2017

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

Southern Nevada Health District

Matthew Kappel, MPH

Arthuro Mehretu, DVM, MPH

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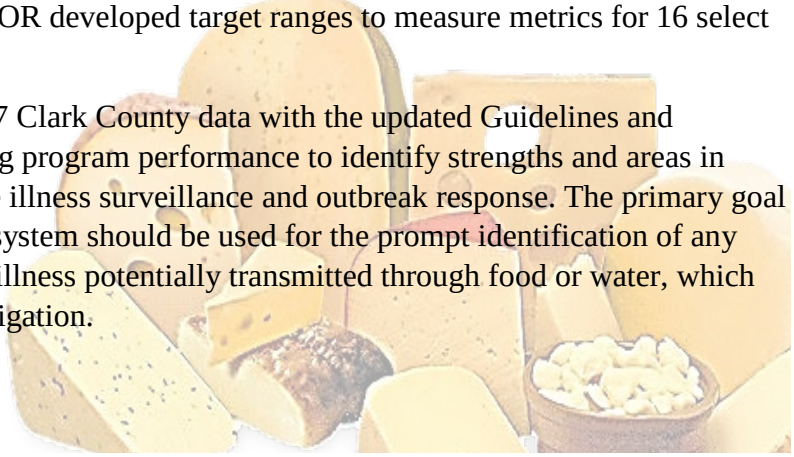
Background

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

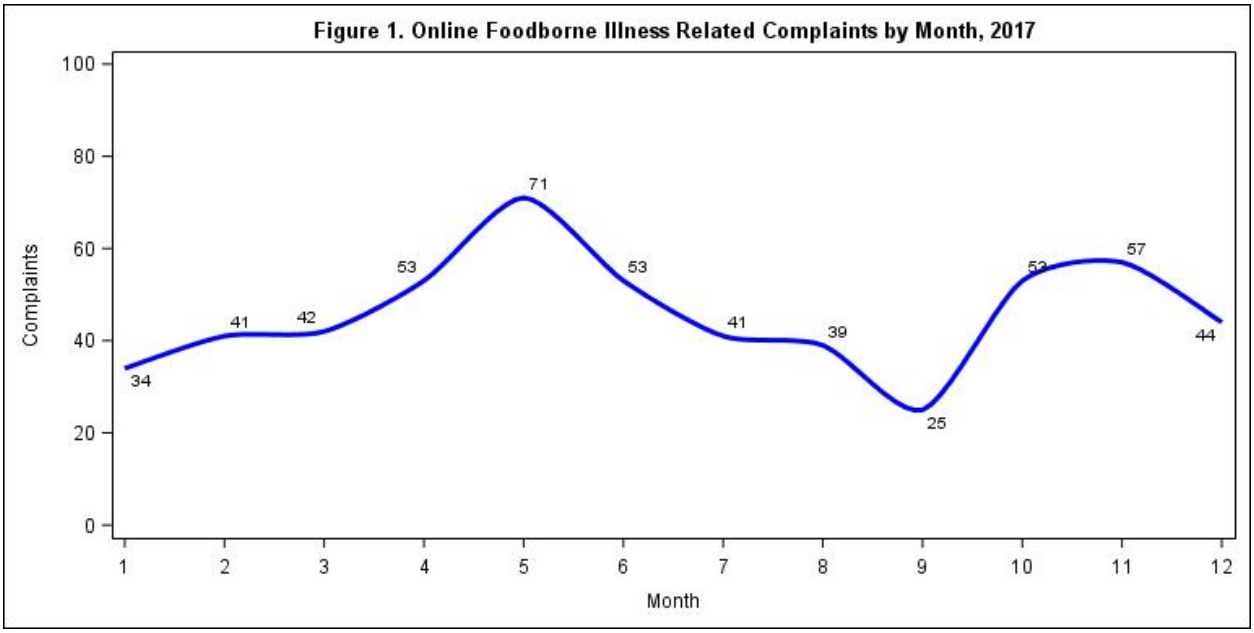
Data was extracted from January 1, 2017 through December 31, 2017 and the data analysis for this review was generated using SAS software 9.4. Copyright © 2018 SAS Institute Inc.

