



**ADHS**

**ARIZONA DEPARTMENT  
OF HEALTH SERVICES**

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**2017-2018 Infectious  
Disease  
Outbreak  
Report**





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# Executive Summary

# Executive Summary

Outbreak detection, response, and reporting are key activities for public health response to infectious disease. This report details trends in outbreaks for the years 2017 and 2018.



There was a **decrease in the number of reported and confirmed outbreaks** that occurred during 2018.

The cause of the decrease remains unknown. The decrease may represent unrecognized protocol or staffing changes within reporting partner agencies. In response to the decrease, local health agencies should consider developing or updating resources and education for partner agencies.

The 2018 decrease in outbreaks was most evident within schools and child care facilities.

Noting that the type of outbreak varies by age group, we recommend that educational efforts and resources for outbreak response in these settings correspond to these trends.



Substantial **changes to communicable disease rules** went into effect on January 1, 2018.

Changes included the addition of provider reporting and local health agency investigation of respiratory disease outbreaks in health care institutions or correctional facilities.

Despite this addition, the number of respiratory disease outbreaks in health care institutions decreased in 2018 and there were no respiratory disease outbreaks reported in correctional facilities.

This may indicate a gap in knowledge of administrators of these facilities for identifying and reporting outbreaks of respiratory disease.



For the first time, this report distinguishes between outbreaks in **assisted living facilities vs. nursing care institutions**.

The largest proportion of outbreaks reported in Arizona occur in health care institutions, primarily in assisted living facilities and nursing care institutions.

We document that the burden of outbreaks is far greater in nursing care institutions than assisted living facilities.

Data presented offer direction for focusing education and resources for responding to outbreaks within these two facility types.



Performance goals show that Arizona's outbreak response is strong in important areas,

including initiating an investigation within 24 hours and confirming the etiology of outbreaks.





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# Overview





# Overview

An outbreak is defined as an increase in cases of disease in time or place that is greater than expected. Frequently, an outbreak occurs when a common source causes illness in two or more people from different households. If a condition is rare (e.g., measles) or has serious public health implications (e.g. bioterrorism agent), an outbreak may involve only one case.

Outbreak detection, response, and reporting are key components of a state's public health capacity and are essential for prevention and control of illness in a population. During and after outbreak investigations, public health officials:

- Take public health action to stop the spread of illness.
- Provide education to prevent future outbreaks.
- Gather information to assist with future outbreak investigations.

The collection and reporting of data on infectious disease outbreak investigations allows the Arizona Department of Health Services (ADHS) to monitor Arizona's burden of infectious disease outbreaks and progress in detecting and responding to reported outbreaks throughout the state. Variables

collected include date of outbreak report, number of ill cases, outbreak etiology, infectious disease category, outbreak location or setting, mode of transmission, and number of clinical specimens collected. These data are collected in order to provide a profile of the infectious disease outbreaks that occur in Arizona and of the timeliness and completeness of outbreak response. The data analysis allows for improved implementation of appropriate outbreak control measures to mitigate the spread of disease and prevent future outbreaks from occurring.

## Definitions

### What is a case?

A case is an instance of diseases in an individual (single person).

### What is an outbreak?

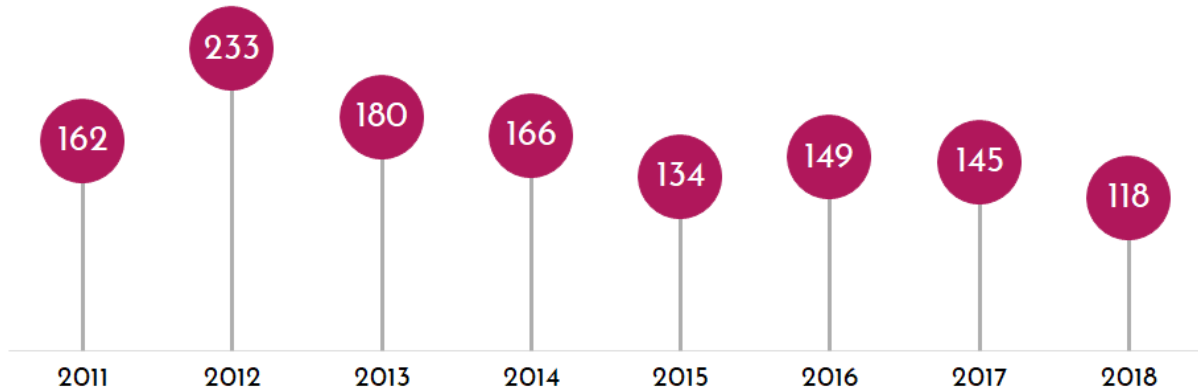
An outbreak is an increase in cases of disease in time or place that is greater than expected.



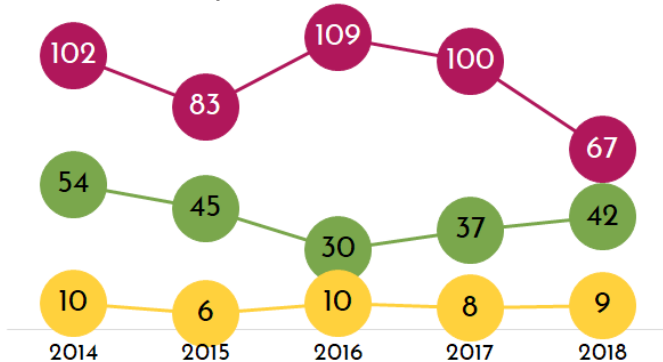
## Decrease in Confirmed Outbreaks

Historically, there was a peak in the number of outbreaks reported in 2012, with a decrease in 2013 through 2015. This may be due to increased surveillance and reporting of outbreaks in 2012, statistical variance, or an actual increase in outbreaks in 2012. In 2017, there were 145 confirmed infectious disease outbreaks reported in which exposure occurred in Arizona. This was an unremarkable decrease compared to 2016. A substantial decrease in the number of confirmed outbreaks occurred during 2018.

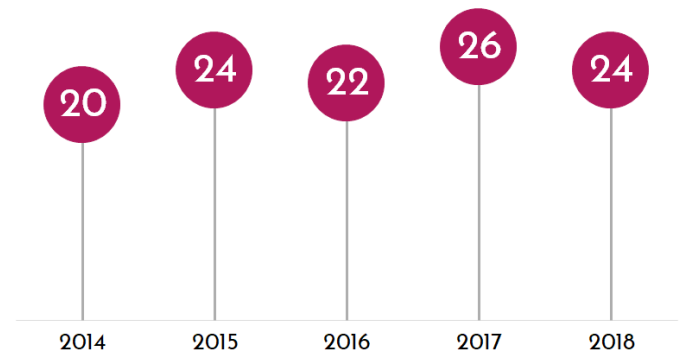
The number of confirmed outbreaks dropped by almost 20% in 2018.



The decrease in 2018 is most notable in **Maricopa County**, with a decrease of one-third between 2017 and 2018. The number of outbreaks in **other counties**, as well as **multistate and multicounty outbreaks**, remained steady.



While the number of outbreaks has decreased since 2014, the **mean number of individuals** affected per outbreak has increased slightly.



The cause of the decrease in confirmed outbreaks remains unknown. The decrease did not appear to be connected to any recognized change in rules, procedures, or communications at the state or local health agencies. However, the decrease may represent unrecognized protocol or staffing changes within reporting partner agencies. In response to the decrease in reported outbreaks, local health agencies should consider developing or updating resources and education for reporting to required reporters, including health care providers and administrators of health care institutions, correctional facilities, schools, child care establishments, and shelters.

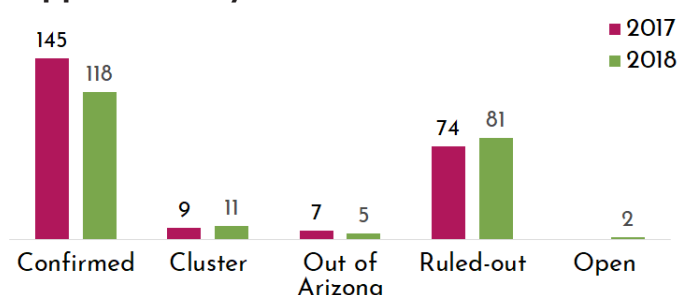


# Ruled-out Outbreaks, Out-of-Arizona Outbreaks, and Clusters

Not all suspected outbreaks that are reported and investigated fit the confirmed outbreak definition. Additionally, only confirmed outbreaks in which cases were exposed in Arizona are included in this report, unless otherwise noted.

Most reported outbreaks were confirmed. A few were confirmed outbreaks affecting Arizona residents but exposure occurred outside of Arizona. A small portion were clusters identified using pulsed-field gel electrophoresis (PFGE), representing an increase or deviation from expected, but no common exposure or experience was identified. Two outbreaks that were reported in 2018 are still under investigation. The remainder of reported outbreaks were ruled out.

**Only the number of confirmed outbreaks dropped notably between 2017 and 2018**



## Definitions

### Confirmed outbreak

An increase in cases of disease in time or place that was greater than expected, and a common source was identified in cases from different households with the same illness. Exposure occurred in Arizona.

### Cluster

Two or more cases from different households with a matching genotyping (e.g. pulsed field gel electrophoresis [PFGE] or whole genome sequencing [WGS]), and the number of cases represents an increase over baseline or demographic or epidemiologic characteristics indicate a deviation from expected, but no common source was identified. PFGE is a laboratory technique used to identify two or more individuals that had similar pathogen strains, indicating their illness may have had a common source.

### Ruled-out outbreak

After investigation, investigators determined that the event did not represent an increase in disease in time or place that was greater than expected, and a common source was not identified.

### Out of Arizona

Arizona residents were affected by a true increase in disease in time or place that was greater than expected, or a common source of illness was identified, but exposure occurred outside of Arizona.

## Changes During 2018

Communicable disease rules are found in Arizona Administrative Code (A.A.C.) Title 9, Chapter 6. This chapter contains rules defining how outbreaks of infectious disease are required to be reported to local health agencies, and how local health agencies are required to report to ADHS. Substantial changes to these rules went into effect on January 1, 2018. Changes that may have affected how outbreaks were reported or investigated in Arizona include:

- Added requirement for provider reporting of respiratory disease outbreaks in a health care institution or correctional facility (R9-6-202).
- Added requirement for local health agency investigation of respiratory disease outbreaks in a health care institution or correctional facility (R9-6-370).
- Changed requirement for local health agency reporting of outbreaks to ADHS to 24 hours, previously one working day (R9-6-206-E).

A complete summary of all the changes that went into effect in 2018 can found at <http://azdhs.gov/reporting>.

## More information about this topic

[Communicable Disease Reporting](#)

[Outbreak threshold guide for healthcare settings and correctional facilities](#)

[Outbreak threshold guide for schools, child care establishments, and shelters](#)





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# Notable Outbreaks



# *E. coli* O157 in a Community on the Arizona-Utah Border

In late June and early July, 2017, local, state, and federal public health agencies participated in a multijurisdictional investigation of an outbreak of *E. coli* O157 in a small, rural community on the Arizona-Utah border. The investigation was conducted as an Epi-Aid Response by the U.S. Centers for Disease Control and Prevention (CDC), the Southwest Utah Public Health Department, the Mohave County Department of Public Health, the Utah Department of Health, and the Arizona Department of Health Services.

This area has a unique religious and cultural history but had recently undergone cultural shifts. The remote nature of the community and its location straddling the Arizona-Utah border contributed to challenging public health response.

A total of 12 cases were identified primarily in children age 6 and under. Five patients who had reported contact with another case-patient during their exposure period were determined to have secondary cases. The remaining seven patients' cases were primary. Two patients died as a result of the *E. coli* infection and subsequent hemolytic uremic syndrome (HUS).

The epidemiologic investigation consisted of hypothesis generation, a focus group discussion, a case-control epidemiologic study, contact tracing and an extensive environmental investigation.

## Key Points:

- 12 cases from a community that straddles the Arizona-Utah border.
- 7 primary cases and 5 secondary cases.
- 11/12 (92%) were children 6 and under
- 9/12 (75%) were hospitalized.
- 4/12 (33%) developed HUS.
- 2/12 (17%) died.
- Local and state public health investigators from both states, as well as federal investigators from CDC, participated in the investigation.
- A case-control study determined that playing in an area with animal manure was associated with illness.
- Samples of manure from a bull and two horses yielded *E. coli* O157 that was highly related genetically to isolates from case-patients.



## Hypothesis Generation

Patients or parents were interviewed to look for things they did or ate in common.

## Focus Group Discussion

A focus group discussion with patients (or parents) further probed for specific exposures they had in common.

## Case-Control Epidemiologic Study

A case-control study was conducted using what was learned in the interviews and focus group. Patients were re-interviewed with new questions and children who were not ill were asked the same questions.

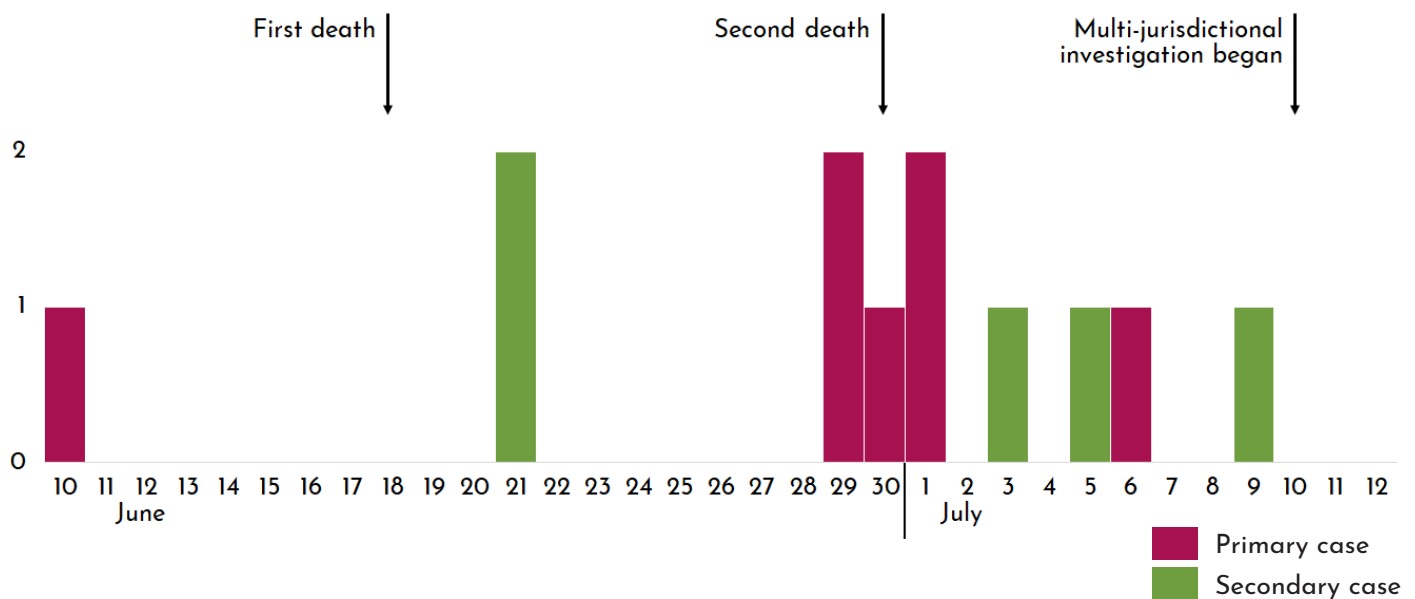
When compared to children who remained healthy, the sick patients were more likely to report one or more of the following:

- Cleaning up or playing in an area with manure
- A cow on their property
- Dogs wandered onto their property
- Drinking municipal water

## Environmental Investigation

Over 140 environmental samples were collected from water sources, foods, food establishments, homes, and animals. Three livestock animals (two horses and a bull) were found to be shedding the outbreak strain of *E. coli* in their manure; all other samples were negative. Some, but not all the human cases could be directly linked to the infected animals.

