

OREGON PUBLIC HEALTH DIVISION • OREGON HEALTH AUTHORITY

OUTBREAKS OF FOODBORNE AND GASTROENTERITIS DISEASES — 2012

Once a year we summarize for our readers the highlights from the previous year's outbreaks of gastroenteritis. Herewith a look at the outbreaks of 2012.

**OUTBREAK PRIMER**

From an investigational point of view, foodborne and gastroenteritis outbreaks usually fall into one of several categories. The elephant in the room can be described as "nursing home Norwalk" — outbreaks of norovirus (or unconfirmed norovirus-like) illness at nursing homes, assisted living centers, and similar institutions. Based on the temporal pattern of illness onsets, these outbreaks are almost always classified as having primarily a person-to-person mode of transmission. (No foodborne or waterborne outbreaks were identified at nursing homes in 2012.)

The next major category is the "event" outbreak, which involves a specific location or event that is usually self-evident at the outset: an office potluck, a wedding, a restaurant meal, or a session at camp. These investigations typically begin with a citizen complaint about multiple illnesses, and focus on the exposures that are unique to the event (e.g., the menu for the reception dinner).

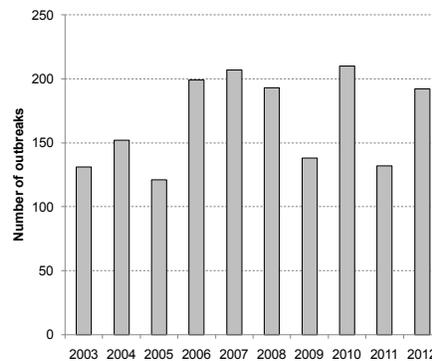
"Commercial product" outbreaks, on the other hand, usually start with laboratory identification of clinical isolates that match by some combination of characteristics (e.g., a *Salmonella* serotype, or a pulsed-field gel electrophoresis [PFGE] pattern for *Escherichia coli* O157:H7). Preliminary interviews can quickly rule out a common-event source for the cluster, in which case we begin to consider the possibility of exposure to a commercial product that could be sold locally, regionally, nationally, or internationally. The signal-to-noise ratio is not high for some of these indicators, and many serotype and PFGE clusters turn out to be nothing of interest. (And others turn out to be too small to "solve.")

**DATA OVERVIEW**

For calendar 2012 we logged 191 outbreaks of gastroenteritis, and an additional outbreak of foodborne botulism — about which more later.<sup>1</sup>

This is up 45% from last year's total (132), but only moderately above averages for the past decade (mean, 168; median, 172; Figure 1). We believe that reporting is more complete and reports better tracked than was true 10 years ago.

**Figure 1. Foodborne/GI outbreaks, Oregon 2003–2012**



The 192 outbreaks logged in 2012 comprised 4,590 sick individuals, according to our official tallies, of whom 514 were lab-confirmed with one bug or another (again, most commonly norovirus).

**CAVEATS**

These numbers represent merely that subset of outbreaks that were recognized and reported to us. The case count is similarly a misleadingly low representative of the true total, because in most outbreaks it is virtually impossible to determine how many people are sick. Most people who develop acute gastroenteritis don't call the health department to complain,\* and so we hear about only a minority of people who suspect they are part of an outbreak. Health departments generally don't have the resources for comprehensive investigation of every outbreak. The process is to address the

\* thank God...

immediate problem and to move on as expeditiously as possible. For all these reasons, the case count represents merely the visible part of a largely submerged hippopotamus.

Nevertheless, outbreak investigations provide real value. Some investigations identify ongoing threats (contaminated commercial food products, for example, or abhorrent practices at a restaurant). Prompt public health action (e.g., product recalls, re-education of food handlers) can prevent illness and worse. In the aggregate, data about outbreak investigations provide the basis for our "common knowledge" about the sources of outbreaks and illness in general, and this understanding informs everything from consumer education to food industry practices to governmental regulation. Foodborne outbreak investigations also stimulate academic and applied research to identify practical ways to improve food safety. We don't need to count all illnesses to be useful.

**CAUSES**

All but one of the outbreaks in 2012 were single-etiology affairs (Figure 2, *verso*). The most common etiology (again) was our nagging nemesis the norovirus, which racked up 120 entries (62%), followed (not too closely) by *Salmonella*, with 10 (5%); Shiga-toxigenic *E. coli* with 7 (4%), including 5 of serogroup O157, one O118, and one mixed O121/O103 outbreak that involved kids playing with baby goats; sapovirus, with 4 (2%). The remainder were *Campylobacter* (2), *Shigella* (2), *Giardia* (1), and botulism (1). Oh yes — 45 outbreaks (23%) were of undetermined etiology, including 28 for which no stool specimens were tested and 12 for which only a single specimen was tested. (It generally takes 2 positive specimens to "confirm" the etiology; do the math. Many of these outbreaks were clinically compatible with a caliciviral [noro- or sapoviral] etiology.)

