from a patient diagnosed by culture independent diagnostic test (CIDT), determine the date of specimen collection and the date of receipt at the PHL. Determine the number of calendar days between these dates, which is the isolate/CIDT-positive clinical specimen submission interval. Analyze the distribution of all known isolate/CIDT-positive clinical specimen submission intervals for the year. Report the median value for isolates/CIDT-positive clinical specimens with known isolate/CIDT-positive clinical specimen submission intervals. Determine the percentages of isolates/CIDT-positive clinical specimens with missing information for which an isolate/CIDT-positive clinical specimen submission interval cannot be determined. Although this is not part of the target range, it is an important process metric that affects the usefulness of the target range to guide performance improvement.	**A.** *Salmonella* **Preferable:** < 7 days **Acceptable**: 7-8 days **B.** *E. coli* **(STEC)** **Preferable:** < 7 days **Acceptable**: 7-8 days **C.** *Listeria* **Preferable:** < 7 days **Acceptable**: 7-8 days

CIFOR performance measure	Measurement methods	Target range
8. Isolate subtyping interval: **Metric:** Median number days from receipt of isolate to PFGE subtyping results.	For each isolate, determine the date of receipt at the PFGE laboratory and the date of upload to PulseNet. Determine the number of calendar days between these dates, which is the isolate subtyping interval. Analyze the distribution of all known isolate subtyping intervals for the year. Report the median value for isolates with known isolate subtyping intervals. Determine the percentages of isolates with missing information for which an isolate subtyping interval cannot be determined. Although this is not part of the target range, it is an important process metric that affects the usefulness of the target range to guide performance improvement.	**A. *Salmonella*** **Preferable:** $\leq$ 4 days **Acceptable**: 5-6 days **B. *E.coli* (STEC)** **Preferable:** $\leq$ 4 days **Acceptable**: 5-6 days **C. *Listeria*** **Preferable:** $\leq$ 4 days **Acceptable**: 5-6 days
9. PHEP *E. coli* O157 and *Listeria* subtyping interval: **Metric:** PHEP *E. coli* O157 and *Listeria* subtyping interval: % of PFGE subtyping data results for *E. coli* O157:H7 and *Listeria* submitted to the PulseNet national database within four working days of receiving isolate at the PFGE laboratory.	Determine the number of isolates submitted to the PHL. Determine the number of isolates for which PFGE subtyping was performed. This will be the denominator for the metric. Determine the number of primary patterns from subtyped isolates uploaded to PulseNet. Determine the number of results from PFGE subtyped isolates that were submitted to PulseNet within four working days of receipt at the PFGE laboratory. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100.	**Acceptable:** $\geq$ 90% of PFGE subtyping results submitted to PulseNet within 4 working days.

CIFOR performance measure	Measurement methods	Target range
10. <u>Outbreak clinical specimen collections</u>: **Metric:** Outbreak clinical specimen collections: Number and % of outbreak investigations with clinical specimens collected and submitted to PHL from two or more people.	Determine the number of foodborne illness outbreaks that were investigated. This will be the denominator for the metric. Determine the number of outbreaks for which clinical specimens were collected and submitted to the PHL from two or more people. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100.	**Preferable:** > 75% of outbreaks **Acceptable**: 50-75% of outbreaks
11. <u>Cluster investigation interval</u>: **Metric:** Median number days from initiation of investigation to identification of source.	Determine the number of clusters that were detected by the PHL. Determine the number and percentage of clusters where a source was identified. For each cluster for which a source was identified, determine the date at which the investigation was initiated and the date at which the source was identified. Determine the number of calendar days between these dates, which is the cluster investigation interval. Analyze the distribution of all known cluster investigation intervals for the year. Report the median value for investigations with known cluster investigation intervals.	**Preferable:** < 7 days **Acceptable**: 7-21 days
12. <u>Complaint investigation interval</u>: **Metric:** Median number days from initiation of investigation to implementation of intervention.	Determine the number of foodborne illness complaints that were investigated. Determine the number and percentage of foodborne complaint investigations that led to an intervention. For each complaint investigation that led to an intervention, determine the date at which the investigation was initiated and the date at which an intervention was initiated. Determine the number of calendar days between these dates, which is the complaint investigation interval. Analyze the distribution of all complaint investigation intervals for the year. Report the median value for complaint investigation intervals.	**Preferable:** < 7 days **Acceptable**: 7-21 days

CIFOR performance measure	Measurement methods	Target range
13. Cluster source identification: **Metric:** Number and % of clusters with more than five cases in which a source was identified.	Determine the number of clusters that include five or more cases. This will be the denominator for the metric. Determine the number of clusters for which a source was identified that include five or more cases. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100.	**Preferable:** > 20% of clusters with >5 cases **Acceptable**: 10-20% of clusters with > 5 cases
14. Outbreak etiology reported to NORS: **Metric:** Number and % of outbreaks for which etiology was identified and reported to the National Outbreak Reporting System (NORS).	Determine the number of foodborne outbreaks that were investigated. This will be the denominator for the metric. Determine the number of outbreaks for which an etiology was identified and reported to NORS. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100.	**Preferable:** > 68% of outbreaks* **Acceptable**: 44-68% of outbreaks
15. Outbreak vehicle reported to NORS: **Metric:** No. and % of outbreaks for which a vehicle was identified and reported to NORS.	Determine the number of foodborne outbreaks that were investigated. This will be the denominator for the metric. Determine the number of outbreaks for which a vehicle was identified and reported to NORS. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100.	**Preferable:** > 60% of outbreaks* **Acceptable**: 48-60% of outbreaks
16. Outbreak contributing factor reported to NORS: **Metric:** Number and % of outbreaks for which contributing factors were identified and reported to NORS.	Determine the number of foodborne outbreaks that were investigated. This will be the denominator for the metric. Determine the number of outbreaks for which a contributing factor was identified and reported to NORS. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100.	**Preferable:** > 55% of outbreaks* **Acceptable**: 33-55% of outbreaks

* The justification for the target ranges in CIFOR performance measures 14-16 is based on the observed variability among states in investigating foodborne outbreaks (Jones T, 2013).

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Evaluation of proposed target ranges for the CIFOR *Guidelines for Foodborne Disease Outbreak Response* performance indicators

The purpose of your involvement with the CIFOR *Guidelines for Foodborne Disease Outbreak Response* performance indicators project is to evaluate proposed targets for a set of core measures based on the performance indicators in Chapter 8 of the CIFOR *Guidelines* that should be feasible for all states to collect. This document provides background and rationale for the development of the target ranges, lists the selected subset of indicators based on their importance and feasibility of implementation, and describes definitions of terms and methodology to measure target values.

Instructions for evaluating the feasibility and usefulness of the proposed target ranges:

1. Review the proposed performance measures, definitions, measurement methods and required data elements.
2. On the worksheet in Table 3 (beginning on p. 29), indicate the jurisdiction for which the evaluation is being carried out, and the time frame over which performance is being assessed.
3. For each performance indictor that is applicable to your agency, attempt to fill out the data elements in the worksheet and calculate the performance measure as indicated.
4. If a particular performance indicator is not applicable to your agency, note that it is not applicable in the comments field.
5. If any required data elements are not available, indicate in the comments field whether they are not collected, or are collected but not readily accessible. If possible, elaborate on what would be required to collect and report these data elements. This could include additional labor, information technology, updated rules, etc.
6. Provide your overall comments on the feasibility and usefulness of the target ranges in the space provided following the worksheet.
7. Return the completed evaluation to Dhara Patel (dpatel@cste.org) who will collect the feedback and forward it to the CIFOR workgroup.

Background: The CIFOR *Guidelines for Foodborne Disease Outbreak Response* were intended to serve as a comprehensive source of information on foodborne disease investigation and control for state and local health departments. The *Guidelines* included measurable indicators of effective surveillance for enteric diseases and for response to outbreaks by state and local public health officials. The performance indicators were intended to be used by agencies to evaluate the performance of their foodborne disease surveillance and control programs. However, the *Guidelines* stopped short of providing specific targets for individual metrics, to avoid their use as a score card that could be compared between agencies.

Since the development of the *Guidelines*, there has been more emphasis placed on performance, accountability and transparency by public health agencies. Therefore, there is a need for the development of target values that will help state and local public health agencies demonstrate their performance and effectiveness for foodborne disease surveillance and outbreak control activities. Given the distributed public health system with multiple independent jurisdictions, having performance targets will also provide a framework for communicating best practices for surveillance activities and create clear expectations for performance that will increase the likelihood of compliance.