No local business establishment, community event or food item was implicated as the source of this outbreak.



## More information about this topic

[Outbreak of \*E. coli\* O157:H7 Infections Associated with Exposure to Animal Manure in a Rural Community – Arizona and Utah, June-July 2017 \(CDC\)](#)



# *E. coli* O157 Linked to Romaine Lettuce

Outbreaks of Shiga toxin-producing *E. coli* (STEC) associated with leafy greens are not uncommon. In fact, between 2009 and 2017 there were 28 suspected or confirmed outbreaks of STEC with leafy greens as a vehicle. In 2018, two outbreaks of *E. coli* O157 were linked to romaine lettuce, one of which was traced to the Yuma growing region in Arizona.

The Yuma growing region has over 230,000 acres of agricultural land, all irrigated by the Colorado River, and produces over 90% of all the leafy greens grown during winter months in the United States. During the height of production, each of the nine salad plants in the area produces more than two million pounds of lettuce each day. In addition to land in Yuma County, AZ, the Yuma growing region also includes areas of Imperial County, CA.

**90%**

of the leafy greens grown in the United States from November to March are **from the Yuma area.**

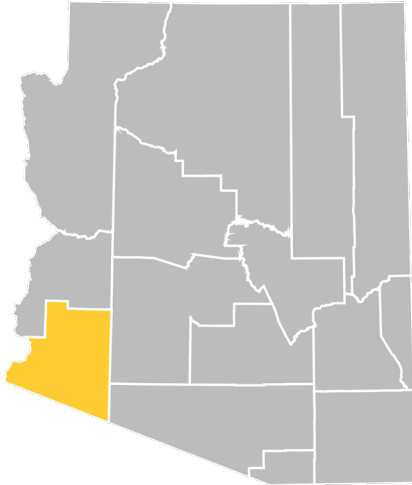


## Key Points:

- Arizona reported 10 cases associated with this multistate outbreak.
- A subcluster of illnesses in Arizona, in which restaurant patrons reported eating Caesar salad made with romaine lettuce, contributed to traceback efforts.
- Romaine lettuce implicated in this outbreak investigation was grown in the Yuma growing region.
- Public health messaging was challenging as growing areas seasonally changed and information about implicated product developed.
- Investigation determined that irrigation water was the source of the contamination; however, the cause of contamination remains unclear.



The **Yuma growing region** has over 230,000 acres agricultural land, all irrigated by the Colorado River.



The 2018 multistate outbreak spanned from March to June. It was the largest outbreak of *E. coli* O157 in the U.S. since 2006, which was associated with consumption of bagged spinach. There were 210 cases, almost half (48%) having been hospitalized, 27 cases of hemolytic uremic syndrome (HUS) and five deaths. Most cases (67%) were female and the median age was 28 years (range 1 to 88). Nearly all cases (87%) reported consumption of romaine lettuce in the week prior to onset, which is almost double what would be expected (46%) in the FoodNet Population Survey.

Arizona reported ten cases, five hospitalizations, one case of HUS and no deaths. All but one case (9/10; 90%) were female, with ages ranging from 6 to 90 years (median 30 years). Similar to national rates, 80% (8/10) reported consuming romaine lettuce before becoming ill.

A subcluster of illnesses in Arizona helped contribute to product traceback led by FDA. Several cases of O157 reported eating salads with romaine lettuce at six locations of a chain restaurant in Maricopa County. The data from these cases helped solidify the common exposure--romaine lettuce--both among Arizona cases and nationally.

FDA's traceback activities were rigorous, and led back to 36 fields on 23 farms. Only once did traceback lead to a single farm, when an isolated sub-cluster of whole head romaine lettuce was discovered at an Alaskan prison.

Public health messaging was widespread and changed over the course of this outbreak. Following available epidemiological data, CDC initially recommended only chopped romaine lettuce from the Yuma growing region be avoided. One week later, public health recommendation expanded to include all romaine lettuce from the Yuma growing region, including hearts, whole head and chopped products.

To complicate matters of communication even more, this outbreak occurred during the transitional time when romaine lettuce production moved from the Yuma growing region to Salinas, CA. The last date of harvest in Yuma was on April 16, 2018. Using the estimated 21-day shelf life of romaine, public health officials calculated that product was no longer available for purchase after May 7, 2018. Illnesses occurring after this date (through early June 2018) were assumed to be epi-linked to sick contacts or from leftover product still lingering in fridges at restaurants or in homes.

**A restaurant subcluster in Arizona helped contribute to romaine lettuce traceback\* led by FDA.**



**\*Traceback:** The collection of information and documents to follow the distribution of product, starting with the case-patient and moving backwards through the supply chain.

## FDA suggests that irrigation water is the source of the romaine lettuce contamination.



A rigorous environmental assessment was completed from June through August 2018 in partnership with FDA, CDC, Arizona Department of Agriculture, Arizona Department of Environmental Quality and the California Department of Food and Agriculture. Samples were collected from soil, excreta from wild and domesticated animals, sub-surface and surface water, irrigation canal sediment and agricultural water. No romaine lettuce was available for testing throughout the outbreak

or environmental assessment. Three samples, all from surface water collected from the Wellton area of Yuma, AZ, were positive for the outbreak strain of *E. coli* O157. FDA suggests that irrigation water is the source of the romaine lettuce contamination, however it remains unclear how the water became contaminated. Other methods of contamination outside of water cannot be ruled out.

In response to this and another multistate outbreak that occurred in the fall of 2018 associated with romaine lettuce, industry standards have changed to make traceback of romaine lettuce quicker and clearer. All romaine lettuce is now labeled with the harvest location and harvest date, as well as being marked if it is greenhouse or hydroponically grown. This advancement has already proven useful in outbreaks with romaine lettuce as the suspected vehicle.

This outbreak allowed for multi-jurisdictional collaboration that ultimately led to identifying an outbreak vehicle and one source of contamination and resulted in improvements in product traceability.

## More information about this topic

[Environmental Assessment of Factors Potentially Contributing to the Contamination of Romaine Lettuce Implicated in a Multi-State Outbreak of \*E. coli\* O157:H7 \(FDA\)](#)

[Multistate Outbreak of \*E. coli\* O157:H7 Infections Linked to Romaine Lettuce \(Final Update\) \(CDC\)](#)

[FDA Investigated Multistate Outbreak of \*E. coli\* O157:H7 Infections Linked to Romaine Lettuce from Yuma Growing Region \(FDA\)](#)

[Statement from FDA Commissioner Scott Gottlieb, M.D., on the current romaine lettuce \*E. coli\* O157:H7 outbreak investigation \(FDA\)](#)

[Agriculture in the Desert \(Visit Yuma\)](#)



# *E. coli* O157 Linked to Soynut Butter



In February 2017, investigators identified seven cases of *E. coli* O157 from four states, with a never-before-identified PFGE pattern. Affected states were Arizona, California, Maryland, and New Jersey. On Tuesday, February 21, 2017, an epidemiologist in California reached out to affected states to start gathering epidemiological information. The next day, CDC initiated an official multistate investigation.

These initial seven cases ranged in age from 3 to 48 years, with a median age of 10 years; 43% were female. Isolation dates ranged from January 7 through February 4. There were several cases diagnosed with hemolytic uremic syndrome (HUS).

The first case in Arizona had occurred in early January, in a three-year-old boy in Coconino County who developed HUS. At that time, public health investigators in Coconino County Public Health Services District determined that he had no sick contacts, no food exposures that were out of the ordinary, had not traveled, reported no contact with animals, and had not had exposure to recreational water. An environmental health inspection of the child care facility was conducted; no other children or staff had signs of *E. coli*.

## Key Points

- 32 cases across 12 states, including 4 in Arizona
- 38% hospitalized
- 28% developed HUS
- 81% under the age of 18
- 78% reported consuming soynut butter-containing products
- Outbreak strain isolated from 5 leftover products from case-patient homes and 2 unopened retail products purchased from stores.
- This outbreak underscores the importance of digging deeper into children's food histories, including menus from child care, when necessary.

# About *E. coli* O157

*E. coli* are intestinal bacteria, most of which are non-pathogenic. One category of *E. coli* that causes illness is called Shiga toxin-producing *E. coli*, including *E. coli* O157. The most common symptom of an *E. coli* O157 infection is diarrhea, often bloody, and stomach cramps. *E. coli* O157 is spread through food, water, waste from certain animals that carry the bacteria, and feces from infected persons.

## What is HUS?

Hemolytic uremic syndrome (HUS) is a rare but serious complication of *E. coli* O157 infections affecting kidney function. Symptoms include abdominal pain, tiredness, swelling, confusion, and malaise. HUS usually affects children. The symptoms of HUS usually start about a week after diarrhea starts. Approximately 3% to 5% of children with HUS die.

*E. coli* outbreaks generally have 5-10% of cases who develop HUS. During the soynut butter outbreak, 28% of cases developed HUS.

Then, a few weeks later, in early February, investigators in Maricopa County Department of Public Health began working diligently on a group of three *E. coli* O157 cases. Two children were siblings, and all three attend the same child care facility. The mother of one of the cases worked in the children's classroom. Onset dates of the three cases made person-to-person transmission most likely. One of these cases also developed HUS.

Thus, when the multistate connection was made using laboratory data, extensive investigation had already taken place. Laboratory data linked the Maricopa County cases to the Coconino County case, as well as to the multistate cases. Exposure information was immediately shared with the multistate investigation team.

On Thursday, February 23, a focused questionnaire was deployed and investigators in all four states immediately started re-contacting case-patients to complete the questionnaire. This was an extensive questionnaire asking about a myriad of exposures including consumption of meat and poultry, dairy, fruits and vegetables, and contact with animals, among others.

The next Wednesday, March 1, one of the investigators in California interviewed the parents of a case-patient who mentioned a product previously unknown to the investigator: soynut butter. The investigator then heard this same product repeated by another case-patient and notified the multistate investigation team.

Investigators in Arizona again contacted the parents of the four Arizona case-patients. All four denied that their children ate this product. However, when investigators contacted child care facilities for these patients, they determined that this item was served in both facilities. The product was labeled I.M. Healthy Soynut Butter. In addition to soynut butter, both child care facilities also served a granola that was coated in soynut butter, also labeled with I.M. Healthy brand.

By Thursday, March 2, 100% of cases in the multistate investigation had reported consuming soynut butter at home or in child care. In response, ADHS immediately issued a notice through child care licensing to stop serving all soynut butter-containing products, including the spread and the granola, until further notice.

## Investigation Timeline February - March 2017

S	M	T	W	TH	F	S
19	20	21 Outbreak Identified	22	23 Re-interviews Started	24	25
26	27	28	1 Soynut Butter Identified	2 Child Cares Notified	3 Product Recalled	4

On Friday, March 3, both ADHS and CDC issued press releases and public messaging advising against consuming any soynut butter or granola coated in soynut butter. In addition, I.M. Healthy also issued a limited recall of their products. That recall was later expanded to include all products.

Samples of product collected by public health agencies in multiple states were tested; *E. coli* O157 was recovered from product tested by public health laboratories in Oregon and Washington. The outbreak strain isolated from 5 leftover products from case-patient homes and 2 unopened retail products purchased from stores. Testing and traceback prompted an expansion of the recall to include the same product under a different label (Carb Not Beanit Butter) as well as a protein bar with soynut butter as an ingredient.

At final count, this outbreak accounted for 32 cases across 12 states, including 4 in Arizona. Almost all cases were children (81% under age 18). A large portion of cases (28%) developed HUS. Seventy-eight percent of cases reported consuming soynut butter-containing products.

This outbreak underscores the importance of digging deeper into children's food histories, including menus from child care, when necessary.

## What is soynut butter?



Soynut butter is a paste made from soybean flour and oil. It may be used as a peanut butter substitute for those with peanut allergies. The brand name is I.M. Healthy, also marketed under the label Carb Not Beanit Butter. Soynut butter is used as an ingredient in several products, including granola and protein bars.

## More information about this topic

[Hassan R, Seelman S, Peralta V, et al. A Multistate Outbreak of E Coli O157:H7 Infections Linked to Soy Nut Butter. Pediatrics. 2019;144\(4\):e20183978](#)

[Shiga toxin-producing E. coli \(STEC\) \(ADHS webpage\)](#)





# Hepatitis A in Persons Experiencing Homelessness (2017)

## Outbreak Identification and Initial Response

On March 29, 2017, Maricopa County Department of Public Health (MCDPH) received reports of three people diagnosed with hepatitis A virus (HAV) within one week. All three patients were clients of a centralized campus in downtown Phoenix that provides housing, food, healthcare, and social services to people experiencing housing instability and homelessness. Maricopa County Environmental Services (MCES) and MCDPH visited the campus on March 30. The environmental inspection did not reveal any major food safety concerns or ill food handlers at either of the two food services on or adjacent to the campus. It was observed that one of the restrooms on campus was lacking soap dispensers and soap. Additionally, alleyways a few blocks away from Campus A were being used as open toilets, with evidence of urine and feces along the walls.

Initial control measures focused on improving hygiene and vaccinating persons at risk. MCDPH partnered with the campus to distribute educational flyers on HAV and hand washing in English and Spanish. Personal-sized bars of soap, personal-sized hand sanitizer, and large pumps of hand sanitizer were also distributed to the campus. MCDPH conducted two HAV vaccination clinics on the campus within

## Key Points

- A total of 15 confirmed cases were identified.
- Cases occurred February through May 2017.
- Over 300 individuals were vaccinated in two vaccination clinics in April 2017.
- The viral strain was identical to the strain circulating among the homeless population in San Diego during the same time.
- The outbreak was declared over on July 23, 2017.
- Any person over the age of one year experiencing homelessness should be immunized against HAV.

two weeks of when the outbreak was identified and administered the HAV vaccine to 326 campus clients (68%) and staff (32%).

