



**Evaluation of Wyoming Foodborne Illness and Outbreak Response
Using the Council to Improve Foodborne Outbreak and Response (CIFOR)**

Proposed Performance Measures

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Background

The Council to Improve Foodborne Outbreak Response (CIFOR) was established in 2006 to improve methods at the local, state, and federal levels to detect, investigate, control, and prevent foodborne disease outbreaks. In 2009, CIFOR released “Guidelines for Foodborne Disease Outbreak Detection and Response” (Guidelines)¹. Chapter 8 of the Guidelines lists over 100 performance measures for foodborne disease programs. These measures are divided into foodborne disease program objectives and indicators (short-term, intermediate, and long-term) and major performance measures and metrics for program evaluation (for local and state communicable disease, environmental health, and laboratory programs).

In preparation for a revision of the Guidelines, the CIFOR Metrics Working Group identified 20 key performance measures from Chapter 8 and suggested target ranges for the measures. These were sent to state epidemiologists in April 2013. States were asked to assess which metrics could be calculated with available state data, the difficulty of obtaining and calculating data, and value of the performance measures in evaluating foodborne disease programs performance. Concurrently, the Colorado Integrated Food Safety Center of Excellence proposed evaluating data using the CIFOR performance measures as a way to assess strengths and areas for improvement in outbreak detection and response in Colorado and states in the Rocky Mountain region.

Based on feedback from thirteen states, the CIFOR Metric Working Group eliminated some performance measures and updated the remaining 16 measures and their target ranges. This evaluation uses the updated performance measures which will be included in the next version of the Guidelines.

Methods

To evaluate Wyoming performance on the 16 performance measures, the following data was used:

- Reportable condition data—Salmonella and E. coli case data were extracted.
- Outbreak Database—excel spreadsheets managed by Wyoming Department of Health (WDH).
- National Outbreak Reporting System (NORS)—managed by the Centers for Disease Control and Prevention (CDC), designated WDH employees report outbreaks to CDC using NORS. NORS contains some different data elements than the WDH Outbreak Database.

- BioNumerics—developed by Applied Maths, BioNumerics is used by CDC PulseNet as an unbiased and reproducible way of describing Pulsed Field Gel Electrophoresis (PFGE) patterns.

Enteric disease case data from 2008-2012 were analyzed unless otherwise noted. NORS data from 2009-2012 were analyzed. No additional data were collected for the purpose of evaluating the CIFOR performance indicators.

Results

Below, table 1 describes the 16 revised CIFOR performance measures, the target ranges suggested by the CIFOR Metrics Working Group, Wyoming findings, and the target range(s) achieved by Wyoming.

Table 1: CIFOR Performance Measures and Wyoming Performance

CIFOR Performance Measures		Wyoming Performance	
Performance Measure	Target Range	Findings for Each Performance Measure	Target Range Achieved
<p>1. Foodborne illness complaint reporting system: 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.</p>	<p>Preferable: database Acceptable: system to log complaints</p>	Foodborne illness complaint system is managed in a Microsoft Access database.	Preferable
<p>2. Outbreaks detected from complaints: Number of outbreaks detected as a result of foodborne illness complaints. Rate of outbreaks detected per 1,000 complaints received.</p>	<p>Preferable: > 20 outbreaks / 1,000 complaints Acceptable: 10-20 outbreaks/ 1,000 complaints</p>	2008-2012: 9 outbreaks from 78 reports= 115 outbreaks per 1,000 complaints.	Preferable
<p>3. Foodborne illness outbreak rate: Number foodborne outbreaks reported, all agents. Rate of outbreaks reported / 1,000,000 population.</p>	<p>Preferable: >6 outbreaks / 1,000,000 population Acceptable: 1-6 outbreaks / 1,000,000 population</p>	2008=15.30 2009=7.63 2010=5.32 2011=22.91 2012=12.14	Preferable
<p>4. Confirmed cases with exposure history obtained: Number and percentage of</p>	<p>Preferable: > 75% of cases Acceptable: 50-</p>	2008-2012 data Salmonella: 88% (302/343) STEC: 80% (66/82)	Preferable

CIFOR Performance Measures		Wyoming Performance	
Performance Measure	Target Range	Findings for Each Performance Measure	Target Range Achieved
confirmed <i>Salmonella</i> , <i>Shiga-toxin producing E. coli</i> (STEC), and <i>Listeria</i> cases with exposure history obtained	75% of cases	Listeria: data not available	
5. Isolate submissions to Public Health Laboratory: Number and percentage of isolates from confirmed <i>Salmonella</i> , STEC, and <i>Listeria</i> cases submitted to Public Health Laboratory	Preferable: > 90% of isolates Acceptable: 60-90% of isolates	2008-2012 data Salmonella: 84% (289/343) STEC: 71% (58/82) Listeria: data not available Note: Only able to quantify the percentage of isolates that were submitted to Wyoming Public Health Lab. Some isolates may have been received in other state public health labs.	Acceptable
6. Pulsed Field Gel Electrophoresis (PFGE) subtyping of isolates: Number and percentage of <i>Salmonella</i> , STEC, and <i>Listeria</i> isolates with PFGE information.	Preferable: > 90% of isolates Acceptable: 60-90% of isolates	2012 data Salmonella: 100% STEC: 100% Listeria: no isolates received	Preferable
7. Isolate submission interval: Median number of days from report of clinical findings to receipt of <i>Salmonella</i> , STEC, and <i>Listeria</i> isolate at PHL	Preferable: <7 days Acceptable: 7-8 days	Unable to calculate with available data.	
8. Isolate subtyping interval: Median number days from receipt of <i>Salmonella</i> , STEC, and <i>Listeria</i> isolates to serotyping or subtyping results	Preferable: ≤4 days Acceptable: 5-6 days	2012 data Salmonella: 4 days STEC: 1 day Listeria: no isolates received	Preferable
9. PFGE <i>E. coli</i> O157 and <i>Listeria</i> subtyping interval: Percent of pulsed-field gel electrophoresis (PFGE) subtyping data results for <i>E. coli</i> O157:H7 and <i>Listeria</i> submitted to the PulseNet national database within four working days of receiving isolate at the PFGE laboratory	Acceptable: ≥90% of PFGE subtyping results submitted to PulseNet within 4 working days.	2012 Data <i>E. coli</i> O157: 100% Listeria: no isolates received	Acceptable
10. Outbreak clinical specimen collections: Number and percentage of	Preferable: > 75% of outbreaks Acceptable: 50-	2009-2012 NORS data 7/11 outbreaks; 64%	Acceptable