Selection of performance indicators and establishment of target ranges: A total of 20 performance indicators were selected for the development of target ranges based on importance and feasibility of implementation. These include metrics for epidemiology, laboratory, and environmental health programs. Most of the selected performance indicators focus on the state level. Several are applicable to both state and local programs and a few are primarily focused on local agencies. For each of the performance indicators, a description is provided that describes the metric, relevant definitions, an assessment of the feasibility of measuring performance of the metric, detailed methods for measurement, and comments on the application of the metric and justification of the proposed target ranges.

The selected performance indicators and proposed target ranges were developed under direction of the CIFOR Performance Indicators Workgroup. The selected performance indicators, by category of activity are shown in Table 1. Categories include the surveillance system evaluated, follow-up on complaints, cases and isolates, investigations of complaints and clusters, and summaries of outbreaks and reporting of outbreak information.

The selected performance indicators and target ranges are shown in Table 2. Proposed target ranges are shown in two columns based on whether the target range is describing an optimal or acceptable practice, or whether the proposed target range is based on an observed or defined range. For these performance indicators, ranges in the high (or low, depending on the variable) and middle ranges are specified.

Following the tables, each performance indicator is described with detailed methods for measurement. A worksheet to assemble data needed to measure performance is provided in Table 3.

If you have any questions, please contact Dhara Patel at 770-458-3811 or dpatel@cste.org.

Revised CIFOR metrics, definitions, feasibility, measurement methods and comments on application:

1. **Metric:** <u>Foodborne illness complaint reporting system</u>: Agency maintains logs or databases for all complaints or referral reports from other sources alleging food-related illness, food-related injury or intentional food contamination, and routinely reviews data to identify clusters of illnesses requiring investigation.

   Definitions: <u>Foodborne illness complaint</u>: A report of illness experienced by one or more persons following exposure to a specific event or establishment.
   <u>Foodborne illness complaint log</u>: A paper registry of complaints that records information about the complaint and specific establishment.
   <u>Foodborne illness complaint database</u>: An electronic database that records information about the complaint and specific establishment in a searchable format.

   Feasibility: This metric is associated with CIFOR Indicator 8.2.1 "Foodborne complaints investigated." FDA's Draft Voluntary National Retail Food Regulatory Program Standards, Standard 5, Part 1.d calls for programs to maintain logs or databases for all complaint or referral reports from other sources alleging food-related illness, injury, or intentional food contamination. Most local agencies maintain some type of complaint reporting system. Most of those that do not use databases would use them if provided at no cost (Li, 2011).

   Measurement methods: If an agency has any complaint system in place and it is used to review foodborne illness complaints, it will be considered acceptable. If an agency had an electronic database that can be systematically reviewed to link complaints, it will be considered optimal.

   Comments on application: This metric may be most applicable to a local health department or food regulatory agency. If foodborne illness complaints are collected or aggregated on a state level, the state program should also report performance based on the target ranges. The justification for the target ranges is based on a survey of local environmental health programs that showed higher rates of outbreaks being detected by agencies using foodborne illness complaint databases (Li, 2011).

2. **Metric:** <u>Foodborne illness complaint rate</u>: No. complaints received. Rate of complaints received per 100,000 population in jurisdiction.

   Definitions: <u>Foodborne illness complaint</u>: A report of illness experienced by one or more persons following exposure to a specific event or establishment.
   <u>Foodborne illness complaint rate</u>: The number of foodborne illness complaints received and entered into the jurisdictions' log or database during the calendar year, divided by the jurisdictions' population x 100,000.

   Feasibility: This metric is associated with CIFOR Indicator 8.2.1 "Foodborne complaints investigated." It provides a consistent expectation for the use of complaint data system. Reporting numbers will allow simple comparisons from year to year for the agency, and reporting rates will allow for comparisons across agencies**.**

   Measurement methods: Determine the population of the jurisdiction. This will be the denominator for the metric. Determine the number of complaints received by the agency during the year. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100,000. If an agency collects more than 20 complaints/ 100,000 population per year it can be reported as being in the high range. If it receives 10-20 complaints/100,000 population per year it can be reported as being in the middle range.

   Comments on application: This metric may be most applicable to a local health department or food regulatory agency. Although many local jurisdictions may have a population less than 100,000, converting observations to standardized rates allows for comparisons of jurisdictions of different sizes. If foodborne illness complaints are collected or aggregated on a state level, the state program should also report performance based on the target ranges. The justification for the target ranges is based on ranges of rates for foodborne illness complaints received by local agencies in a survey of local environmental health programs (Li, 2011).

3. **Metric:** Outbreaks detected from complaints: No. outbreaks detected as a result of foodborne illness complaints. Rate of outbreaks detected per 1,000 complaints received.

   Definitions: Outbreak detected from a complaint: A foodborne illness outbreak that was detected as a result of a foodborne illness complaint investigation.
   Foodborne illness outbreak: The occurrence of two or more similar illnesses resulting from ingestion of a common food.
   Foodborne illness complaint: A report of illness experienced by one or more persons following exposure to a specific event or establishment.

   Feasibility: This metric is associated with CIFOR Indicator 8.2.1 "Foodborne complaints investigated." It provides a consistent expectation for the use of complaint data system. Reporting numbers will allow simple comparisons from year to year for the agency, and reporting rates will allow for comparisons across agencies.

   Measurement methods: Determine the number of foodborne illness complaints that were received during the year. This will be the denominator for the metric. Determine the number of foodborne illness outbreaks that were detected as a result of a foodborne illness complaint investigation during the year. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 1,000. This will convert the observed numbers into a standardized rate. If an agency reports more than 20 outbreaks/1,000 complaints per year it can be reported as being in the high range. If it reports 10-20 outbreaks/1,000 complaints per year it can be reported as being in the middle range.

   Comments on application: This metric may be most applicable to a local health department or food regulatory agency. Although many local jurisdictions may receive fewer than 1,000 complaints, converting observations to standardized rates allows for comparisons of jurisdictions of different sizes. If foodborne illness complaints are collected or aggregated on a state level, the state program should also report performance based on the target ranges. The justification for the target ranges is based on ranges of rates for foodborne outbreaks received by local agencies in a survey of local environmental health programs (Li, 2011).

4. **Metric:** <u>Foodborne illness outbreak rate</u>: No. foodborne outbreaks reported, all agents. Rate of outbreaks reported/1,000,000 population.

   Definitions: <u>Foodborne illness outbreak</u>: The occurrence of two or more similar illnesses resulting from ingestion of a common food.
   <u>Foodborne illness outbreak rate</u>:   The number of confirmed foodborne illness outbreaks within a jurisdiction during a year, divided by the population of jurisdiction x 1,000,000.

   Feasibility: This metric is associated with CIFOR Indicator 8.2.4 "Foodborne outbreaks investigated." It aggregates FoodCORE metrics for outbreak investigations across all pathogens. Reporting foodborne outbreaks is part of PHEP Performance Measure 13.3 Outbreak Investigation Reports. Reporting numbers will allow simple comparisons from year to year for the agency, and reporting rates will allow for comparisons across agencies.

   Measurement methods: Determine the population of the jurisdiction. This will be the denominator for the metric. Determine the number of foodborne illness outbreaks that were reported during the year. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 1,000,000. This will convert the observed numbers into a standardized rate. If an agency reports more than 6 outbreaks/1,000,000 population per year it can be reported as being in the high range. If it reports 1-6 outbreaks/1,000,000 population per year it can be reported as being in the middle range.

   Comments on application: This metric may be most applicable to a state health department large local agency. Many small local jurisdictions may not investigate an outbreak during a given year. Although many local jurisdictions may have a population less than 1,000,000, converting observations to standardized rates allows for comparisons of jurisdictions of different sizes. If a small local agency routinely investigates by foodborne outbreaks in their jurisdiction, they should also report performance based on the target ranges. The justification for the target ranges is based on ranges of rates for foodborne outbreaks, by state reported to CDC's NORS (CDC, 2013).

5. **Metric:** <u>Confirmed cases with exposure history obtained</u>: No. and % of confirmed cases with exposure history obtained.

   Definitions: <u>Confirmed case</u>: Reported case with confirmed *Salmonella*, Shiga toxin- producing *E. coli* (STEC) or *Listeria* infection.
   <u>Exposure history</u>: An interview (of any format) that assesses exposures prior to onset of illness. The assessment should go beyond assessment of high risk settings and prevention education to ascertain food consumption/preference, or other exposure data.

