
Notes from the Field: Clostridium perfringens Gastroenteritis Outbreak Associated with a Catered Lunch – North Carolina, November 2015

Weekly / November 25, 2016 / 65(46);1300–1301

Jessica L. Rinsky, PhD^{1,2}; E. Berl, DVM²; V. Greene²; J. Morrow, MD³; A. Didomenico²; J. MacFarquhar, MPH^{1,4}; G.A. Gómez⁵; C. Lúquez, PhD⁵; C. Williams, DVM² ([View author affiliations](#))

[View suggested citation](#)

During November 2015, the North Carolina Division of Public Health was notified by the Pitt County Health Department (PCHD) that approximately 40 persons who attended a catered company Thanksgiving lunch the previous day were ill with diarrhea and abdominal pain. The North Carolina Division of Public Health and PCHD worked together to investigate the source of illness and implement control measures. Within hours of notification, investigators developed and distributed an online survey to all lunch attendees regarding symptoms and foods consumed and initiated a cohort study. A case of illness was defined as abdominal pain or diarrhea in a lunch attendee with illness onset <24 hours after the event. Risk ratios (RRs) and 95% confidence intervals (CIs) were estimated for all menu items. Among 80 attendees, 58 (73%) completed the survey, including 44 respondents (76%) who reported illnesses meeting the case definition; among these, 41 (93%) reported diarrhea, and 40 (91%) reported abdominal pain. There were no hospitalizations. Symptom onset began a median of 13 hours after lunch (range = 1–22 hours). Risk for illness among persons who ate turkey or stuffing (38 of 44; 86%), which were plated and served together, was significantly higher than risk for illness among those who did not eat turkey or stuffing (six of 14; 43%) (RR = 2.02; 95% CI = 1.09–3.73).

PCHD collected stool specimens from ill persons and samples of leftover food from the company that hosted the lunch. Stool specimens were tested for norovirus and bacterial enteric pathogens at the North Carolina State Laboratory for Public Health. Based on reported symptoms and short interval between the lunch and symptom onset, a toxin was suspected as the cause of the outbreak; therefore, five stool specimens from ill persons and 20 food samples were submitted to CDC for *Clostridium perfringens* detection. Stools were tested for *C. perfringens* enterotoxin (CPE) using reversed passive latex agglutination. Stool culture and enumeration of *C. perfringens* colony forming units (CFU) were performed for five samples of foods implicated by the epidemiologic investigation (one stuffing sample and four turkey samples). Because meat is the most common

source of *C. perfringens* outbreaks (1), one ham sample also was analyzed, although consumption of ham was not associated with an increased risk for illness. CPE was detected in all five stool specimens. *C. perfringens* containing the *C. perfringens* enterotoxin gene (*cpe*) was recovered from all five stool specimens and from all four turkey samples; one turkey sample contained $>10^5$ CFU/g. *C. perfringens* was not recovered from samples of other foods. No other pathogens were detected in stool specimens. Collectively, laboratory results met CDC guidelines for confirming *C. perfringens* as the outbreak source (3).

PCHD environmental health specialists interviewed the caterer about food handling and preparation practices. The North Carolina Food Code requires that all commercial caterers operate in a facility that has been inspected for compliance and permitted by the regulatory authority (4). The caterer had previously maintained a permitted facility, but reported having prepared the lunch food served at this event in an uninspected, residential kitchen. Turkeys were cooked approximately 10 hours before lunch, placed in warming pans, and plated in individual servings. Food was then delivered by automobile, which required multiple trips. After cooking and during transport, food sat either in warming pans or at ambient temperature for up to 8 hours. No temperature monitoring was conducted after cooking.

C. perfringens toxicoinfection (a foodborne illness caused by ingestion of toxin-producing bacteria) is often associated with consumption of meat that has been improperly prepared and handled (1,2). Because diagnostic testing is not widely available, *C. perfringens* can go undetected as a cause of foodborne illness outbreaks (2,3,5). Diagnostic testing to assist with outbreak source identification is useful to corroborate epidemiologic information, document disease prevalence, and guide prevention recommendations.

Epidemiologic, laboratory, and environmental evidence indicate that this outbreak was caused by consumption of turkey prepared by a commercial caterer operating in an unpermitted kitchen. Inadequate facilities, extended time between turkey preparation and consumption, and failure to monitor and control temperature before and during transport resulted in an anaerobic environment conducive to *C. perfringens* spore germination and growth (4). Prompt local health department response, use of an online survey, and rapid collaboration between local, state, and federal public health agencies were instrumental in identifying the outbreak source quickly and preventing additional cases.

These findings confirm the need for commercial food preparers to adhere to existing food safety regulations (4), including use of permitted facilities and having a certified kitchen manager on staff. Caterers should be aware of the risks associated with improper storage of prepared food for long periods and the importance of temperature monitoring and regulation during food preparation and handling.

