

## ***Escherichia coli* O157 and other Shiga toxin-producing *Escherichia coli* (STEC) infections**

*Escherichia coli* O157 (O157) is one of the most dreaded causes of infectious gastroenteritis. Bloody diarrhea is a hallmark of this pathogen, but the real danger is post-diarrheal hemolytic uremic syndrome (HUS). Oregon has been the setting for many O157 outbreaks, and the investigations of those outbreaks, combined with the analysis of other surveillance data, have contributed greatly to our understanding of this pathogen. Spread by the fecal-oral route, O157 has a number of animal reservoirs, the most important of which are ruminants: cattle, goats, sheep, deer, elk, etc. Transmission often occurs from consumption of contaminated food or water, as well as direct person-to-person spread and environmental exposures. Mid-to-late summer is the peak season for O157 infections.

With increasing deployment of diagnostic kits that identify Shiga toxin-producing *E. coli* (rather than O157 per se) comes an appreciation of the significant role that other STEC play as human pathogens. In the U.S. (and in Oregon), O26, O45, O103, O111, O121, and O145 are the most common “other” serogroups of the enterohemorrhagic *E. coli* making p about half of the reported cases. O157 infections are much more likely to result in HUS than is infection by STEC.

Over the past 10 years, the number of O157 cases reported statewide has ranged between 61 and 149 annually. After being relatively steady during 2008–2011, the number increased to 111 in 2012 and remains elevated with 106 cases reported in 2013.

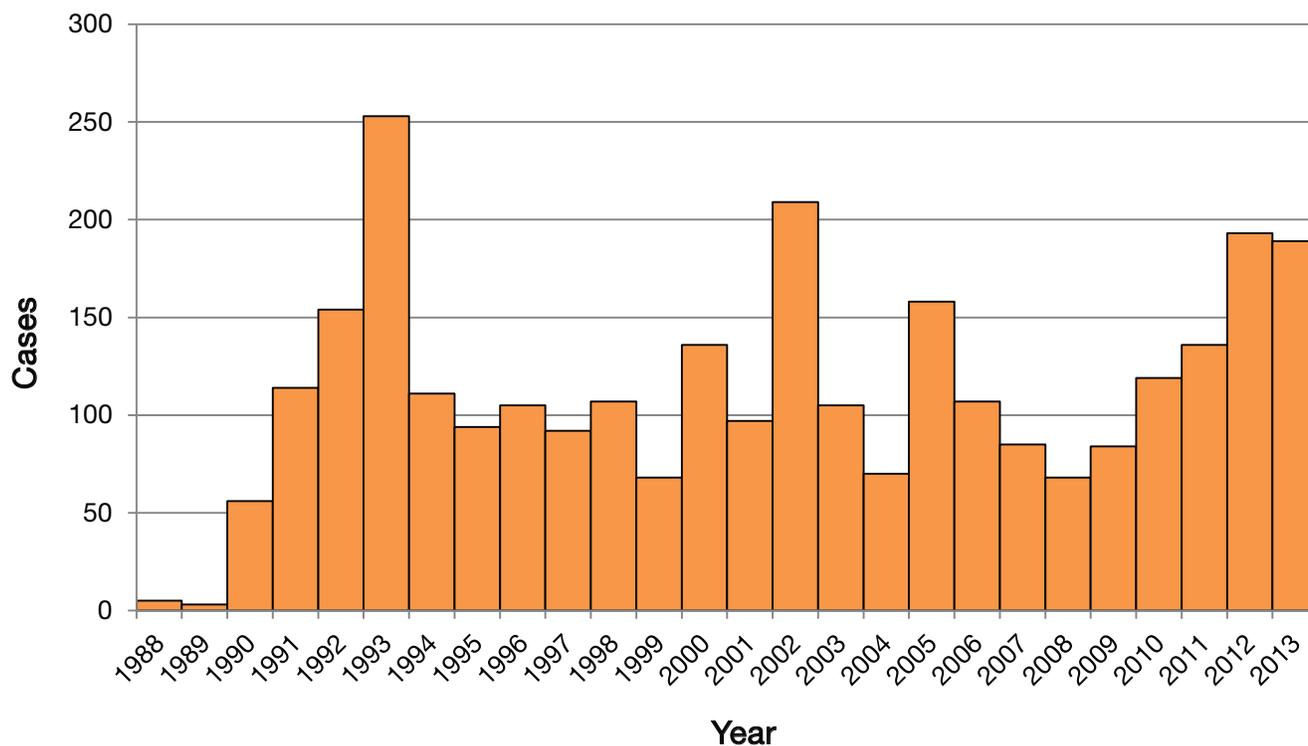
As for the non-O157 serogroups, those case counts have increased steadily from single digits in 2007 and 2008 to 59 confirmed cases in 2013. Of the 165 confirmed STECs serotyped in 2013, 106 were O157, 59 were non-O157, including O26 (N = 25), O103 (13), O121 (7) and 12 other serogroups.

