

What is *Listeria monocytogenes*?

Listeria is a bacterium that is commonly found in the environment, on our hands and in our refrigerators. Most people are routinely exposed to *Listeria* with no health consequences. But one strain of *Listeria* – *Listeria monocytogenes* – is a virulent strain and can lead to the very serious disease, listeriosis, particularly among at-risk populations, including pregnant women, newborns, the very old and people who are immunocompromised.

L. monocytogenes is found in soil, water and the digestive system of warm-blooded animals, including humans. While processed meat and poultry products are cooked to destroy *L. monocytogenes*, on rare occasions, this environmental bacteria can recontaminate the product as it is being packaged, handled or distributed.

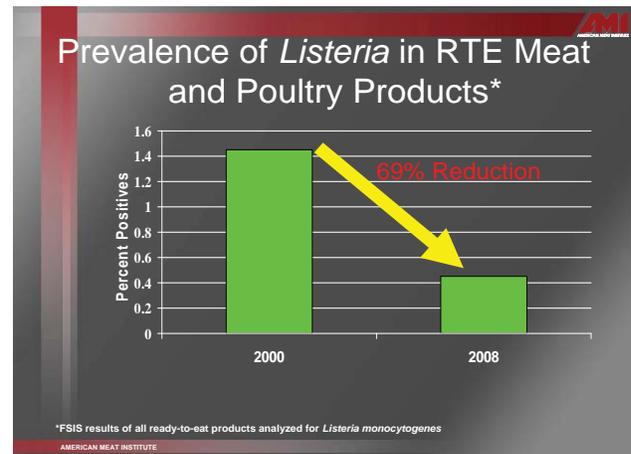
L. monocytogenes can be found in unprocessed foods of animal origin like raw milk, meat, poultry and fish. The pasteurization and cooking of these products will destroy *Listeria*. It also can be found in some processed foods like cheese, ice cream and processed meats due to post-processing contamination. These bacteria also are sometimes found on fresh fruits and vegetables.

Listeria can thrive in a cold, moist environment commonly found in refrigerators. Even if a *Listeria*-free product is placed in a refrigerator, if it is improperly handled or stored, bacteria in the refrigerator can contaminate products. In fact, protein products like meat and cheese are excellent media or “food” for bacterial growth.

United States Department of Agriculture (USDA) data indicates that *L. monocytogenes* can be found in a small percentage of ready-to-eat meat and poultry products. Its occurrence on these products is unacceptable to both industry and government. The AMI Foundation (AMIF) has made research related to *Listeria* elimination one of its top priorities.

What is Listeriosis?

Listeriosis is a *Listeria*-related illness characterized



by flu-like symptoms including fever, muscle aches and, sometimes, gastrointestinal symptoms. If infection spreads to the nervous system, symptoms may progress to include severe headache, stiff neck, confusion, loss of balance or convulsions.

Since 2000, the *Listeria* incidence rate in ready-to-eat meat and poultry products has dropped 69 percent to less than one half of one percent. It is also noteworthy that there have been no recalls of ready-to-eat meat or poultry products triggered by a listeriosis outbreak since 2002.

It is unknown how many of the *L. monocytogenes* organisms (known as the “infective dose”) are required to cause listeriosis, but it is believed to vary with the specific strain of the bacterium and the susceptibility of the individuals. Research is ongoing on infective doses, but the scientific opinion is currently that low levels of *L. monocytogenes* are not likely to cause illness in most people.

Healthy adults and children can become infected, but rarely become seriously ill.

Pregnant women may experience only mild flu-like symptoms, but infection during pregnancy can transfer to newborns or lead to premature delivery, miscarriage or stillbirth.

According to the Centers for Disease Control and Prevention (CDC), pregnant women are 20 times more likely to get listeriosis and account for about one-third of reported cases. In such instances, usually the unborn child suffers the most serious effects.

The incubation period for *L. monocytogenes* ranges from four days to several weeks. Symptoms of listeriosis can last for several days. Diagnosis requires laboratory analysis of blood or cerebrospinal fluid. Treatment is administered through antibiotics like penicillin or ampicillin.

Incidence of Illnesses

Listeriosis is very rare. When you consider the estimated 76 million foodborne illnesses that CDC estimates occur each year, listeriosis is responsible for a tiny fraction of illnesses. It is responsible for 3.8 percent of foodborne illness-related hospitalizations and 27.6 percent of foodborne disease-related deaths.

Listeria monocytogenes increased from 0.29 cases per 100,000 people in 2008 to 0.34 cases per 100,000 people in 2009. The CDC called this increase “concerning,” but stated the incidence of *Listeria* infections continues to be substantially lower than at the start of the FoodNet surveillance program.

