

Listeriosis in Connecticut, 1998-2004

Listeriosis is a relatively uncommon but severe infection caused by the bacterium *Listeria monocytogenes*. In Connecticut, listeriosis is a physician and laboratory reportable disease. Persons were counted as cases if *L. monocytogenes* was isolated from a normally sterile site. This report reviews the epidemiology of listeriosis cases reported to the Connecticut Department of Public Health from 1998-2004.

During 1998-2004, 147 cases were reported with an average of 21 cases per year (Figure 1). The annual rate declined 45%, from 9.5 cases per million population in 1998 to 5.2 per million population in 2004. Listeriosis was reported among persons of all age groups (Figure 2). Persons aged ≥ 60 years had the highest average annual rate (19.1 per million population), followed by those < 1 year old (6.7) and persons aged 50-59 years (5.3 per million population).

Of the 147 cases, 77% were considered to be at high risk: 107 (73%) had an immunosuppressive condition, 4 (3%) were pregnant, and 2 (1%) were newborns (with one mother-child pair). The remaining 34 (23%) had no underlying immune related conditions or their conditions were unknown.

During 1998-2004, four multistate outbreaks of *L. monocytogenes* involving Connecticut residents were investigated by the DPH in collaboration with the CDC. An outbreak, occurring from August 1998 through January 1999, resulted in the deaths of 6 adults and 2 spontaneous abortions nationwide (1). This outbreak was successfully traced back to hot dogs and deli meats originating from a single manufacturer. In 2000, an outbreak caused 29 illnesses in ten states, 4 deaths, and 3 miscarriages/stillbirths (2). Subsequent investigation implicated deli turkey meat; traceback efforts identified a single processing plant as the possible source of the outbreak. In 2002, another multistate outbreak linked to sliced turkey deli meat resulted in one of the largest meat recalls in US history (3).

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Figure 1: Listeriosis Case Rate and Number of Cases, Connecticut, 1998-2004

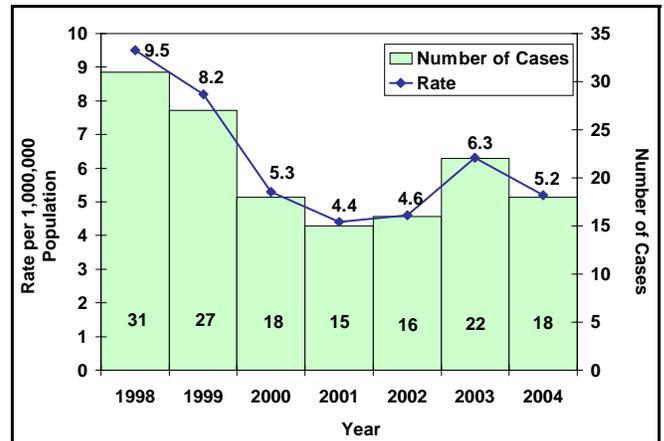
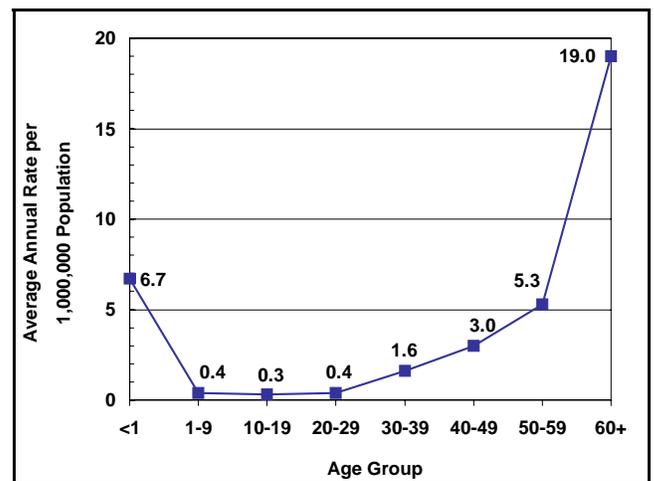


Figure 2: Average Annual Rate of Listeriosis by Age Group, Connecticut 1998-2004



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Editorial Note:

The Centers for Disease Control and Prevention (CDC) report that *L. monocytogenes* infects approximately 2,518 people annually. More than 90% of the infections require hospitalization, and 20% result in death (4). *Listeria monocytogenes* primarily affects pregnant women, the immunocompromised, and the elderly. In these susceptible populations, listeriosis often manifests as bacteremia, influenza-like illness, or meningoenzephalitis; infection during pregnancy can result in congenital infection, possibly leading to abortion or neonatal death. In healthy adults, *L. monocytogenes* infection may produce fever, abdominal cramps, diarrhea, and vomiting.

