

DISEASE OUTBREAKS IN OREGON, 2019

An “outbreak” is the occurrence of a specific disease in time and space that is greater than what we would normally expect. In Oregon, any outbreak of illness is reportable to public health so that public health can investigate to determine its cause and to intervene to prevent further spread of illness. Interventions might include recalling contaminated food items, warning the public, providing targeted education, or immunizing susceptible contacts.

OUTBREAK OVERVIEW

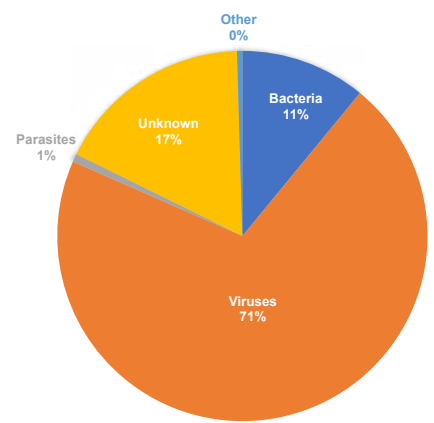
Outbreaks are often first reported to public health when someone notices an increase in persons with a clinical syndrome such as gastroenteritis, respiratory or neurological illness, or rash. This initial clinical information guides the public health investigation. One of the basic tenets of outbreak investigation is to confirm the diagnosis, so a priority for outbreaks of infectious diseases is specimen collection and laboratory testing to identify a specific organism. The Oregon State Public Health Laboratory (OSPHL) routinely performs whole genome sequencing on enteric pathogens to identify cases with closely related genetic ancestry—the presumption being that genetically related isolates stemmed from a common source. We also find it helpful to classify outbreaks based on the primary mode of transmission, such as foodborne (spread through a contaminated food vehicle), person-to-person (including physical contact and droplet spread), water-borne, vector-borne or via contact with infected animals. The specific pathogen and its mode of transmission guide the health investigation and interventions.

2019 BY THE NUMBERS

Oregon state and local public health authorities logged 429 outbreaks of disease in 2019, an increase of 24% from the 346 investigated in 2018. The outbreaks investigated in 2019 affected at least 7,374 people. Viruses caused 303 (71%) of the 429 outbreaks (Figure 1). Next were bacteria, including bacterial toxins, which caused 47 (11%) of the outbreaks; and parasites, which caused 3 (0.7%). Two outbreaks in 2019 were caused by other agents: an outbreak of scabies (actually an infestation by the mite *Sarcoptes scabiei* var. *hominis* rather than an “infection”); and an outbreak of lung injury associated with vitamin E acetate in e-cigarette or vaping products.¹

Figure 2 shows the number of outbreaks investigated in Oregon in 2019 by month and reported syndrome. While the number of gastrointestinal (GI) outbreaks remained somewhat stable throughout the year, most respiratory outbreaks in 2019 were investigated from January to March and in December, consistent with the

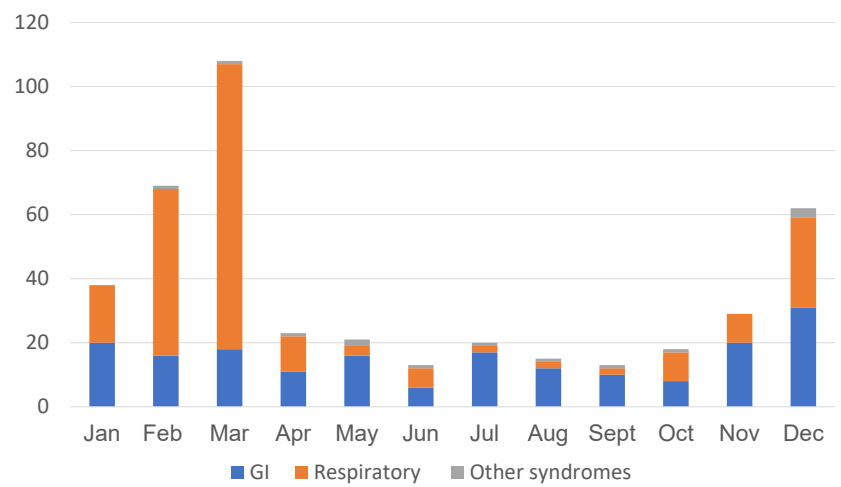
Figure 1. Outbreaks by pathogen or agent, Oregon, 2019



influenza season. Of the 187 respiratory outbreaks investigated during those months in 2019, 162 (87%) of them were influenza.

