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For more information about FoodNet, see the Foodnet website:
http://www.cdc.gov/ncidod/dbmd/foodnet/foodnet.htm

From the Foodborne and Diarrheal Diseases Branch (FDDB), Division of Bacterial and Mycotic Diseases

the Catchment

Volume 1, Fall 1998

A First Catch

Since its inception in December 1995, FoodNet, the Foodborne Diseases Active Surveillance Network, has made large strides in investigating and describing the burden of foodborne disease in the United States. Requests from persons in state health departments, regulatory agencies, and other locations have led us to start up an informal reporting outlet. Thus, *The Catchment* — a means to update you on FoodNet activities, accomplishments, and plans for future directions.

Pardon us if we take the "catchy" theme too far, but we'd like to fish for future catches together with you. While the staff at FDDB will coordinate newsletter production, your input on content will help determine the newsletter's direction. How about a per-issue focus on projects under way at individual FoodNet sites? Or do you have a question about a particular program component which we could highlight here?
Not to mention format; do you like the rustle of news on paper, or maybe you prefer to catch up via the web? Just let us know. You can drop a line to Sam Yang at say9@cdc.gov.

FoodNet: What We Are, Where We Are, and What We're Doing In 1998

What we are

FoodNet is the foodborne diseases component of the CDC Emerging Infections Program (EIP), a world-spanning effort to combat the ongoing threat of emerging infectious diseases. FoodNet is a collaborative project among CDC, participating EIP sites, the U.S. Department of Agriculture (USDA), and the U.S. Food and Drug Administration (FDA). The objectives of FoodNet are to 1) describe the epidemiology of infectious foodborne diseases of national importance, 2) determine more precisely the frequency and severity of foodborne diseases in the United States, and 3) determine the proportion of some infections caused by eating specific foods. Data on a variety of bacterial and parasitic pathogens are currently being collected and analyzed. These pathogens include *Campylobacter, Cryptosporidium, Cyclospora, Escherichia coli* O157, *Listeria, Salmonella, Shigella, Yersinia,* and *Vibrio.* Program results are being used to help develop and refine foodborne disease prevention and control strategies.

Where we are

The project began with five active surveillance sites: the entire states of Minnesota and Oregon, and selected counties in California, Georgia, and Connecticut. The total population of these catchment areas in 1996 was 14.3 million people, or 5% of the American population. In 1997, an additional county was added in Connecticut (Fairfield), and selected counties were introduced in two more states: Maryland (around Baltimore) and New York (around Rochester). This year, Connecticut will conduct surveillance statewide. Currently, 20.3 million persons are covered, which is nearly 8% of the American population, and there are plans to grow again; Georgia plans to go statewide this year.

Why emphasize statewide surveillance? This method allows us to improve estimates of the national burden of foodborne disease. Statewide surveillance also enhances our ability to detect outbreaks of foodborne illness.

What we're doing

Active surveillance of laboratory-confirmed cases of foodborne illness is FoodNet's core activity. However, FoodNet is designed to monitor foodborne illness at all levels, from the general population through health care providers and laboratories. FoodNet also conducts investigations that target specific infections to learn more about the sources of those infections through detailed epidemiologic studies. In 1998, these additional activities include:

- A *Campylobacter* case-control study: Currently ongoing in all seven sites, this study will help to identify risk factors for *Campylobacter* infection.
- A second population survey: Because the majority of persons with a foodborne illness never see a doctor, little is known about the true extent of foodborne disease. To help give an estimate, during 1996-1997, a population survey was conducted in five FoodNet sites (Minnesota, Oregon, and selected counties in California, Connecticut, and Georgia). About 9,000 persons were surveyed randomly via telephone. Information was gathered on the extent of diarrheal illness in the community and the extent of exposure to specific foods. A similar survey is being readministered this year in all seven sites, including Maryland and New York.