^ Top

Corresponding author: Jessica L. Rinsky, ywc8@cdc.gov (<mailto:ywc8@cdc.gov>), 919-546-

¹Epidemic Intelligence Service, CDC; ²North Carolina Department of Health and Human Services; ³Pitt County Health Department, North Carolina; ⁴Career Epidemiology Field Office, CDC; ⁵Division of Foodborne, Waterborne, and Environmental Diseases, CDC.

^ [Top](#)

^ [Top](#)

References

1. Grass JE, Gould LH, Mahon BE. Epidemiology of foodborne disease outbreaks caused by *Clostridium perfringens*, United States, 1998–2010. Foodborne Pathog Dis 2013;10:131–6. [CrossRef \(http://dx.doi.org/10.1089/fpd.2012.1316\)](http://dx.doi.org/10.1089/fpd.2012.1316) [PubMed \(http://www.ncbi.nlm.nih.gov/pubmed/23379281\)](http://www.ncbi.nlm.nih.gov/pubmed/23379281)
2. Scallan E, Hoekstra RM, Angulo FJ, et al. Foodborne illness acquired in the United States—major pathogens. Emerg Infect Dis 2011;17:7–15. [CrossRef \(http://dx.doi.org/10.3201/eid1701.P11101\)](http://dx.doi.org/10.3201/eid1701.P11101) [PubMed \(http://www.ncbi.nlm.nih.gov/pubmed/21192848\)](http://www.ncbi.nlm.nih.gov/pubmed/21192848)
3. Bennett SD, Walsh KA, Gould LH. Foodborne disease outbreaks caused by *Bacillus cereus*, *Clostridium perfringens*, and *Staphylococcus aureus*—United States, 1998–2008. Clin Infect Dis 2013;57:425–33. [CrossRef \(http://dx.doi.org/10.1093/cid/cit244\)](http://dx.doi.org/10.1093/cid/cit244) [PubMed \(http://www.ncbi.nlm.nih.gov/pubmed/23592829\)](http://www.ncbi.nlm.nih.gov/pubmed/23592829)
4. North Carolina Food Code Manual. Raleigh, NC: North Carolina Department of Health and Human Services; 2012. <http://ehs.ncpublichealth.com/faf/docs/foodprot/NC-FoodCodeManual-2009-FINAL.pdf> (<http://ehs.ncpublichealth.com/faf/docs/foodprot/NC-FoodCodeManual-2009-FINAL.pdf>)
5. Dailey NJM, Lee N, Fleischauer AT, et al. *Clostridium perfringens* infections initially attributed to norovirus, North Carolina, 2010. Clin Infect Dis 2012;55:568–70. [CrossRef \(http://dx.doi.org/10.1093/cid/cis441\)](http://dx.doi.org/10.1093/cid/cis441) [PubMed \(http://www.ncbi.nlm.nih.gov/pubmed/22550114\)](http://www.ncbi.nlm.nih.gov/pubmed/22550114)
6. Taormina PJ, Dorsa WJ. Growth potential of *Clostridium perfringens* during cooling of cooked meats. J Food Prot 2004;67:1537–47. [PubMed \(http://www.ncbi.nlm.nih.gov/pubmed/15270517\)](http://www.ncbi.nlm.nih.gov/pubmed/15270517)

^ [Top](#)

Suggested citation for this article: Rinsky JL, Berl E, Greene V, et al. *Notes from the Field: Clostridium perfringens* Gastroenteritis Outbreak Associated with a Catered Lunch — North Carolina, November 2015. MMWR Morb Mortal Wkly Rep 2016;65:1300–1301. DOI: <http://dx.doi.org/10.15585/mmwr.mm6546a5> (<http://dx.doi.org/10.15585/mmwr.mm6546a5>) .

Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

References to non-CDC sites on the Internet are provided as a service to *MMWR* readers and do not constitute or imply endorsement of these organizations or their programs by CDC or the U.S. Department of Health and Human Services. CDC is not responsible for the content of pages found at these sites. URL addresses listed in *MMWR* were current as of the date of publication.

All HTML versions of *MMWR* articles are generated from final proofs through an automated process. This conversion might result in character translation or format errors in the HTML version. Users are referred to the electronic PDF version (<http://www.cdc.gov/mmwr> (<http://www.cdc.gov/mmwr>)) and/or the original *MMWR* paper copy for printable versions of official text, figures, and tables. An original paper copy of this issue can be obtained from the Superintendent of Documents, U.S. Government Printing Office (GPO), Washington, DC 20402-9371; telephone: (202) 512-1800. Contact GPO for current prices.

Questions or messages regarding errors in formatting should be addressed to mmwrq@cdc.gov (<http://www.cdc.gov/mmwr/form/index.html>).

File Formats Help:

How do I view different file formats (PDF, DOC, PPT, MPEG) on this site?

(<http://www.cdc.gov/Other/plugins/>)

(<http://www.cdc.gov/Other/plugins/#pdf>)

Page last reviewed: November 22, 2016

Page last updated: November 22, 2016

Content source: Centers for Disease Control and Prevention (<http://www.cdc.gov/>)