

Antibiotic Commonsense

"An investment in knowledge always pays the best interest." Benjamin Franklin



Volume 8, Issue 1

March/April 2014

Editor, Lois Lux



Antigen Testing Likely Contributes to Increased Reporting of Campylobacteriosis

Matthew Rolloson, RN, MPH&TM

The number of campylobacteriosis cases reported to the Tacoma-Pierce County Health Department increased dramatically from 79 cases in 2009 to 221 cases in 2012. Until 2012, the incidence of campylobacteriosis in Pierce County was lower than that for Washington State.

detect *Campylobacter* vary. Bessède³ estimated the sensitivity of culture to be 65%. Granato⁴ estimated culture sensitivity to be 94.1%.

Figure 1 Campylobacteriosis Incidence 2008–2012

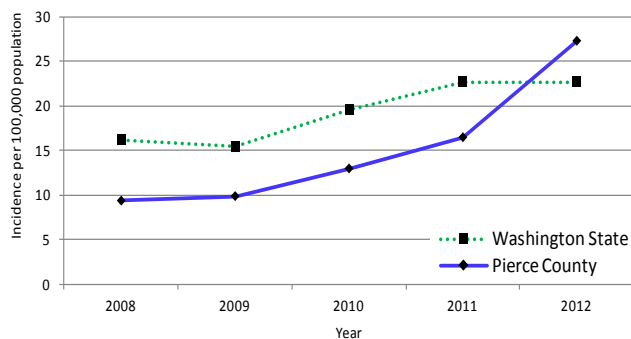
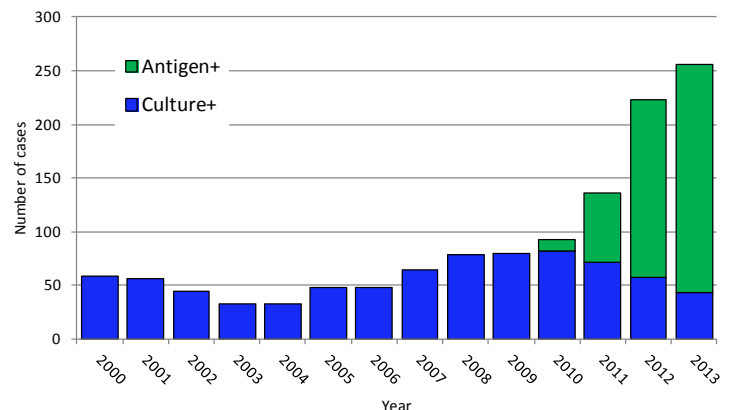


Figure 2 Campylobacteriosis cases Pierce County, WA, 2000–2013



Pierce is the only county in Washington where the majority of the reported cases of campylobacteriosis are being diagnosed by antigen tests rather than culture (Figure 2). Between 2010 and 2012, both MultiCare and Franciscan Health Systems switched from culture-based diagnosis of campylobacteriosis to enzyme immunoassays (EIA). Of the 1,551 cases of campylobacteriosis reported to the Washington State Department of Health in 2012, 227 were diagnosed with non-culture methods; and, of those, 167 (74%) were Pierce County residents.

In contrast to *Campylobacter* culture, antigen tests are highly sensitive. Granato⁴ found the sensitivity and specificity of three antigen tests for *Campylobacter* to be $\geq 98\%$ with a positive predictive value of $\geq 95\%$. Dediste⁵ and Floch⁶ found the positive predictive value of *Campylobacter* antigen assays to be 78.3% and 80.6%, respectively. The difference in sensitivity between culture and antigen tests likely contributes to, but may not completely explain, the increase in the number of reported cases of campylobacteriosis in Pierce County.

Laboratory Testing

Campylobacter species are fastidious organisms that require special media and/or techniques to culture.^{1,2} Estimates of the sensitivity of culture techniques to

We analyzed Pierce County campylobacteriosis data to determine if there were clinical differences between cases that were diagnosed using antigen tests and cases that were diagnosed with culture. We found that cases diagnosed with culture were

more likely to present with fever and bloody diarrhea than antigen-positive cases. We also found that the mean duration of symptoms from onset to specimen collection for antigen-positive cases was significantly longer than for culture-positive cases.

These results suggest that culture positive cases were more likely to present with “textbook” signs and symptoms of campylobacteriosis than antigen positive cases. Signs and symptoms include diarrhea (frequently bloody), abdominal pain, malaise, fever, nausea and/or vomiting. We suspect that a large proportion of antigen positive cases reported to the Health Department would not have been detected using culture for laboratory confirmation.