Foodborne Diseases Active Surveillance Network (FoodNet) Population 20.3 million

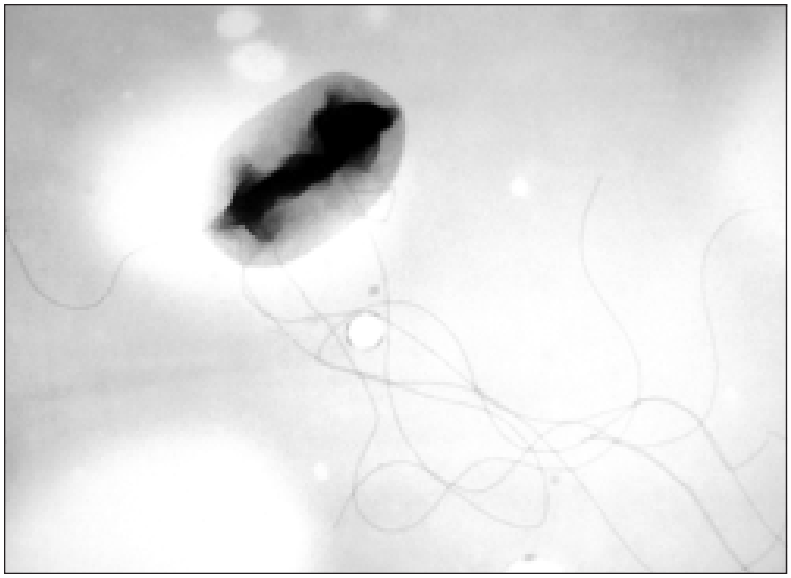
Seven Emerging Infections Program (EIP) Sites

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

A Glimpse of What We Did In 1996 and 1997

To give you an idea of what we did in 1996 and 1997, we've put together an overview of FoodNet abstracts presented at the International Conference on Emerging Infectious Diseases, held in Atlanta, Georgia, March 8-11, 1998. This overview provides abstract titles, authors, and some interesting findings.