Listeria monocytogenes is found in soil and water. It has also been isolated from a variety of food products, including raw vegetables and meat, and processed foods such as soft cheeses, cold cuts, and unpasteurized milk.

The Foodborne Diseases Active Surveillance Network (FoodNet) is a component of the CDC's Emerging Infections Program. Data are collected from 10 CDC funded sites in the United States (US) on illnesses resulting from enteric pathogens commonly spread through food. In Connecticut, FoodNet is a collaborative effort between the Connecticut DPH and the Department of Epidemiology and Public Health at Yale University School of Medicine. Listeriosis is a laboratory and physician reportable condition.

In 2004, the overall rate of listeriosis in the ten FoodNet sites was 2.7 cases per million population (5). The rate in Connecticut was 5.2 per million population, the highest among all sites. This rate is more than double the Healthy People 2010 objective of 2.5 cases per million population. To attain this objective, further prevention efforts are necessary.

In 1999, the Food Safety and Inspection Service (FSIS) initiated steps to help industry control *L. monocytogenes* in ready-to-eat products (6). These included a Federal Register notice encouraging plants to reassess their Hazard Analysis and Critical Control Points (HACCP) plans for *L. monocytogenes*. HACCP requires plants to identify critical points along their production lines and ensure that practices at those points minimize or prevent the likelihood of bacterial contamination or

growth. FSIS also recommended that plants conduct environmental and end product testing for general *Listeria* species. An extensive education effort targeting "at risk" consumers was also initiated.

The following steps can be taken in the home to reduce the risk of *L. monocytogenes* infection: store ready-to-eat foods in the refrigerator at 40° F. or lower; consume ready-to-eat/perishable foods in a timely manner; and regularly disinfect the refrigerator. During food preparation, wash hands, surfaces, dishes, and utensils following contact with food, and keep food items separate from one another. All foods should be cooked to appropriate temperatures, and foods must be stored in the refrigerator as quickly as possible. Those at high risk of *Listeria* infection should not consume soft cheeses, refrigerated pâtés or meat spreads, smoked seafood, unpasteurized milk, hot dogs, or deli or luncheon meats unless appropriate precautions are taken. Soft cheeses may be eaten if made from pasteurized milk. Hot dogs and luncheon meats should be reheated until steaming hot. Canned or shelf-stable meat spreads, pâtés, and smoked seafood may be eaten.

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Restaurant-Associated Outbreak of Cyclosporiasis, New Haven County, June 2005

During June 2005, the Department of Public Health (DPH), in conjunction with the local health department (LHD), investigated an outbreak of cyclosporiasis among patrons of a restaurant. The epidemiologic and environmental investigation implicated fresh basil as the most likely source of contamination. This report summarizes the findings of that investigation.

On June 22, the DPH Food Protection Program (FPP) received a call regarding 4 persons (from 2 separate households) who became ill with gastrointestinal (GI) symptoms approximately one week after eating at Restaurant X in New Haven County. An initial investigation of the restaurant was conducted by the FPP and LHD. Between June 24-29, 7 laboratory-confirmed cases of cyclosporiasis were reported to the DPH Epidemiology Program. Interviews of these 7 cases revealed that all had eaten at Restaurant X between June 2-4.