Several STEC outbreaks were investigated in 2013; two outbreaks were associated with county fairs. One O157 outbreak affected two children who were handling farm animals at a county fair. The other fair-related outbreak was caused by O26. Three children attended a county fair and had farm animal exposures, and a fourth child developed illness while attending day care with one of the initial cases. No source was confirmed for either outbreak, although environmental exposure to farm animals was likely the cause of both.

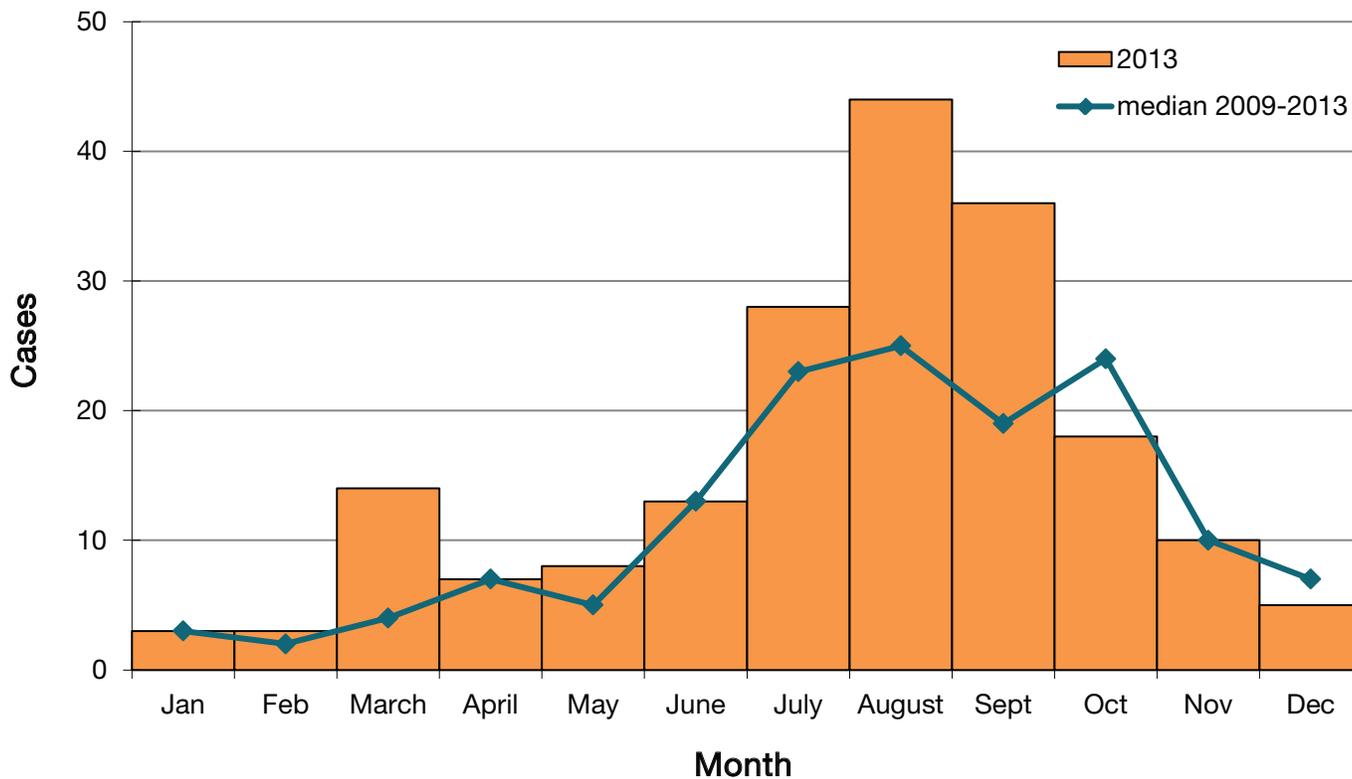
More labs are testing for the presence of Shiga toxin rather than just O157. Unfortunately, at the same time, many labs are dropping culture-based methods, leaving clinicians (and epidemiologists) in the dark as to the specifics of the etiologic agent, and putting more of the diagnostic burden on the public health reference lab.