   Feasibility: This metric is associated with CIFOR Indicator 8.2.2 "Reported cases with specified foodborne illness interviewed." It is consistent with FoodCORE common metrics for *Salmonella*, STEC, and *Listeria*. Reporting numbers will allow simple comparisons from year to year for the agency, and reporting rates will allow for comparisons across agencies.

   Measurement methods: Determine the number of confirmed cases reported. This will be the denominator for the metric. Determine the number of confirmed cases with exposure history obtained. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. This will convert the observed numbers into a standardized rate. If an agency reports more than 75% of cases with exposure history obtained it can be reported as high. If it reports 50-75% of cases with exposure history obtained, it can be reported as being in the middle range.

   Comments on application: Although not all state and local agencies routinely interview all confirmed cases to obtain detailed exposure information, the CIFOR Guidelines does identify this as a model practice for routine surveillance (4.2.10.3, Case interviews). CDC's *Listeria* initiative requests routine interview with a standardized exposure questionnaire for all confirmed cases of *Listeria* infection. The justification for the target ranges is based on year 1 results of case follow-up by FoodCORE sites, with the middle range reflecting baseline values.

6. **Metric:** <u>Isolate submissions to PHL</u>: No. and % of isolates from confirmed cases submitted to PHL.

   Definitions: <u>Isolate</u>: Primary isolates of *Salmonella*, Shiga toxin-producing *E. coli* (STEC) or *Listeria*, limited to first or representative isolate or sample for each case.
   <u>PHL</u>**:** State or local public health laboratory designated to serve as a reference laboratory for confirmation and subtyping of isolates for jurisdiction.

   Feasibility: This metric is associated with CIFOR Indicator 8.2.3 "Isolates of specified foodborne pathogens submitted to PHL." It is consistent with FoodCORE common metrics for *Salmonella*, STEC, and *Listeria*. Reporting numbers will allow simple comparisons from year to year for the agency, and reporting rates will allow for comparisons across agencies.

   Measurement methods: Determine the number of confirmed cases reported. This will be the denominator for the metric. Determine the number of isolates submitted to the PHL. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. This will convert the observed numbers into a standardized rate. If an agency reports more than 90% of submitted it can be reported as high. If it reports 60-90% of isolates submitted, it can be reported as being in the middle range.

   Comments on application: This metric is applicable to a state health department or large local agency with its own PHL. The justification for the target ranges is based on benchmark data established by the EDITS timeline study (Hedberg, 2008).

7. **Metric:** <u>PFGE subtyping of isolates</u>: No. and % of isolates with PFGE information.

   Definitions: <u>Isolate</u>: Primary isolates of *Salmonella*, Shiga toxin-producing *E. coli* (STEC) or *Listeria*, limited to first or representative isolate or sample for each case.
   <u>PFGE</u>: Pulsed-field gel electrophoresis.

   Feasibility: This metric is associated with CIFOR Indicator 8.2.3 "Isolates of specified foodborne pathogens submitted to PHL." It is consistent with FoodCORE common metrics for *Salmonella*, STEC, and *Listeria*. Reporting numbers will allow simple comparisons from year to year for the agency, and reporting rates will allow for comparisons across agencies.

   Measurement methods: Determine the number of isolates submitted to the PHL. This will be the denominator for the metric. Determine the number of isolates with PFGE information. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. This will convert the observed numbers into a standardized rate. If an agency reports more than 90% of isolates with PFGE information it can be reported as high. If it reports 60-90% it can be reported as being in the middle range.

   Comments on application: This metric is applicable to a state health department or large local agency with its own PHL that performs subtyping by PFGE. The justification for the target ranges is based on Year 1 results of PFGE subtyping by FoodCORE sites, with the middle range reflecting baseline values for STEC.

8. **Metric:** <u>Isolate submission interval</u>: Median no. days from report of clinical findings to receipt of isolate at PHL.

   Definitions: <u>Isolate</u>: Primary isolates of *Salmonella*, Shiga toxin-producing *E. coli* (STEC) or *Listeria*, limited to first or representative isolate or sample for each case.
   <u>Isolate submission interval</u>: The number of days from primary isolation at a clinical laboratory to receipt of the isolate at the PHL.

   Feasibility: This metric is associated with CIFOR Indicator 8.2.3 "Isolates of specified foodborne pathogens submitted to PHL." It is consistent with FoodCORE common metrics for *Salmonella* and STEC. Median values likely reflect consistent general practices within the jurisdiction. Reporting median values will allow for comparisons across years within the agency and across agencies.

   Measurement methods: For each isolate, determine the date of isolation and the date of receipt at the PHL. Determine the number of calendar days between these dates, which is the isolate submission interval. Analyze the distribution of all known isolate submission intervals for the year. Report the median value for isolates with known isolate submission intervals. Determine the percentages of isolates with missing information for which an isolate submission interval cannot be determined. If an agency reports an isolate submission interval of < 4 days it can be reported as low. If it reports an isolate submission interval of 4-5 days it can be reported as being in the middle range.

   Comments on application: This metric is applicable to a state health department or large local agency with its own PHL. Although FoodCORE metrics are based on working days rather than calendar days, outbreaks do not take pause for weekends and holidays. Because outbreak detection may depend on subtyping results, measuring "turn-around-times" with calendar days provides a better assessment of detection and response capabilities. The justification for the target ranges is based on benchmark data established by the EDITS timeline study (Hedberg, 2008).

9. **Metric:** Isolate subtyping interval: Median no. days from receipt of isolate to serotyping or subtyping results.

    Definitions: Isolate: Primary isolates of *Salmonella*, Shiga toxin-producing *E. coli* (STEC) or *Listeria*, limited to first or representative isolate or sample for each case.
    Isolate subtyping interval: The number of days from receipt of the isolate at the PHL to serotyping or subtyping results.

    Feasibility: This metric is associated with CIFOR Indicator 8.2.3 "Isolates of specified foodborne pathogens submitted to PHL." It is consistent with FoodCORE common metrics for *Salmonella* and STEC. Median values likely reflect consistent general practices within the jurisdiction. Reporting median values will allow for comparisons across years within the agency and across agencies.

    Measurement methods: For each isolate, determine the date of receipt at the PHL and the date at which subtyping information is complete. For PFGE this is the date of upload to PulseNet. Determine the number of calendar days between these dates, which is the isolate subtyping interval. Analyze the distribution of all known isolate subtyping intervals for the year. Report the median value for isolates with known isolate subtyping intervals. Determine the percentages of isolates with missing information for which an isolate subtyping interval cannot be determined. If an agency reports a median isolate subtyping interval of ≤ 4 days it can be reported as acceptable.

    Comments on application: This metric is applicable to a state health department or large local agency with its own PHL. Although FoodCORE metrics and the PHEP performance measures are based on working days rather than calendar days, outbreaks do not take pause for weekends and holidays. Because outbreak detection may depend on subtyping results, measuring "turn-around-times" with calendar days provides a better assessment of detection and response capabilities. The justification for the target ranges is based on benchmark data established by the EDITS timeline study (Hedberg, 2008) and by PHEP performance measures which establish standards for PFGE subtyping of *E. coli* O157:H7 (PHEP 12.14) and *L. monocytogenes* (PHEP 12.15).

10. **Metric:** PHEP *E. coli* O157 and *Listeria* subtyping interval: % of pulsed field gel electrophoresis (PFGE) subtyping data results for *E. coli* O157:H7 and *Listeria* submitted to the PulseNet national database within four working days of receiving isolate at the PFGE laboratory.

    Definitions: PHEP: Public Health Emergency Preparedness Cooperative Agreement. PHEP specifies performance measures regarding public health surveillance and investigation of specified agents.

    Feasibility: This metric is associated with CIFOR Indicator 8.2.3 "Isolates of specified foodborne pathogens submitted to PHL" but entirely incorporates existing PHEP performance measures PFGE subtyping of *E. coli* O157:H7 (PHEP 12.14) and *L. monocytogenes* (PHEP 12.15)

    Measurement methods: Determine the number of isolates submitted to the PHL. Determine the number of isolates for which PFGE subtyping was performed. This will be the denominator for the metric. Determine the number of number of primary patterns from subtyped isolates uploaded to PulseNet. Determine the number of results from PFGE subtyped isolates that were submitted to PulseNet within four working days of receipt at the PFGE laboratory. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. If an agency reports that ≥ 90% of subtyping results for *E. coli* O157:H7 and *Listeria* were submitted to Pulsenet within 4 working days it can be reported as acceptable.

