

Public Health Practice Stories from the Field



Increased four-fold

the percentage of *Listeria* isolates uploaded and reported by Massachusetts to national surveillance systems during 2007–2011

Collaborated

effectively with laboratory, epidemiology, and environmental health professionals to respond quickly to outbreaks

Changed

state regulations to make reporting of *Listeria* isolates required instead of voluntary

Expanded

food laboratory capacity to support increased food sample testing at the state laboratory

Massachusetts Tackles *Listeria* and Other Foodborne Bacteria Through Teamwork

Unpasteurized (raw) milk and cheeses made from raw milk can be contaminated with bacteria that cause serious illness or death. These bacteria include *Brucella*, *Campylobacter*, *Listeria*, *Mycobacterium bovis*, *Salmonella*, Shiga toxin-producing *Escherichia coli*, *Shigella*, *Streptococcus pyogenes*, and *Yersinia enterocolitica*.

Listeria monocytogenes—the third leading cause of death from food poisoning. At least 90% of people who get *Listeria* infection are pregnant women and their newborns, people aged 65 years or older, or people with weakened immune systems. Most require hospitalization, and about 1 in 5 dies.

Listeria is a hardy germ that can grow on refrigerated foods and be found on equipment and appliances where food is processed and prepared. Pasteurization eliminates *Listeria*, but contamination can occur after pasteurization.

The [Massachusetts Department of Public Health](#) (MDPH) meets the challenge of foodborne illness through teamwork by bringing together experts in laboratory science, environmental health, and epidemiology in the Working Group on Foodborne Illness Control, established in 1986. This teamwork was tested in 2007 when Massachusetts identified a deadly *Listeria* outbreak that sickened five people, killed three, and caused one miscarriage. At the time, this was only the third report of a US outbreak of *Listeria* infection linked to pasteurized milk. Because such outbreaks are so uncommon and most cases likely go undetected, this outbreak could have grown if not for the coordinated efforts of MDPH.

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What We Did

In June 2007, MDPH's State Laboratory Institute used pulsed-field gel electrophoresis (PFGE) to identify the "DNA fingerprint" of a novel strain of *Listeria monocytogenes* in a patient with listeriosis. This strain had neither been previously identified in Massachusetts nor detected by PulseNet. PulseNet is a national network of public health and regulatory laboratories that submit results of PFGE subtyping (the bacterial DNA fingerprints) to a central database where isolates can be compared across states. The state laboratory staff looked for identical matches of the novel *Listeria* strain and identified it in three additional Massachusetts patients. Using questionnaires developed for the [Listeria Initiative](#), MDPH epidemiologists identified pasteurized milk from a local Massachusetts dairy as a possible source of contamination. A sample of milk provided by one patient confirmed the milk was indeed contaminated with the same strain. This finding directed investigators to the outbreak's source—a local dairy.

Environmental experts from MDPH's [Food Protection Program](#) conducted a full environmental inspection, which included milk sampling of the local dairy plant. This led to a voluntarily closure of the facility and recall of its dairy products. The team then collected more than 100 additional milk samples and environmental swabs for testing, including swabs from two floor drains and one from the bottle washer. The state laboratory detected the outbreak *Listeria* strain in eight milk samples and one swab from the floor drain. It was concluded that since records indicated that pasteurization methods at the dairy were adequate, contamination of the product likely occurred after pasteurization.

On February 1, 2008, the milk processing facility was permanently closed.

What We Accomplished

Massachusetts' quick detection, coordinated approach, and thorough response saved lives. This unusual *Listeria* outbreak is one example of teamwork used to tackle food-related emergencies. To continue the fight against foodborne illnesses, MDPH has also

- Enhanced food laboratory capacity at the state level
- Expanded emphasis on food testing within Massachusetts
- Changed state regulations to require clinical laboratories throughout Massachusetts to submit all *Listeria* isolates to the state laboratory for PFGE testing
- Increased the number of food samples submitted for state laboratory testing three-fold from nearly 100 specimens to 300 specimens annually
- Increased the percentage of *Listeria* isolates uploaded and cases reported to national surveillance systems four-fold during 2007–2011

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