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 page[8] and diseases not reportable in Clark County but were found to cause an outbreak.

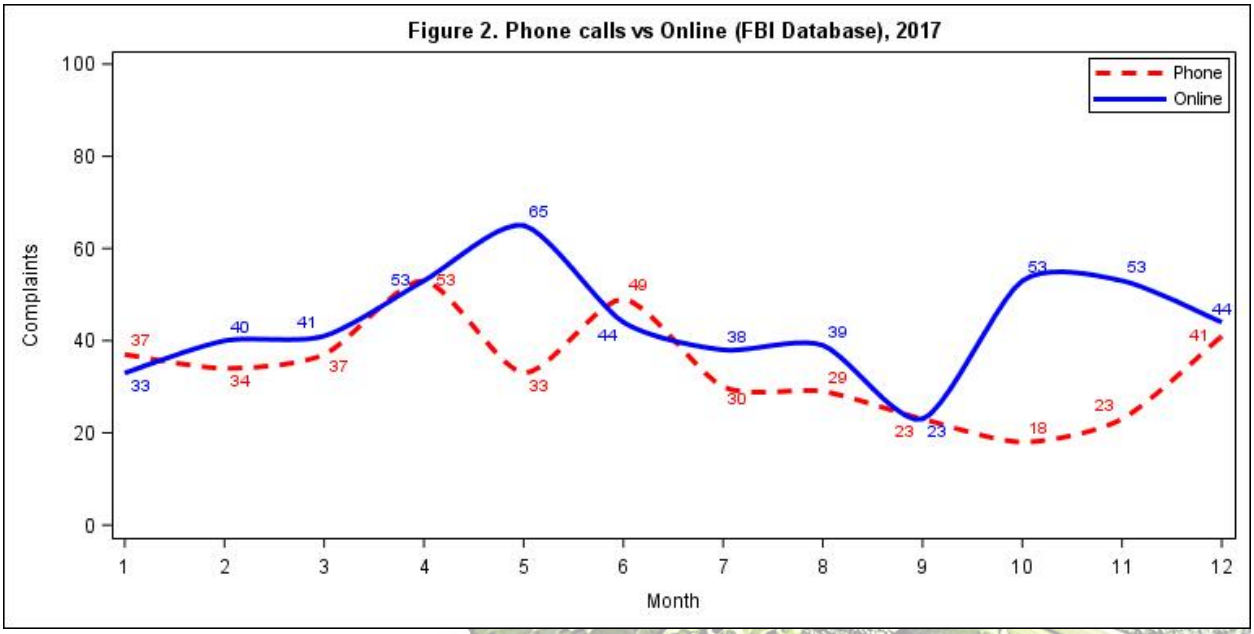
The "Development of Target Ranges for Selected Performance Measures" in the CIFOR Guidelines provides target ranges for *Salmonella,* Shiga toxin-producing *E. coli* (STEC), and *Listeria.*[7] OEDS adopted the same measures for *Shigella*.

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. Foodborne illness complaint reporting system Source: 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. Outbreaks detected from complaints Sources: 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. Foodborne illness outbreak rate Source: 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**: 1.9 per 1,000,000
4. Confirmed cases with exposure history obtained Source: TriSano	Number and % of **confirmed** cases with exposure history **obtained**.	**Preferable**: >75% of cases **Acceptable**: 50-75% of cases	A. *Salmonella* 52 ix / 133 = 39% B. *E. coli* (STEC) = **Preferable** 19 ix / 19 = 100% C. *Listeria* = **Preferable** 2 ix / 2 = 100% D. *Shigella* = **Preferable** 53 ix / 61 = 87%

Southern Nevada Public Health Laboratory (SNPHL)

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

Submission and subtyping intervals

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

Specimen collection and investigation

Performance Measure	Metric	Target Range	OEDS performance (2017)
10. Outbreak clinical specimen collections Source: 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. Cluster investigation interval Source: 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. Cluster source identification Source: 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. Complaint investigation interval Source: 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. Outbreak etiology reported to NORS Source: NORS	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. Outbreak vehicle reported to NORS Source: NORS	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. Outbreak contributing factors reported to NORS Source: NORS	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:

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