

LISTERIA HYSTERIA

PUTTING A CRIMP into many a holiday meal plan, a nationwide recall was announced on December 22 for hot dogs manufactured at a Michigan plant. The tube steaks in question have been linked to a multi-state outbreak of listeriosis. The recall covers a large variety of brands, some of which have been sold in Oregon.* The wiener recall comes less than two weeks after the Health Division warned Oregon consumers about an ongoing and more generic risk of listeriosis (and other infections) associated with the consumption of soft cheeses made with unpasteurized milk—notably *queso fresco*—a staple in many Latino households.

Listeriosis is a potentially serious infection caused by the Gram-positive bacterium *Listeria monocytogenes*. Once thought to be primarily a veterinary disease, then thought to be an occasional human illness among persons with direct animal contact, only over the past 15 years has listeriosis become appreciated as primarily a foodborne disease that may be much more common than surveillance figures would suggest. Although exposure to *L. monocytogenes* only infrequently leads to disease, when it does occur, it can be devastating; the case-fatality rate for reported infections in the United States remains over 20%, and listeriosis is a well-documented cause of stillbirth and septic abortion.

There are several species of *Listeria*; *L. monocytogenes* is the only significant human pathogen. *L. monocytogenes* can be found in soil and water. Vegetables can become contaminated from the soil or from manure used as fertilizer. Animals can carry the bacterium without appearing ill and can contaminate foods of animal origin such as meats and dairy products. *Listeria* has been found in a variety of raw foods, such as uncooked meats and vegetables, as well as in processed foods that become contaminated after processing.

Unpasteurized (raw) milk or foods made from unpasteurized milk also may contain the bacterium. *Listeria* is psychrophilic, meaning it can multiply at the refrigerator temperatures that induce an indolent torpor in other, fair-weather bacteria. *L. monocytogenes* isolates can be serotyped, and further subtyping by a variety of molecular techniques can be helpful in epidemiological investigations. There is no clear evidence of any predictable variation in strain virulence.

An estimated 1,850 persons become seriously ill with listeriosis each year in the United States. Between 10 and 20 cases are reported each year in Oregon. Historically, sporadic reports of human cases have not generated much response from the public health system. In part, that reflects the implications of a long and variable incubation period and a consequent inability to link cases to each other. With the increasing availability of molecular subtyping, though, that may change.

DISEASE

Listeriosis has a variable clinical presentation. Reported cases are skewed to the more serious end of the spectrum, and bacteremia and/or meningitis are the most commonly reported manifestations. These may be accompanied or preceded by influenza-like symptoms, such as myalgias, headache, and fever; for some patients these are the only symptoms. A large 1994 outbreak in the Midwest traced to improperly pasteurized chocolate milk helped demonstrate that *L. monocytogenes* can also be a source of fairly run-of-the-mill gastroenteritis; cases in that outbreak reported diarrhea, fatigue, fever, chills, myalgia, and abdominal cramps; with diarrhea lasting around two days.¹

Healthy adults and children occasionally are infected with *Listeria*, but they rarely become seriously ill. Listeriosis is most commonly diagnosed in persons with impaired cell-mediated immunity, notably including the transient immunosuppression associated with pregnancy. Pregnant women are about 20 times more

likely than other healthy adults to get listeriosis. About one-third of documented listeriosis infections happen during pregnancy, and infection can readily spread transplacentally to the fetus or at birth to the newborn. Other victims include older neonates and adults with weakened immune systems by dint of infection, diabetes, or immunosuppressive therapy for cancer or organ transplant; their risk may be as much as 300 times higher than that of immunocompetent adults.

Bacteremic infection during pregnancy can lead to abortion, stillbirth, or infection of the newborn. In utero infections during the third trimester often result in neonatal sepsis with a very high fatality rate. “Delayed-onset” cases, with onset several weeks after delivery, more commonly develop meningitis or meningoencephalitis, and have a somewhat better prognosis. These cases may reflect exposure at parturition, and can occur following either vaginal or Caesarean delivery.