### Case Finding

Multiple methods were utilized for case finding. A syndromic surveillance query was created that utilized the terms "hepatitis" and "homeless". This query utilizes data received from selected emergency departments at hospitals throughout the county, allowing investigators to identify and follow up with patients who may fit the outbreak case definition but were otherwise not reported to public health. Results of the query were reviewed daily. MCDPH epidemiologists also conducted a retrospective review of cases of HAV identified through routine electronic laboratory reporting (MEDSIS) to determine if patients might have been experiencing homelessness. Finally, a short questionnaire to screen for symptoms of HAV and to ask about ill contacts was administered to all of the vaccine clinic participants. When possible, clinical samples were located and forwarded to CDC for molecular typing.

### Case Definition

Outbreak cases were defined as follows:

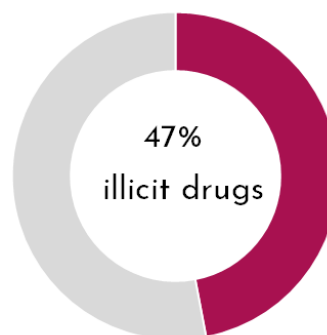
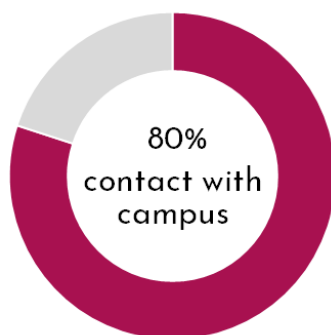
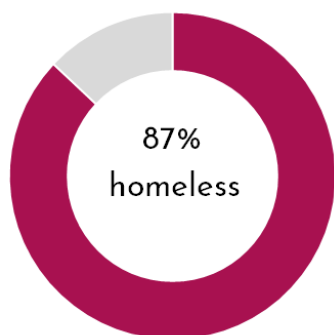
**Clinical illness:** Acute hepatitis and jaundice OR elevated liver enzymes, with onset in 2017

**Epidemiologic link:** History of homelessness or exposure to the campus (within 50 days of symptom onset) OR household or sexual contact of a confirmed outbreak case

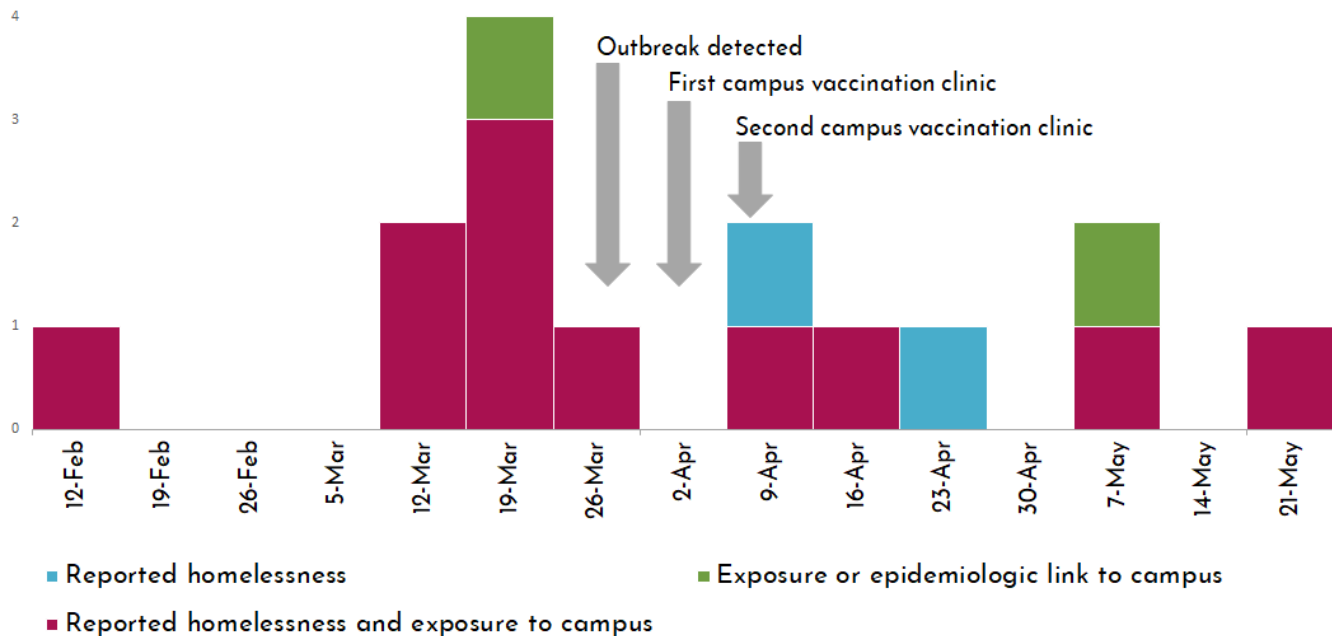
**Laboratory evidence:** Positive serologic testing for anti-HAV IgM

MCDPH identified 15 outbreak-associated cases of HAV. One was detected by campus reporting, three by healthcare provider reporting, and 11 through enhanced surveillance. The syndromic surveillance query identified the earliest outbreak-associated case that was previously lost to follow-up without an interview. Of the 15 cases, 13 (87%) patients reported a history of homelessness; 12 (80%) reported exposure to the campus, and 7 (47%) reported illicit drug use (including marijuana). Ages ranged from 30-78 years with a median of 43 years. Fourteen of the 15 patients were hospitalized; there were no deaths.

## Patient Exposures (N=15)



# Cases of hepatitis A by week of illness onset -- Maricopa County, 2017 (N=15)



## Case-Control Study

In conjunction with the HAV vaccination clinics, MCDPH also conducted a case-control study. Cases were outbreak cases that had either a history of homelessness or exposure to the campus. These interviews were completed verbally when possible, or information was gleaned from medical records when the patient was not able to be contacted for interview. Campus clients or campus staff that attended the HAV vaccination clinics but did not have hepatitis A served as controls.

The case-control study assessed participants' exposure to three food or shelter services on or near campus. It also assessed two hand hygiene behaviors by asking participants how often they washed their hands or used hand sanitizer prior to eating and after using a bathroom.

For analysis, the categories of "sometimes" or

"never" washing hands were combined as "not always washing hands" prior to eating or after using the bathroom.

Fourteen cases and 342 controls were enrolled into the case control study; one secondary case, a household contact, was excluded. We did not find that any food or shelter service was statistically significantly associated with infection. Case-patients reported more frequent lapses in hand hygiene. Odds of being a case were increased, though insignificantly, for those that did not "always wash their hands" before eating (OR = 4.2; 95% CI = 0.8-33.8) or using the bathroom (OR = 4.2, 95% CI = 0.4-27.5)

## Connection with San Diego

The earliest case, detected through syndromic surveillance, had a note in his medical record that he had arrived in Phoenix from San Diego



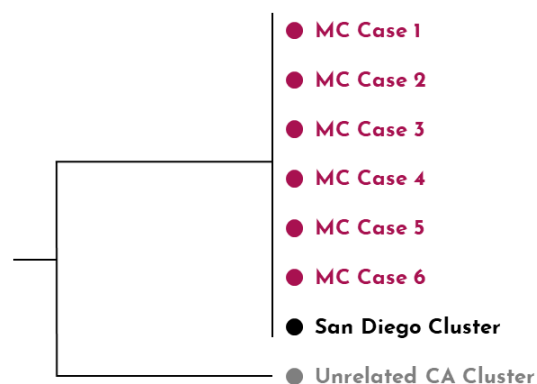
10 days prior to symptom onset. Ultimately, samples for 6 cases were forwarded to the CDC for molecular typing. All were genotyped as 1b and were molecularly identical to isolates from cases of HAV from San Diego. Thus, molecular and epidemiologic data supported that the campus outbreak was linked to an ongoing outbreak of hepatitis A in San Diego, highlighting that people experiencing housing instability can travel relatively far distances.

## Conclusion and Recommendations

This was the largest outbreak of HAV in Maricopa County since the universal recommendation for childhood HAV vaccine in 2006. Results of the environmental inspection and case control study indicated that suboptimal hygiene practices might have facilitated person-to-person transmission on the campus and among the homeless population, and recommendations to improve access to hand hygiene products were made to the campus. Expeditious vaccination might have slowed spread and should be considered as early as possible after the detection of an outbreak in a homeless population.

**Editorial note:** A larger outbreak of hepatitis A affecting persons experiencing homelessness, drug use, and incarceration began in November 2018 and is ongoing at the time of publication.

Six samples from Maricopa County were identical to samples from San Diego.



In response to a nationwide increase in HAV outbreaks since 2016, many of which are occurring among injection drug users and persons experiencing homelessness, the Advisory Committee on Immunization Practices (ACIP) amended the HAV vaccine policy, published in February 2019. The new policy recognizes homelessness as an independent risk factor for HAV, and recommends that any person over the age of one year experiencing homelessness should be immunized against HAV.

## About Hepatitis A

Hepatitis A is a contagious liver disease, resulting from infection with the hepatitis A virus (HAV). Infections can be asymptomatic in children, but cause an acute illness in adults, characterized by fever, malaise, nausea, abdominal pain, and jaundice, which is yellowing of the skin. The virus has a relatively long incubation period ranging from 10 to 50 days with an average of 30 days. It is transmitted through the fecal oral route, so to become infected you have to come into contact with another person's feces, or a fecally contaminated food or surface.

## More information about this topic

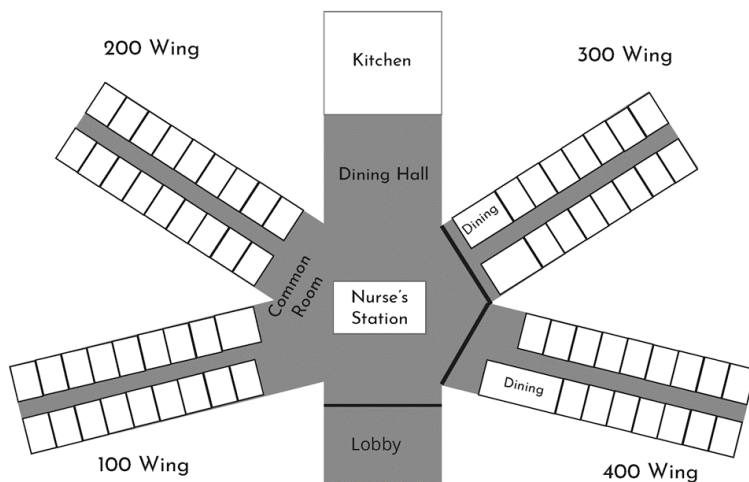
[Hepatitis A in Arizona](#)

[Vaccine Information](#)

[Recommendations of the Advisory Committee on Immunization Practices for Use of Hepatitis A Vaccine for Persons Experiencing Homelessness](#)

# Respiratory Syncytial Virus in a Nursing Care Institution

On February 7, 2017, the Arizona Department of Health Services was notified of an outbreak of 24 cases of respiratory syncytial virus (RSV) at a nursing care institution in Navajo County. The first case was diagnosed on January 25, and by February 10, 27 total residents had tested positive. The Navajo County Public Health Services District and ADHS visited the facility to observe practices and give recommendations. The facility had four different wings, and cases of RSV were identified in all wings.



## Key Points:

- A total of 36 RSV cases were identified at the same nursing care institution in Navajo County.
- A site visit to the facility identified areas for improvement in residents' respiratory hygiene habits and facility infection control practices.
- Implementation of public health recommendations helped prevent new cases from occurring.
- This outbreak demonstrates the importance of collaboration between public health and facility staff.

# Control Measures

Initial control measures focused on the following activities:

- RSV-positive patients were cohorted into the same living spaces and shared areas (such as dining services).
- Contact precautions for RSV-positive residents were recommended for the entire infectious period.
- Education of staff and residents on infection control and hand hygiene was conducted.
- Visitors were restricted to the facility, and new admissions were suspended during the outbreak.
- Symptomatic staff members were excluded from work.
- Surveillance for newly symptomatic individuals, and reporting of new cases to public health, were continued.

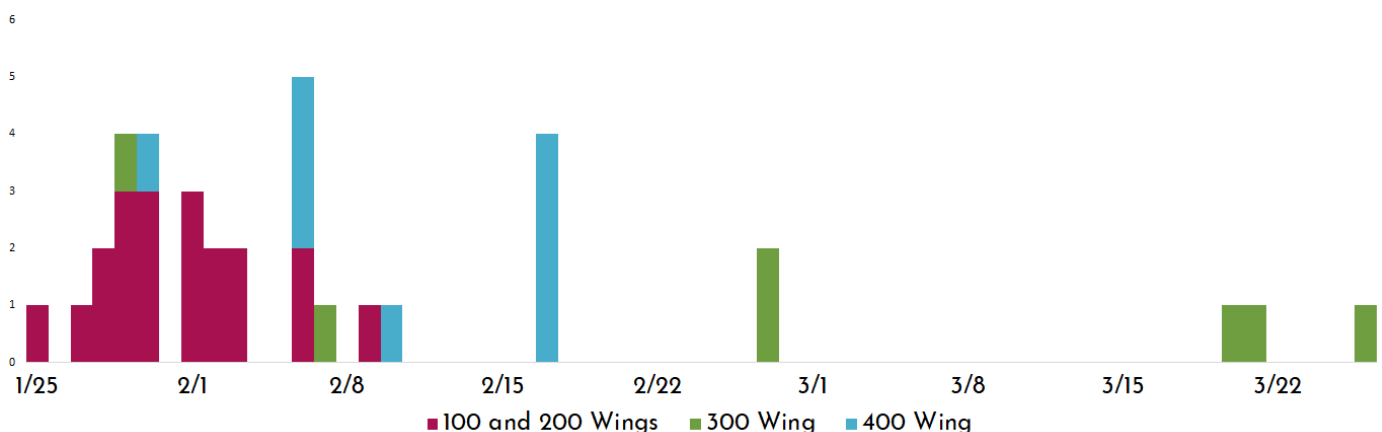
It was noted that the facility had many residents who were immunocompromised and/or had co-morbidities.

There were numerous challenges in infection control that were identified during this visit. Of note, many residents of the facility had poor respiratory hygiene habits, including spitting into the living environment of the facility. In addition, there was a high ratio of residents to healthcare workers and limited resources in the facility.

After ADHS issued recommendations for public health best practices, there were no further cases until February 17, when four cases were identified all in the same wing of the facility. Then on February 27, two additional cases were identified in another wing, which had not had a case in nearly three weeks. With these two new cases, there was concern of extended viral shedding from immunocompromised residents, or potential lapses in infection control practices.

ADHS strongly emphasized enhanced employee training and education for all staff and residents as they may be a source for further transmission. Another four weeks passed before three additional cases were identified, further illustrating the potential for prolonged viral shedding in immunocompromised residents.

