

Investigation Number 2015-3740800 NE Oregon St., Ste. 772
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ohd.acdp@state.or.us**Outbreak 2015-3740
Shiga-toxin-producing *Escherichia coli* O26 Infections****Background:**

On October 29, 2015, the Oregon Health Authority (OHA) State Public Health Laboratory identified an increase in Shiga toxin-producing *Escherichia coli* cultures. That day, Multnomah County Health Department officials reported to the OHA Public Health Division that they were going to inspect the Cascade Station Chipotle in response to a request from Clark County, Washington, public health officials; three Clark County residents with Shiga-toxin-producing *E. coli* O26 infection had reported eating there in the week prior to their illness onsets. On October 30, OHA epidemiologists contacted colleagues at the Washington State Department of Health (WSDOH) and began investigating the outbreak.

Methods:

Officials in OHA, Oregon's local health departments (LHDs), WSDOH, the Centers for Disease Control and Prevention (CDC), the U.S. Food and Drug Administration (FDA), and the Oregon Department of Agriculture participated in various stages of the investigation. Daily conference calls were led by WSDOH officials, because the index cases, and ultimately the majority of cases, were among Washington State residents.

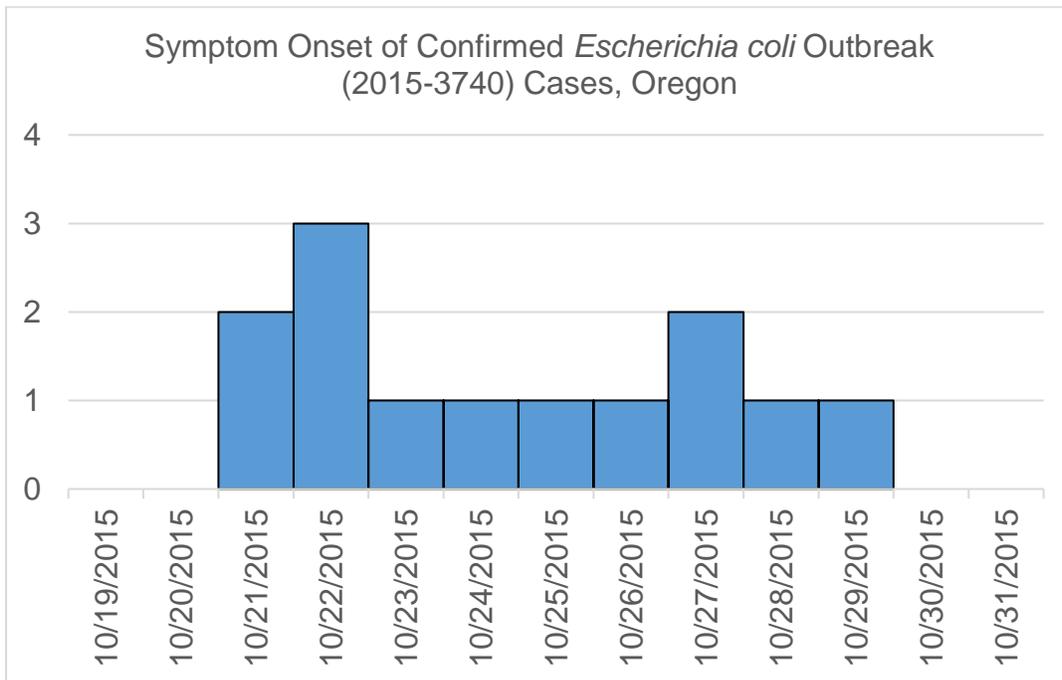
Confirmed cases were defined as Oregon residents with *E. coli* O26 with PFGE pattern matching the outbreak strain (OR Xba1 ECNX-390/CDC Xba1 EVCX01.1180) isolated from a fecal specimen on or after October 7th.

A Health Alert was sent to all Oregon LHDs. Oregon's statewide reportable disease database "Orpheus" was queried for additional STEC cases of any serogroup, and LHDs were asked to inquire of cases specifically about Chipotle exposure if it had not been named on their seven-day exposure history. MCHD emailed Portland Metro area providers requesting stool testing of any cases of bloody diarrhea, and referral to the LHD. Oregon's "ESSENCE" emergency department surveillance system was queried for cases with acute-onset diarrhea. Chipotle officials provided contact information as well as food orders for cases who ordered on line from locations in Multnomah, Clackamas and Washington counties, and menu-item recipes. Customers with online orders were emailed a link to an on-line, standardized questionnaire.

Three controls per case were identified from among case meal companions or from online orders from the same dates and Chipotle locations as cases, and interviewed by telephone using the same questionnaire. Interview data were entered into a FileMaker database and exported for matched analysis using SAS. Foods items distributed only to Chipotle locations in the Pacific Northwest and served without a kill step were selected for testing: cilantro, jalapeños, green bell peppers, shredded lettuce, shredded cheese, tomatoes, corn/veggie mix, green onions, red salsa, and red onions were collected from two separate locations and tested at the FDA’s Pacific Regional Lab Northwest in Bothell, Washington. In addition, leftover cheese from a case patient was tested at IEH Laboratories, Lake Forest Park, Washington.