Recent technological developments have increased the ability of scientists to identify the cause of foodborne illness outbreaks. One in particular being used by CDC, Pulsed Field Gel Electrophoresis (PFGE), analyzes the DNA fingerprints of suspected pathogens from an outbreak to link cases with potential sources of the illness. This provides government agencies and the industry a means by which to identify the source of contamination, reduce the scope of an outbreak and hopefully prevent future outbreaks.

A public health network known as PulseNet allows federal and state government agencies to share data concerning foodborne illness outbreaks, thus improving pathogen tracking and identification capabilities. These developments have and will result in increased awareness of foodborne illness, including listeriosis, within the food industry, the medical and public health communities and the public.

Preventing Listeriosis

Both industry and government are working diligently to reduce the incidence of *L. monocytogenes* in foods. AMI has developed operational guidelines to minimize the spread of *Listeria* in meat processing plants. Key to these guidelines are excellent sanitation and environmental controls in processing facilities.

AMIF also has developed an aggressive research agenda to reduce and ultimately eliminate *L. monocytogenes* on ready-to-eat meat and poultry

products. Some technologies currently under investigation include the use of certain ingredients to retard the growth of *L. monocytogenes*. Also under research are technologies that pasteurize products after they are packaged. Irradiation is not yet approved for processed meat and poultry, but AMI, along with other food trade associations, has petitioned the Food and Drug Administration (FDA) seeking permission to use the technology on processed meat and poultry.

Regulatory Standards

Both the Food Safety and Inspection Service (FSIS) and the FDA have strict regulatory standards for ready-to-eat products. These standards include a “zero tolerance” for *L. monocytogenes* on all ready-to-eat foods, the strictest standard in the world.

FSIS and FDA have been sampling ready-to-eat foods in processing plants for *L. monocytogenes* since 1987. Foods found to contain the organism are either withheld from distribution or recalled.

In recent years, FSIS and industry stepped up their sampling programs for *Listeria* in processing environments and on ready-to-eat meat and poultry products. Because the process of testing destroys the product, it is not feasible to test every ounce of ready-to-eat meat and poultry. The goal of the effort is to monitor the adequacy of the system to produce product that does not contain *L. monocytogenes*. In this effort, “sampling programs” are used, which are selected to represent a larger “lot” of product.

Recent regulatory enhancements by USDA have further strengthened the required control methods that RTE meat and poultry manufacturers must employ. USDA has established regulations that require manufacturers to have environmental sampling and testing programs and have further established risk-based processing alternatives to further eliminate or prevent growth of inadvertent *Listeria* contamination.

Consumer Information

The decline in the incidence of *L. monocytogenes* on ready-to-eat meat and poultry products by FSIS coincides with the transition to a more science-based meat and poultry inspection system in 1998. From the time that *L. monocytogenes* was recognized as a potential risk, the meat and poultry industry has taken a number of key actions that have also helped reduce *L. monocytogenes*. These are numerous and can include:

- Training of industry employees through comprehensive *Listeria* control workshops.

- The use of a thermal treatment after a product has been packaged to destroy *L. monocytogenes*.
- The use of new ingredients to inhibit the growth of *L. monocytogenes* on ready-to-eat meat and poultry. Many products now contain these ingredients.
- Development of new principles for processing equipment design that facilitate sanitation and reduce the possibility of bacteria being “harbored” in tiny spaces, such as the thread of an exposed screw or a hollow roller on a conveyor belt.
- Sophisticated new environmental sampling programs that work to target *Listeria* in the plant environment so it can be destroyed before it is transferred to products.
- Research to discover new technologies.
- Declaration by the meat and poultry industry that food safety is a “non-competitive issue,” which results in the free exchange of food safety information among competitors.

Despite the safeguards and improvements in processing technologies, post-processing contamination, even in the consumer’s home is a potential risk. The prevalence of *L. monocytogenes* in the environment makes proper food handling procedures and sanitation essential for protecting at-risk consumers from this pathogen.

L. monocytogenes, like other bacteria, is very susceptible to heat. Cooking product to 160 degrees F for a few seconds is sufficient to kill these bacteria.

The meat and poultry industry advises at-risk consumers, such as pregnant women, follow the CDC’s recommendations: thoroughly reheat to steaming hot ready-to-eat meat and poultry products, like hot dogs and lunchmeats, before consuming them.

Consumers with questions should visit www.meatsafety.org or call USDA’s Meat and Poultry Hotline, 1-888-674-6854.

Helpful Links

American Meat Institute
<http://www.meatami.com>
<http://www.meatsafety.org>

American Meat Institute Foundation
<http://www.amif.org>

American Society for Microbiology
<http://www.asmus.org>

Centers for Disease Control and Prevention
<http://www.cdc.gov>

Institute of Food Technologists
<http://www.ift.org>

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