By clinical syndrome, the most commonly reported outbreak was of respiratory illnesses: 231 (54%). Of these, the predominant etiology was influenza, causing 179 (77%) of these outbreaks and affecting at least 2,606 people. Influenza A accounted for 133

Figure 2. Number of outbreaks by month and clinical syndrome, Oregon, 2019

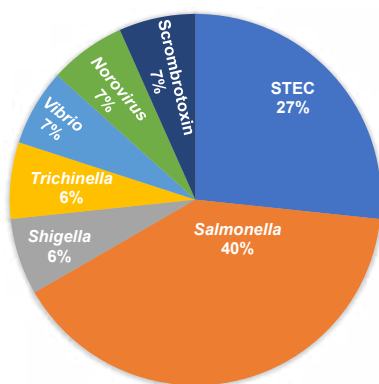


(74%) of these outbreaks and influenza B for 16 (9%). Consistent with most seasons, the 2018–19 influenza season in Oregon began with a wave of influenza A cases, which continued to predominate throughout the season. The 2019–2020 influenza season, however, reversed this trend and began with a large wave of influenza B followed by a smaller wave of influenza A.² Two outbreaks involved both influenza A and influenza B, and the type was unknown in 26 (15%) influenza outbreaks. The great majority of influenza outbreaks investigated in 2019 were in long-term care facilities (118, 66%) and schools (41, 23%).

Other respiratory outbreaks in 2019 were caused by measles (4), mumps (1), pertussis (22) and respiratory syncytial virus (RSV) (12).

Forty-three percent (185) of the reported outbreaks presented as gastroenteritis. Consistent with outbreaks in previous years, norovirus was the etiologic agent in the majority of these, causing 96 (52%) of 185. *Salmonella* and Shiga-toxin producing *Escherichia coli* (STEC) caused 14 (8%) and 5 (3%), respectively. Among the strains typed in 19 norovirus outbreaks, genogroup II were the most common (74%), consistent with what was observed nationally.³ Among the fifteen foodborne GI outbreaks, *Salmonella* was confirmed as the etiologic agent in six and STEC in four (Figure 3).

Figure 3. Etiology of foodborne outbreaks, Oregon, 2019



NOTABLE OUTBREAKS

STEC in ground beef

In November 2019, isolates from three cases of STEC O157:H7 in neighboring counties had similar

molecular typing based on whole genome sequencing (they were identical). Over the following three weeks, four additional cases were identified among household contacts and through reports from astute clinicians. Each had purchased ground beef from the same grocery market chain, so a multi-agency outbreak investigation was initiated.⁴ Ground beef samples from multiple market locations were genetically similar to the clinical cases. Within three days of identifying the initial cluster, the grocery chain issued a recall of in-house ground beef from all 26 store locations; the recall was later expanded to all beef products. The Oregon Health Authority issued two press releases and used loyalty cards to identify other customers who had purchased beef. From an online customer survey, 56 more people with symptoms consistent with STEC infection were identified, for a total of 63 Oregon cases. None of these 56 cases had been tested for STEC. The cases ranged from 2 to 77 years of age (median, 44); 59% were female. Two cases were hospitalized for their illness, and one developed hemolytic uremic syndrome. None died. The investigation revealed that the market was unknowingly grinding beef that the processing facility intended only for intact use (to be sold e.g., as steaks or roasts) and was therefore not required to be tested for STEC. This misunderstanding highlights an opportunity for education and the need for improved communication between beef suppliers and their buyers.

A tale of two restaurants

In August 2019, an Oregon local public health authority (LPHA) received reports of five cases of *Salmonella typhimurium* in a single day, prompting investigation. Another five cases had been reported in a neighboring county during the previous week. Over the following three weeks, ten more cases were reported to these LPHAs. Initial interviews identified no shared exposures, but genetic sequencing of case isolates found them to be closely related. In follow-up interviews, cases reported eating at one of two restaurants (one in each county). The two Mexican restaurants had a common food supplier from whom they ordered similar food items. Public health outreach to

other customers identified three more who experienced symptoms consistent with salmonellosis, bringing the count to 23 *Salmonella* serotype Typhimurium cases in this outbreak. The cases ranged from 5 to 86 (median, 41) years of age, and 11 (48%) were female. Two cases were hospitalized for their illness; none died. Due to substantial overlap in the two restaurants' orders from the supplier and in cases' food purchases, no single food item could be identified as the cause of this outbreak.

Bears—oh my!

In August 2019, a clinician contacted the LPHA after diagnosing trichinellosis based on a patient's clinical presentation and recent exposure to bear meat. Trichinellosis is contracted by eating raw or undercooked meat of animals infected with larvae of roundworms of the genus *Trichinella*. While the clinical manifestation varies, cases often experience fever and myalgia and have periorbital edema and eosinophilia. In the U.S. today, trichinellosis remains relatively uncommon. Review of the medical record revealed that the patient had become sick along with three others who attended a gathering where they consumed burgers of ground bear meat. The four all became ill within three days of consuming the bear meat, and three were hospitalized for their illnesses. Four samples of leftover bear meat were tested, and *Trichinella murrelli* larvae were identified in all four, ranging from 2–19 larvae per gram. Thanks to prompt reporting by an astute clinician, the leftover bear meat was discarded, and others were spared the illness.

