



2017

Evaluation & Review of the Office of Epidemiology & Disease Surveillance Foodborne Illness Complaint System and Outbreak Response



Matthew Kappel, MPH

Arthuro Mehretu, DVM, MPH

September 2018

Background

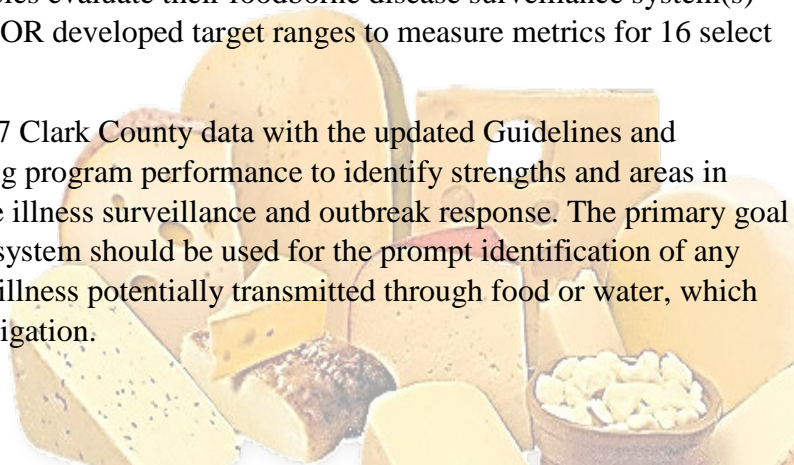
Based on population estimates from the Nevada State Demographer's office, Clark County, NV is estimated to have a population of 2.2 million people and represents approximately 73% of Nevada's total population.¹ One of the largest cities in Nevada is Las Vegas in Clark County. Las Vegas is a popular tourist destination attracting visitors with diverse backgrounds from all over the world. According to the Las Vegas Convention and Visitors Authority, Las Vegas saw a visitor volume of approximately 42 million people in 2017.² The Southern Nevada Health District (SNHD) is responsible for safeguarding the health of the communities, residents, and visitors in Southern Nevada. One of the more prominent public health concerns is foodborne illnesses. The Centers for Disease Control and Prevention (CDC) estimates approximately 47.8 million individuals in the United States are affected by foodborne illnesses annually.

Approximately 9.4 million of those foodborne illnesses occur from known pathogens (i.e., *Salmonella*)³, whereas approximately 38.4 million foodborne illnesses are unspecified.⁴ In the United States, there are several foodborne illness surveillance systems in place to monitor the trends and the burden of foodborne illnesses (i.e., FoodNet, CaliciNet, PulseNet, NNDSS, and NORS).⁵ Most of these surveillance systems play a critical role in the detection and prevention of possible foodborne illness clusters and outbreaks.

The Southern Nevada Health District's Office of Epidemiology and Disease Surveillance (OEDS) relies on mandatory reporting of reportable enteric diseases and foodborne illness complaints received from the public to identify clusters and outbreaks of foodborne illness. Receiving and responding to complaints of foodborne illness in the community does not depend on the identification of specific enteric pathogens and can result in the detection of outbreaks regardless if the etiology is known.

In 2009, the Council to Improve Foodborne Outbreak Response (CIFOR) developed and published the CIFOR "Guidelines for Foodborne Disease Outbreak Response" as a comprehensive source of information on foodborne illness investigation and control. Chapter 8 of the Guidelines provides performance indicators for foodborne disease programs for effective surveillance of enteric diseases and for response to foodborne illness outbreaks. Initially, these performance indicators were intended to be used to evaluate current surveillance systems and outbreak response but fell short of providing specific target ranges for metrics to be measured. To help state and local health agencies evaluate their foodborne disease surveillance system(s) and outbreak control activities, CIFOR developed target ranges to measure metrics for 16 select performance measures.^{6,7}

OEDS reviewed and evaluated 2017 Clark County data with the updated Guidelines and suggested target ranges for assessing program performance to identify strengths and areas in need of improvement for foodborne illness surveillance and outbreak response. The primary goal of the foodborne illness complaint system should be used for the prompt identification of any unusual clusters of gastrointestinal illness potentially transmitted through food or water, which might require a public health investigation.