CIFOR Performance Measures		Wyoming Performance	
Performance Measure	Target Range	Findings for Each Performance Measure	Target Range Achieved
outbreak investigations with clinical specimens collected and submitted to PHL from 2 or more people	75% of outbreaks		
11. Cluster investigation interval: Median no. days from initiation of investigation to identification of a source.	Preferable: < 7 days Acceptable: 7-21 days	Clusters and outbreaks are tracked in one system and data cannot be separated in this manner.	
12. Complaint investigation interval: Median no. days from initiation of investigation to implementation of intervention.	Preferable: < 7 days Acceptable: 7-21 days	Clusters and outbreaks are tracked in one system and data cannot be separated in this manner.	
13. Cluster source identification: Number and percentage of clusters with more than 5 cases in which a source was identified.	Preferable: >20% of clusters with >5 cases Acceptable: 10-20% of clusters with >5 cases	Clusters and outbreaks are tracked in one system and data cannot be separated in this manner.	
14. Outbreak etiology reported to NORS: Number and percentage of outbreaks for which etiology was identified and reported to NORS.	Preferable: > 68% of outbreaks Acceptable: 44-68% of outbreaks	2009-2012 NORS data 81% (9/11 outbreaks)	Preferable
15. Outbreak vehicle reported to NORS: Number and percentage of outbreaks for which a vehicle was identified and reported to NORS.	Preferable: > 60% of outbreaks Acceptable: 48-60% of outbreaks	2009-2012 NORS data 64% (7/11 outbreaks)	Preferable
16. Outbreak contributing factor reported to NORS: Number and percentage of outbreaks for which contributing factors were identified and reported to NORS.	Preferable: >55% of outbreaks Acceptable: 33-55% of outbreaks	2009-2012 NORS data 100% (11/11 outbreaks)	Preferable

Discussion

Of the 16 performance indicators, 12 could be evaluated using available Wyoming data. Of those, preferable target ranges were achieved for 8 and acceptable ranges were achieved for 4.

Since cluster and outbreak investigations are tracked in one system, it is not possible to calculate cluster-specific performance measures (#11, #13).

The number and percentage of confirmed enteric disease cases who were interviewed and an exposure history was obtained was high (*Salmonella* 88%, STEC 80%). Case data cannot easily be matched with laboratory data, so performance measure #7 could not be calculated.

The number and percentage of *Salmonella*, STEC, and *Listeria* isolates submitted to a public health laboratory (performance measure #5) is an underestimate. Some medical providers in Wyoming use reference laboratories in other states; those isolates may have been sent to the public health laboratories in those states. Data on cases with Wyoming addresses were not sought from other state public health laboratories. Preferable/acceptable ranges were achieved for the remaining laboratory-related performance measures (#6, #8, #9).

An electronic foodborne illness complaint system detected 9 foodborne outbreaks from 78 complaints between 2008-2012 (#1, #2). Intervention date is not captured in the complaint system or cluster tracking, so complaint investigation interval could not be calculated (#12).

Overall foodborne illness outbreak detection is thorough. Clinical specimens were collected in 64% of foodborne outbreaks. Reporting of outbreak etiology, vehicle, and contributing to NORS was preferable (performance measures #14, #15, #16).

Evaluating outbreak data with these performance indicators reinforced the importance of thorough and accurate data entry into NORS. More than one field in NORS can be used to calculate some performance measures (#10, #14, #15) and in multiple instances the data in the fields were contradictory. For example, in performance measure #10 the number of outbreaks for which two or more clinical specimens were collected and submitted can be gleaned from the field for the number of specimens. Only 2 (18%) of outbreaks had this variable completed. However, data in another field indicated that the etiology was confirmed for 7 (64%) of outbreaks. For these outbreaks, two positive stool specimens are needed to for the etiology to be confirmed meaning that at least two specimens were collected. The higher rate (64%) was used for the performance measure because it better represents work done in the outbreak investigations.

Recommendations

- Continue aggressive detection and investigation of all foodborne illness outbreaks.
- Continue thorough investigation of all confirmed *Salmonella*, STEC, and *Listeria* cases.
- Continue current foodborne illness complaint system.
- Continue to monitor completeness isolate submission, testing, and reporting.
- Explore ways to facilitate specimen collection during outbreaks to increase percentage of outbreaks with known etiology.
- Ensure that NORS data entry is complete and updated at the end of each outbreak. It is likely that preliminary data were not updated at the end of outbreaks.

References

¹Council to Improve Foodborne Outbreak Response (CIFOR). Guidelines for Foodborne Disease Outbreak Response. Atlanta: Council of State and Territorial Epidemiologists, 2009