

## Electronic Distribution of the Connecticut Epidemiologist Newsletter

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## *Escherichia coli* O157:H7 Gastroenteritis – Connecticut, 2002

Shiga toxin-producing *Escherichia coli* (STEC) strains are an important cause of diarrhea and hemolytic uremic syndrome. The most common STEC in the United States (U.S.) is *E. coli* O157:H7, causing an estimated 73,000 illnesses, 2,000 hospitalizations, and 60 deaths each year (1).

In 1990, the Connecticut Department of Public Health (DPH) added *E. Coli* O157:H7 to the List of Reportable Laboratory Findings (RLF). Connecticut's first documented outbreak of *E. coli* O157:H7 gastroenteritis occurred in September 1993 (2). In 1994, the DPH added *E. coli* O157:H7 gastroenteritis and hemolytic-uremic syndrome (HUS) to the List of Reportable Diseases. In 1997, the DPH revised the list of RLF to require laboratories to send suspect *E. coli* O157:H7 isolates to the DPH laboratory for confirmation and testing by pulsed-field gel electrophoresis (PFGE) to aid in the detection of outbreaks. In 1999, the list of RLF was revised to include all *E. coli* O157 isolates. Beginning in March 1999, the DPH has routinely submitted all *E. coli* O157 PFGE patterns to PulseNet (see page 7).

The surveillance case definition for *E. coli* O157:H7 has been expanded over time. In 1995, the national surveillance case definition was revised to include the isolation of Shiga toxin-producing *E. coli* O157:NM from a clinical specimen (strains of *E. coli* O157:H7 that have lost the flagellar "H" antigen become nonmotile and are designated "NM"). The most recent revision in 2000 added the isolation of

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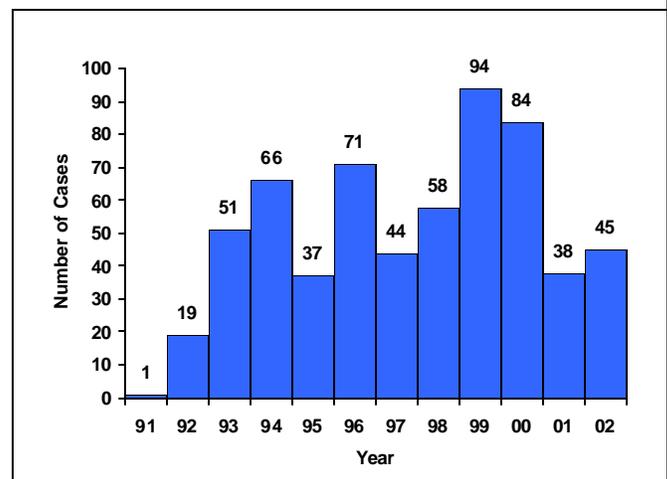
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Shiga toxin-producing *E. coli* (non-O157) from a clinical specimen (3). For the purposes of this report, a laboratory-confirmed case of *E. coli* O157:H7 is defined as a person with gastroenteritis and the isolation of *E. coli* O157:H7 or Shiga toxin-producing *E. coli* O157:NM from a clinical specimen.

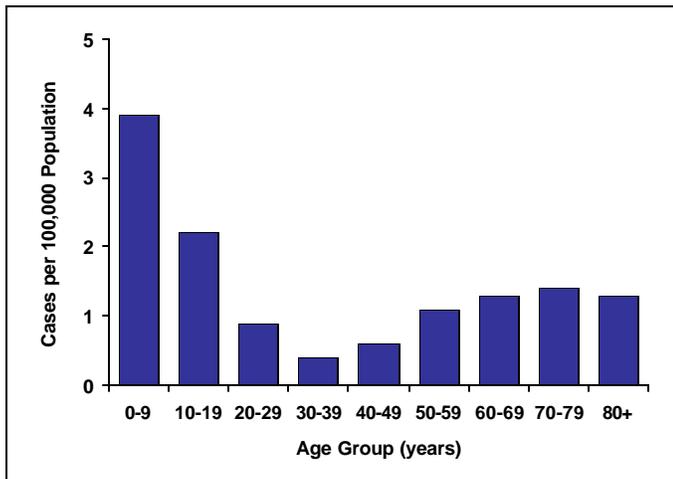
In 1990, no laboratory confirmed cases of *E. coli* O157:H7 gastroenteritis were reported. From 1991 to 2002, 608 cases were reported (Figure 1). Of these 115 (19%) were outbreak related. During this period, children <10 years of age had the highest average annual rate of *E. coli* O157:H7 infection while the lowest rate occurred among persons 30-39 years of age (Figure 2).