Methods

To evaluate OEDS foodborne illness complaint surveillance and performance on the 16 performance indicators, the following data sources were used:

- Foodborne Illness Database (FBI Database) – a Microsoft Access database used by OEDS to log and investigate complaints of possible foodborne illness.
- TriSano – a surveillance, case management, and outbreak management application used by OEDS
- Pulsed-field gel electrophoresis (PFGE) export file – a Microsoft Excel file provided by the Southern Nevada Public Health Laboratory (SNPHL)
- Foodborne Illness Taskforce (FIT) assessment log – a Microsoft Excel file shared by OEDS and Environmental Health (EH) to track and monitor complaint referrals and EH inspections/assessments
- National Outbreak Reporting System (NORS) – outbreak reporting application managed by the CDC

Data was extracted from January 1, 2017 through December 31, 2017 and the data analysis for this review was generated using SAS software 9.4. Copyright © 2018 SAS Institute Inc.

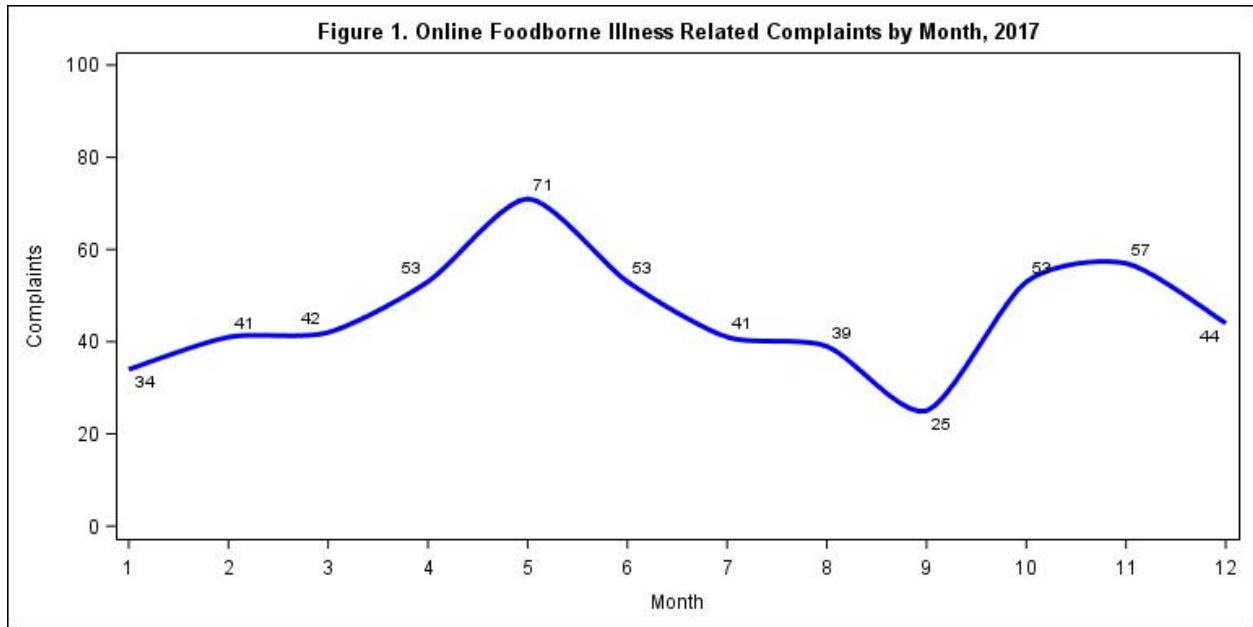
OEDS included in this evaluation all reportable diseases, conditions and events per the Nevada Administrative Code Chapter 441A related to foodborne diseases as listed on the Center for Disease Control and Prevention (CDC) Food Safety page⁸ and diseases not reportable in Clark County but were found to cause an outbreak.

