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**Outbreak of Invasive Listeriosis Associated with the Consumption of Hog Head Cheese - Louisiana, 2010, MMWR, April 8, 2011 / 60(13);401-405**

http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6013a2.htm?s_cid=mm6013a2_e&source=govdelivery

During January-June 2010, a total of 14 cases of laboratory-confirmed invasive listeriosis were reported to the Louisiana Office of Public Health (OPH). Isolates of *Listeria monocytogenes* from the blood samples of eight patients were identified as serotype 1/2a and had pulsed-field gel electrophoresis (PFGE) pattern combinations that were indistinguishable from one another. The detection of this cluster prompted an investigation in coordination with CDC, the Louisiana Department of Agriculture and Forestry (LDAF), and the U.S. Department of Agriculture's Food Safety and Inspection Service (USDA-FSIS). In-depth epidemiologic and environmental investigations of the cluster were initiated on July 26, including food history interviews of four patients. Three patients reported eating hog head cheese (a meat jelly made from swine heads and feet); the product was purchased at two grocery stores in Louisiana. A traceback investigation determined that a single brand of hog head cheese was common between the two grocery stores. *L. monocytogenes* serotype 1/2a was cultured from one of three product samples and from two of 16 environmental samples collected by LDAF at the processing establishment; the product and one of the two environmental samples yielded isolates with PFGE pattern combinations that were indistinguishable from the patient isolates. On August 14, LDAF coordinated a voluntary recall of approximately 500,000 pounds of hog head cheese and sausage because of possible contamination with *L. monocytogenes*. This is the first published report of an invasive listeriosis outbreak associated with hog head cheese, which is a ready-to-eat (RTE) meat. USDA-FSIS has a "zero tolerance" policy for *L. monocytogenes* contamination of RTE food products, requesting recall of such products at any detectable level of *L. monocytogenes* contamination. LDAF imposes and enforces equivalent requirements in state-inspected establishments.

Invasive listeriosis has been nationally notifiable since 1999. In 2003, the Council of State and Territorial Epidemiologists recommended prompt, routine interviews of all patients using a standardized questionnaire and forwarding all *L. monocytogenes* isolates from clinical laboratories for PFGE subtyping at public health laboratories. Accordingly, the Louisiana OPH collects demographic and clinical information for all reported cases of invasive listeriosis. Patients are interviewed immediately for food histories using CDC's Listeria Initiative questionnaire.* Patient isolates are sent to the Public Health Central Laboratory at OPH for confirmation and PFGE characterization.

Louisiana OPH epidemiologists noted that 14 cases of invasive listeriosis had been reported during January-June 2010, which exceeded the state's average of five cases reported during each January--June period during the previous 3 years. For this investigation, a cluster-associated case was defined as isolation of *L. monocytogenes* serotype 1/2a from a normally sterile site (e.g., blood or cerebrospinal
Eight patients had illnesses that met the case definition. Their median age was 64 years (range: 38-93 years). Six patients were men; no patients were pregnant. Six patients had one or more underlying medical conditions (i.e., human immunodeficiency virus [HIV] infection, alcohol abuse, cancer, and diabetes mellitus). Illness onsets occurred from February 18 to June 16. Signs and symptoms included fever (n = 6 patients), altered mental status (n = 3), diarrhea (n = 3), vomiting (n = 3), and weakness (n = 2). Seven patients were hospitalized; two patients died.

OPH epidemiologists obtained food histories from four patients; the remaining patients could not be reached for interview because of their illness or death. Two patients initially reported eating hog head cheese purchased from the same grocery store. Upon re-interview, a third patient also reported eating hog head cheese purchased from a grocery store in another city. A fourth patient could not be reached for re-interview but had initially reported eating "other deli meats," a category that would include hog head cheese. The traceback investigation determined that only one brand of hog head cheese was sold at both stores, suggesting that this brand was the outbreak source.

OPH sanitarians conducted an environmental investigation at both grocery stores to gather additional information on the suspect product. The sanitarians determined that hog head cheese offered for sale arrived in small, 0.7 pound blocks that were individually vacuum-sealed at the processing establishment. Each store weighed and priced the product and sold it in the refrigerated meat section. The sanitarians collected one unopened package of mild hog head cheese from the first store and two unopened packages of hog head cheese, one mild and one spicy, from the second store. At CDC's Enteric Diseases Laboratory Branch, *L. monocytogenes* serotype 1/2a with the outbreak PFGE pattern combination was isolated from the package of spicy hog head cheese. This finding triggered a voluntary recall of approximately 500,000 pounds of hog head cheese and sausage that was processed on the same equipment. LDAF also collected 16 environmental samples from the processing establishment. Cultures of samples from a refrigeration unit and a door threshold yielded *L. monocytogenes*. An isolate from the refrigeration unit exhibited the outbreak PFGE pattern combination, and an isolate from the door threshold exhibited a pattern combination that was new to the PulseNet database (GX6A16.1362 and GX6A12.1939). CDC and the USDA Agricultural Research Service further characterized the patient, product, and environmental isolates using multiple-locus variable-number tandem repeat analysis and multilocus genotyping. All isolates, with the exception of the isolate from the door threshold, displayed indistinguishable multiple-locus variable-number tandem repeat analysis patterns and identical multilocus genotyping haplotypes, further strengthening the association between the outbreak-associated cases and the hog head cheese producer.

*L. monocytogenes* can be found in soil, water, and silage, and causes a spectrum of illness ranging from asymptomatic infection to severe disease in both animals and humans. Invasive listeriosis, including sepsis and meningoencephalitis, occurs predominantly in older adults, persons with impaired immune systems, fetuses, and neonates. Based on its ubiquitous nature and the ability of the bacterium to establish itself in food processing environments, *L. monocytogenes* presents unique challenges for the food industry and regulatory agencies in their efforts to prevent the contamination of RTE foods. In addition, unlike most foodborne pathogens, *L. monocytogenes* can multiply at refrigerator temperatures.

The implicated brand of hog head cheese originated from a small, state-inspected processing establishment in Louisiana, which produces approximately 600 pounds of hog head cheese per week. This establishment was under federal inspection until January 2007. Routine FSIS microbiologic testing of products at the establishment detected *L. monocytogenes* contamination in October and December 2006;
the company voluntarily recalled 290 pounds of hog head cheese in January 2007. Four *L. monocytogenes* isolates from USDA-FSIS samples collected in 2006 did not match the 2010 outbreak-related PFGE pattern combination. In addition, *Listeria* contamination was not detected in any of the 12 product samples collected by LDAF since 2007; analysis of routine environmental samples collected by the management of the processing establishment during January--July 2010 also did not detect *Listeria*. However, the outbreak strain was identified in environmental samples collected during the investigation, which was several weeks after the manufacture of the outbreak-associated products, suggesting that persistent environmental contamination in the processing establishment was responsible for product contamination and resulting illnesses.

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