    Comments on application: This metric is applicable to a state health department or large local agency with its own PHL. PHEP performance measures are based on working days rather than calendar days. The justification for the target range is the PHEP performance measure for PFGE subtyping of *E. coli* O157:H7 (PHEP 12.14) and *L. monocytogenes* (PHEP 12.15).

11. **Metric:** <u>Outbreak case exposure assessments</u>: No. and % of outbreak investigations with exposure assessments conducted.

   Definitions: <u>Exposure history</u>: An interview (of any format) that assesses exposures prior to onset of illness. The assessment should go beyond assessment of high risk settings and prevention education to ascertain food consumption/preference, or other exposure data. <u>Foodborne illness outbreak:</u> The occurrence of two or more similar illnesses resulting from ingestion of a common food.

   Feasibility: This metric is associated with CIFOR Indicator 8.2.4 "Foodborne outbreaks investigated." It aggregates FoodCORE metrics for investigations across all pathogens**.**

   Measurement methods: Determine the number of confirmed foodborne illness outbreaks that were investigated. This will be the denominator for the metric. Determine the number of confirmed outbreaks for which exposure assessments were conducted for cases. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. If an agency reports exposure assessments were conducted for all outbreak investigations it can be reported as acceptable.

   Comments on application: This metric is applicable to all agencies that conduct foodborne illness outbreak investigations. The justification for the target range is based on the *a priori* need to assess case exposures to confirm that an outbreak is foodborne.

12. **Metric:** <u>Outbreak clinical specimen collections</u>: No. and % of outbreak investigations with clinical specimens collected and submitted to PHL from 2 or more people.

   Definitions: <u>Foodborne illness outbreak</u>: The occurrence of two or more similar illnesses resulting from ingestion of a common food.

   Feasibility: This metric is associated with CIFOR Indicator 8.2.4 "Foodborne outbreaks investigated." It extends FoodCORE metrics to investigations for all pathogens.

   Measurement methods: Determine the number of foodborne illness outbreaks that were investigated. This will be the denominator for the metric. Determine the number of outbreaks for which clinical specimens were collected and submitted to the PHL from 2 or more people. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. If an agency reports that clinical specimens were collected in more than 75% of outbreak investigations it can be reported as high. If it reports collecting clinical specimens in 50-75% of outbreak investigations it can be reported as being in the middle range.

   Comments on application: This metric is applicable to all agencies that conduct foodborne illness outbreak investigations. The justification for the target range is based on characteristics of foodborne disease outbreak investigations conducted by Foodborne Diseases Active Surveillance Network (FoodNet) Sites, 2003–2008 (Murphree, R 2012).

13. **Metric:** <u>Outbreak clinical specimen testing</u>: No. and % of outbreak investigations where specimens were tested for potential agents at PHL.

Definitions: <u>Foodborne illness outbreak</u>: The occurrence of two or more similar illnesses resulting from ingestion of a common food.
<u>Potential agents</u>: Norovirus, enteric bacterial pathogens, and enteric parasites associated with foodborne outbreaks that are consistent with signs and symptoms of illness, incubation period and duration of illness. A consistent set of potential agents cannot be specified for all outbreaks,

Feasibility: This metric is associated with CIFOR Indicator 8.2.4 "Foodborne outbreaks investigated." It aggregates FoodCORE metrics for investigations across all pathogens.

Measurement methods: Determine the number of foodborne illness outbreaks that were investigated. This will be the denominator for the metric. Determine the number of outbreaks for which potential agents were tested for at PHL. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. If an agency reports that clinical specimens were tested for potential agents in more than 75% of outbreak investigations it can be reported as high. If it reports testing clinical specimens in 50-75% of outbreak investigations it can be reported as being in the middle range.

Comments on application: This metric is applicable to all agencies that conduct foodborne illness outbreak investigations. The justification for the target range is based on characteristics of foodborne disease outbreak investigations conducted by Foodborne Diseases Active Surveillance Network (FoodNet) Sites, 2003–2008 (Murphree, R 2012).

14. **Metric:** Cluster or complaint investigation interval: Median no. days from initiation of investigation to implementation of intervention or close out of investigation.

    Definitions: Foodborne illness complaint: A report of illness experienced by one or more persons following exposure to a specific event or establishment.
    Complaint investigation interval: The number of days from the initiation of an investigation to the initial intervention or close out of investigation.
    Cluster: Two or more isolates with a matching molecular subtype pattern identified in a period of 2 weeks.
    Cluster investigation interval: The number of days from the initiation of an investigation to the initial intervention or close out of investigation.
    Initiation of an investigation: Steps taken to investigate the possible source of a complaint or a cluster of cases after it is determined that they may represent a common source outbreak. This goes beyond routine follow-up of individual complaints or cases. Intervention: A public health action taken to control an identified hazard.

    Feasibility: This metric is associated with CIFOR Indicator 8.2.1 "Foodborne complaints investigated" and CIFOR indicator 8.2.5 "Case clusters investigated." It aggregates FoodCORE metrics for investigations across all pathogens.

    Measurement methods: Determine the number of foodborne illness complaints that were received. Determine the number of foodborne complaints that were investigated as potential outbreaks. Determine the number of clusters that were detected by the PHL. Determine the number of clusters that were investigated as potential outbreaks. For each complaint and cluster investigation, determine the date at which the investigation was initiated. For each investigation, determine the date at which an intervention was initiated, or the investigation was closed out. Determine the number of calendar days between these dates, which is the complaint or cluster investigation interval. Analyze the distribution of all known complaint and cluster investigation intervals for the year. Report the median value for investigations with known complaint or cluster investigation intervals. Determine the percentages of investigations with missing information for which a complaint or cluster investigation interval cannot be determined. If an agency reports a cluster or complaint investigation interval of < 7 days it can be reported as low. If it reports an isolate submission interval of 7-21 days it can be reported as being in the middle range.

    Comments on application: This metric is applicable to all agencies that conduct foodborne illness outbreak investigations. For agencies that conduct foodborne illness complaint investigations but do not have responsibility for pathogen-specific surveillance or cluster investigations, only the complaint investigation intervals should be reported. The justification for the target range is based on results of multistate outbreak investigations (Hedberg, 2009) and cluster investigations in MN from 2001-2007 (Rounds J, 2010).

15. **Metric:** <u>Multistate outbreak investigation interviews</u>: Once a multistate foodborne outbreak has been declared by CDC, state health departments in conjunction with their local health departments complete or closeout 80% of interviews within 48 hours using the 'outbreak designated' questionnaire.

    Definitions: <u>Multistate foodborne outbreak investigation</u>: Investigation of an outbreak involving cases with illnesses and probable exposures distributed across multiple states, for which CDC has initiated multistate conference calls to coordinate the investigation.
    <u>Outbreak designated questionnaire</u>: A questionnaire developed to systematically assess exposures in a consistent manner in all states participating in the investigation.
    <u>Case close out</u>: Determination is made that interview is not possible because case refused, was incapable of being interviewed, or was otherwise lost to follow up.

    Feasibility: This metric is associated with CIFOR Indicator 8.2.4 "Foodborne outbreaks investigated" and is a standard proposed for adoption by CSTE.

    Measurement methods: Determine the date at which CDC declares the existence of a multistate outbreak investigation and has distributed the outbreak designated questionnaire. Determine the number of outbreak-associated cases in the jurisdiction. This will be the denominator for the metric. Determine the number of outbreak-associated cases interviewed with the outbreak designated questionnaire within 48 hours after CDC has distributed the questionnaire. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. If more than 80% of cases have been interviewed, the standard has been met. If an agency reports meeting the standard for all multistate outbreak investigations involving cases within its jurisdiction it can be reported as acceptable.

    Comments on application: This metric is applicable to all state and local agencies that participate in multistate foodborne illness outbreak investigations. The standard would be applied and commence once CDC holds its first multistate conference call to initiate an investigation and an outbreak designated questionnaire is distributed. Close out is defined as refused, incapable of being interviewed, lost to follow up, or other circumstance whereby interview is not possible. The justification for the target range is based on compliance with the proposed standard (CSTE 2013).

16. Metric: <u>Cluster source identification</u>: No. and % of clusters in which a source was identified.

Definitions: <u>Cluster</u>: Two or more isolates with a matching molecular subtype pattern identified in a period of 2 weeks.
<u>Cluster source identification</u>:   The number of identified clusters for which a specific food transmission setting, meal, food item or ingredient was identified, leading the cluster to be considered an outbreak.

Feasibility: This metric is associated with CIFOR indicator 8.2.5 "Case clusters investigated".