In 2002, 45 cases of *E. coli* O157:H7 gastroenteritis were reported to the DPH. Of these, 43 were *E. coli* O157:H7 and 2 were *E. coli*

**Figure 1. Number of *E. coli* O157:H7 Cases by Year, Connecticut, 1991-2002**



**Figure 2. Average Annual Rate of *E. coli* O157:H7 Gastroenteritis by Age Group, Connecticut, 1991 - 2002**



O157:NM. The DPH Laboratory received and conducted PFGE on 42 isolates. The remaining 3 isolates were identified and confirmed by out-of-state public health laboratories. The incidence was 1.3 cases per 100,000 population. Cases ranged in age from 10 months to 90 years (median 12 years). Twenty-three (51%) involved males. Cases were reported from all eight counties: Fairfield (12), Hartford (11), Litchfield (5), New London (5), Middlesex (4), Tolland (3), Windham (3), and New Haven (2). The majority of cases, 62%, occurred in May through August.

In 2002, 24 case-patients (53%) were hospitalized; of whom, 7 (16%) had HUS, and 1 (2%) died. The median duration of hospitalization was 3.5 days (range 1 to 15 days). Of the 7 patients with HUS, 4 (57%) were children <5 years of age. The death involved an elderly Connecticut resident with HUS. No outbreaks of *E. coli* O157:H7 were identified.

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#### **Editorial Note**

Since 1995, the DPH has participated in the Emerging Infections Program's Foodborne Diseases Active Surveillance Network (FoodNet). FoodNet is a collaborative project between the Centers for Disease Control and Prevention, the U. S. Department of Agriculture, the Food and Drug Administration, and 10 states. The project consists of active surveillance for specific foodborne infectious disease agents (including *E. coli* O157:H7) and related studies to better understand the epidemiology of foodborne diseases in the U.S.

The majority of *E. coli* O157:H7 cases reported represent sporadic infections. Multi-state epidemiologic studies conducted by FoodNet have shown that consumption of undercooked ground beef, exposure to cows, living on or visiting farms, and swimming in or drinking untreated surface waters are significant risk factors for sporadic *E. coli* O157:H7 infections (4,5). Person-to-person transmission of *E. coli* O157:H7 can also occur, particularly within households and child care settings.

#### **References**

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#### **Foodborne Disease Outbreaks, Connecticut, 2000-2002**

Foodborne disease outbreaks are reportable to both the Connecticut Department of Public Health (DPH) and the local health department. A foodborne disease outbreak is defined as "the occurrence of two or more cases of a similar illness resulting from the ingestion of a common food (1)."

From 2000 through 2002, the DPH Epidemiology Program identified 36 foodborne disease outbreaks: 9 were reported in 2000, 19 in 2001, and 8 in 2002.

The 36 foodborne outbreaks caused at least 736 illnesses, of which 80 were laboratory-confirmed. The median number of cases of illness identified per outbreak was 9 (range 2 to 297 persons). Twenty-three persons were hospitalized, and no deaths were reported.

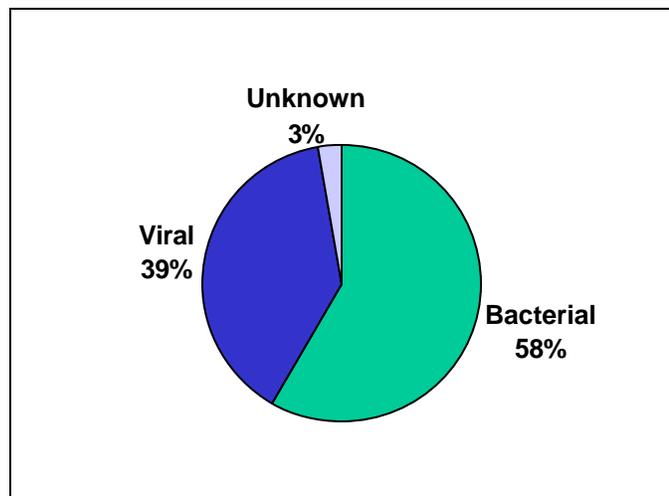
The majority of reported outbreaks were caused by bacterial pathogens (Figure 1). Of the 36 outbreaks, 14 were caused by *Salmonella* species, 4 by *Campylobacter jejuni*, 1 by *Vibrio parahaemolyticus*, 1 by *Clostridium perfringens*, and 1 by *Staphylococcus aureus*. There were 6 confirmed and 8 suspected outbreaks of Norovirus (formerly Norwalk-like virus) based on epidemiologic features. The etiology was undetermined in one outbreak.