Much of the heavy lifting for prevention must be done upstream, with plans to minimize contamination of crops and processing equipment. Hazard Analysis and Critical Control Points (HACCP) practices focus on documenting and controlling risks during food processing and commercial food preparation, as well as efforts to control water and other potential environmental sources of infection.

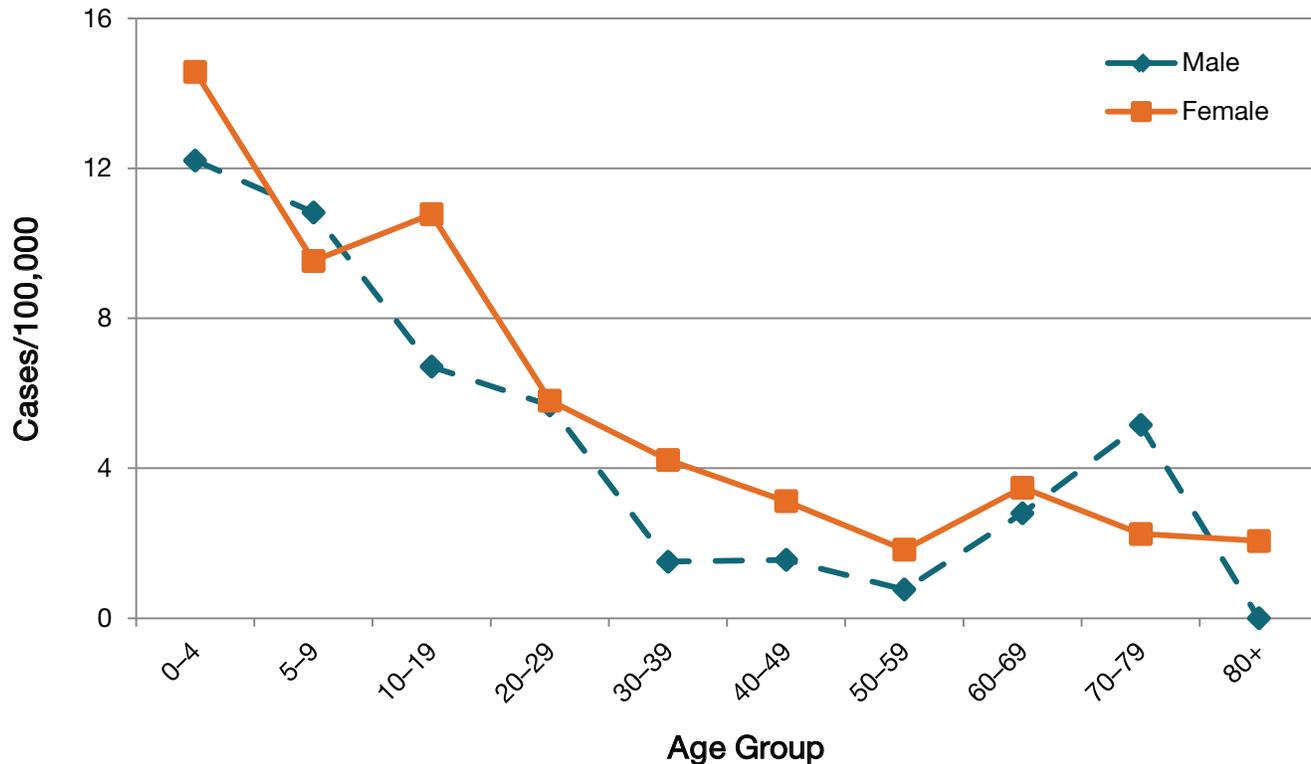
### STEC infection (including *E. coli* O157) by year: Oregon, 1988–2013