Number of confirmed RSV cases in a nursing care institution by date of specimen collection





# About RSV

Respiratory syncytial virus (RSV) is a virus that causes a contagious respiratory illness, with usually minor, cold-like symptoms. The majority of people will recover within 1-2 weeks, but RSV can cause serious illness in infants and older adults. In children less than 1 year old, it is the leading cause of pneumonia and bronchiolitis (inflammation of the small airways in the lung). RSV spreads through droplets from coughs or sneezes of an infected person, as well as touching surfaces that have the virus on them. People with RSV infection are contagious for an average of 3-8 days; however, immunocompromised individuals can be contagious for up to 4 weeks.

The outbreak ended on May 11, 2017, two incubation periods after the last immunocompromised case was potentially infectious. There were 36 RSV cases identified among residents. This investigation and response demonstrated the importance of collaboration between public health and facility staff during healthcare-associated outbreaks to ensure that appropriate interventions are implemented as well as proper training for all staff including non-medical staff.

This outbreak emphasizes the importance of the collaboration between public health and facility staff in implementing public health recommendations.



## More information about this topic

[RSV in Arizona](#)

[Outbreaks in Health Care Institutions](#)

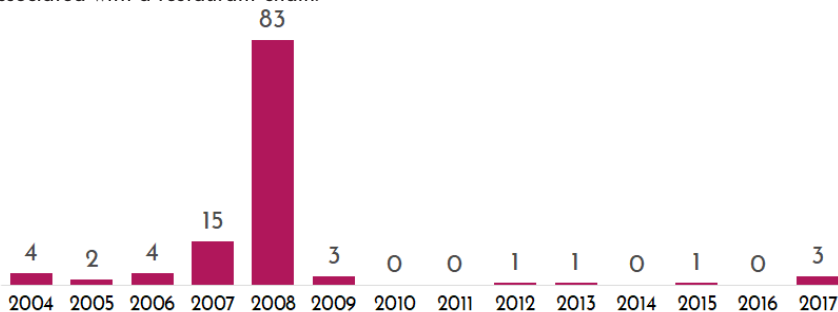


# Salmonella Montevideo Associated with a Chicken Restaurant

In May 2018, the Arizona State Public Health Laboratory (ASPHL) notified the ADHS Office of Infectious Disease Services of an increase in cases of *Salmonella* Montevideo with pulsed field gel-electrophoresis (PFGE) pattern J1XX01.0126. Cases dated back to April of 2018.

In looking at historical data for *Salmonella* in Arizona, it was noted there was a large outbreak caused by this PFGE pattern in 2008. During the 2008 outbreak, 58 cases reported eating at the same restaurant chain,

The 2008 increase in *Salmonella* Montevideo J1XX01.0126 was due to an outbreak associated with a restaurant chain.



## Key Points

- A total of 19 cases associated with this 2018 outbreak.
- There were outbreaks of this same PFGE pattern in 2008 and 2018.
- Both outbreaks were linked to the same Maricopa County location of a restaurant chain.
- An isolate from the 2008 outbreak served as reason to believe the 2008 and 2018 outbreaks were related.
- In response to the outbreak, the restaurant chain made adjustments to their policies and procedures.

# About Salmonellosis

Salmonellosis is a contagious gastrointestinal illness that is caused by infection with *Salmonella* bacteria. Most people infected with *Salmonella* develop diarrhea, fever, and abdominal cramps between 12 and 72 hours after infection. The illness usually lasts 4 to 7 days, and most individuals recover without treatment. Illness can be more severe in infants, the elderly, and people with weakened immune systems. It is spread by the fecal-oral route.

Restaurant P, which has 19 locations in Maricopa County. The investigation focused on three locations (Location A, Location B and Location C) of Restaurant P, that had two or more ill individuals reporting a meal there in the week before onset.

This restaurant serves many chicken-based dishes, and since chicken is known to be a vehicle for transmission of *Salmonella*, it was thought perhaps raw chicken introduced the *Salmonella* into the restaurant. During the 2008 outbreak, Maricopa County Environmental Services (MCES) inspected Restaurant P locations and conducted environmental sampling. The outbreak strain was isolated from cilantro, a cilantro and cheese mixture, chicken marinade and a cutting board at two locations. Location B of Restaurant P had the most food and environmental samples that tested positive for *Salmonella*.

Initially in 2018, no common restaurants were identified. However, upon case re-interview, several cases then mentioned eating at Restaurant P, and specifically mentioned eating at Location B. MCES inspected Location B and collected 24 samples: 18 environmental swabs and six from food.

Seven samples were positive, including tongs, a kitchen backsplash, the cutting board, the freezer door handle, a

plastic air curtain in the freezer, the order screen in the kitchen, and a piece of the lettuce chopper. All samples except for the lettuce chopper tested positive for the outbreak strain of *Salmonella* Montevideo. The lettuce chopper component was typed as a different *Salmonella* strain, and was not related to any human illnesses. MCES returned and re-swabbed the seven items that tested positive. Despite the heightened cleaning performed by the restaurant, three of the seven items that were originally positive tested positive again a second time: the backsplash, cutting board, and tongs.

Two rounds of sampling with *Salmonella* present in the kitchen prompted MCES to close Location B for a week. During this time, cleaning and disinfection and staff training were conducted. Before reopening, the cutting board, tongs, and backsplash were re-tested and were negative for *Salmonella*. The restaurant reopened and there were no additional cases reported since the end of May 2018.

ADHS was curious to compare epidemiological data to lab data through the use of whole genome sequencing (WGS). For this outbreak, WGS was conducted by the Laboratory Services Division of the Colorado Department of Public Health and Environment.

WGS results showed that all 2018 isolates were highly related. Additionally, an isolate from the 2008 outbreak was found to be moderately related the 2018 isolates. The 10-year gap in time could be responsible for the genetic diversity between the 2008 and 2018 isolates. Epidemiological data were invaluable for interpreting these WGS results.



Outbreak investigators hypothesized that this outbreak strain was present in the restaurant kitchen since 2008, perhaps in biofilm, a protective layer that can grow over bacteria and allow it to safely lurk on surfaces. Disruption to the biofilm, such as scraping or kitchen construction, can release the *Salmonella* back into the environment to contaminate foods and surfaces.

## More information about this topic

[Salmonellosis in Arizona](#)

[Whole Genome Sequencing](#) (CDC)

[Pulsed-Field Gel Electrophoresis](#) (CDC)

## Digging deeper

The laboratorians in Colorado who assisted with WGS alerted ADHS that a restaurant in Orange County, California had experienced three recurrent outbreaks of *Salmonella* Montevideo over the course of twelve years. Though it was a different PFGE pattern than seen in Arizona, WGS demonstrated genetic similarities in the pathogen. Within the Orange County location, isolates from a 1997 outbreak were moderately related to isolates from outbreaks in 2000 and in 2012. This means both the Arizona and the Orange County outbreaks saw persistent restaurant outbreaks of *Salmonella* Montevideo with a similar pattern of genetic changes over time. Based

upon the commonalities between the two outbreaks, Arizona reached out to California and it turns out the outbreaks shared something else in common: It was the same chain restaurant!

Arizona and California worked with corporate quality assurance at the restaurant chain to discuss preventative steps to help ensure that this outbreak does not reoccur in the future. The company made some changes to processes and cleaning as a response including adjustments to the chicken marination process and equipment storage and replacement.

**Arizona**  
Outbreaks in  
2008 & 2018



**Genetically related isolates in outbreaks in both states.**

*Salmonella* Montevideo had a similar pattern of genetic change over time while persisting in restaurants in both Arizona and California.

**California**  
Outbreaks in  
1997, 2000 & 2012



# Other Notable Multistate Foodborne Outbreaks



## Salmonella Newport linked to ground beef

- 403 cases from 30 states (Aug 2018 - Feb 2019)
- 54 cases in Arizona
- Ground beef was recalled by JBS Tolleason, Inc.
- More info: [Outbreak of Salmonella Infections Linked to Ground Beef](#) (CDC)



## Salmonella linked to Kratom

- 199 cases from 41 states (Jan 2017 - May 2018)
- 7 cases in Arizona
- Kratom is a plant consumed for its stimulant effects and as an opioid substitution.
- Kratom was recalled by several companies.
- More info: [Multistate Outbreak of Salmonella Infections Linked to Kratom](#) (CDC)



## Salmonella Reading linked to ground turkey

- 358 cases from 42 states (Nov 2017 - Mar 2019)
- 5 cases in Arizona
- Several turkey products were recalled. A single, common supplier was not identified.
- More info: [Outbreak of Multidrug-Resistant Salmonella Infections Linked to Raw Turkey Products](#) (CDC)



## Salmonella Mbandaka linked to breakfast cereal

- 135 cases from 36 states (Mar 2018 - Aug 2018)
- 3 cases in Arizona
- The Kellogg Company recalled Honey Smacks cereal.
- More info: [Multistate Outbreak of Salmonella Mbandaka Infections Linked to Kellogg's Honey Smacks Cereal](#) (CDC)



# Special Circumstances





# Outbreaks in Health Care Institutions

Health care institutions in Arizona are licensed by the Division of Public Health Licensing at the Arizona Department of Health Services (ADHS). Health care institution is defined in Arizona Revised Statutes (A.R.S.) 36-401 (see sidebar).

A.R.S. 36-405 requires ADHS to adopt rules to classify health care institutions and prescribe licensure standards. These rules are found in Arizona Administrative Code (A.A.C.) Title 9, Chapter 10. Within these rules, multiple health care institution classes and subclasses are defined.

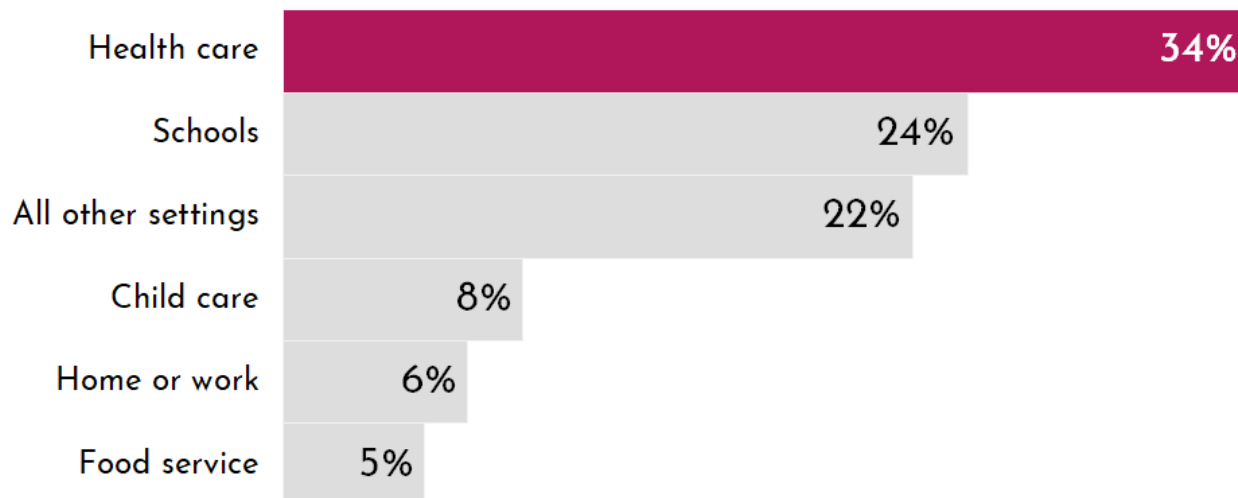
Communicable disease rules are found in A.A.C. Title 9, Chapter 6. Substantial revisions to these rules went into effect on January 1, 2018. Within the communicable disease rules, A.A.C. R9-6-202 outlines requirements for health care providers and administrators of health care institutions for reporting outbreaks to public health agencies. Additionally, ADHS has created an optional [Communicable Disease Outbreak Report](#) form that reporters may use to provide required information about outbreaks that are identified.

## What is a health care institution?

Health care institution is defined in A.R.S. 36-401-21 as follows:

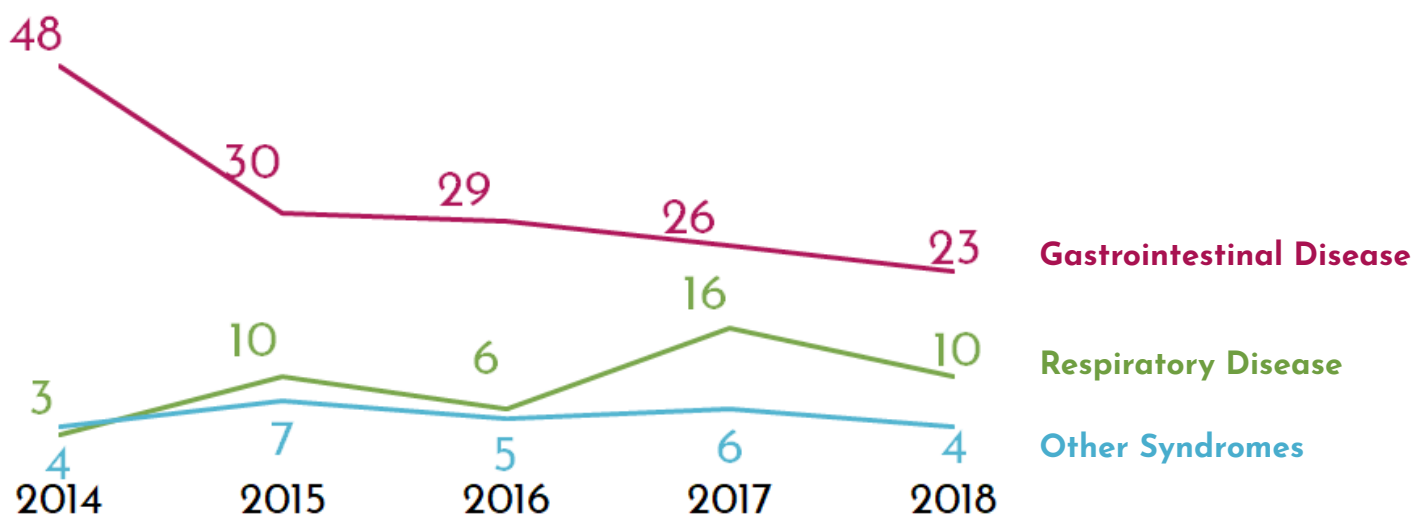
“Health care institution” means every place, institution, building or agency, whether organized for profit or not, that provides facilities with medical services, nursing services, behavioral health services, health screening services, other health-related services, supervisory care services, personal care services or directed care services and includes home health agencies as defined in section 36-151, outdoor behavioral health care programs and hospice service agencies. Health care institution does not include a community residential setting as defined in section 36-551.

During 2017 and 2018, **health care institutions** accounted for the largest proportion of outbreaks reported in Arizona. Approximately one-third of all reported outbreaks occurred in **health care institutions**. This may be because outbreaks in health care institutions are more likely to be reported than outbreaks in other settings due to reporting requirements in A.A.C. R9-6-202. Additionally, this may be due to stronger partnerships that public health has with health care institutions than with others.