The “Development of Target Ranges for Selected Performance Measures” in the CIFOR Guidelines provides target ranges for *Salmonella*, Shiga toxin-producing *E. coli* (STEC), and *Listeria*.⁷ OEDS adopted the same measures for *Shigella*.

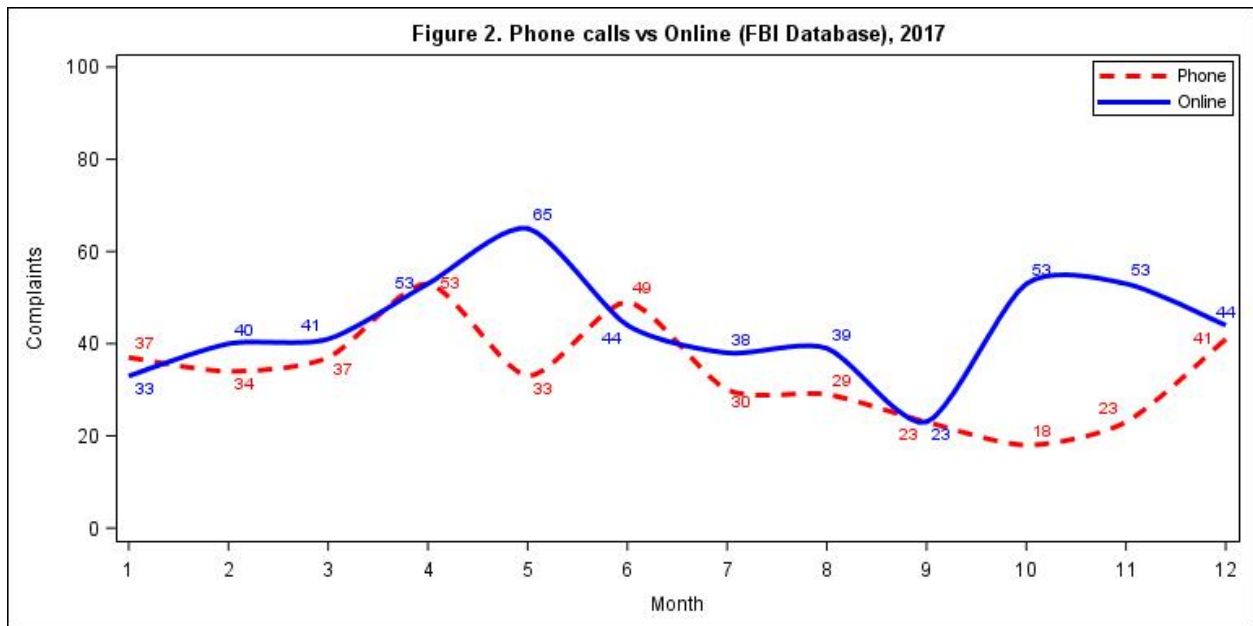


Results

Online Foodborne Illness Complaint Form (SNHD website)



Foodborne Illness Database (Microsoft Access)



Foodborne Illness Database (FBI Database) and TriSano

Performance Measure	Metric	Target Range	OEDS performance (2017)
1. <u>Foodborne illness complaint reporting system</u> <u>Source:</u> FBI Database	Agency maintains logs or database 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.	Preferable: Electronic database Acceptable: System to log complaints	Preferable: Electronic database
2. <u>Outbreaks detected from complaints</u> <u>Sources:</u> FBI Database & TriSano	Outbreaks detected from complaints: Number of outbreaks detected because of foodborne illness complaints. Rate of outbreaks detected per 1,000 complaints received.	Preferable: >20 outbreaks / 1,000 complaints Acceptable: 10-20 outbreaks / 1,000 complaints	0 outbreaks detected from complaints
3. <u>Foodborne illness outbreak rate</u> <u>Source:</u> TriSano	Number of foodborne outbreaks reported , all agents. Rate of outbreaks reported / 1,000,000 population.	Preferable: >6 outbreaks / 1,000,000 population Acceptable: 1-6 outbreaks / 1,000,000 population	Acceptable: 1.4 per 1,000,000
4. <u>Confirmed cases with exposure history obtained</u> <u>Source:</u> TriSano	Number and % of confirmed cases with exposure history obtained .	Preferable: >75% of cases Acceptable: 50-75% of cases	A. <i>Salmonella</i> 52 ix / 133 = 39% B. <i>E. coli</i> (STEC) = Preferable 19 ix / 19 = 100% C. <i>Listeria</i> = Preferable 2 ix / 2 = 100% D. <i>Shigella</i> = Preferable 53 ix / 61 = 87%