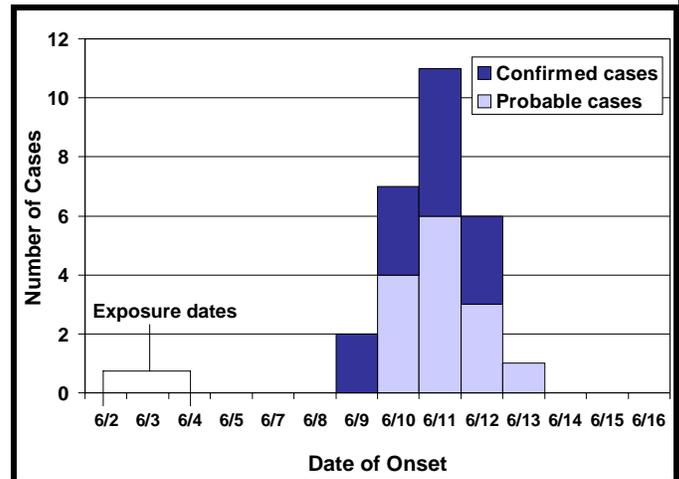
To identify additional cases, laboratories in New Haven County were contacted and asked to immediately report by telephone any specimen positive for *Cyclospora*. All local health departments were alerted to the increase in cyclosporiasis and those in New Haven County were asked to alert local primary care physicians.

A case-control study was conducted among restaurant patrons. The restaurant's credit card receipts from June 2-4 were reviewed. Identified patrons were interviewed by telephone using a survey with questions about symptoms and foods consumed. A case was defined as having onset of illness 1-14 days after eating at the restaurant. A confirmed case was defined as having a stool specimen positive for *Cyclospora*. A probable case was defined as having either ≥ 3 loose stools in a 24 hour period and 1 other symptom, or ≥ 5 symptoms including ≥ 3 GI symptoms. A control was any person who did not become ill 1-14 days after eating at the restaurant.

A total of 30 cases and 22 controls were enrolled in the study. Of the 30 cases, 14 (47%) were laboratory-confirmed; 16 (53%) were male; and the median age was 64 years (range 15 to 82). Predominant symptoms included diarrhea (97%)

with a median of 13 days duration, cramps (87%), fatigue (87%), anorexia (85%), and weight loss (65%). Twenty-three (77%) persons visited a physician, and 1 (3%) was hospitalized. Onsets of illness occurred during June 9-13 (Figure 1).

Figure 1: Number of Cases of Cyclosporiasis by Date of Onset*, Connecticut, 2005



* 3 cases not included because of unknown onset date.

Food items that were significantly and independently associated with illness included; bruschetta (odds ratio [OR]= 12.0, 95% confidence interval [CI]= 1.3-109.0, p-value= 0.0003) and/or house salad (OR= 10.6, 95% CI= 1.9-58.5, p-value= 0.0003).

The focus of the environmental investigation at Restaurant X was on assessment of food workers and identifying factors that could have led to contamination of the food source. All food workers submitted stool samples. Of the 17 stool samples collected, 5 (29%) were positive for *Cyclospora*. Onsets of illness were during June 10-11, consistent with the patrons. Food workers were reportedly allowed to eat any food prepped during their shifts.

Fresh produce items in the bruschetta consisted of red round tomatoes, red onions, and basil. The house salad contained a variety of fresh produce including red onions (the only shared fresh ingredient among both implicated dishes). Ample opportunities were identified for the house salad (including the red onions) to have been cross contaminated by fresh basil. The same cutting board was routinely used, throughout different prep areas within the kitchen, to chop fresh basil and other produce items.

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Listeriosis in Connecticut, Restaurant-Associated Outbreak of Cyclosporiasis

Based on epidemiologic and environmental evidence, the DPH requested the Food and Drug Administration (FDA) conduct a traceback of the basil. The FDA traceback was inconclusive, and the source of the basil was not determined.

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Editorial Note:

Cyclosporiasis is most common in tropical and subtropical areas. Past outbreaks of domestically-acquired cyclosporiasis have been associated with imported fresh produce including raspberries, blackberries, basil, snow peas, and mesclun lettuce (1,2).

Based on epidemiologic, environmental, and compelling supportive information, fresh basil was the most likely source of contamination in this Connecticut outbreak. Besides basil, no fresh produce implicated in other US outbreaks was served at the restaurant during the 2 weeks before and after the known exposures. The

outbreak occurred during a period when multiple outbreaks in at least one other state were linked to fresh basil, and trace-back activities were in progress (3).

This outbreak highlighted several important factors that are critical to the detection and control of *Cyclospora* outbreaks. Physicians should consider cyclosporiasis in the differential diagnosis of intermittent or protracted diarrhea. Because most laboratories do not routinely test for *Cyclospora*, physicians must specifically order this test. For appropriate public health follow-up and intervention, cases should be promptly reported to the DPH and local health departments.

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