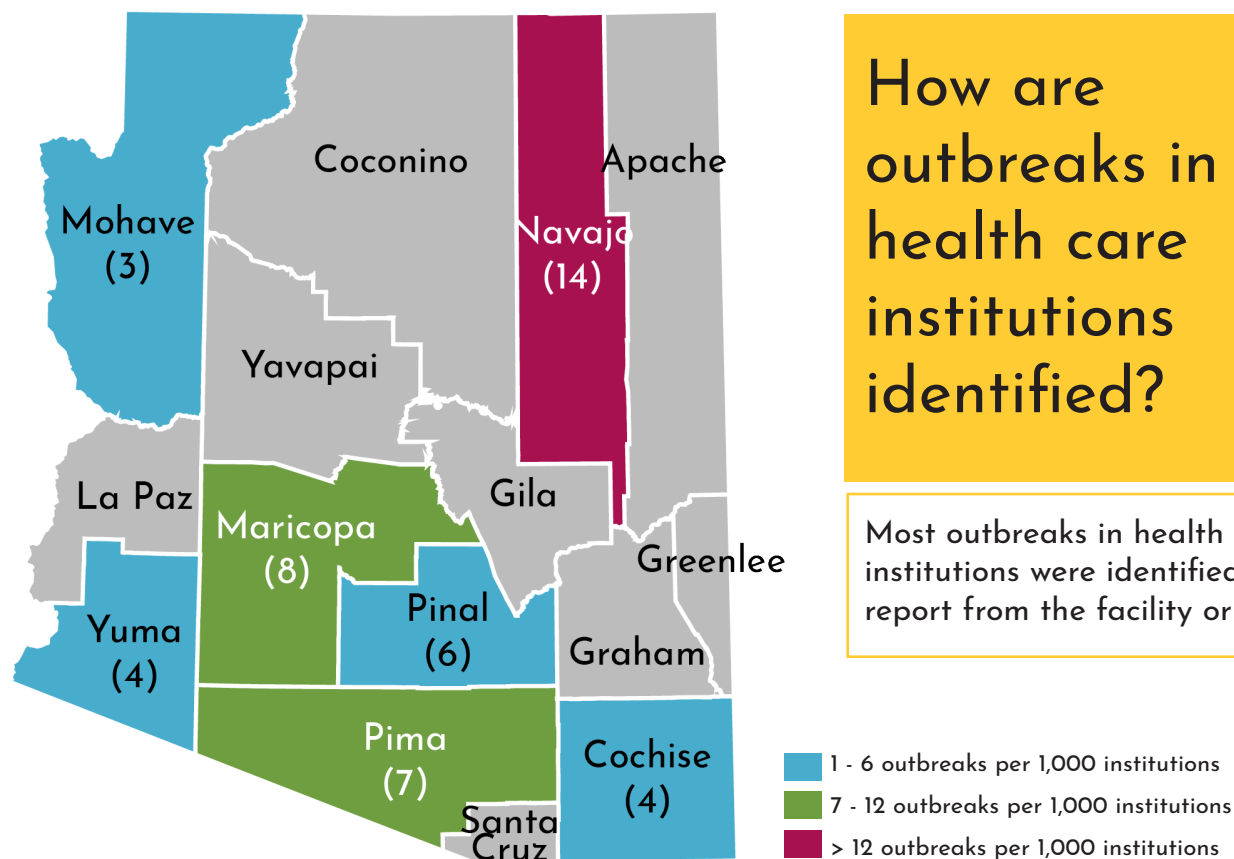


In the most recent revisions to the communicable disease rules, outbreaks of **respiratory disease** in a health care institution were added to the reporting requirements. Despite not being explicitly included in the communicable disease rule, outbreaks due to **respiratory disease** in health care institutions have been reported and investigated every year. The number of outbreaks in health care institutions due to **respiratory disease** increased in 2017. However, during 2018, after the addition of the reporting requirement, reports of outbreaks due to **respiratory disease** decreased. This may be normal variation between years. This may also indicate a gap in knowledge of health care institution administrators on the reporting requirement addition.

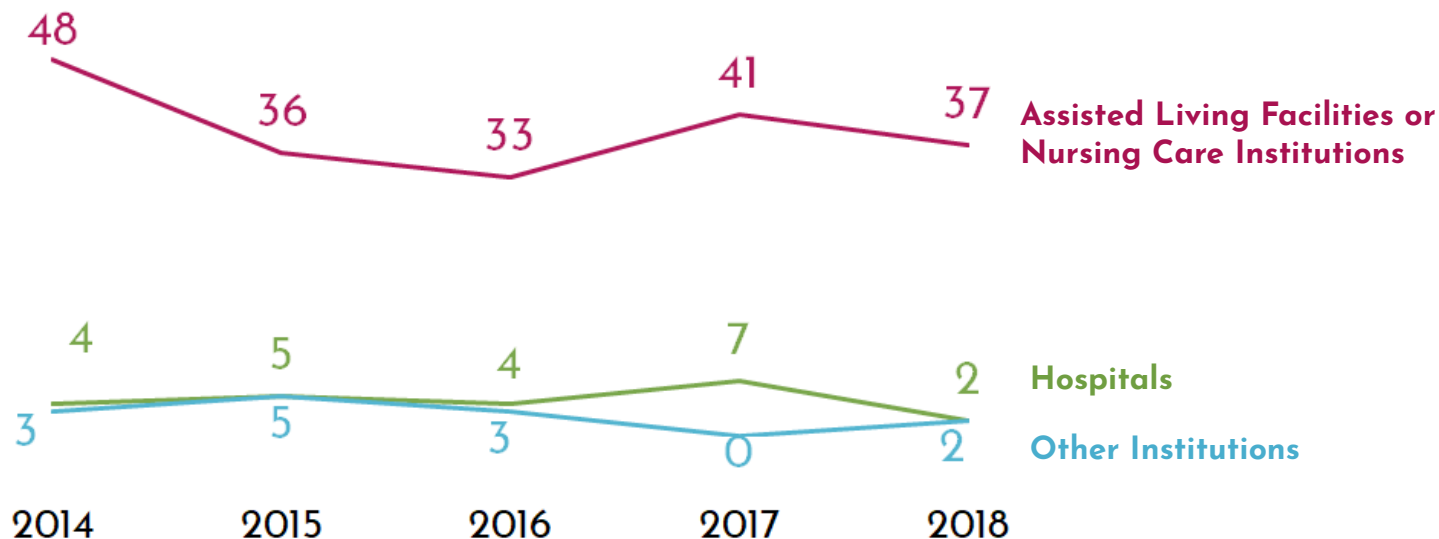
The number of reported outbreaks in health care institutions due to **gastrointestinal disease** has been decreasing since 2014. Outbreaks due to **other syndromes** did not noticeably change between 2016 and 2017.



For 2017-2018, there was an average of seven reported outbreaks per 1,000 health care institutions in Arizona. While most outbreaks were reported in Maricopa County (66 outbreaks; 74%), Navajo County had the **highest average rate of outbreaks** (2 outbreaks; average 14 per 1,000 institutions).



Most outbreaks in health care institutions occurred in **assisted living facilities or nursing care institutions**. Other outbreaks have been reported in **hospitals** and **other health care institutions**.





## What is an assisted living facility?

"Assisted living facility" means a **residential care institution**, including an adult foster care home, that provides or contracts to provide **supervisory care services, personal care services or directed care services** on a continuous basis. (A.R.S. 36-401-8)

Assisted living facilities are further broken down by size:

- Assisted living home (10 or fewer residents)
- Assisted living center (11 or more residents)

## What is a nursing care institution?

"Nursing care institution" means a **health care institution** that provides inpatient beds or resident beds and nursing services to persons who need **continuous nursing services** but who do not require hospital care or direct daily care from a physician. (A.R.S. 36-401-32)

A nursing care institution is often referred to as a long-term care facility (LTCF) or a skilled nursing facility (SNF).

# Assisted Living vs Nursing Care Institutions

Prior to 2017, the setting classification in MEDSIS Outbreak Module (OBM) for outbreaks in health care institutions was not rigorously moderated. Therefore, the type of health care institution reported by the investigator may not have matched the actual license type for the institution. This is particularly noticeable in health care institutions classified as assisted living (AL), long-term care (LTCF), or skilled nursing facilities (SNF). Historically, investigators have used these terms interchangeably to described various institution types. Moreover, frequently an institution has multiple license types for different units within the institution. This has made it difficult to historically compare outbreaks in these differently licensed health care institutions.

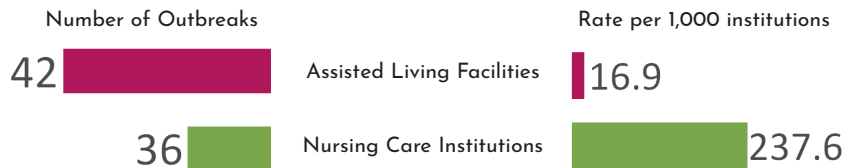
However, beginning in 2017, ADHS began a close moderation of setting classifications for outbreak reports for health care institutions. ADHS Division of Public Health Licensing maintains a publicly available database of [residential medical facilities](#), [long term care facilities](#), and [other medical facilities](#). Since 2017, ADHS cross-checks each institution with these databases to determine the licensure type for each outbreak institution. ADHS works with investigators to ensure that the outbreak setting listed in OBM matches the license type for that institution. In the case of multiple units in the same institution affected by the outbreak, the highest level of licensure is indicated.

By closely monitoring outbreaks by type of licensure, investigators can better understand how differences in level of staffing, types of care, medical fragility, and other differences may affect outbreak occurrences in assisted living facilities and nursing care institutions.

**Assisted living facilities** are far more common than **nursing care insititutions**. For every one nursing care institution, there are seventeen assisted living facilities.

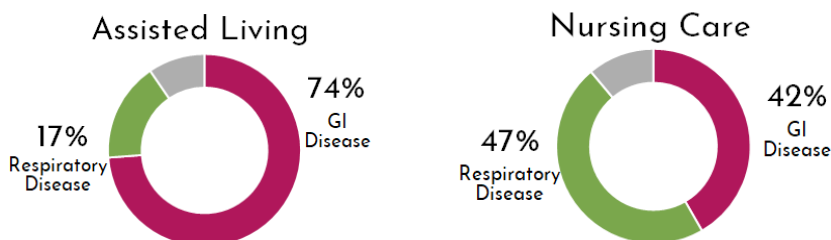


In 2017-2018, there were more outbreaks reported in **assisted living facilities** than in **nursing care institutions**. However, there are more licensed assisted living facilities than nursing care institutions. With that, the burden of outbreaks is greater in nursing care institutions.



Within assisted living facilities, outbreaks due to gastrointestinal diseases are most commonly reported. This may indicate underreporting of respiratory disease outbreaks in this setting. Additionally, assisted living facilities may need increased education and resources on responding to and preventing gastrointestinal disease outbreaks.

Within nursing care institutions, outbreaks due to gastrointestinal disease and respiratory disease are reported with about the same frequency.



## Key Points:

### Outbreaks in Health Care Institutions



Health care institutions are licensed by ADHS.



Outbreak reporting is mandated for health care institutions.



Public health investigators partner with health care institutions to investigate outbreaks.



Outbreaks in assisted living facilities and outbreaks in nursing care institutions have different characteristics.

## More information about this topic

[ADHS Healthcare Associated Infections Program](#)

[ADHS Division of Public Health Licensing](#)

[How to report communicable diseases](#)

# Outbreaks in Child Care Facilities and Schools



Child care facilities in Arizona are licensed by the Division of Public Health Licensing at the Arizona Department of Health Services (ADHS). “Child care facility” means any facility in which child care is regularly provided for compensation for five or more children not related to the proprietor, as defined in Arizona Revised Statutes (A.R.S.) 36-81-3.

During 2017 and 2018, there were approximately 2,600 licensed child care facilities in Arizona, with about 60% of facilities located in Maricopa County. A searchable database of licensed child care facilities is maintained by ADHS at [azcarecheck.com](http://azcarecheck.com).

During fiscal year 2017-2018, there were 2,000 publicly funded schools serving approximately 1.1 million students. Arizona Department of Education oversees all public education. Approximately 50 additional private and independent schools operate in Arizona.

Communicable disease rules are found in A.A.C. Title 9, Chapter 6. Within the communicable disease rules, A.A.C. R9-6-203 outlines requirements for administrators of schools and child care establishments for reporting outbreaks to public health agencies. Additionally, ADHS has created an optional [Communicable Disease Outbreak Report](#) form that reporters may use to provide required information about outbreaks that are identified.

## Outbreak Reporting

in schools and child care establishments

Administrators of schools and child care establishments are required to report **outbreaks** of:

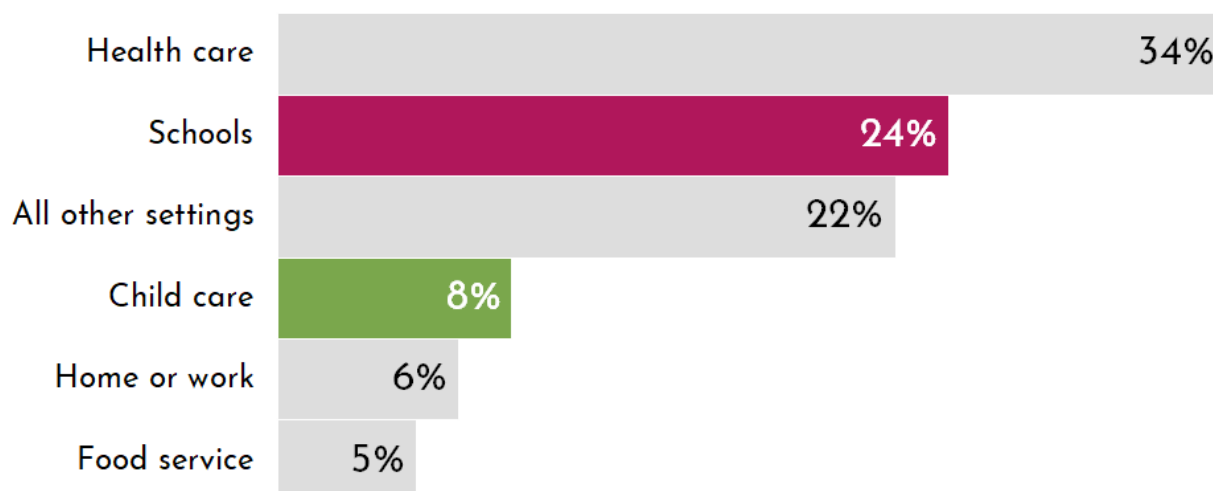
- Conjunctivitis
- Diarrhea, nausea, or vomiting
- Scabies
- Streptococcal group A infection

Threshold guidelines for defining outbreaks can be found at [azdhs.gov](http://azdhs.gov).

Individual cases of other diseases are also required to be reported. A complete list is provided at the end of this section.