Measurement methods: Determine the number of clusters that were detected by the PHL. escribe the distribution of clusters by size. Determine the number of clusters that include five or more cases. This will be the denominator for the metric. Determine the number of clusters that were investigated as potential outbreaks. Determine the number of cluster investigations for which a source was identified. Describe the distribution of clusters for which a source was identified by size. Determine the number of clusters for which a source was identified that include five or more cases. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. If an agency reports that a source was identified for more than 20% of clusters that include five or more cases it can be reported as high. If it reports a source being identified in 10-20% of clusters that include five or more cases, it can be reported as being in the middle range.

Comments on application: This metric is applicable to a state health department or large local agency with its own PHL that conducts pathogen-specific surveillance. The justification for the target range is based on results of cluster investigations in MN from 2001-2007 (Rounds J, 2010).

17. **Metric:** <u>NORS form completion</u>: No. and % of outbreaks where NORS form completed.

Definitions: <u>Foodborne illness outbreak</u>: The occurrence of two or more similar illnesses resulting from ingestion of a common food.
<u>NORS form</u>: National Outbreak Reporting System, Foodborne Disease Outbreaks and Enteric Disease Outbreaks Transmitted by Contact with Persons, Animals, or Environmental Sources, or by an Unknown Mode; NORS Form (CDC 52.13 Form)

Feasibility: This metric is associated with CIFOR Indicator 8.4.2 "Trends in no. confirmed foodborne outbreaks." It aggregates FoodCORE metrics for all pathogens.

Measurement methods: Determine the number of confirmed foodborne outbreaks that were investigated. This will be the denominator for the metric. Determine the number of outbreaks for which NORS forms were completed and submitted to NORS. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. If an agency reports that all confirmed foodborne outbreaks were reported to NORS it can be reported as acceptable.

Comments on application: This metric is applicable to all agencies that conduct foodborne illness outbreak investigations. The justification for the target range is based on the expectation that all confirmed outbreaks should be reported to NORS.

18. Metric: <u>Outbreak etiology reported to NORS</u>: No. and % of outbreaks for which etiology was identified and reported to NORS.

Definitions: <u>Foodborne illness outbreak:</u> The occurrence of two or more similar illnesses resulting from ingestion of a common food.
<u>NORS form</u>: National Outbreak Reporting System, Foodborne Disease Outbreaks and Enteric Disease Outbreaks Transmitted by Contact with Persons, Animals, or Environmental Sources, or by an Unknown Mode; NORS Form (CDC 52.13 Form).
<u>Etiology identified</u>: For most etiologic agents CDC considers an outbreak to have a confirmed etiology if there are two or more lab-confirmed cases (MMWR 2000/Vol. 49/SS-1/App. B). Etiology may be suspected based on characteristic combinations of clinical symptoms, incubation periods, and duration of illness.

Feasibility: This metric is associated with CIFOR Indicator 8.3.1 "Etiology of outbreak identified." This metric will require improved investigation and documentation by many agencies.

Measurement methods: Determine the number of confirmed foodborne outbreaks that were investigated. This will be the denominator for the metric. Determine the number of outbreaks for which an etiology was identified and reported to NORS. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. If an agency reports that more that 68% of confirmed foodborne outbreaks have an etiology identified and reported to NORS it can be reported as high. If 44-68% of outbreaks have an etiology reported to NORS it can be reported as being in the middle range.

Comments on application: This metric is applicable to all agencies that conduct foodborne illness outbreak investigations. The justification for the target range is based on the observed variability among states in investigating foodborne outbreaks (Jones T, 2013).

19. **Metric:** <u>Outbreak vehicle reported to NORS</u>: No. and % of outbreaks for which a vehicle was identified and reported to NORS.

Definitions: <u>Foodborne illness outbreak</u>: The occurrence of two or more similar illnesses resulting from ingestion of a common food.
<u>NORS form</u>: National Outbreak Reporting System, Foodborne Disease Outbreaks and Enteric Disease Outbreaks Transmitted by Contact with Persons, Animals, or Environmental Sources, or by an Unknown Mode; NORS Form (CDC 52.13 Form)
<u>Vehicle identified</u>: A specific food item or ingredient was confirmed or suspected to be the source of the outbreak based on one of the following: (1) Statistical evidence from epidemiological investigation, (2) Laboratory evidence (e.g., identification of agent in food), (3) Compelling supportive information, (4) Other data (e.g., same phage type found on farm that supplied eggs), (5) Specific evidence lacking but prior experience makes it a likely source.

Feasibility: This metric is associated with CIFOR Indicator 8.3.2 "Vehicle of outbreak identified." This metric will require improved investigation and documentation by many agencies.

Measurement methods: Determine the number of confirmed foodborne outbreaks that were investigated. This will be the denominator for the metric. Determine the number of outbreaks for which a vehicle was identified and reported to NORS. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. If an agency reports that more that 60% of confirmed foodborne outbreaks have a vehicle identified and reported to NORS it can be reported as high. If 48-60% of outbreaks have a vehicle reported to NORS it can be reported as being in the middle range.

Comments on application: This metric is applicable to all agencies that conduct foodborne illness outbreak investigations. The justification for the target range is based on the observed variability among states in investigating foodborne outbreaks (Jones T, 2013).

20. Metric: <u>Outbreak contributing factor reported to NORS</u>: No. and % of outbreaks for which contributing factors were identified and reported to NORS.

Definitions: <u>Foodborne illness outbreak</u>: The occurrence of two or more similar illnesses resulting from ingestion of a common food.
<u>NORS form</u>: National Outbreak Reporting System, Foodborne Disease Outbreaks and Enteric Disease Outbreaks Transmitted by Contact with Persons, Animals, or Environmental Sources, or by an Unknown Mode; NORS Form (CDC 52.13 Form)
<u>Contributing factor identified</u>: Contributing factors (CFs) are defined as the food safety practices and behaviors which most likely contributed to a foodborne illness outbreak.
A CF should be identified only if the investigator has strong evidence that it actually occurred in the investigated outbreak; just because a factor has been cited in similar outbreaks in the past does not mean it was involved in the investigated outbreak.

Feasibility: This metric is associated with CIFOR Indicator 8.3.3 "Contributing factor identified." This metric will require improved investigation and documentation by many agencies.

Measurement methods: Determine the number of confirmed foodborne outbreaks that were investigated. This will be the denominator for the metric. Determine the number of outbreaks for which a contributing factor was identified and reported to NORS. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. If an agency reports that more than 55% of confirmed foodborne outbreaks have a contributing factor identified and reported to NORS it can be reported as high. If 33-55% of outbreaks have a contributing factor reported to NORS it can be reported as being in the middle range.

Comments on application: This metric is applicable to all agencies that conduct foodborne illness outbreak investigations. The justification for the target range is based on the observed variability among states in investigating foodborne outbreaks an evaluation of contributing factor data from FoodNet Jurisdictions from 1999 – 2002 (Croughwell K, 2005).

Revised CIFOR performance measure	Data elements for performance Jurisdiction: Time frame:	Performance based on target range (Select one)	Comments on availability of information needed to measure performance
1. Foodborne illness complaint reporting system: **Metric:** Agency maintains logs or databases for all complaints or referral reports from other sources alleging food-related illness, food-related injury or intentional food contamination, and routinely reviews data to identify clusters of illnesses requiring investigation. **Definitions:** Foodborne illness complaint: A report of illness experienced by one or more persons following exposure to a specific event or establishment. Foodborne illness complaint log: A paper registry of complaints that records information about the complaint and specific establishment. Foodborne illness complaint database: An electronic database that records information about the complaint and establishment in a searchable format. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.1 "Foodborne complaints investigated." FDA's Draft Voluntary National Retail Food Regulatory Program Standards, Standard 5, Part 1.d calls for programs to maintain logs or databases for all complaint or referral reports from other sources alleging food-related illness, injury, or intentional food contamination.	**Measurement methods:** If an agency has any complaint system in place and it is used to review foodborne illness complaints, it will be considered acceptable. If an agency had an electronic database that can be systematically reviewed to link complaints, it will be considered optimal. **Complaint system is: (select one)** Database: Log: Other: Not applicable:	**Optimal:** Database n=6 **Acceptable:** System to log complaints n=0 **Neither:** n=0	**Calculated** = 6 **Could not calculate** = 6; Data elements not maintained at state health department. **Comments:** Not feasible for states that do not maintain complaint data, but appropriate for states that do, and local health departments.

