

Title: Tracing a Listeria Outbreak to Chocolate Milk in Ontario, Canada

Activities: Manage food supply chain

Stakeholders: National and subnational health authorities; World Health Organization; Food and Agriculture Organization of the United Nations; World Food Program

Phases: Early response; Intervention

Years: 2015-2016

Countries: Canada

Agent: Listeria monocytogenes

Case study prepared by: Hannah Todd, June 26, 2020

Please include full case study text below this line.

Beginning in November 2015, individuals in Ontario, Canada began presenting with listeriosis. By June 2016, there were 34 cases. Of these patients, 94% (32) were hospitalized, and 12% (4) died. All cases were Ontario residents, and many shopped at a common grocery store chain.

To trace the outbreak, local public health professionals completed the national invasive listeriosis questionnaire and collected food samples. Researchers conducted a case-case analysis coupled with supplemental questionnaires, centralized interviewing, and reviewal of purchase records from shoppers' loyalty card programs. Pulsed-field gel electrophoresis (PFGE) and whole-genome sequencing were performed, along with food safety investigations and laboratory analyses of food samples.

Public Health Ontario collaborated with local, provincial, and federal public health and food safety partners to determine the origins of the outbreak.¹ Potential explanations included a connection to an ongoing listeriosis outbreak tied to leafy greens in the United States and to a food manufacturer of coleslaw which supplied several of the venues at which six case-patients had eaten.

In late May 2016, the correct strain of Listeria was isolated from expired bagged chocolate milk. Although exposure to pasteurized milk was only reported by 60 percent of case patients in the outbreak's first wave (as compared with 76% of controls), milk had been initially ruled out. With

¹ Public Health Ontario. Reportable Disease Trends in Ontario: Archive of 2016 summaries. Published November 2018. Accessed June 27, 2020.
<https://www.publichealthontario.ca/-/media/documents/R/2019/rdto-summaries-2016.pdf?la=en>.

this new suspicion about milk as the source, case-patients from the second wave were re-interviewed, resulting in 75% (9) case-patients reporting consumption of the worrisome brand for chocolate milk.

On June 3, a retail sample (from a popular grocery store chain at which many of the patients shopped) of the suspected brand of chocolate milk was confirmed positive for *L. monocytogenes*. On June 5, health officials recalled all chocolate milk of this brand processed at the facility where this positive isolate was identified. Of note, no white milk samples were positive for the bacteria.

Through environmental sampling at the manufacturer, researchers ultimately traced the contamination in food supply to postprocess contamination of the chocolate milk line. The outbreak strain was confirmed within a post-pasteurization pump for solely chocolate milk and on nonfood contact surfaces. Contamination was speculated to have occurred due to a specific maintenance event or poor equipment design. Prior to resuming chocolate milk production, equipment was replaced, and corrective measures were implemented to prevent recurrence.²

Please include case study summary text below this line.

There was a listeriosis outbreak in Ontario, Canada from November 2015 until June 2016. Pasteurized chocolate milk was identified as the source. Contamination likely occurred after pasteurization due to the confirmed presence of the outbreak strain within a post-pasteurization pump dedicated to chocolate milk and on nonfood contact surfaces. Production resumed after the replacement of the contaminated equipment and implementation of corrective measures to prevent recurrence.

² Hanson H, Whitfield Y, Lee C, et al. *Listeria monocytogenes* Associated with Pasteurized Chocolate Milk, Ontario, Canada. *Emerg Infect Dis*. 2019;25(3):581-584. doi:10.3201/eid2503.180742.