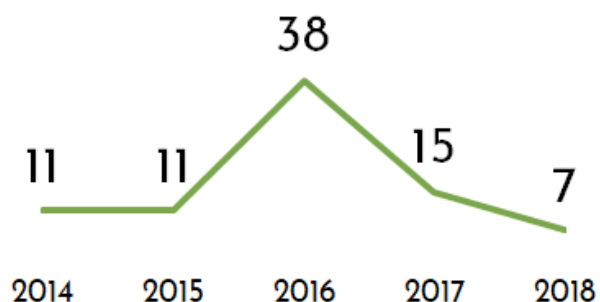


During 2017-2018, a quarter of all reported outbreaks occurred in schools, mimicking the proportion of outbreaks for the previous three years.

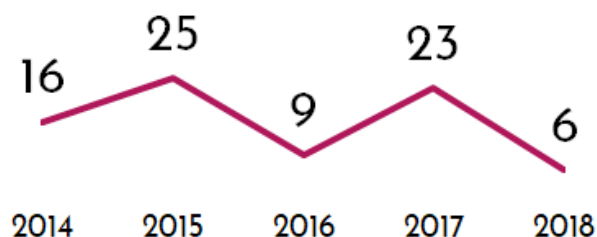


Outbreaks in child care centers spiked in 2016, due to multiple outbreaks of shigellosis. An increase in outbreaks in elementary and mixed-grade schools followed in 2017. Outbreaks in both schools and child care facilities were at a five-year low in 2018.

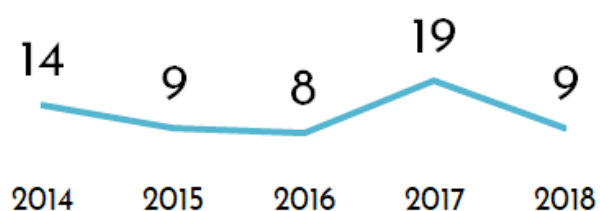
Child Care Establishments



Elementary Schools



Mixed-Grade Schools (K-8 and K-12)

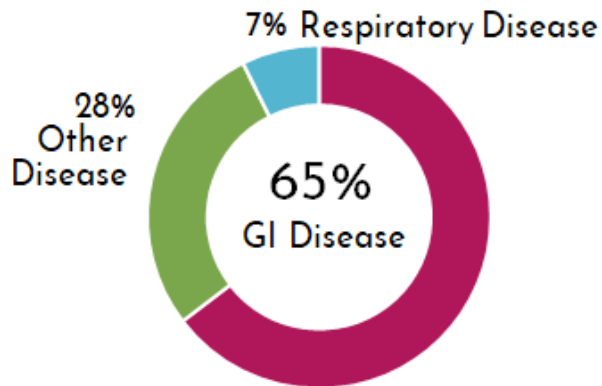


Middle and High Schools

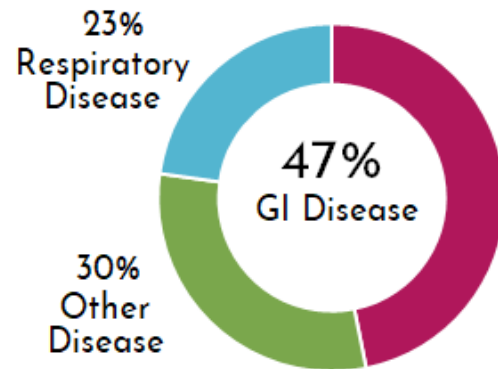


During 2017-2018, outbreaks reported in child care facilities and elementary schools were primarily due to **gastrointestinal disease**. Outbreaks reported in middle and high schools were primarily due to **respiratory disease**. Within public health agencies, educational efforts and resources for outbreak response in these settings should correspond to these trends.

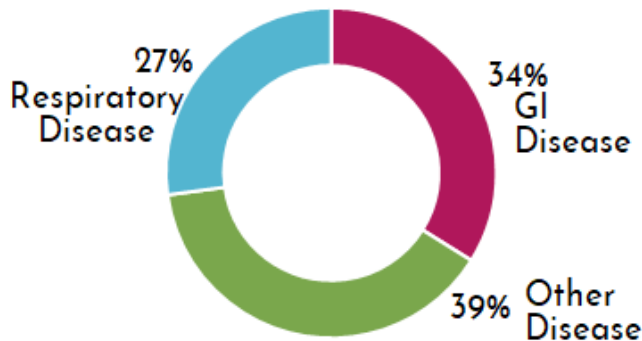
### Child Care Establishments



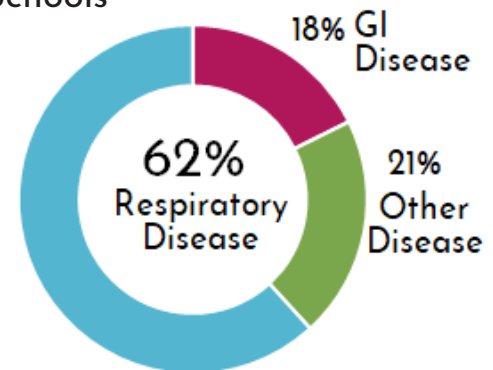
### Elementary Schools



### Mixed-Grade Schools (K-8 and K-12)



### Middle and High Schools



INFECTIOUS  
DISEASE  
FLIP CHART



SCHOOL HEALTH  
FLIP CHART



VACCINE  
INFORMATION



PREVENTING  
INFECTIONS

[Health Kids AZ](#) is a free mobile app for Arizona school nurses, health aides and child care staff. It contains information about control of infectious diseases specific to settings with children in group, as well as other resources.

## How are outbreaks in child care establishments and schools identified?

Most outbreaks were reported by a child care facility or school. Outbreaks were also identified by surveillance by the health department and calls from the public.



Arizona Administrative Code<sup>†</sup> requires an Administrator of a School,  
Child Care Establishment, or Shelter to:

## REPORT COMMUNICABLE DISEASES

to the Local Health Department

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	Campylobacteriosis
O	Conjunctivitis, acute
	Cryptosporidiosis
O	Diarrhea, nausea, or vomiting
	<i>Escherichia coli</i> , Shiga toxin-producing
	<i>Haemophilus influenzae</i> , invasive disease
	Hepatitis A
	Measles
	Meningococcal invasive disease
	Mumps
	Pertussis (whooping cough)
	Rubella (German measles)
	Salmonellosis
O	Scabies
	Shigellosis
O	Streptococcal group A infection
	Varicella (chickenpox)

---

**Key:**

- Submit a report within 24 hours after detecting a case or suspect case.
- Submit a report within five working days after detecting a case or suspect case.
- O Submit a report within 24 hours after detecting an outbreak.

<sup>†</sup>**A.A.C. R9-6-2**  
Effective 01/01/20

<http://azdhs.gov/schoolreporting>

## More information about this topic

[ADHS Division of Public Health Licensing](#)

[How to report communicable diseases](#)





# Outbreaks in Correctional Facilities

Correctional facility is defined in the communicable disease rules found in Arizona Administrative Code (A.A.C.) Title 9, Chapter 6:

“Correctional facility” means any place used for the confinement or control of an individual:

- a. Charged with or convicted of an offense,
- b. Held for extradition, or
- c. Pursuant to a court order for law enforcement purposes.

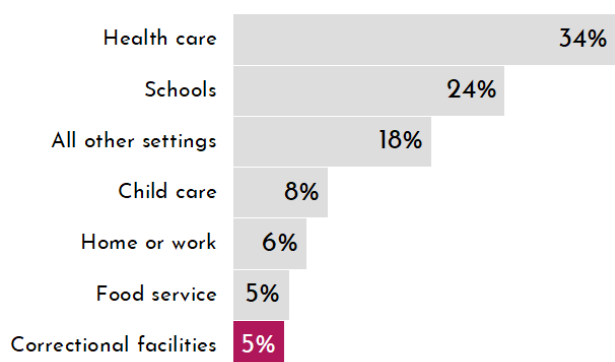
Correctional facilities include prisons, jails, and detention centers. These facilities are under the jurisdiction of several different government agencies, including multiple federal entities and state, county, and city agencies. Additionally, some jurisdictions contract the operation of correctional facilities to private companies.

There are approximately 50 correctional facilities in Arizona, the majority of which are in Pinal County (26%) and Maricopa County (24%). The U.S. Department of Justice

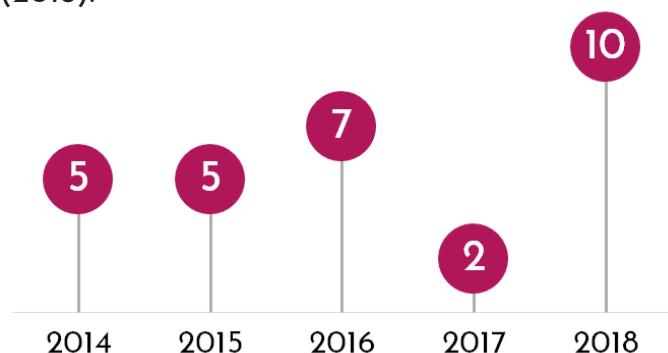
estimated that there were 55,000 inmates in Arizona’s prisons or local jails in 2016 (latest available data). The incarceration rate in Arizona is eighth highest in the nation, at 1,030 inmates per 100,000 residents age 18 or older. The U.S. incarceration rate is 850 per 100,000 residents age 18 or older. (Source: [“Correctional Populations in the United States, 2016”, U.S. Justice Department.](#))

Within the communicable disease rules, A.A.C. R9-6-202 outlines requirements for administrators of correctional facilities for reporting outbreaks to public health agencies. ADHS has developed an [outbreak threshold guide](#) for interpreting outbreak as related to each listed disease and condition for which outbreak reporting is required in correctional facilities. Additionally, ADHS has created an optional [Communicable Disease Outbreak Report form](#) that reporting individuals or agencies may use to provide required information about outbreaks that are identified.

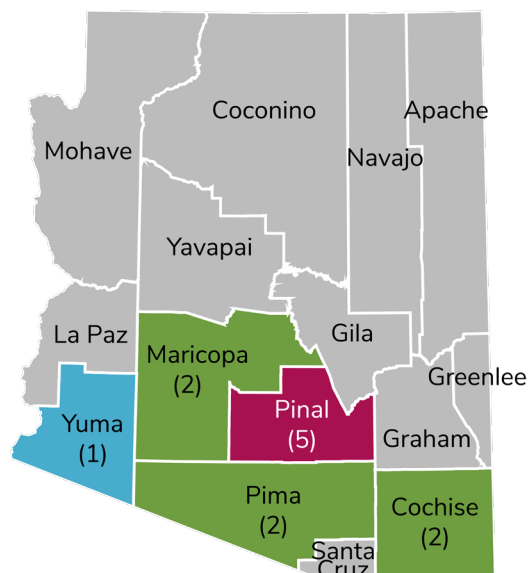
During 2017-2018, a small portion of reported outbreaks occurred in correctional facilities.



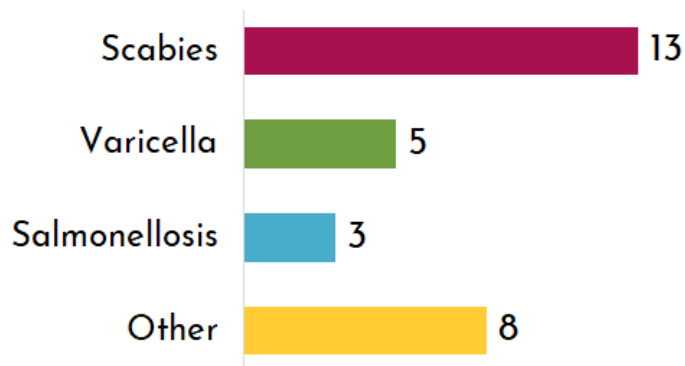
There was wide range of the annual burden of **outbreaks reported in correctional facilities**, from two outbreaks per year (2017) to 10 (2018).



Because of its large number of correctional facilities, Pinal County experienced the largest number of outbreaks in correctional facilities during 2017-2018.



From 2014-2018, outbreaks of scabies were reported in correctional facilities every year. Varicella also caused outbreaks in correctional facilities most years. Salmonellosis outbreaks occurred in 2015 and 2018. Otherwise, there was a wide variety of outbreaks of other etiologies in correctional facilities.



Other etiologies: Unknown GI disease (2014 and 2015), Measles (2016), Unknown rash illness (2017), and norovirus, mumps, strep throat, and conjunctivitis (2018)

In the most recent revisions to the communicable disease rules that went into effect on January 1, 2018, outbreaks of respiratory disease in a correctional facility were added to the reporting requirements. Since 2014, there have been no outbreaks of respiratory disease reported in a correctional facility. Therefore, since the addition of the reporting requirement, reports of outbreaks due to respiratory disease have not changed. This may indicate a gap in knowledge of correctional facility administrators for identifying and reporting outbreaks of respiratory disease.

## More information about this topic

[How to report communicable diseases](#)

[Outbreak threshold guide](#)



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# Performance Goals





# Performance Goals

ADHS utilizes MEDSIS Outbreak Module to collect a standardized set of outbreak summary form elements based on the Centers for Disease Control and Prevention (CDC) performance indicators. These indicators are meant to be used by state and local health agencies to evaluate the performance of their outbreak response and control programs and identify specific needs for improvement. See [Outbreak Reporting Requirements and Data Sources](#) for more information about MEDSIS Outbreak Module.

Note: Multistate outbreaks and outbreaks for which exposure occurred outside of Arizona are excluded from all performance goals.

**Goal:** Initiate investigation within 24 hours of receipt of report.

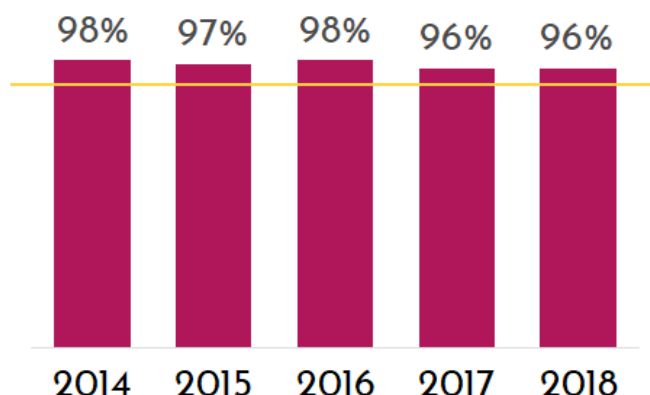
## Why it's important

By starting the investigation as soon as possible, the investigation team is able to confirm that an outbreak has occurred, work to identify the source, and implement measures to prevent additional illnesses. Delayed response may result in more illnesses or inability to gather necessary information for the investigation.