Title	Authors	Some Findings
Active surveillance for hemolytic uremic syndrome at selected sites, United States, 1997	Mead P, Bender J, Dembek Z, Gilbert L, Shallow S, Shiferaw B, Griffin P	Preliminary results suggest that most U.S. cases of diarrhea-associated hemolytic uremic syndrome are caused by infection with *E. coli* O157:H7. Active surveillance networks based on data from specialty health care providers can provide timely and detailed surveillance data and may be valuable in monitoring other serious sequelae of foodborne disease.
Case-control study of sporadic *Escherichia coli* O157:H7 infections in 5 FoodNet sites (CA, CT, GA, MN, OR)	Kassenborg H, Hedberg C, Evans M, Chin G, Fiorentino T, Vugia D, Bardsley M, Slutsker L, Griffin P	Consumption of pink hamburgers is a risk factor for infection. Differences in exposure to *E. coli* O157:H7 on farms and through locally processed ground beef may contribute to the regional variability in the annual incidence of *E. coli* O157:H7.
Deaths from enteric bacterial pathogens: a chart review of deaths occurring in the active surveillance network population (FoodNet) during 1996	Villar R, Bardsley M, Reddy S, Fiorentino T, Wicklund J, McGivern T, Vugia D, Swerdlow D, and FoodNet	Deaths from foodborne bacterial pathogens occurred primarily among adults with serious underlying disease. Focusing food safety programs on high-risk groups may prevent fatal infections from foodborne pathogens.
Determining the burden and causes of foodborne illness: Foodborne Diseases Active Surveillance Network (FoodNet), 1996-1997	Angulo F, Voetsch D, Swerdlow D, Griffin P, Vugia D, Marcus R, Farley M, Blake P, Hedberg C, Cieslak P, Dietz V, Pinner R, Tauxe R, and FoodNet	Using data collected from active surveillance for culture-confirmed cases of foodborne disease; surveys of the population, physicians, and laboratories; and case-control studies, FoodNet provides a network for monitoring the burden of foodborne diseases, identifying the source of specific foodborne disease, and responding to new and emerging foodborne diseases of national importance.
FoodNet active surveillance for *Salmonella* Enteriditis (SE): 1996	Marcus R, Fiorentino T, Evans M, Swerdlow D, Werner B, Shiferaw B, Hadler J, and FoodNet	More than 15 years after SE began to increase in the northeastern U.S., rates continue to vary markedly by region.
FoodNet active surveillance for *Yersinia enterocolitica* (YE) infection: 1996	Ray S, Voetsch D, Segler S, Koehler J, Vugia D, Fiorentino T, Townes J, Farley M, and FoodNet	YE infection shows considerable geographic and racial variation. In FoodNet sites, it is most common among black, Hispanic, and Asian children less than 1 year old.
The FoodNet physician survey: implications for foodborne disease surveillance	Hennessy T, Deneen V, Marcus R, Reddy S, Vugia D, Townes J, Bardsley M, Swerdlow D, and FoodNet	This study marked the first U.S. population-based study of physician diagnostic practices for diarrhea. Physicians ordered no stool culture for over half of patients seeking care for diarrhea. Variability in culture ordering practices suggests a need for clinical diagnostic guidelines.
Hemolytic uremic syndrome (HUS) cases identified in the 1996 FoodNet *Escherichia coli* O157:H7 surveillance	Bender J, Mead P, Voetsch D, Vugia D, Fiorentino T, Koehler J, Shiferaw B, Griffin P, and FoodNet	There are regional differences in both the *E. coli* O157:H7 and HUS incidence among the FoodNet sites. Differences may be explained by regional variability of *E. coli* O157:H7 and completeness of reporting.
High-risk food consumption, handling, and preparation practices of adults in the FoodNet sites, 1996-1997	Ladd-Wilson S, Yang S, Deneen V, Koehler J, Marcus R, Vugia D, Voetsch D, Angulo F, and FoodNet	Although risky food handling and consumption practices were apparent in all groups studied, health officials should consider focusing food safety educational campaigns on 18-25-year-olds, men, Hispanics, and higher socioeconomic groups. State-specific food preferences warrant home-grown messages.
The impact of physician knowledge of laboratory practices on detection of *Escherichia coli* O157:H7	Deneen J, Wicklund J, Marcus R, Shallow S, Segler S, Townes J, Reddy S, Hennessy T, and FoodNet	Physicians often assume incorrectly that their laboratories culture all stool specimens for *E. coli* O157:H7, and so do not order this test for persons with bloody diarrhea. To increase awareness and improve detection of *E. coli* O157:H7, laboratories should identify which organisms were tested when reporting negative stool culture results.
Laboratory-based active surveillance for *Campylobacter* infections, FoodNet, 1996	Reilly, K, Shallow S, Angulo F, Cassidy M, Wicklund J, Fiorentino T, Bardsley M, Vugia D, and FoodNet	*Campylobacter* is the most frequently diagnosed foodborne pathogen nationwide. *Campylobacter* infection results in substantial health care costs and lost productivity.
Population-based estimate of the burden of diarrheal illness: FoodNet 1996-1997	Herikstad H, Vugia D, Hadler J, Blake P, Deneen V, Townes J, Yang S, Angulo F, and FoodNet	An estimated 340,000,000 episodes of acute diarrheal illness occur in the United States annually, and 1 in 12 persons with this illness seek medical care. Diarrheal illness is a major burden for the population and health care system.
Salmonella bacteremia incidences and characteristics, FoodNet 1996	Vugia D, Shallow S, Farley M, Marcus R, Shiferaw B, Angulo F, and FoodNet	*Salmonella* bacteremia is a notable cause of morbidity and mortality in the general population. Rates of hospitalization and death are higher in bacteremic cases, but possible contributors are yet to be identified.



Focus: *Escherichia coli* O157:H7 and Diarrhea-Associated Hemolytic Uremic Syndrome (D+HUS) In FoodNet Sites

The Catchment asked **Dr. Paul Mead**, a medical epidemiologist from the Foodborne and Diarrheal Diseases Branch, a few questions about the ongoing diarrhea-associated (D+) HUS surveillance project.

Catchment: *Just what is HUS?*

Dr. Mead: Hemolytic uremic syndrome, or HUS, is a life-threatening illness characterized by hemolytic anemia, thrombocytopenia, and acute renal failure. In the United States, about 90% of HUS cases are associated with diarrhea (D+HUS) and are caused by infection with Shiga toxin-producing *Escherichia coli*. *E. coli* O157:H7 has been isolated most frequently, but we know that other strains can cause HUS.

D+HUS develops most commonly in children, specifically in about 10% of children infected with *E. coli* O157:H7. Overall, 3%-5% of patients with D+HUS die in the acute phase of illness, and 10% - 30% experience long-term complications.