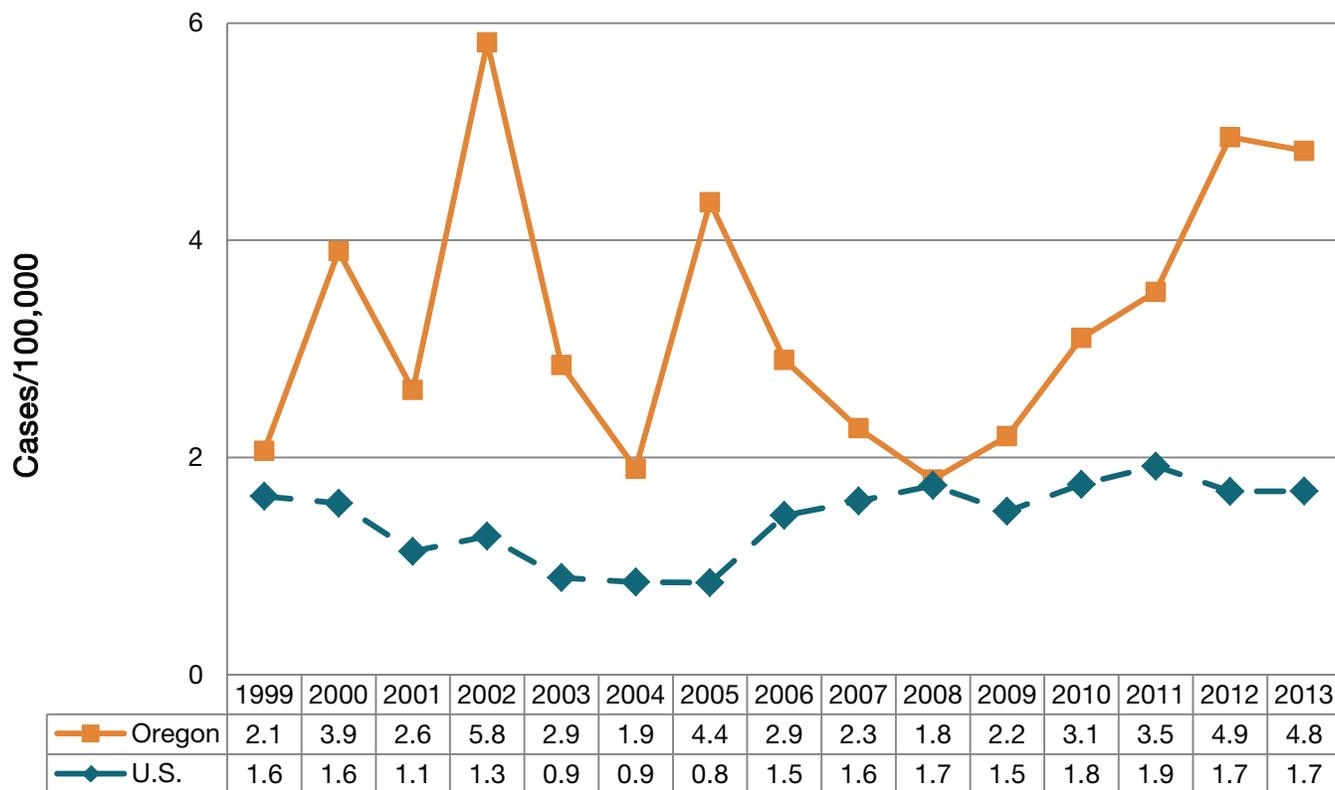
### STEC infection by onset month: Oregon, 2013