**Includes:** All investigation statuses, all morbidities.

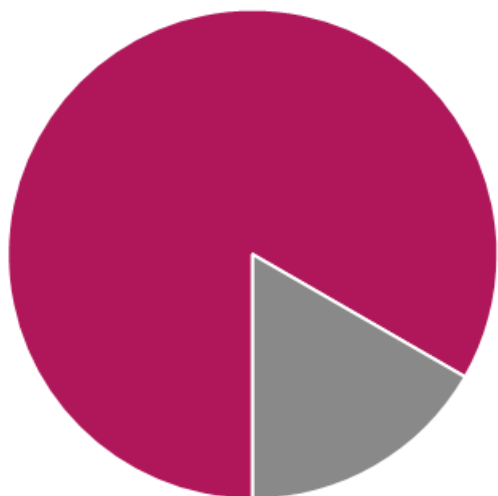
**Target:** 90%

**Met** statewide in 2017 and 2018.



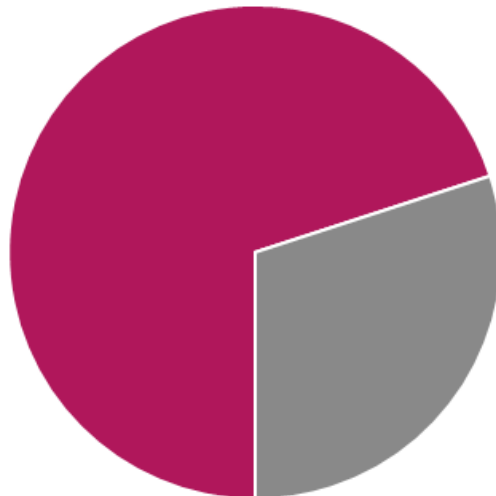
### 2017

**10 out of 12 counties** initiated investigation of outbreaks within 24 hours for at least 90% of outbreaks.



### 2018

**7 out of 10 counties** initiated investigation of outbreaks within 24 hours for at least 90% of outbreaks.



# Goal: Report outbreaks to ADHS within 24 hours of receipt of report.

## Why it's important

Rapid reporting to ADHS ensures a unified, collaborative response to outbreaks and allows for cohesion in responding to events statewide. Additionally, rapid reporting to ADHS allows for accurate collection of relevant data, before information is lost.

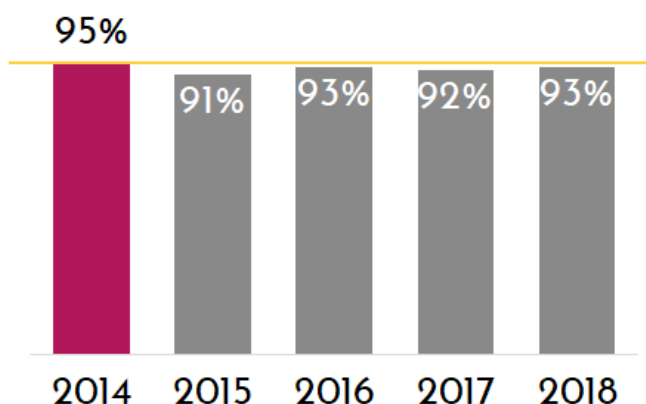
**Includes:** All investigation statuses, all morbidities.

### What we're doing to improve:

ADHS sends monthly summary reports to investigators and stakeholders, as a reminder and a check to ensure that all outbreaks are reported.

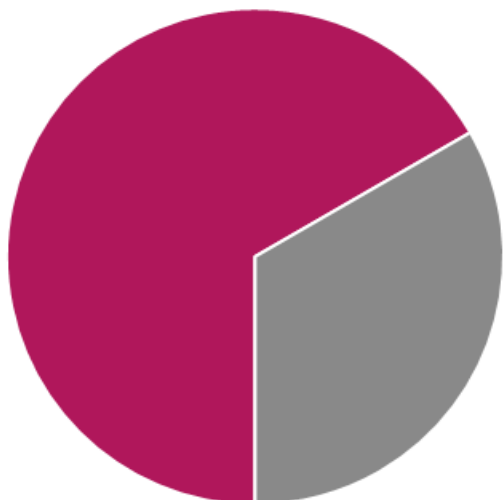
**Target:** 95%

**Not met** statewide in 2017 and 2018.



## 2017

**8 out of 12 counties** reported outbreaks to ADHS within 24 hours for at least 95% of outbreaks.



## 2018

**4 out of 10 counties** reported outbreaks to ADHS within 24 hours for at least 95% of outbreaks.



**Goal:** Submit summary reports to ADHS within 30 days after completion of the investigation.

## Why it's important

Completing summary reports quickly ensures that data are available for ADHS to summarize for quarterly reporting, producing a more complete picture of outbreak response throughout the year. Additionally, ADHS uses data from summary reports to report to CDC.

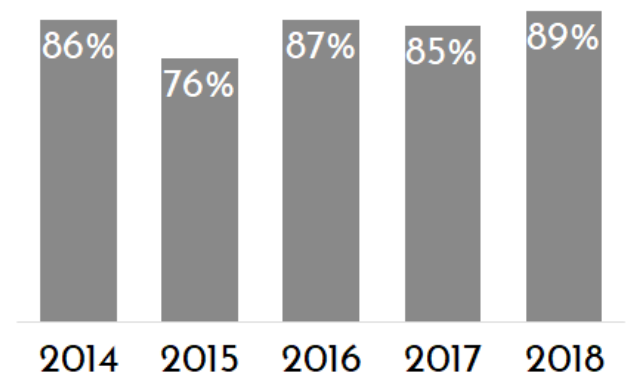
**Excludes:** Ruled-out outbreaks, and outbreaks due to conjunctivitis, scabies, non-reportable diseases, and influenza.

**What we're doing to improve:**

ADHS sends a reminder to investigators to submit summary reports a week before the 30-day mark. ADHS also sends monthly reminders about open outbreaks.

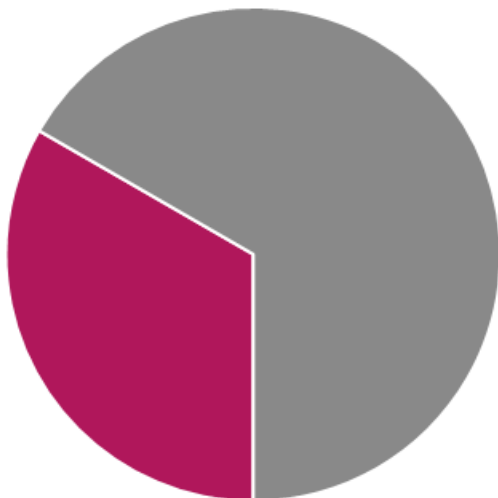
**Target:** 100%

**Not met** statewide in 2017 and 2018.



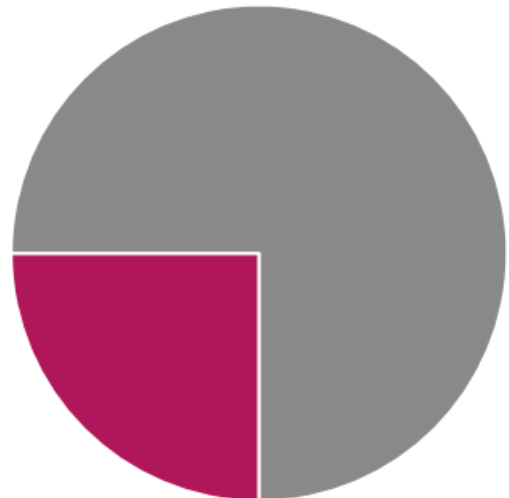
## 2017

**3 out of 9 counties** submitted summary reports within 30 days for 100% of outbreaks.



## 2018

**2 out of 8 counties** submitted summary reports within 30 days for 100% of outbreaks.





**Goal:** Collect at least two specimens during gastrointestinal illness outbreak investigations.

## Why it's important

Collecting specimens during outbreak investigations is the method by which investigators are able to identify the pathogen causing the outbreak.

**Includes:** Outbreaks due to GI illnesses.

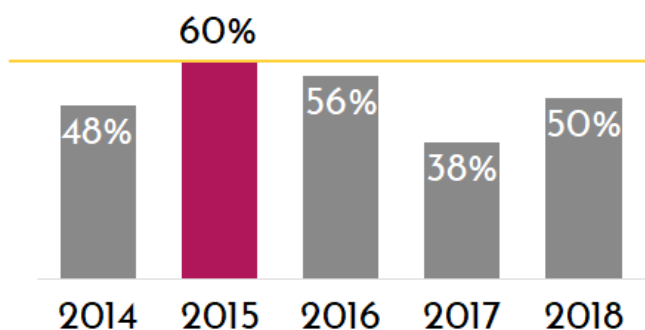
**Excludes:** Ruled-out outbreaks.

### What we're doing to improve:

ADHS is working with the Colorado Food Safety Center of Excellence to explore factors contributing to specimen submission during outbreak investigations. Results of the study, expected in early 2020, will be used to identify and supply resources to support specimen collection.

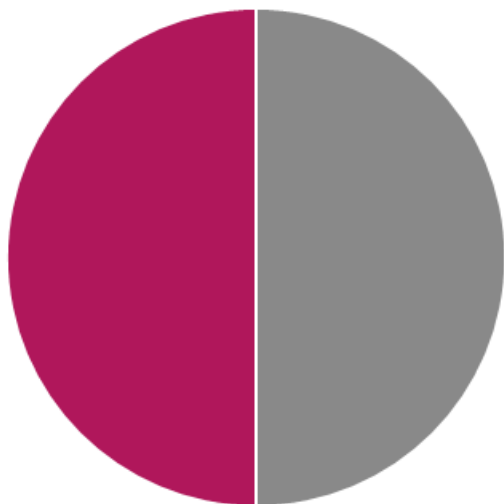
**Target:** 60%

**Not met** statewide in 2017 and 2018.



## 2017

**4 out of 8 counties** collected at least 2 specimens for at least 60% of GI illness outbreaks.



## 2018

**3 out of 7 counties** collected at least 2 specimens for at least 60% of GI illness outbreaks.



# Goal: Confirm etiology.

## Why it's important

Confirming the etiology via laboratory testing is an important key to determining the vehicle through which the pathogen was transmitted. Confirmed etiology also allows investigators to provide targeted recommendations for preventing future outbreaks.

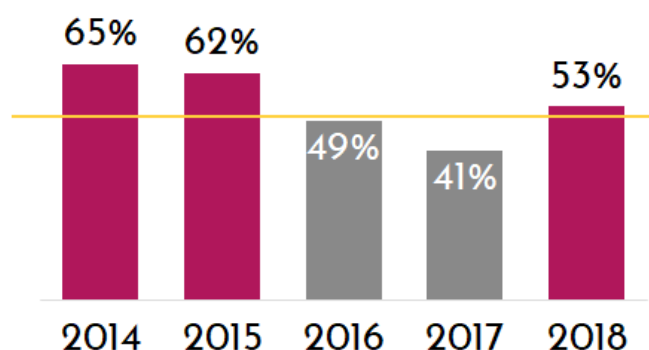
**Excludes:** Ruled-out outbreaks, and outbreaks due to conjunctivitis, scabies, non-reportable diseases, and influenza.

**What we'll continue doing:** ADHS will continue to work to improve specimen collection for GI illness outbreaks (see previous goal).

**Target:** 50%

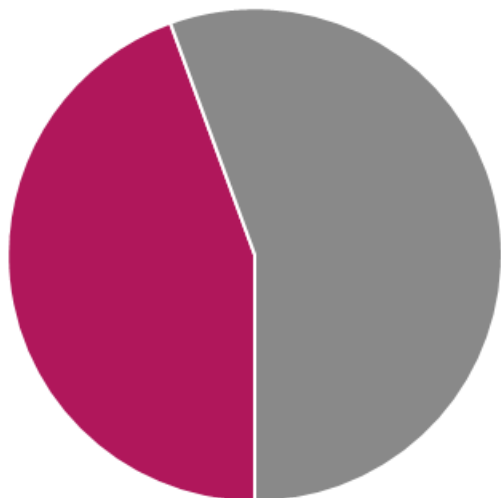
**Not met** statewide in 2017.

**Met** statewide in 2018.



## 2017

**4 out of 9 counties** reported a confirmed etiology for at least 50% of outbreaks.



## 2018

**6 out of 8 counties** reported a confirmed etiology for at least 50% of outbreaks.





# Appendices

# Outbreak Reporting Requirements and Data Sources

In Arizona, healthcare providers, healthcare institutions, correctional facilities, and administrators of schools and shelters are required to report outbreaks of infectious diseases to their county health department under [Arizona Administrative Code \(A.A.C.\) R9-6-202 and R9-6-203](#) and [Arizona Revised Statutes \(A.R.S.\) Title 36](#). Hotels, motels, and resorts are also required to report contagious or epidemic diseases occurring in their establishments within 24 hours under [A.R.S. 36-622](#). Outbreaks are reportable to ADHS within 24 hours after a county health department receives a report ([A.A.C. R9-6-206F](#)). The information provided at the time of report includes location/setting of outbreak, number of cases and suspect cases, the date reported, the disease suspected, and important contact information.

The communicable disease surveillance system and reporting tool used by public health in Arizona is the [Medical Electronic Disease Surveillance Intelligence System \(MEDSIS\)](#). An extension of the case-based surveillance in MEDSIS, Outbreak Module (OBM) was introduced in 2014 to help users report, manage, and share information about outbreaks. OBM's integration into MEDSIS allows users to easily link existing MEDSIS cases to an outbreak, create new cases to link to an outbreak, and retrieve outbreak data for analysis. Notable features of the OBM include the Outbreak

Summary Forms page, which can automatically calculate fields within the form using case information that has been entered, and the Outbreak Long Form Creation page, which allows users to create outbreak-specific investigation forms. Furthermore, public health partners can share outbreak information within OBM to better coordinate outbreak investigations across jurisdictions.

Population denominators used in this report are from the [ADHS Bureau of Public Health Statistics](#). Population denominators were estimated using the 2017 and 2018 population projections obtained from the Office of Employment and Population Statistics within the Arizona Department of Administration.

The descriptive epidemiology included in this report is based on data from OBM for outbreaks reported in 2014-2018. Since the publication of previous outbreak summary reports, errors within outbreak data have been corrected. Additionally, some outbreak reports have been updated with information not available at the time that the outbreak report was published. These corrections and updates are included in this report. Thus, there are some discrepancies between previous years' outbreak data contained herein and data in [previous years' Infectious Disease Outbreak Summary Reports](#).