Because *Campylobacter* species and antibiotic sensitivities cannot be determined by antigen testing, isolates for genotyping would not be available for cases diagnosed with antigen testing, making investigation of an outbreak difficult.⁷

Treatment

For most patients, campylobacteriosis is a self-limiting illness that does not require antibiotic therapy.^{1,2,9,12} Persons for whom antibiotic therapy should be considered include those with fever and diarrhea, bloody stool, extraintestinal infections, diarrhea lasting more than a week, and immunocompromised individuals.^{1,2} In their meta-analysis, Ternhag, et al.¹² found that antibiotics reduced the duration of diarrhea in persons with campylobacteriosis by less than two days.

Due to the rising prevalence of *Campylobacter* resistance to fluoroquinolones, azithromycin is preferred for the treatment of *Campylobacter* enteritis,^{2,9,10} however, *Campylobacter* resistance to macrolides is an increasing problem.^{8,11} *Campylobacter* drug resistance is largely the result of agricultural use of antibiotics.^{1,2,8}

A parenteral aminoglycoside and/or a carbapenem should be considered for those with extraintestinal *Campylobacter* infection.^{1,2}

Summary

There has been a dramatic increase in the number of cases of campylobacteriosis reported to the Health Department over the last four years. We believe that this is due in part to the higher sensitivity of *Campylobacter* antigen tests compared to culture.

For most patients, campylobacteriosis is a self-limiting disease that does not require antibiotic therapy. Because the prevalence of fluoroquinolone resistance in *Campylobacter* has increased, macrolides are the preferred treatment when antibiotic therapy is indicated.

References

1. Allos BM, Blaser MJ. *Campylobacter jejuni* and related species. In Mandell GL, Bennett JE, Dolin R, eds. *Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases*. 7th ed. Philadelphia, PA: Elsevier; 2010:2793-2802.
2. Zakhour R, Heresi GP, Murphy, JR. *Campylobacter jejuni*. In: Cherry JD, Harrison GJ, Kaplan SL, Steinbach WJ, Hotez PJ, eds. *Feigin and Cherry's Textbook of Pediatric Infectious Diseases*. 7th ed. Philadelphia, PA: Elsevier; 2014:1644-1657.
3. Bessède E, et al., *New Methods for Detection of Campylobacter in Stool Samples in Comparison to Culture*. *J Clin Microbiol*, Mar 2011;49(3):941-944.
4. Granato PA, et al. *Comparison of Premier CAMPY Enzyme Immunoassay (EIA), ProSpecT Campylobacter EIA, and ImmunoCard STAT! CAMPY Tests with Culture for Laboratory Diagnosis of Campylobacter Enteric Infections*. *J Clin Microbiol*. November 2010;48(11):4022-4027.
5. Dediste A, et al. *Evaluation of the ProSpecT microplate assay for detection of Campylobacter: a routine laboratory perspective*. *Clin Microbiol Infect*. 2003 Nov;9(11):1085-1090.
6. Floch P, et al. *Evaluation of the positive predictive value of a rapid Immunochromatographic test to detect Campylobacter in stools*. *Gut Pathog*. 2012;4:17. doi:10.1186/1757-4749-4-17.
7. Cronquist AB, et al. *Impacts of culture-independent diagnostic practices of public health surveillance for bacterial enteric pathogens*. *Clin Infect Dis*. 2012 Jun;54 Suppl. 5:S432-S439. doi: 10.1093/cid/cis267.
8. Moore JE, et al. *The epidemiology of antibiotic resistance in Campylobacter*. *Microbes Infect*. 2006 Jun;8(7):1955-66. Epub 2006 Mar 31.
9. Eiland LS, Jenkins LS. *Optimal Treatment of Campylobacter Dysentery*. *J Pediatr Pharmacol Ther*. Jul-Sep;13(3):170-174.
10. Kirkpatrick BD, Tribble DR. *Update on human Campylobacter jejuni infections*. *Curr Opin Gastroenterol*. 2011 Jan;27(1):1-7. doi:10.1097/MOG.0b013e3283413763.
11. Gibreel A, Taylor DE. *Macrolide resistance in Campylobacter jejuni and Campylobacter coli*. *J Antimicrob Chemother*. 2006;58(2):243-55.
12. Ternhag A, et al. *A meta-analysis on the effects of antibiotic treatment on duration of symptoms caused by infections with Campylobacter species*. *Clin Infect Dis*. 2007 Mar 1;44(5):696-700. Epub 2007 Jan 25.

Contact

Lois Lux llux@tpchd.org
Phone: (253) 798-6416
Fax (253) 798-7666