Of the 36 outbreaks, 25 (69%) were associated with food service establishments such as restaurants, delicatessens, or caterers. Other settings where outbreak-associated foods were prepared included private homes (6), nursing homes (2), a camp (1), and a church/temple (1). One outbreak was due to contaminated food brought into the United States (U.S.). Five (14%) of the 36 foodborne outbreaks were multi-state outbreaks.

Of the 36 outbreaks, 20 (56%) were linked to a specific food vehicle. Implicated food vehicles included salads (5), meats or poultry (4), deli sandwiches (3), fresh vegetables or fruits (3), cheeses (3), seafood (1), and pizza (1).

Of the 20 outbreaks with an implicated food vehicle, 13 (65%) had at least one contributing environmental factor identified (Table 1, see page 8). Contamination factors relate to how the agent got onto or into the food vehicle. Proliferation factors relate to how microbial agents were able to increase in numbers and/or produce toxic products

**Figure 1. Foodborne Outbreaks by Etiology Connecticut, 2000-2002**



prior to the food being ingested. Survival factors refer to processes or steps that should have eliminated or reduced the agent but did not for the reason listed. Outbreaks may have had more than one contributing factor.

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### Editorial Note

Foodborne diseases cause an estimated 76 million illnesses in the U.S. each year (2). Most reported foodborne illnesses are sporadic in nature; only a small number are identified as being part of an outbreak. The number of outbreaks summarized in this report likely represents only a fraction of the outbreaks that actually occurred. Most outbreaks are never recognized or go unreported.

Current methods to detect and investigate foodborne disease outbreaks are improving. Connecticut is a participant in PulseNet, a national network of public health laboratories that perform pulsed-field gel electrophoresis (PFGE) on bacteria that might be foodborne. The network permits rapid comparison of PFGE patterns through an electronic database maintained at the Centers for Disease Control and Prevention (CDC); closely related PFGE patterns suggest a common source (3). The PFGE capability has contributed significantly to detection and investigation of foodborne outbreaks in Connecticut and nationally.

Connecticut also participates in the Environmental Health Specialist Network (EHS-Net), a network of environmental health specialists and epidemiologists. This project is a collaborative effort of the CDC's FoodNet and Environmental Health Branch, and FoodNet states (4). An initial goal of EHS-Net is to design and conduct studies concerning restaurants and other environmental factors that contribute to foodborne disease outbreaks. Currently, members of the Connecticut EHS-Net are using a specific data collection instrument for all restaurant-associated outbreaks to help assess environmental contributing factors. It is anticipated that this project will facilitate the development of efficient and effective foodborne disease prevention strategies.

**In This Issue... Escherichia coli O157:H7 Gastroenteritis, Foodborne Disease Outbreaks**

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**Table 1. Number and Percent of Outbreaks by Contributing Factors Identified**

<b>Contamination Factors (n=13)</b>	<b>No. (%)</b>
Raw product/ingredient contaminated by pathogens from animal or environment	6 (46%)
Bare-handed contact by handler/worker/preparer with ready-to-eat foods	6 (46%)
Inadequate cleaning of processing/preparation equipment/utensils	5 (38%)
Ingestion of contaminated raw products	2 (15%)
Handling by an infected person or carrier of pathogen	2 (15%)
Cross-contamination from raw ingredient of animal origin	1 (8%)
<b>Proliferation Factors (n=9)</b>	
Allowing foods to remain at room/warm outdoor temperature for several hours	4 (44%)
Slow cooling	2 (22%)
Inadequate cold-holding temperatures	2 (22%)
Preparing foods half day or more before serving	2 (22%)
Insufficient time and/or temperature during hot holding	1 (11%)
Inadequate thawing of frozen products	1 (11%)
<b>Survival Factors (n=9)</b>	
Insufficient time and/or temperature during initial cooking/heat processing	4 (44%)
Insufficient time and/or temperature during reheating	1 (11%)

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