## Outbreaks by exposure county, 2017

Outbreak Exposure County	Frequency	Percent	Population	Rate per 100,000
Apache County	1	1	72,713	1.4
Cochise County	2	1	128,383	1.6
Coconino County	1	1	144,057	0.7
Gila County	0	0	54,947	0.0
Graham County	1	1	38,275	2.6
Greenlee County	0	0	10,961	0.0
La Paz County	0	0	21,598	0.0
Maricopa County	100	69	4,221,684	2.4
Mohave County	2	1	209,792	1.0
Navajo County	4	3	111,266	3.6
Pima County	19	13	1,026,099	1.9
Pinal County	5	3	427,603	1.2
Santa Cruz County	0	0	51,507	0.0
Yavapai County	1	1	225,364	0.4
Yuma County	1	1	221,648	0.5
Exposure occurred in multiple counties	1	1		
Exposure occurred in multiple states	7	5		
Total	145	100	6,965,897	2.1













## Outbreaks by exposure county, 2018

Outbreak Exposure County	Frequency	Percent	Population	Rate per 100,000
Apache County	0	0	73,330	0.0
Cochise County	7	5	130,319	5.4
Coconino County	2	1	145,564	1.4
Gila County	1	1	54,946	1.8
Graham County	0	0	38,126	0.0
Greenlee County	0	0	10,506	0.0
La Paz County	0	0	21,890	0.0
Maricopa County	67	46	4,294,460	1.6
Mohave County	0	0	212,948	0.0
Navajo County	2	1	112,746	1.8
Pima County	14	10	1,034,201	1.4
Pinal County	9	6	440,591	2.0
Santa Cruz County	0	0	52,390	0.0
Yavapai County	5	3	228,970	2.2
Yuma County	2	1	225,212	0.9
Exposure occurred in multiple counties	1	1		
Exposure occurred in multiple states	8	6		
Total	118	81	7,076,199	1.7

## Outbreaks by exposure county, 2014-2018

Outbreak Exposure County	2014	2015	2016	2017	2018	
Apache County	0	0	1	1	0	
Cochise County	0	0	1	2	7	
Coconino County	5	6	3	1	2	
Gila County	2	1	0	0	1	
Graham County	0	2	0	1	0	
Greenlee County	0	1	0	0	0	
La Paz County	2	1	1	0	0	
Maricopa County	102	83	109	100	67	
Mohave County	0	3	3	2	0	
Navajo County	0	3	0	4	2	
Pima County	29	17	11	19	14	
Pinal County	8	5	6	5	9	
Santa Cruz County	1	0	0	0	0	
Yavapai County	6	5	2	1	5	
Yuma County	1	1	2	1	2	
Exposure occurred in multiple counties	1	1	1	1	1	
Exposure occurred in multiple states	9	5	9	7	8	
Total	166	134	149	145	118	













## Outbreaks by month of report and county, 2017

	Apache	Cochise	Coconino	Graham	Maricopa	Mohave	Navajo	Pima	Pinal	Yavapai	Yuma	Multi- county	Multi- state	Total	
Jan	0	0	1	0	7	0	0	0	0	0	0	0	1	9	
Feb	0	0	0	0	12	2	1	1	0	0	0	0	1	17	
Mar	0	0	0	0	7	0	0	1	1	0	0	0	1	10	
Apr	1	0	0	0	20	0	0	6	1	0	0	0	2	30	
May	0	0	0	0	14	0	2	3	1	0	1	1	1	23	
Jun	0	0	0	1	4	0	1	0	0	0	0	0	0	6	
Jul	0	0	0	0	3	0	0	0	1	0	0	0	1	5	
Aug	0	0	0	0	6	0	0	1	1	1	0	0	0	9	
Sep	0	1	0	0	4	0	0	0	0	0	0	0	0	5	
Oct	0	0	0	0	4	0	0	1	0	0	0	0	0	5	
Nov	0	0	0	0	7	0	0	1	0	0	0	0	0	8	
Dec	0	1	0	0	12	0	0	5	0	0	0	0	0	18	
Total	1	2	1	1	100	2	4	19	5	1	1	1	7	145	

No outbreaks were confirmed in 2017 in the following counties: Gila, Greenlee, La Paz, and Santa Cruz.
















## Outbreaks by month of report and county, 2018

	Cochise	Coconino	Gila	Maricopa	Navajo	Pima	Pinal	Yavapai	Yuma	Multi- county	Multi- state	Total	
Jan	2	0	0	13	0	3	0	0	0	0	0	18	
Feb	1	0	0	6	1	1	0	0	0	0	2	11	
Mar	1	0	0	2	0	1	1	0	0	0	0	5	
Apr	1	0	0	8	0	1	2	2	0	0	2	16	
May	0	0	0	6	0	1	0	0	0	0	1	8	
Jun	0	1	0	8	1	1	0	2	0	0	0	13	
Jul	1	0	1	2	0	2	1	0	1	0	0	8	
Aug	0	0	0	2	0	0	0	0	0	0	1	3	
Sep	1	1	0	3	0	1	1	0	0	0	0	7	
Oct	0	0	0	3	0	3	0	0	1	1	2	10	
Nov	0	0	0	5	0	0	3	1	0	0	0	9	
Dec	0	0	0	9	0	0	1	0	0	0	0	10	
Total	7	2	1	67	2	14	9	5	2	1	8	118	

No outbreaks were confirmed in 2018 in the following counties: Apache, Graham, Greenlee, La Paz, Mohave, and Santa Cruz.

## Outbreaks by month of report, 2014-2018










Month of Report	2014	2015	2016	2017	2018	
January	22	12	18	9	18	
February	30	16	21	17	11	
March	15	13	24	10	5	
April	21	17	21	30	16	
May	15	12	17	23	8	
June	11	5	8	6	13	
July	6	6	5	5	8	
August	4	7	6	9	3	
September	9	13	5	5	7	
October	5	9	9	5	10	
November	12	8	10	8	9	
December	16	16	5	18	10	
Total	166	134	149	145	118	

## Outbreaks by type of setting and county, 2017

	Apache	Cochise	Coconino	Graham	Maricopa	Mohave	Navajo	Pima	Pinal	Yavapai	Yuma	Multi-county	Multi-state	Total	
Health Care Institution	0	0	0	0	35	1	1	9	1	0	1	0	0	48	
School	1	0	0	0	41	0	0	4	0	0	0	0	0	46	
Child Care Facility	0	1	0	0	11	0	0	1	1	0	0	0	1	15	
Other	0	0	0	1	3	0	1	4	1	0	0	1	0	11	
Unknown	0	0	0	0	3	0	0	1	0	0	0	0	5	9	
Home/Work Setting	0	0	1	0	4	0	2	0	0	0	0	0	1	8	
Food Service	0	1	0	0	2	0	0	0	0	1	0	0	0	4	
Correctional Facility	0	0	0	0	0	0	0	0	2	0	0	0	0	2	
Hotel/Motel	0	0	0	0	1	1	0	0	0	0	0	0	0	2	
Recr. Water Venue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Total</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>100</b>	<b>2</b>	<b>4</b>	<b>19</b>	<b>5</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>7</b>	<b>145</b>	

No outbreaks were confirmed in 2017 in the following counties: Gila, Greenlee, La Paz, and Santa Cruz.












## Outbreaks by type of setting and county, 2018

	Cochise	Coconino	Gila	Maricopa	Navajo	Pima	Pinal	Yavapai	Yuma	Multi- county	Multi- state	Total	
Health Care Institution	1	0	0	31	1	6	2	0	0	0	0	41	
School	2	0	0	9	0	1	2	3	0	0	0	17	
Child Care Facility	1	0	0	5	0	0	0	0	1	0	0	7	
Other	0	2	0	5	0	1	1	1	0	0	1	11	
Unknown	0	0	0	4	0	1	1	0	0	1	5	12	
Home/Work Setting	1	0	1	4	0	0	0	1	0	0	2	9	
Food Service	0	0	0	6	1	2	0	0	0	0	0	9	
Correctional Facility	2	0	0	2	0	2	3	0	1	0	0	10	
Hotel/Motel	0	0	0	1	0	1	0	0	0	0	0	2	
Recr. Water Venue	0	0	0	0	0	0	0	0	0	0	0	0	
<b>Total</b>	<b>7</b>	<b>2</b>	<b>1</b>	<b>67</b>	<b>2</b>	<b>14</b>	<b>9</b>	<b>5</b>	<b>2</b>	<b>1</b>	<b>8</b>	<b>118</b>	

No outbreaks were confirmed in 2018 in the following counties: Apache, Graham, Greenlee, La Paz, Mohave, and Santa Cruz.



## Outbreaks by type of setting, 2014-2018

	2014	2015	2016	2017	2018	
Health Care Institution	55	46	40	48	41	
School	41	40	28	46	17	
Unknown	12	2	5	9	12	
Other	23	17	9	11	11	
Correctional Facility	5	5	7	2	10	
Home or Work Setting	3	5	11	8	9	
Food Service	14	8	5	4	9	
Child Care Facility	11	11	38	15	7	
Hotel/Motel	2	0	3	2	2	
Recreational Water Venue	0	0	3	0	0	
Total	166	134	149	145	118	

[illegible]

## Outbreaks by syndrome category and county, 2017, continued

	Apache	Cochise	Coconino	Graham	Maricopa	Mohave	Navajo	Pima	Pinal	Yavapai	Yuma	Multi-county	Multi-state	Total
Other	0	0	0	1	13	0	0	2	0	1	0	0	1	18
	Group A Strep infection													8
	Listeriosis													3
	Conjunctivitis, acute													2
	B. cepacia													1
	Hepatitis A													1
	Hepatitis C													1
	Mumps													1
	Pinworms													1
	Apache	Cochise	Coconino	Graham	Maricopa	Mohave	Navajo	Pima	Pinal	Yavapai	Yuma	Multi-county	Multi-state	Total
Parasitic Skin Infestations	1	0	0	0	8	0	0	0	1	0	0	0	0	10
	Scabies													9
	Lice													1
	Apache	Cochise	Coconino	Graham	Maricopa	Mohave	Navajo	Pima	Pinal	Yavapai	Yuma	Multi-county	Multi-state	Total
Rash Illness	0	0	1	0	10	0	0	1	1	0	0	0	0	13
	Varicella													6
	Hand, foot, and mouth disease													5
	Impetigo													1
	Unknown rash illness													1

No outbreaks were confirmed in 2017 in the following counties: Gila, Greenlee, La Paz, and Santa Cruz.

	Cochise	Coconino	Gila	Maricopa	Navajo	Pima	Pinal	Yavapai	Yuma	Multi-county	Multi-state	Total
GI Illness	1	1	0	40	1	11	2	3	1	1	7	68

Unknown GI Illness	19
Salmonellosis	21
Norovirus (confirmed)	15
Norovirus (suspect)	10
B. cereus	1
Campylobacteriosis	1
Shiga toxin-producing <i>E. coli</i> infection	1

	Cochise	Coconino	Gila	Maricopa	Navajo	Pima	Pinal	Yavapai	Yuma	Multi-county	Multi-state	Total
Other	3	0	1	10	0	1	2	2	0	0	0	19
										Group A Strep infection		6
										Conjunctivitis, acute		6
										CRE		2
										Botulism		1
										Hepatitis A		1
										Listeriosis		1
										Mumps		1







## Outbreaks by syndrome category and county, 2018, continued

	Cochise	Coconino	Gila	Maricopa	Navajo	Pima	Pinal	Yavapai	Yuma	Multi- county	Multi- state	Total		
Respiratory	1	0	0	13	1	2	0	0	0	0	1	18		
													Influenza virus	12
													Pertussis	4
													Unknown respiratory illness	1
													RSV	1
	Cochise	Coconino	Gila	Maricopa	Navajo	Pima	Pinal	Yavapai	Yuma	Multi- county	Multi- state	Total		
Parasitic Skin	2	0	0	3	0	0	3	0	0	0	0	8		
Infestations													Scabies	8
	Cochise	Coconino	Gila	Maricopa	Navajo	Pima	Pinal	Yavapai	Yuma	Multi- county	Multi- state	Total		
Rash Illness	0	1	0	2	0	0	2	0	1	0	0	6		
													Varicella (chickenpox)	5
													Hand, foot, and mouth disease	1

No outbreaks were confirmed in 2018 in the following counties: Apache, Graham, Greenlee, La Paz, Mohave, and Santa Cruz.



## Outbreaks by syndrome category, 2014-2018

	2014	2015	2016	2017	2018	
GI Illness	107	78	106	73	68	
Respiratory	21	28	20	31	18	
Parasitic Skin Infestations	15	12	10	10	8	
Rash Illness	9	7	8	13	6	
Other	14	9	5	18	18	
Total	166	134	149	145	118	

# Outbreaks by mode of transmission and county, 2017

	Apache	Cochise	Coconino	Graham	Maricopa	Mohave	Navajo	Pima	Pinal	Yavapai	Yuma	Multi- county	Multi- state	Total	
Fecal-oral	0	1	0	0	42	1	1	9	2	0	1	0	0	57	
Respiratory	0	0	0	0	20	0	1	7	1	0	0	1	0	30	
Other*	0	0	1	0	22	0	0	1	1	1	0	0	0	26	
Foodborne	0	1	0	1	5	0	0	2	0	0	0	0	5	14	
Skin-to-skin	1	0	0	0	8	0	0	0	1	0	0	0	0	10	
Animal exposure	0	0	0	0	2	0	2	0	0	0	0	0	2	6	
Waterborne	0	0	0	0	1	1	0	0	0	0	0	0	0	2	
Total	1	2	1	1	100	2	4	19	5	1	1	1	7	145	

*\*Includes outbreaks of undetermined transmission mode, and outbreaks that may have had multiple modes of transmission.*

*No outbreaks were confirmed in 2017 in the following counties: Gila, Greenlee, La Paz, and Santa Cruz.*








# Outbreaks by mode of transmission and county, 2018

	Cochise	Coconino	Gila	Maricopa	Navajo	Pima	Pinal	Yavapai	Yuma	Multi- county	Multi- state	Total	
Fecal-oral	0	1	0	27	0	9	1	1	1	0	0	40	
Respiratory	1	0	0	13	1	2	1	0	0	0	1	19	
Other*	3	1	1	10	0	0	3	2	1	0	0	21	
Foodborne	0	0	0	13	1	2	1	1	0	1	7	26	
Skin-to-skin	2	0	0	3	0	0	3	0	0	0	0	8	
Animal exposure	1	0	0	1	0	1	0	1	0	0	0	4	
Waterborne	0	0	0	0	0	0	0	0	0	0	0	0	
Total	7	2	1	67	2	14	9	5	2	1	8	118	

*\*Includes outbreaks of undetermined transmission mode, and outbreaks that may have had multiple modes of transmission.*

*No outbreaks were confirmed in 2018 in the following counties: Apache, Graham, Greenlee, La Paz, Mohave, and Santa Cruz.*

## Outbreaks by mode of transmission, 2014-2018

	2014	2015	2016	2017	2018	
Fecal-oral	81	57	80	57	40	
Respiratory	22	27	20	30	19	
Foodborne	21	17	18	14	26	
Other*	20	15	11	26	21	
Skin-to-skin	15	12	10	10	8	
Animal exposure	7	3	5	6	4	
Waterborne	0	3	5	2	0	
Total	166	134	149	145	118	

*\*Includes outbreaks of undetermined transmission mode, and outbreaks that may have had multiple modes of transmission.*