Revised CIFOR performance measure	Data elements for performance Jurisdiction: Time frame:	Performance based on target range (Select one)	Comments on availability of information needed to measure performance
2. Outbreaks detected from complaints: **Metric:** Outbreaks detected from complaints: Number outbreaks detected as a result of foodborne illness complaints. Rate of outbreaks detected per 1,000 complaints received. **Definitions:** Outbreak detected from a complaint: A foodborne illness outbreak detected as a result of a foodborne illness complaint investigation. Foodborne illness outbreak: The occurrence of two or more similar illnesses resulting from ingestion of a common food. Foodborne illness complaint: A report of illness experienced by one or more persons following exposure to a specific event or establishment. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.1 "Foodborne complaints investigated." It provides a consistent expectation for the use of complaint data system. Reporting numbers will allow simple comparisons from year to year for the agency, and reporting rates will allow for comparisons across agencies.	**Measurement methods:** Determine the number of foodborne illness complaints that were received during the year. This will be the denominator for the metric. Determine the number of foodborne illness outbreaks that were detected as a result of a foodborne illness complaint investigation during the year. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 1,000. This will convert the observed numbers into a standardized rate. **Denominator (**No. complaints) **=** _____ **Numerator (**No. outbreaks detected from complaints) = _____ **Rate** (Num./Denom. x 1,000) = _____	**High:** > 20 outbreaks / 1,000 complaints n=3 **Middle:** 10-20 outbreaks/ 1,000 complaints n=1 **Neither:** n=2	**Calculated** = 6 **Could not calculate** = 6; Data elements not maintained at state health department. **Comments:** Not feasible for states that do not maintain complaint data. Concern expressed about small jurisdictions that may not have any identified foodborne outbreaks, and value judgments associated with range labels. However, ranges high and middle were established based on observational data.

Revised CIFOR performance measure	Data elements for performance Jurisdiction: Time frame:	Performance based on target range (Select one)	Comments on availability of information needed to measure performance
3. Foodborne illness outbreak rate: **Metric:** Number foodborne outbreaks reported, all agents. Rate of outbreaks reported/1,000,000 population. **Definitions:** <u>Foodborne illness outbreak</u>: The occurrence of two or more similar illnesses resulting from ingestion of a common food. <u>Foodborne illness outbreak rate:</u> The number of confirmed foodborne illness outbreaks within a jurisdiction during a year, divided by the population of jurisdiction x 1,000,000. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.4 "Foodborne outbreaks investigated." It aggregates FoodCORE metrics for outbreak investigations across all pathogens. Reporting foodborne outbreaks is part of PHEP Performance Measure 13.3 Outbreak Investigation Reports. Reporting numbers will allow simple comparisons from year to year for the agency, and reporting rates will allow for comparisons across agencies.	**Measurement methods:** Determine the population of the jurisdiction. This will be the denominator for the metric. Determine the number of foodborne illness outbreaks that were reported during the year. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 1,000,000. This will convert the observed numbers into a standardized rate. **Denominator (**Population) = _____ **Numerator (**No. foodborne outbreaks reported) = _____ **Rate** (Num./Denom. x 1,000,000)= _____	**High:** >6 outbreaks/ 1,000,000 population n=1 **Middle:** 1-6 outbreaks/1,000,000 population n=7 **Neither:** n=1	**Calculated** = 9 **Comments:** Concern expressed about small jurisdictions that may not have any identified foodborne outbreaks, and value judgments associated with range labels. However, ranges high and middle were established based on observational data.

Revised CIFOR performance measure	Data elements for performance Jurisdiction: Time frame:	Performance based on target range (Select one)	Comments on availability of information needed to measure performance
4. Confirmed cases with exposure history obtained: **Metric:** Number and % of confirmed cases with exposure history obtained. **Definitions:** Confirmed case: Reported case with confirmed *Salmonella*, Shiga toxin-producing *E. coli* (STEC) or *Listeria* infection. Exposure history: An interview (of any format) that assesses exposures prior to onset of illness. The assessment should go beyond assessment of high risk settings and prevention education to ascertain food consumption/preference or other exposure data. For STEC this should include disease-specific data elements identified by CSTE and for *Listeria* it should include completing the *Listeria* case form. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.2 "Reported cases with specified foodborne illness interviewed." It is consistent with FoodCORE common metrics for *Salmonella*, STEC, and *Listeria*. Reporting numbers will allow simple comparisons from year to year for the agency, and reporting rates will allow for comparisons across agencies.	**Measurement methods**: Determine the number of confirmed cases reported. This will be the denominator for the metric. Determine the number of confirmed cases with exposure history obtained. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. This will convert the observed numbers into a standardized rate. **Denominator (**No. confirmed cases) **=** _____ **Numerator (**No. cases with exposure history) = _____ **Rate** (Num./Denom. x 100) = _____	**A. *Salmonella*** **High:** > 75% of cases n=3 **Middle**: 50-75% of cases n=4 **Neither:** n=2 **B. *E. coli* (STEC)** **High:** > 75% of cases **Middle:** 50-75% of cases **Neither:** **C. *Listeria*** **High**: > 75% of cases **Middle:** 50-75% of cases **Neither:**	**Calculated** = 9 **Comments:** Concern expressed about lumping *Salmonella*, *E. coli* (STEC) and *Listeria* into a common group, as there may be different priorities established for interviewing. Data needed to establish ranges for STEC and *Listeria*. *Listeria* initiative data indicated use of *Listeria* case form for 77% of cases reported in 2010. **Modification:** Separate ranges established for each pathogen.

Revised CIFOR performance measure	Data elements for performance Jurisdiction: Time frame:	Performance based on target range (Select one)	Comments on availability of information needed to measure performance
5. Isolate submissions to PHL: **Metric:** Isolate submissions to PHL: Number and % of isolates from confirmed cases submitted to PHL. **Definitions:** Isolate: Primary isolates of *Salmonella*, Shiga toxin-producing *E. coli* (STEC) or *Listeria*, limited to first or representative isolate or sample for each case. PHL: State or local public health laboratory designated to serve as a reference laboratory for confirmation and subtyping of isolates for jurisdiction. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.3 "Isolates of specified foodborne pathogens submitted to PHL." It is consistent with FoodCORE common metrics for *Salmonella*, STEC, and *Listeria*. Reporting numbers will allow simple comparisons from year to year for the agency, and reporting rates will allow for comparisons across agencies.	**Measurement methods:** Determine the number of confirmed cases reported. This will be the denominator for the metric. Determine the number of isolates submitted to the PHL. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. This will convert the observed numbers into a standardized rate. **Denominator (**No. confirmed cases) = _____ **Numerator (**No. isolates submitted) = _____ **Rate** (Num./Denom. x 100)= _____	**A. *Salmonella*** **High:** > 90% of isolates n=5 **Middle**: 60-90% of isolates n=3 **Neither:** n=1 **B. *E. coli* (STEC)** **High:** > 90% of isolates **Middle:** 60-90% of isolates **Neither:** **C. *Listeria*** **High**: > 90% of isolates **Middle:** 60-90% of isolates **Neither:**	**Calculated** = 9 **Comments:** Concern expressed about lumping *Salmonella*, *E. coli* (STEC) and *Listeria* into a common group, as there may be different priorities established for submitting. **Modification:** Separate ranges established for each pathogen. .

Revised CIFOR performance measure	Data elements for performance Jurisdiction: Time frame:	Performance based on target range (Select one)	Comments on availability of information needed to measure performance
6. PFGE subtyping of isolates: **Metric**: Number and % of isolates with PFGE information. **Definitions**: Isolate: Primary isolates of *Salmonella*, Shiga toxin-producing *E. coli* (STEC) or *Listeria*, limited to first or representative isolate or sample for each case. PFGE: Pulsed-field gel electrophoresis. **Feasibility**: This metric is associated with CIFOR Indicator 8.2.3 "Isolates of specified foodborne pathogens submitted to PHL." It is consistent with FoodCORE common metrics for *Salmonella*, STEC, and *Listeria*. Reporting numbers will allow simple comparisons from year to year for the agency, and reporting rates will allow for comparisons across agencies.	**Measurement methods:** Determine the number of isolates submitted to the PHL. This will be the denominator for the metric. Determine the number of isolates with PFGE information. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. This will convert the observed numbers into a standardized rate. **Denominator (**No. isolates submitted) = ——————————————— **Numerator (**No. isolates with PFGE information) = ——————————————— **Rate** (Num./Denom. x 100) = ———————————————	**A. *Salmonella*** **High:** > 90% of isolates n=6 **Middle**: 60-90% of isolates n=1 **Neither:** n=1 **B. *E. coli* (STEC)** **High:** > 90% of isolates **Middle:** 60-90% of isolates **Neither:** **C. *Listeria*** **High:** > 90% of isolates **Middle:** 60-90% of isolates **Neither:**	**Calculated** = 8 **Comments:** Concern expressed about lumping *Salmonella*, *E. coli* (STEC) and *Listeria* into a common group, as there may be different priorities established for subtyping. **Modification:** Separate ranges established for each pathogen.