Southern Nevada Public Health Laboratory (SNPHL)

Performance Measure	Metric	Target Range	OEDS performance (2017)
<p>5. <u>Isolate/CIDT-positive clinical specimen submissions to public health laboratories</u></p> <p><u>Source:</u> TriSano</p>	<p>Number and % of isolates from confirmed cases and clinical specimens from patients diagnosed by culture independent diagnostic test (CIDT), submitted to PHL.</p>	<p>Preferable: >90% of isolates/CIDT-positive clinical specimens Acceptable: 60-90% of isolates/CIDT-positive clinical specimens</p>	<p>A. <i>Salmonella</i> = Acceptable 118 isolates / 133 = 88%</p> <p>B. <i>E. coli</i> (STEC) = Preferable 19 isolates / 19 = 100%</p> <p>C. <i>Listeria</i> = Preferable 2 isolates / 2 = 100%</p> <p>D. <i>Shigella</i> = Acceptable 53 isolates / 61 = 87%</p>
<p>6. <u>PFGE subtyping of isolates</u></p> <p><u>Source:</u> TriSano</p>	<p>Number and % of isolates with PFGE information.</p>	<p>Preferable: >90% of isolates Acceptable: 60-90% of isolates</p>	<p>A. <i>Salmonella</i> = Preferable 111 PFGEs / 118 = 94%</p> <p>B. <i>E. coli</i> (STEC) = Preferable 19 PFGEs / 19 = 100%</p> <p>C. <i>Listeria</i> = Preferable 2 PFGEs / 2 = 100%</p> <p>D. <i>Shigella</i> = Preferable 51 PFGEs / 53 = 96%</p>

Submission and subtyping intervals

Performance Measure	Metric	Target Range	OEDS performance (2017)
<p>7. <u>Isolate/CIDT-positive clinical specimen submission interval</u></p> <p><u>Source</u>: SNPHL excel log</p>	<p>Median number of days from collection of clinical specimen to receipt of isolate or clinical specimen at PHL.</p>	<p>Preferable: < 7 days Acceptable: 7-8 days</p>	<p>A. <i>Salmonella</i> = Acceptable Med. # days = 8 days</p> <p>B. <i>E. coli</i> (STEC) = Acceptable Med. # days = 8 days</p> <p>C. <i>Listeria</i> = Preferable Med. # days = 6.5 days</p> <p>D. <i>Shigella</i> = Preferable Med. # days = 6 days</p>
<p>8. <u>Isolate subtyping interval</u></p> <p><u>Source</u>: SNPHL excel log</p>	<p>Median number days from receipt of isolate to PFGE subtyping results.</p>	<p>Preferable: ≤ 4 days Acceptable: 5-6 days</p>	<p>A. <i>Salmonella</i> = Preferable Med. # days = 3 days</p> <p>B. <i>E. coli</i> (STEC) Med. # days = 10.5 days</p> <p>C. <i>Listeria</i> = Preferable Med. # days = 2 days</p> <p>D. <i>Shigella</i> = Acceptable Med. # days = 6 days</p>
<p>9. <u>PHEP <i>E. coli</i> and <i>Listeria</i> subtyping interval</u></p> <p><u>Source</u>: SNPHL excel log</p>	<p>% of 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 isolate receipt at the PFGE laboratory.</p>	<p>Acceptable: > 90% of PFGE subtyping results submitted to PulseNet within 4 working days.</p>	<p>Acceptable: 4 PFGE / 4 confirmed = 100%</p>