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The primary modes of transmission for these outbreaks were as follows: person-to-person, 125 (65%); foodborne, 26 (14%); animal contact, 7 (4%); indeterminate, 27 (14%); unknown,† 6 (3%); and other environmental.<sup>1,2</sup> Among the foodborne outbreaks, specific vehicles were identified for 10 (38%). Even among the foodborne subset, norovirus remained the most common etiology: 14 (54%) of 26 outbreaks.

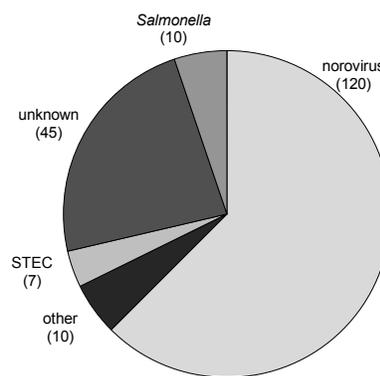
#### NOTABLE OUTBREAKS

In any year a handful of outbreaks stand out from the crowd, because of their size, severity, or some other outé feature; 2012 was no exception.

The aforementioned botulism outbreak comprised 3 cases. The culprit was beets that had been home canned without a pressure cooker. One person died. Imported Mexican mangoes were identified as the source of an outbreak of *Salmonella* Braenderup infections. Eventually, >150 cases were identified in 15 states and Canada — but only one in Oregon.<sup>1</sup> With the arrival of spring, baby chicks were once again identified as the source of *Salmonella* infections in Oregon and many other states. Retail chicken is often tainted with live *Salmonella*; Foster Farms-produced chicken proved to be the source of an outbreak of *Salmonella* Heidelberg infections in Oregon and Washington that stretches back almost a decade.<sup>3</sup>

† The distinction between “indeterminate” and “unknown” is subtle. The former means that the data collected were insufficient to distinguish between alternative modes, and the latter means that insufficient data were collected to hazard a guess.

Figure 2. Etiology of 2012 outbreaks, Oregon



An outbreak at an auto dealership started out looking like a run-of-the-mill foodborne norovirus cluster. Some 30 hours after a staff meeting, workers at the dealership began to experience the vomiting and diarrhea that are characteristic of norovirus infections. Sandwiches served at the meeting were the obvious suspect, and the local health department swooped in on the hapless caterer. It transpired, however, that shortly before the meeting had begun, a worker had entered a bathroom to discover a customer attempting—rather unsuccessfully—to manage a toddler with explosive‡ diarrhea on a diaper-changing station. The environment was grossly contaminated, and the environmental contamination was apparently tracked over enough of the dealership to sicken 75% of the staff (and an unknown number of subsequent customers). Matching norovirus was subsequently isolated from employees, the toddler, and the diaper-changing station.<sup>4</sup> The caterer was

‡ yeah, just like it sounds.

exonerated; the proximate source was environmental, not food.

Finally, we recall the *E. coli* O157:H7 outbreak caused by consumption of unpasteurized milk obtained via a “herd-share” arrangement. Technically the milk wasn’t being “sold”; rather, people paid to own a share of a cow or herd, and got some corresponding share of the production. The legal subtleties were lost on the bacteria: at least 16 people became sick, including 3 children with hemolytic uremic syndrome hospitalized for 27, 44, and >90 days, respectively. Sixteen months later, one case is scheduled for a kidney transplant.

#### FOR MORE INFORMATION

- See <http://public.health.oregon.gov/DiseasesConditions/CommunicableDisease/Outbreaks/Pages/index.aspx>

#### REFERENCES

1. Canadian Food Inspection Agency. Food safety investigation *Salmonella* braenderup in imported fresh mangoes See [www.inspection.gc.ca/food/information-for-consumers/food-safety-investigations/salmonella-mangoes/salmonella-braenderup-in-imported-fresh-mangoes/eng/1366311935738/1366312052759](http://www.inspection.gc.ca/food/information-for-consumers/food-safety-investigations/salmonella-mangoes/salmonella-braenderup-in-imported-fresh-mangoes/eng/1366311935738/1366312052759). Accessed 16 Aug 2013.
2. Centers for Disease Control and Prevention (CDC). Multistate outbreak of *Salmonella* Braenderup associated with mangoes. [www.cdc.gov/salmonella/braenderup-08-12](http://www.cdc.gov/salmonella/braenderup-08-12). Accessed 16 Aug 2013.
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4. Repp KK, Hostetler TP, Keene WE. A norovirus outbreak related to contaminated surfaces. J Infect Dis 2013; 208:295–8. See [www.ncbi.nlm.nih.gov/pubmed/23559462](http://www.ncbi.nlm.nih.gov/pubmed/23559462). Accessed 20 Aug 2013.