Catchment: *When and why did FoodNet establish surveillance for D+HUS?*

Dr. Mead: We began active surveillance for HUS in 1997 in five locations with a total population of 14.3 million people: Minnesota, Oregon, and selected counties in California, Connecticut, and Georgia. The system is based on a network of pediatric nephrologists, so much of the data gathered focus on HUS in children. To be reported, a patient should have hemolytic anemia, thrombocytopenia and acute renal injury, but no specific lab criteria must be met.

We began surveillance for several reasons. First, to determine the incidence and better define the clinical features of D+HUS. Second, by examining stools from patients with HUS, we hope to get a sense of what proportion of HUS cases are caused by *E. coli* O157, and what proportion are caused by serotypes other than O157. Finally, we hope the system will create a springboard from which to launch future studies of the pathogenesis and treatment of D+HUS.

Catchment: *So how is surveillance going?*

Dr. Mead: During the first 12 months of surveillance, 32 cases of D+HUS were reported, and 25 of these were in persons living within the catchment area. Patients were very young—median age 3 years—and most cases occurred in the summertime. Seven (23%) of 30 patients reported having diarrhea without blood. The median interval between diarrhea onset and HUS diagnosis was 5 days. At the time of HUS diagnosis, patients had a median serum creatinine level of 3.1 mg/dl (range 0.5-14.1 mg/dl), a median hemoglobin of 18%, and a median platelet count of 38 k/ml. Patients were hospitalized for a median of 12 days, 87% received transfusions, and 44% underwent dialysis. Complications included seizures (9%), bacteremia (6%), and death (3%). *E. coli* O157:H7 was isolated from 69% of stool specimens obtained within 14 days of diarrhea onset from patients who had not received antibiotics. At this time, due to lack of testing, no other serotypes have been identified.

Catchment: *Among the data collected, what stands out most?*

Dr. Mead: Several things stand out. First, nearly 25% of patients reported having diarrhea without blood. Second, over 50% of patients with D+HUS had not been treated with antimicrobial agents. Finally, *E. coli* O157:H7 accounted for at least 69% of D+HUS cases among children in the FoodNet catchment area. We'll be very interested to see what our continuing data collection adds to this picture.

Catchment: *Are there any changes planned for the near future?*

Dr. Mead: One of our goals from the start has been to determine which non-O157 strains are causing HUS. With recently received funding, we are working with participating reference laboratories to improve their ability to isolate non-O157 Shiga toxin-producing *E. coli* from stool specimens. In addition, we have transferred to each site the technology for detecting antibodies to *E. coli* O157 in patients' serum. Together, these tools should greatly improve our ability to define the role of non-O157 strains as a cause of HUS. A second major, long-term goal has been to determine the incidence of HUS among adults. Sites are now searching 1997 hospital discharge databases using ICD-9 codes to determine the completeness of reporting for pediatric cases. From this we should also be able to identify which providers or types of providers are diagnosing cases in adults. These providers could then be added to the network.

the Catchment
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Many Thanks To Drew Voetsch

On behalf of the entire FoodNet Team, *The Catchment* would like to thank Drew Voetsch for his dedicated work as FoodNet's coordinator and to wish him luck as he takes a new job position in Australia. After graduating in the fall of 1995 with an MPH from Emory University's Rollins School of Public Health in Atlanta, Drew was hired by CDC to help design, initiate, and maintain FoodNet. Drew held a tremendous load of responsibilities as FoodNet's coordinator, some of which included organizing FoodNet's budget, initiating electronic surveillance, managing and analyzing surveillance data, and coordinating other FoodNet surveys. Starting this fall, Drew will be launching an active surveillance program for foodborne diseases similar to FoodNet in Australia. Drew, best of luck in your new endeavor!

The Catchment also welcomes Dr. Tom Van Gilder to the FoodNet Team. Before joining FoodNet, Tom worked at CDC in the Epidemiology Program Office in the State Branch, where he supervised Epidemic Intelligence Service Officers and Preventive Medicine Residents stationed in various state health departments.

Tom is now the Director of Science for FoodNet projects. Welcome, Tom!

Note to readers:

We'd like to spotlight other studies in future **"Catchment"** issues. Have a study you'd like to know more about? *Please contact us!*

Resources

To receive regular copies, send your request to:

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