Specimen collection and investigation

Performance Measure	Metric	Target Range	OEDS performance (2017)
10. <u>Outbreak clinical specimen collections</u> <u>Source:</u> TriSano	Number and % of outbreak investigations with clinical specimens collected and submitted to the PHL from two or more people.	Preferable: >75% of outbreaks Acceptable: 50-75% of outbreaks	0 collections / 4 reported = 0%
11. <u>Cluster investigation interval</u> <u>Source:</u> TriSano	Number of clusters that were detected by the PHL. Median number days from initiation of investigation to identification of source.	Preferable: < 7 days Acceptable: 7-21 days	No sources identified
12. <u>Cluster source identification</u> <u>Source:</u> TriSano	Number and % of clusters with more than five cases in which a source was identified.	Preferable: > 20% of clusters with > 5 cases Acceptable: 10-20% of clusters with > 5 cases	No sources identified
13. <u>Complaint investigation interval</u> <u>Source:</u> Fit Log	Median number days from initiation of investigation to implementation of intervention.	Preferable: < 7 days Acceptable: 7-21 days	Preferable 0 days

NORS reporting

Performance Measure	Metric	Target Range	OEDS performance (2017)
14. <u>Outbreak etiology reported to NORS</u> <u>Source: NORS</u>	Number and % of outbreaks for which etiology was identified and reported to the National Outbreak Reporting System (NORS).	Preferable: > 68% of outbreaks Acceptable: 44-68% of outbreaks	3 etiologies identified / 7 = 43%
15. <u>Outbreak vehicle reported to NORS</u> <u>Source: NORS</u>	Number and % of outbreaks for which a vehicle was identified and reported to NORS.	Preferable: > 60% of outbreaks Acceptable: 48-60% of outbreaks	0 vehicles identified / 7 = 0%
16. <u>Outbreak contributing factors reported to NORS</u> <u>Source: NORS</u>	Number and % of outbreaks for which contributing factors were identified and reported to NORS.	Preferable: > 55% of outbreaks Acceptable: 33-55% of outbreaks	0 cont. fact. Identified / 7 = 0%

References:

1. The Nevada State Demographer's Office (2018). Vintage 2017 data.
2. Las Vegas Convention and Visitors Authority (2018). Year-to-Date Summary 2017. Retrieved from <https://www.lveva.com/stats-and-facts/visitor-statistics/>
3. Scallan, E., Hoekstra, R. M., Angulo, F. J., Tauxe, R. V., Widdowson, M., Roy, S. L. Griffin, P. M. (2011). Foodborne Illness Acquired in the United States—Major Pathogens. *Emerging Infectious Diseases*, 17(1), 7-15. <https://dx.doi.org/10.3201/eid1701.p11101>
4. Scallan, E., Griffin, P. M., Angulo, F. J., Tauxe, R. V., & Hoekstra, R. M. (2011). Foodborne Illness Acquired in the United States—Unspecified Agents. *Emerging Infectious Diseases*, 17(1), 16-22. <https://dx.doi.org/10.3201/eid1701.p21101>
5. Centers for Disease Control and Prevention. Foodborne Illness Surveillance Systems Fact Sheet. [(accessed on 4 September 2018)]. Available online: http://www.cdc.gov/foodborneburden/PDFs/FACTSHEET_G_SURVEILLANCE.pdf
6. Council to Improve Foodborne Outbreak Response (CIFOR). Guidelines for Foodborne Disease Outbreak Response. Atlanta: Council of State and Territorial Epidemiologists, 2009. Available online: <http://cifor.us/products/guidelines>
7. Council to Improve Foodborne Outbreak Response (CIFOR). Development of Target Ranges for Selected Performance Measures in the CIFOR Guidelines. Atlanta: Council of State and Territorial Epidemiologists, 2009. Available online: <http://cifor.us/products/metrics>
8. Centers for Disease Control and Prevention. A-Z Index for Foodborne Illness. [(accessed on 10 September 2018)]. Available online: <https://www.cdc.gov/foodsafety/diseases/index.html>