Revised CIFOR performance measure	Data elements for performance Jurisdiction: Time frame:	Performance based on target range (Select one)	Comments on availability of information needed to measure performance
7. Isolate submission interval: **Metric:** Median number days from collection of clinical specimen to receipt of isolate at PHL. **Definitions:** Isolate: Primary isolates of *Salmonella*, Shiga toxin-producing *E. coli* (STEC) or *Listeria*, limited to first or representative isolate or sample for each case. Isolate submission interval: The number of days from collection of the clinical specimen to receipt of the isolate at the PHL. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.3 "Isolates of specified foodborne pathogens submitted to PHL." It is consistent with FoodCORE common metrics for *Salmonella* and STEC. Median values likely reflect consistent general practices within the jurisdiction. Reporting median values will allow for comparisons across years within the agency and across agencies.	**Measurement methods:** For each isolate, determine the date of specimen collection and the date of receipt at the PHL. Determine the number of calendar days between these dates, which is the isolate submission interval. Analyze the distribution of all known isolate submission intervals for the year. Report the median value for isolates with known isolate submission intervals. Determine the percentages of isolates with missing information for which an isolate submission interval cannot be determined. % of isolates with missing information: _____ Median interval for isolates with known isolate submission intervals:	**A. *Salmonella*** **Low:** < 7 days n=1 **Middle**: 7-8 days n=1 **Neither:** n=1 **B. *E. coli* (STEC)** **Low:** < 7 days **Middle:** 7-8 days **Neither:** **C. *Listeria*** **Low:** < 7 days **Middle:** 7-8 days **Neither:**	**Calculated** = 3 **Could not calculate** = 7**;** Data on date of clinical finding not available. **Comments:** Only feasible surrogate is specimen collection date. Likely interval from specimen collection to clinical finding ~ 3 days. **Modification:** Changed range to reflect collection date, and added 3 days to range. Separate ranges established for each pathogen.

Revised CIFOR performance measure	Data elements for performance Jurisdiction: Time frame:	Performance based on target range (Select one)	Comments on availability of information needed to measure performance
8. Isolate subtyping interval: **Metric:** Median number days from receipt of isolate to PFGE subtyping results. **Definitions:** Isolate: Primary isolates of *Salmonella*, Shiga toxin-producing *E. coli* (STEC) or *Listeria*, limited to first or representative isolate or sample for each case. Isolate subtyping interval: The number of days from receipt of the isolate at the PFGE laboratory to PFGE subtyping results. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.3 "Isolates of specified foodborne pathogens submitted to PHL." It is consistent with FoodCORE common metrics for *Salmonella* and STEC. Median values likely reflect consistent general practices within the jurisdiction. Reporting median values will allow for comparisons across years within the agency and across agencies.	**Measurement methods:** For each isolate, determine the date of receipt at the PFGE laboratory and the date of upload to PulseNet. Determine the number of calendar days between these dates, which is the isolate subtyping interval. Analyze the distribution of all known isolate subtyping intervals for the year. Report the median value for isolates with known isolate subtyping intervals. Determine the percentages of isolates with missing information for which an isolate subtyping interval cannot be determined. If an agency reports a median isolate subtyping interval of < 4 days it can be reported as acceptable. % of isolates with missing information: _____ Median interval for isolates with known isolate subtyping intervals: _____	**A. *Salmonella*** **Low**: $\leq$ 4 days n=6 **Middle:** 5-6 days n=0 **Neither:** n=2 **B. *E. coli* (STEC)** **Low:** < 4 days **Middle:** 5-6 days **Neither:** **C. *Listeria*** **Low:** < 4 days **Middle:** 5-6 days **Neither:**	**Calculated** = 8 **Comments:** Concern expressed about lumping *Salmonella*, *E. coli* (STEC) and *Listeria* into a common group, as there may be different priorities established for subtyping. **Modification:** Changed isolate subtyping interval definition to reflect date of isolate receipt at PFGE laboratory. Target range changed from "Acceptable/Not" to "Low/Middle" to better reflect range of performance. Separate ranges established for each pathogen.

Revised CIFOR performance measure	Data elements for performance Jurisdiction: Time frame:	Performance based on target range (Select one)	Comments on availability of information needed to measure performance
9. PHEP *E. coli* O157 and *Listeria* subtyping interval: **Metric:** PHEP *E. coli* O157 and *Listeria* subtyping interval: % of pulsed field gel electrophoresis (PFGE) subtyping data results for *E. coli* O157:H7 and *Listeria* submitted to the PulseNet national database within four working days of receiving isolate at the PFGE laboratory. **Definitions:** PHEP: Public Health Emergency Preparedness Cooperative Agreement. PHEP specifies performance measures regarding public health surveillance and investigation of specified agents. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.3 "Isolates of specified foodborne pathogens submitted to PHL," but entirely incorporates existing PHEP performance measures PFGE subtyping of *E. coli* O157:H7 (PHEP 12.14) and *L. monocytogenes* (PHEP 12.15).	**Measurement methods:** Determine the number of isolates submitted to the PHL. Determine the number of isolates for which PFGE subtyping was performed. This will be the denominator for the metric. Determine the number of number of primary patterns from subtyped isolates uploaded to PulseNet. Determine the number of results from PFGE subtyped isolates that were submitted to PulseNet within four working days of receipt at the PFGE laboratory. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. **Denominator (**No. isolates subtyped by PFGE) **=** —————————————— **Numerator (**No. isolates subtyped within 4 days) = —————————————— **Rate** (Num./Denom. x 100) = ——————————————	**Acceptable**: $\geq$ 90% of PFGE subtyping results submitted to PulseNet within 4 working days. n=4 **Not:** n=3	**Calculated** = 7 **Comments:** Some states expressed difficulty in calculating working days. Performance indicator references an existing measure.

Revised CIFOR performance measure	Data elements for performance Jurisdiction: Time frame:	Performance based on target range (Select one)	Comments on availability of information needed to measure performance
10. Outbreak clinical specimen collections: **Metric:** Outbreak clinical specimen collections: Number and % of outbreak investigations with clinical specimens collected and submitted to PHL from 2 or more people. **Definitions:** Foodborne illness outbreak: The occurrence of two or more similar illnesses resulting from ingestion of a common food. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.4 "Foodborne outbreaks investigated." It extends FoodCORE metrics to investigations for all pathogens.	**Measurement methods:** Determine the number of foodborne illness outbreaks that were investigated. This will be the denominator for the metric. Determine the number of outbreaks for which clinical specimens were collected and submitted to the PHL from 2 or more people. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. **Denominator (**No. outbreaks) = _____ **Numerator (**No. outbreaks with clinical specimens collected)= _____ **Rate** (Num./Denom. x 100)= _____	**High:** > 75% of outbreaks n=4 **Middle**: 50-75% of outbreaks n=2 **Neither:** n=1	**Calculated** = 7 **Comments:** This performance measure is being kept, while previous measure related to testing of specimens collected was dropped.

Revised CIFOR performance measure	Data elements for performance Jurisdiction: Time frame:	Performance based on target range (Select one)	Comments on availability of information needed to measure performance
11. Cluster investigation interval: **Metric:** Median number days from initiation of investigation to identification of source. **Definitions:** Cluster: Two or more isolates with a matching molecular subtype pattern identified in a period of 2 weeks. Cluster investigation interval: The number of days from the initiation of an investigation to the identification of source, for clusters with a source identified. Initiation of an investigation: Steps taken to investigate the possible source of a cluster of cases after it is determined that they may represent a common source outbreak. This goes beyond routine follow-up of individual cases. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.5 "Case clusters investigated." It aggregates FoodCORE metrics for investigations across all pathogens.	**Measurement methods:** Determine the number of clusters that were detected by the PHL. Determine the number and percentage of clusters where a source was identified. For each cluster for which a source was identified, determine the date at which the investigation was initiated and the date at which the source was identified. Determine the number of calendar days between these dates, which is the cluster investigation interval. Analyze the distribution of all known cluster investigation intervals for the year. Report the median value for investigations with known cluster investigation intervals. Percentage of clusters with source identified: _____ Median interval for cluster with known investigation intervals: _____	**Low:** < 7 days n=0 **Middle:** 7-21 days n=1 **Neither:** n=0	**Calculated** = 1 **Comments:** There is some disagreement with the use of 2 weeks to define a cluster, as this is not the FoodCORE definition, and is not consistent with PulseNet practices. However, evidence from MN supports usefulness of cluster definition. Concern also expressed about "mushy" definitions for interval calculation. Metric will be re-evaluated following use. **Modification:** Report % of clusters with source identified, and investigation intervals only for clusters with a source identified.