The incubation period (time from exposure to onset of symptoms) is long and variable. Two to four weeks covers the median for most clusters, but incubations up to >70 days are reported. In the chocolate milk outbreak, the average incubation was very short (median 20 hours, range 9–32), reflecting perhaps the estimated very high inoculum (>10¹¹).¹

When infection occurs during pregnancy, ampicillin (often with gentamicin) given promptly to the pregnant woman can prevent infection of the fetus or newborn. Infants with listeriosis receive the same antibiotics as adults, although a combination of antibiotics is often used until physicians are certain of the diagnosis.

RISK REDUCTION

As with almost all foodborne infections, the keys to reducing personal risk include 1) processing potentially contaminated foods sufficiently to inactivate pathogens (i.e., cooking it to death) 2) handling food properly to avoid cross-contamination of fomites and other foodstuffs, and 3) when all else fails, avoiding foods that are most likely to be contaminated.

* A *Listeria* isolate from a November Oregon case matches the outbreak type by ribotyping; that patient reported eating hot dogs from the implicated plant.

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CD SUMMARY

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PERIODICALS
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Raw food from animal sources, including beef, pork, poultry, and seafood, should be cooked thoroughly. Raw vegetables should be washed thoroughly* before eating. Uncooked meats should be kept separate from vegetables and from cooked or otherwise ready-to-eat foods. Avoid raw (unpasteurized) milk or foods made from raw milk. Wash hands, knives, and cutting boards after handling uncooked foods.

Persons at high risk, including all pregnant women and persons with weakened immune systems, should also consider the following recommendations:²

Avoid soft cheeses such as feta, Brie, Camembert, blue-veined, and Mexican-style cheese. (Hard cheeses, processed cheeses, cream cheese, cottage cheese, and yogurt are ok vis-à-vis *Listeria*.) In particular, queso fresco, which is often made with unpasteurized milk, is one of the highest risk foods—if only because of its popularity. Queso fresco is often sold outside mainstream retail channels: by door-to-door sales, at flea markets, through local markets; or it may be homemade and distributed as a gift to family and friends.

Left-overs and ready-to-eat foods such as hot dogs should be heated until they are steaming hot before eating. Although the risk of listeriosis associated with foods from deli counters is relatively low, pregnant women and immunosuppressed persons may choose to avoid these foods or thoroughly reheat cold cuts before eating. In other words, these items are much more likely to be contaminated than many other foods, but not so likely that we feel comfortable making

sweeping recommendations that people “should” avoid these foods. Pick your poison.

We strongly encourage physicians who see pregnant women, particularly Hispanic women, to counsel their patients about food safety. Ask specifically about consumption of queso fresco, and discourage consumption of it unless your patients are certain it is made from adequately heat-treated milk. Although traditional recipes often call for the use of raw milk, safe alternatives have been developed that maintain virtually all of the desirable properties of the cheese without the risk of a horrible death. Recipes in Spanish and English are available on request.

Government agencies and the food industry have taken steps to reduce contamination of food by *Listeria*, and this enhanced attention has been temporally associated with a decrease in cases nationally.³ The FDA, USDA, and state food safety agencies currently have a “zero tolerance” policy for *Listeria*, meaning

that ready-to-eat foods found to be contaminated at any level are subject to embargo. (In Europe, similar regulatory action is triggered only when threshold concentrations are exceeded or a product is linked to human illness.) Unfortunately, the confirmation that contaminated product has been sold rarely comes until some time (at least 5-10 days) after the product has been sold and—typically—consumed. And foods that are prepared for distribution or sale in home or other unlicensed facilities are never routinely screened. According to some estimates, for example, well over half of the queso fresco consumed is made by unlicensed operations, often with minimal attention to concerns about food safety.

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* whatever that means.