Environmental Health Specialists in 6 Oregon counties inspected all Chipotle restaurants in their jurisdictions. They interviewed staff and managers, reviewed cleaning products and procedures and employee illness policy education, and gathered invoices of items from the previous weeks. OHA epidemiologists assisted in one such visit on November 19, 2016, and collected environmental and food samples for testing at IEH Laboratories. The Portland regional Chipotle representative was given dates and locations of meals for ill persons and conducted an internal product traceback.

Results: Thirteen confirmed Oregon cases were ultimately identified, with onsets during October 21–29 (Figure).



Case demographics are shown in Table 1; median age was 18 years. Cases resided in Clackamas (5), Columbia (1), Multnomah (1), and Washington (6) counties. Four (31%) were hospitalized, none developed the hemolytic uremic syndrome, and none died.

Table 1: Demographics of confirmed cases of *E. coli* O26 infection
Outbreak #2015-3740, Oregon

Age (years)	Male	Female	Total
<10	0	0	0
10–19	3	4	7
20–49	2	3	5
≥50	0	1	1
Total	5	8	13

All 13 confirmed cases were interviewed by phone, and all reported having eaten at one or more of 5 Chipotle restaurants in the Portland metropolitan area. Chipotle meal dates for confirmed cases were October 21–23, yielding an average incubation period of 4 (range, 1–7) days. None of the 30 potential vehicles studied was statistically significantly associated with illness; consumption of red tomatillo salsa was inversely associated with illness ($P=0.04$; Table 2, page 4). All food items and environmental samples tested negative for shiga-toxin-producing *E. coli*. Chipotle’s internal traceback did not identify a common source that would have explained a majority of the cases. In response to a request from local health officers, Chipotle closed restaurants voluntarily in the Portland metro area during October 30 – November 11, 2015 while the outbreak was being investigated. Environmental health specialists reported that salad spinners, cheese graters and tomato slicers were difficult to clean properly, and that at some facilities the cheese graters were used to slice tomatoes, which presented opportunity for cross-contamination.

Nationally, the outbreak involved 55 confirmed cases, 21 of whom were hospitalized, in 11 states. A summary of the nationwide investigation is available at www.cdc.gov/ecoli/2015/o26-11-15/.

As detailed in this report from the Food and Drug Administration, www.fda.gov/Food/RecallsOutbreaksEmergencies/Outbreaks/ucm470410.htm, in response to the outbreak, Chipotle tested food and equipment, conducted additional deep cleaning and sanitization, replaced all ingredients in the closed restaurants, and expanded testing of foods before restocking the restaurants.

Conclusions: An outbreak of Shiga-toxin-producing *E. coli* O26 infections was transmitted by some food or ingredient served at Chipotle restaurants in the Pacific Northwest during October 2015; however, the specific food vehicle of transmission was not identified by epidemiologic study or food testing. In restaurants like Chipotle, the fact that various menu items share many of the same ingredients, which are mixed together prior to serving, makes it difficult for a specific contaminated food component to be identified epidemiologically. Inspection of the facilities identified several areas for improvement. In response, Chipotle implemented several new food-safety practices in its restaurants nationwide.

Table 2. Chipotle food exposures among cases and matched controls
Oregon Outbreak 2015-3740

Ingredient	% eating		Odds Ratio	P value
	cases	controls		
	n=13	n=39		
Burrito	46	31	1.8	0.57
Burrito bowl	38	69	0.2	0.06
Salad	23	13	1.8	0.69
Corn tortilla	0	8	0.5	0.56
Flour tortilla	38	46	0.6	0.69
Chicken	69	69	1.0	1.00
Steak	23	10	1.8	0.74
Barbacoa	0	21	0.4	0.37
Sofritas	8	13	0.5	0.94
Brown rice	38	36	0.8	1.00
White rice	62	59	0.8	1.00
Black beans	54	72	0.3	0.23
Pinto beans	38	15	2.6	0.28
Cheese	85	77	4.6	0.26
Lettuce	62	74	0.5	0.58
Fajitas	23	44	0.3	0.24
Fresh tomato salsa	77	69	1.5	0.87
Roasted chili corn salsa	46	41	1.2	1.00
Green tomatillo salsa	46	28	2.2	0.44
Red tomatillo salsa	8	41	0.1	0.04
Guacamole	46	44	1.2	1.00
Sour cream	54	54	1.0	1.00
Chips	46	51	0.1	0.80
Any jalapeño	85	82	1.1	1.00
Any cilantro	92	92	1.6	1.00
Any corn	54	41	1.5	0.70
Any poblano pepper	54	41	1.3	0.94
Any red onion	92	90	2.5	0.81
Any tomato	77	64	1.8	0.70
Any citrus	92	100	1.7	0.67