Revised CIFOR performance measure	Data elements for performance Jurisdiction: Time frame:	Performance based on target range (Select one)	Comments on availability of information needed to measure performance
12. Complaint investigation interval: Metric: Median number days from initiation of investigation to implementation of intervention. Definitions: Foodborne illness complaint: A report of illness experienced by one or more persons following exposure to a specific event or establishment. Complaint investigation interval: The number of days from the initiation of an investigation to the initial intervention. Initiation of an investigation: Steps taken to investigate the possible source of a complaint after it is determined that it may represent a common source outbreak. This goes beyond routine follow-up of individual complaints. Intervention: A public health action taken to control an identified hazard. Feasibility: This metric is associated with CIFOR Indicator 8.2.1 "Foodborne complaints investigated." It aggregates FoodCORE metrics for investigations across all pathogens.	Measurement methods: Determine the number of foodborne illness complaints that were investigated. Determine the number and percentage of foodborne complaint investigations that led to an intervention. For each complaint investigation that led to an intervention, determine the date at which the investigation was initiated and the date at which an intervention was initiated. Determine the number of calendar days between these dates, which is the complaint investigation interval. Analyze the distribution of all complaint investigation intervals for the year. Report the median value for complaint investigation intervals. % of complaint investigations with interventions: _____ Median interval for complaints with known isolate investigation intervals: _____	**Low:** < 7 days n=0 **Middle:** 7-21 days n=1 **Neither:** n=0	Calculated = 1 Comments: Concern expressed about "mushy" definitions for interval calculation. Metric will be re-evaluated following use. Modification: Report % of complaint investigations with interventions, and investigation intervals only for complaint investigations with interventions.

Revised CIFOR performance indicator	Data elements for performance Jurisdiction: Time frame:	Performance based on target range (Select one)	Comments on availability of information needed to measure performance
13. Cluster source identification: **Metric:** Number and % of clusters with more than 5 cases in which a source was identified. **Definitions:** Cluster: Two or more isolates with a matching molecular subtype pattern identified in a period of 2 weeks. Cluster source identification: The number of identified clusters for which a specific food transmission setting, meal, food item or ingredient was identified, leading the cluster to be considered an outbreak. **Feasibility:** This metric is associated with CIFOR Indicator 8.2.5 "Case clusters investigated."	**Measurement methods:** Determine the number of clusters that include five or more cases. This will be the denominator for the metric. Determine the number of clusters for which a source was identified that include five or more cases. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. **Denominator (**No. clusters with $\geq$ 5 cases) **=** _____ **Numerator (**No. clusters with > 5 cases with source identified) = _____ **Rate** (Num./Denom. x 100)= _____	**High:** > 20% of clusters with >5 cases n=6 **Middle**: 10-20% of clusters with > 5 cases n=0 **Neither:** n=2	**Calculated** = 8 **Comments:** Clusters involving 5 or more cases were chosen for this metric due to the increased likelihood of finding a source for clusters of this size**.**

Revised CIFOR performance measure	Data elements for performance Jurisdiction: Time frame:	Performance based on target range (Select one)	Comments on availability of information needed to measure performance
14. Outbreak etiology reported to NORS: **Metric:** Number and % of outbreaks for which etiology was identified and reported to NORS. **Definitions:** Foodborne illness outbreak: The occurrence of two or more similar illnesses resulting from ingestion of a common food. NORS form: National Outbreak Reporting System, Foodborne Disease Outbreaks and Enteric Disease Outbreaks Transmitted by Contact with Persons, Animals, or Environmental Sources, or by an Unknown Mode; NORS Form (CDC 52.13 Form). Etiology identified: For most etiologic agents CDC considers an outbreak to have a confirmed etiology if there are two or more lab-confirmed cases (MMWR 2000/Vol. 49/SS-1/App. B). Etiology may be suspected based on characteristic combinations of clinical symptoms, incubation periods, and duration of illness. **Feasibility:** This metric is associated with CIFOR Indicator 8.3.1 "Etiology of outbreak identified." This metric will require improved investigation and documentation by many agencies.	**Measurement methods:** Determine the number of foodborne outbreaks that were investigated. This will be the denominator for the metric. Determine the number of outbreaks for which an etiology was identified and reported to NORS. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. **Denominator (**No. outbreaks) **=** _____ **Numerator (**No. with etiology reported to NORS) = _____ **Rate** (Num./Denom. x 100)= _____	**Top:** > 68% of outbreaks n=7 **Middle:** 44-68% of outbreaks n=1 **Neither:** n=0	**Calculated** = 8 **Comments:** Dropped performance measure on completing NORS form.

Revised CIFOR performance measure	Data elements for performance Jurisdiction: Time frame:	Performance based on target range (Select one)	Comments on availability of information needed to measure performance
15. Outbreak vehicle reported to NORS: **Metric:** Number and % of outbreaks for which a vehicle was identified and reported to NORS. **Definitions:** Foodborne illness outbreak: The occurrence of two or more similar illnesses resulting from ingestion of a common food. NORS form: National Outbreak Reporting System, Foodborne Disease Outbreaks and Enteric Disease Outbreaks Transmitted by Contact with Persons, Animals, or Environmental Sources, or by an Unknown Mode; NORS Form (CDC 52.13 Form). Vehicle identified: A specific food item or ingredient was confirmed or suspected to be the source of the outbreak based on one of the following: (1) Statistical evidence from epidemiological investigation, (2) Laboratory evidence (e.g., identification of agent in food), (3) Compelling supportive information, (4) Other data (e.g., same phage type found on farm that supplied eggs), (5) Specific evidence lacking but prior experience makes it a likely source. **Feasibility:** This metric is associated with CIFOR Indicator 8.3.2 "Vehicle of outbreak identified." This metric will require improved investigation and documentation by many agencies.	**Measurement methods:** Determine the number of foodborne outbreaks that were investigated. This will be the denominator for the metric. Determine the number of outbreaks for which a vehicle was identified and reported to NORS. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. **Denominator (**No. outbreaks) = ——————————————— **Numerator (**No. with vehicle reported to NORS) = ——————————————— **Rate** (Num./Denom. x 100)= ———————————————	**Top:** > 60% of outbreaks n=4 **Middle**: 48-60% of outbreaks n=1 **Neither:** n=3	**Calculated** = 8 **Comments:** Dropped performance measure on completing NORS form.

Revised CIFOR performance measure	Data elements for performance Jurisdiction: Time frame:	Performance based on target range (Select one)	Comments on availability of information needed to measure performance
16. Outbreak contributing factor reported to NORS: **Metric:** Number and % of outbreaks for which contributing factors were identified and reported to NORS. **Definitions:** Foodborne illness outbreak: The occurrence of two or more similar illnesses resulting from ingestion of a common food. NORS form: National Outbreak Reporting System, Foodborne Disease Outbreaks and Enteric Disease Outbreaks Transmitted by Contact with Persons, Animals, or Environmental Sources, or by an Unknown Mode; NORS Form (CDC 52.13 Form). Contributing factor identified: Contributing factors (CFs) are defined as the food safety practices and behaviors which most likely contributed to a foodborne illness outbreak. A CF should be identified only if the investigator has strong evidence that it actually occurred in the investigated outbreak; just because a factor has been cited in similar outbreaks in the past does not mean it was involved in the investigated outbreak. **Feasibility:** This metric is associated with CIFOR Indicator 8.3.3 "Contributing factor identified." This metric will require improved investigation and documentation by many agencies.	**Measurement methods:** Determine the number of foodborne outbreaks that were investigated. This will be the denominator for the metric. Determine the number of outbreaks for which a contributing factor was identified and reported to NORS. This will be the numerator for the metric. Divide the numerator by the denominator and multiply by 100. **Denominator (**No. outbreaks) **=** _____ **Numerator (**No. with contributing factors reported to NORS) = _____ **Rate** (Num./Denom. x 100) = _____	**Top:** > 55% of outbreaks n=4 **Middle**: 33-55% of outbreaks n=2 **Neither:** n=1	**Calculated** = 7 **Comments:** Dropped performance measure on completing NORS form.