

# Antibiotic Commonsense

## Antibiotic Prescriptions for Diarrhea in Pierce County



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Campylobacteriosis, salmonellosis, and Shigatoxin producing *E. coli* (STEC) infections are nationally notifiable conditions. Tacoma-Pierce County Health Department epidemiology staff investigate cases of notifiable diseases and collect epidemiologic and clinical data on all confirmed, probable, and suspect cases residing in Pierce County. The purpose of this public health work is to detect outbreaks, control spread of communicable diseases within households and social groups in the community, investigate potential sources of infection and to characterize disease trends. In the course of our investigations, we found that many campylobacteriosis, salmonellosis, and STEC cases had been prescribed one or more antibiotics for treatment of their diarrheal illnesses.

### Methods

In an effort to quantify the proportion of cases receiving antibiotics, we retrieved data for all cases of campylobacteriosis, salmonellosis, and STEC in Pierce County from Jan. 1, 2010 through Dec. 31, 2014. For campylobacteriosis and salmonellosis, we limited our analysis to adults ages 19 to 45 years to exclude pediatric patients and older adults who are more likely to have chronic, pre-existing conditions. Because antibiotic therapy can increase the risk of hemolytic-uremic syndrome (HUS) in children with STEC, we included all ages in our analysis. We then reviewed medical records of cases of campylobacteriosis and salmonellosis for evidence that one or more antibiotic had been prescribed. Data on antibiotics prescribed

for STEC are recorded by the Health Department investigator and entered to our statewide public health reporting database.

### Results

#### Campylobacteriosis

We retrieved data for 943 campylobacteriosis cases reported between 2010 through 2014. Of those, 290 were between the ages of 19 and 45 years of age at the time the diagnosis was reported to the Health Department. We reviewed the medical records of 54 of those cases. Of those, 24 (44%) had been prescribed an antibiotic to treat their campylobacteriosis. Five of those had received azithromycin, the drug of choice for campylobacteriosis. Thirteen received ciprofloxacin and two received levofloxacin. Three received metronidazole and one received cephalexin.

#### Salmonellosis

We retrieved data for 352 cases of salmonellosis. Out of 96 cases between the ages of 19 and 45 years of age, we reviewed the records of 41 cases. Twenty-seven of those (66%) received an antibiotic to treat diarrhea.

#### Shigatoxin-producing *E. coli*

We retrieved data for 74 cases of STEC diarrhea, 21 (28%) of whom received antibiotics. Only one child (age 11 years) received an antibiotic. The median age were 25.6 years for STEC cases who received antibiotic therapy and 13.8 for those who did not. The mean ages were 31.2 for cases who received antibiotics and 17.2 for those who did not ( $p = 0.003$ ).

Disease	Records Retrieved	Age 19 to 45	Medical records reviewed	Antibiotics Prescribed	Percent
Campylobacteriosis	943	290	54	24	44%
Salmonellosis	352	96	41	27	66%
STEC	74	NA	NA	21	28%

## Discussion

Although antibiotics are indicated for subsets of patients, e.g., those with non-STEC bloody diarrhea, extraintestinal infections, prolonged illness, and immunocompromised individuals, campylobacteriosis and salmonellosis are usually self-limiting diseases. Antibiotic therapy for campylobacteriosis reduces the duration of diarrhea by less than one day.<sup>1</sup> Antibiotic therapy does not reduce the duration of diarrhea in non-typhoidal salmonellosis and can prolong fecal shedding of the organism.<sup>2</sup> Antibiotic therapy for STEC can increase the release of Shiga toxins and may increase the risk of HUS in children and is therefore contraindicated.<sup>3</sup>

Agricultural use of fluoroquinolones has increased the prevalence of *Campylobacter* resistance to those agents.<sup>4</sup> Azithromycin is the current drug of choice for treating campylobacteriosis, but resistance to macrolides is increasing.<sup>5</sup> Fluoroquinolone resistance in non-typhoidal *Salmonella* is increasing and multidrug resistant *Salmonella* is an emerging problem worldwide.<sup>2</sup> Viral gastroenteritides, e.g., norovirus, rotavirus, adenovirus infections, are the most common causes of acute diarrhea in the United States.<sup>6</sup> Viral gastroenteritides are not notifiable conditions, so the incidence of viral diarrhea in Pierce County is unknown. Campylobacteriosis is one of the most common bacterial diarrheal diseases in the United States and is the most commonly reported diarrheal disease in Pierce County (CDC, 2014). Campylobacteriosis is second only to pertussis as the most commonly reported notifiable condition in Pierce County. The increase in the number of reported campylobacteriosis cases in Pierce County appears to be due in part to a switch from culture-based testing to antigen tests for *Campylobacter*.

## Conclusions

Our data suggest that relatively large proportions of cases of campylobacteriosis, salmonellosis, and STEC infections in Pierce County are receiving unnecessary and/or contraindicated antibiotic therapy for diarrheal diseases. Most acute diarrheal diseases are self-limiting and require only supportive treatment. For most patients with acute diarrhea, antibiotic therapy offers little or no benefit and increases the risks of adverse drug effects, complications, and prolonged pathogen shedding. Inappropriate antibiotic use is one of the most important contributors to the development of antibiotic resistance. In spite of increasing resistance to fluoroquinolones in *Campylobacter* and *Salmonella*, those drugs are frequently empirically prescribed to treat diarrhea. Fluoroquinolones are among the

antibiotics with the highest risk for causing *Clostridium difficile* colitis.<sup>7</sup>

We recognize that antibiotic therapy is indicated for some patients with acute diarrhea, however, we encourage healthcare providers to consider the epidemiology of diarrheal diseases in Pierce County and carefully consider the risks versus benefits of antibiotic therapy for suspected or confirmed infectious diarrhea.

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