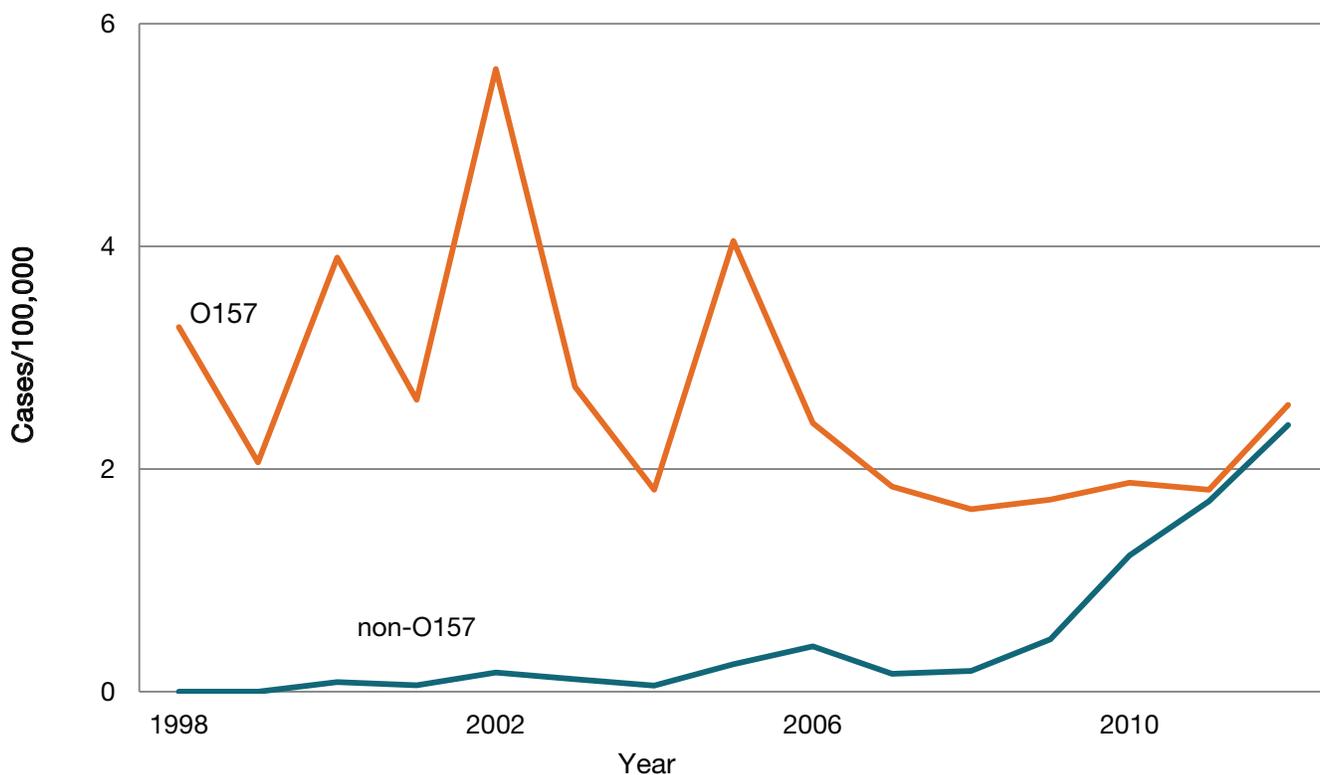
### Incidence of STEC infection by age and sex: Oregon, 2013