Expounding the EVALI enigma

Beginning in August 2019, multiple states across the U.S. began noticing cases of severe lung injury among young persons, often previously healthy, who reported using e-cigarettes or vaping devices; soon the condition was dubbed “e-cigarette or vaping product-associated lung injury” (“EVALI”). In total the outbreak affected 2,807 people in all 50 states, the District of Columbia and two U.S. territories. All cases were hospitalized, and there were 68 confirmed deaths. Oregon made EVALI reportable on October 9, and ultimately logged 23 cases and two

deaths.¹ The median case age was 34 in Oregon and 24 in the U.S. CDC led a national investigation that included case interviews, medical record reviews, extensive clinical evaluations and testing of leftover vaping products.⁵ Laboratory data found vitamin E acetate in the products to be strongly associated with illness; however, a role for other chemicals in these products has not been ruled out. Vitamin E acetate was found in product samples tested by FDA and in 48 of 51 bronchoalveolar lavage fluid samples from EVALI patients but in 0 of 99 healthy controls.⁶ Thanks to increased awareness of the risk associated with e-cigarette or vaping product use and the removal of vitamin E acetate from some products, cases of EVALI have since declined in the U.S. Due to this decline, mandatory reporting of EVALI to public health authorities in Oregon expired in February 2020.

Problems with pertussis

Twenty-two outbreaks of pertussis were reported in Oregon in 2019—nearly double the 12 reported in 2018. Outbreaks of pertussis in 2019 comprised 155 cases, ranging from 0 to 70 (median, 15) years of age. Females accounted for 54% of outbreak cases. The outbreaks did not result in any hospitalizations or deaths. The largest pertussis outbreak in 2019 was a community-wide outbreak of 42 cases. Investigations began in May 2019 when two cases of pertussis were reported in a single high school. Four additional cases were reported throughout May at different schools in the county, leading public health officials to classify this as a community-wide outbreak; and over the course of the summer, 34 additional cases were identified in multiple schools, camps and community sports clubs, among other locations. The cases ranged from 3 to 25 (median, 15) years of age, and 52% were female. Of the 40 cases less than 19 years old, 85% were up to date on pertussis vaccination. The outbreak was determined to be over in August 2019 when cases in the community had returned to baseline levels. Unfortunately, community-wide outbreaks of pertussis are not uncommon in Oregon: an even larger one was ignited in 2018 by cases in several high-school populations, resulting in a total of 227 cases. Pertussis outbreaks in previous years have

also consisted primarily of young adult cases.

Measles mayhem

After historically low case counts during the earlier years of the millennium, measles cases spiked in 2019 with 28 cases reported in Oregon—the most since 1991. This was consistent with outbreaks observed in the rest of the United States in 2019. Four Oregon measles outbreaks accounted for 27 of the 28 cases. In February 2019, public health officials investigated an outbreak of measles at a missionary training school after members were exposed to a case from out of state; ultimately, the outbreak comprised nine Oregon cases. In August 2019, a 10-case outbreak began with a case acquired during international travel; nine secondary cases resulted from subsequent public exposures and close contact among household members, relatives, and others. A four-case outbreak was associated with exposure to an infectious case on an international flight. Finally, four Oregon cases of measles were associated with a large outbreak in Clark County, Washington in early 2019.⁷ The median age of all 28 measles cases in Oregon in 2019 was 10.5 years, and 79% were female. All cases were unvaccinated.

MORE HIGHLIGHTS FROM 2019

This *CD Summary* covers only a small portion of the disease outbreaks investigated in 2019; space precludes a discussion of the many other notable investigations. Oregonians were involved in six separate multi-state outbreaks of *Salmonella* infections associated with live poultry,⁸ each associated with a different *Salmonella* serotype, including 17 Oregon cases in all. CDC also investigated a multi-state outbreak of *Vibrio parahaemolyticus* infections that included 13 cases from Oregon, associated with consumption of raw oysters from various harvest locations. A five-case outbreak of hepatitis A occurred among persons reporting injection drug use and unstable housing. The index case in the outbreak had been exposed to hepatitis A in California. In response, multiple local vaccination clinics were organized to immunize this high-risk population.

CONCLUSION

These data would not exist without astute clinicians reporting, local and tribal public health jurisdictions investigating and reporting of outbreaks to

the Oregon Health Authority's Public Health Division. If you suspect an outbreak of any illness, please alert your local public health authority (LPHA) promptly. Contact information for Oregon LPHAs can be found at www.healthoregon.org/lhddirectory.

FOR MORE INFORMATION

- [List of 2019 Disease Outbreaks \(Tableau\)](#)
- [2019 Communicable Disease Annual Report \(Tableau\)](#)
- [ACDP's outbreak investigation webpage](#)

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