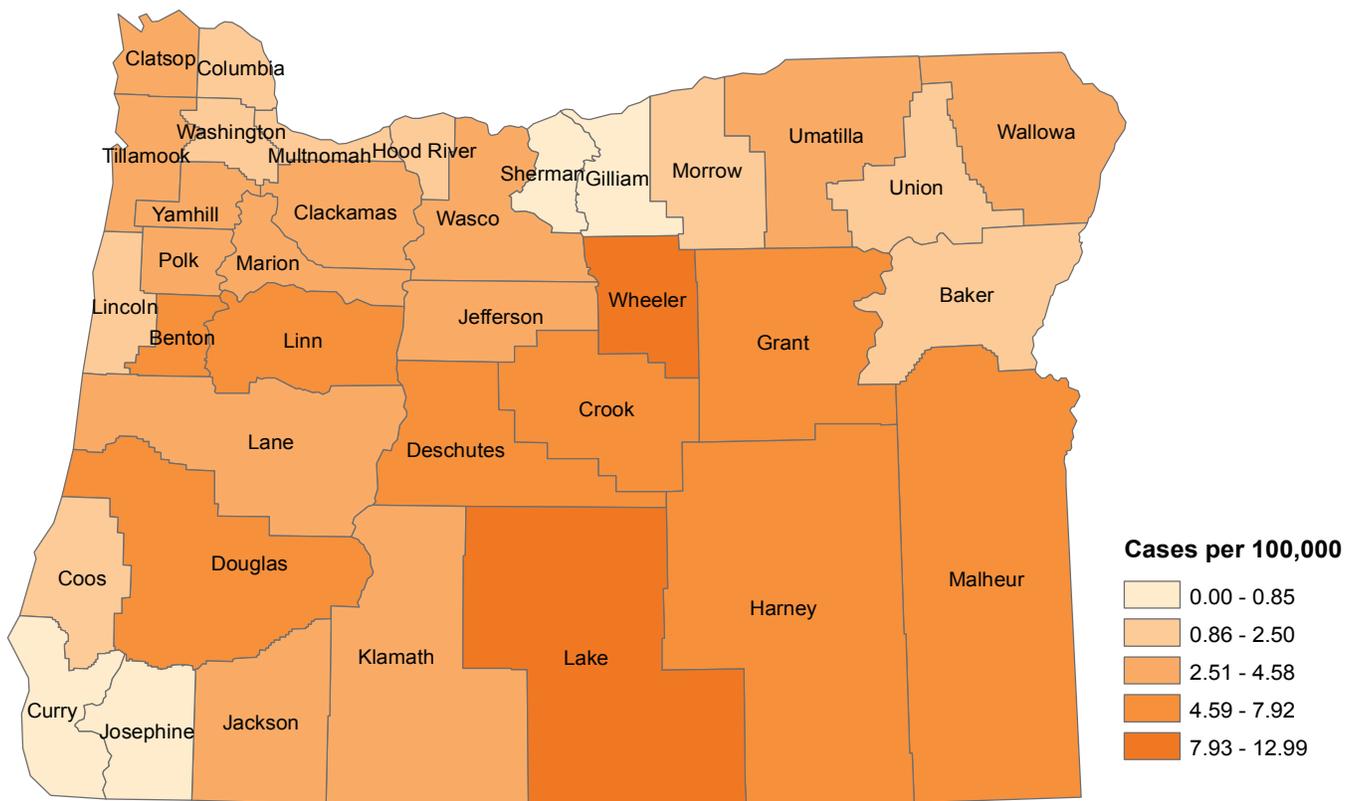
### Incidence of STEC infection: Oregon vs. U.S., 1999–2013



### Incidence of STEC infection, O157 vs. non-O157 type, Oregon, 1999–2013



### Incidence of STEC infection by county of residence: Oregon, 2004–2013



## Prevention

- Wash hands with soap carefully and frequently, especially after going to the bathroom, after changing diapers, or after touching livestock. Supervise hand washing of toddlers and small children after they use the toilet.
- Do not work or attend daycare, serve or prepare food, or work in healthcare while ill with diarrhea.
- Practice safe food handling: Rinse raw produce thoroughly under running tap water; separate uncooked meats from vegetables, cooked foods, and ready-to-eat foods; and cook meat to the proper temperatures.
- Do not drink raw milk and do not eat foods that have unpasteurized milk in them.