FoodNet Active Manuscripts

Status	#	Lead	Coauthors	Title	Journal	Updated	Comment
8							
	120	Devasia, Rose	Varma, Jay K., Whichard, Jean M., Gettner, Sharmeen, Cronquist, Alicia B., Hurd, Sharon, Segler, Suzanne D., Smith, Kirk E., Hoefer, Dina, Shiferaw, Beletshachew, Angulo, Fredrick J., Jones, Timothy F., EIP FoodNet Working Group	Antimicrobial Use and Outcomes in Patients with Multidrug-Resistant and Pansusceptible Salmonella Newport Infections, 2002-2003	Microbial Drug Resistance	7/25/2005	
	122	Koehler, Kathleen M.	Lasky, Tamar, Fein, Sara B., DeLong, Stephanie M., Hawkins, Marguerite A., Rabatsky-Ehr, Therese R., Ray, Susan M., Shiferaw, Beletshachew, Swanson, Ellen, Vugia, Duc J., EIP FoodNet Working Group	Population-Based Incidence of Infection with Selected Enteric Bacterial Pathogens for Children < 5 Years of Age, FoodNet, 1996-1998	Pediatric Infectious Disease Journal	9/15/2005	Tentative publication date is January 2006.
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	65	Jones, Timothy F.	McMillian, Marcella B., Scallan, Elaine, Thomas, Stephanie M., Cronquist, Alicia B., Frenzen, Paul D., Angulo, Fredrick J.	A Population-Based Estimate of the Substantial Burden of Diarrheal Disease in the United States; FoodNet, 1996-2003	Epidemiology and Infection	1/6/2006	
	118	Kennedy, Malinda	Rabatsky-Ehr, Therese R., Lance-Parker, Susan, Thomas, Stephanie M., Smith, Kirk E., Mohle-Boetani, Janet C., Keene, William E., Mead, Paul S.	Changes in Bovine Risk Factors for E. coli O157: a Case-Control Study in FoodNet Sites: 1999-2000			Submitted to Epidemiology and Infection.
	366	Klontz, Karl C.	Ailes, Elizabeth, Angulo, Fredrick J.	Recalls of Spices due to Bacterial Contamination Monitored by the U.S. Food and Drug Administration. The Predominance of Salmonellae	Journal of Food Protection	6/1/2005	
	106	Marcus, Ruthanne	Varma, Jay K., Medus, Carlota, Boothe, Effie, Anderson, Bridget J., Crume, Tessa L., Fullerton, Kathleen E., Moore, Matthew R., White, Patricia L., Lyszkowicz, Ewelina, Voetsch, Andrew C., Angulo, Fredrick J., EIP FoodNet Working Group	Risk factors for sporadic infection caused by Salmonella Enteritidis in the United States, 2002-2003		12/6/2005	Submitted to Epidemiology and Infection
	117	Patrick, Mary	Griffin, Patricia M., Mead, Paul S., Voetsch, Andrew C.	The Effectiveness of Recall Notification: Community Response to a Nationwide Recall of Hot Dogs and Deli Meats			
	112	Varma, Jay K.	Marcus, Ruthanne, Stenzel, Sara A., Hanna, Samir S., Gettner, Sharmeen, Anderson, Bridget J., Hayes, Tameka, Shiferaw, Beletshachew, Crume, Tessa L., Joyce, Kevin W., Fullerton, Kathleen E., Voetsch, Andrew C., Angulo, Fredrick J.	Highly-resistant Salmonella Newport-MDRAmpC Transmitted Through the Domestic United States Food Supply: FoodNet Case Control Study, 2002-2003		1/11/2006	Submitted to AJPH
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Status	#	Lead	Coauthors	Title	Journal	Updated	Comment
	124	Dunne, Eileen F.	Griffin, Patricia M., Snider, Cynthia J., Bender, Jeffrey B., Beletshachew, Shiferaw, Vugia, Duc J., Dembek, Zygmunt F., Wesolowski, Laura G., Carter, Michael A., Zansky, Shelley M., Boothe, Effie J., Burnite, Steve, Wells, Joy G., Bibb, William, Mead, Paul S., Henao, Olga L., EIP FoodNet Working Group	Pediatric Hemolytic Uremic Syndrome in the United States, 1997-2002: A Study of 379 Cases	Journal of Food Protection		
	114	Hoefer, Dina	Malone, Shauna, Zansky, Shelley M., Marcus, Ruthanne, Frenzen, Paul D., Scallan, Elaine	Knowledge, Attitude, and Practice of the Use of Irradiation Among Respondents to the FoodNet Population Survey in Connecticut and New York			
	121	Samuel, Michael C.	Vugia, Duc J., Koehler, Kathleen M., Marcus, Ruthanne, McNees, Alexander A., Deneen, Valerie C., Damaske, Barbara, Shiferaw, Beletshachew, Hadler, James L., Angulo, Fredrick J.	Consumption of Risky Foods Among Adults at High Risk for Severe Foodborne Diseases: Room for Improved Targeted Prevention Messages			
	113	Varma, Jay K.	Samuel, Michael C., Marcus, Ruthanne, Hoekstra, Robert M., Medus, Carlota, Segler, Suzanne D., Anderson, Bridget J., Jones, Timothy F., Shiferaw, Beletshachew, Haubert, Nicole, Megginson, Melanie, McCarthy, Patrick V., Graves, Lewis M., Van Gilder, Thomas J., Angulo, Fredrick J.	Listeria Monocytogenes Infection From Food in the Regulatory Era: A Case-Control Study of Risk Factors for Sporadic Illness in the United States		1/11/2006	To be submitted to New England Journal of Medicine
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	105	Fullerton, Kathleen E.	Ingram, Amanda, Jones, Timothy F., Anderson, Bridget J., McCarthy, Patrick V., Hurd, Sharon, Shiferaw, Beletshachew, Vugia, Duc J., Haubert, Nicole, Hayes, Tameka, Wedel, Stephanie, Scallan, Elaine, Henao, Olga L., Angulo, Fredrick J., EIP FoodNet Working Group	Risk Factors for Infant Campylobacter Infections: A FoodNet Case-Control Study		12/6/2005	
	24	Jones, Timothy F.	Ingram, Amanda, Fullerton, Kathleen E., Marcus, Ruthanne, Anderson, Bridget J., McCarthy, Patrick V., Vugia, Duc J., Shiferaw, Beletshachew, Haubert, Nicole, Wedel, Stephanie, Angulo, Fredrick J.	A Case Control Study of Salmonella Infection in Infants, FoodNet, 2002-2004		12/6/2005	
	433	Roy, Sharon L.	Scallan, Elaine, Beach, Michael J.	The Burden of Acute Gastrointestinal Illness		1/3/2006	
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	104	Scallan, Elaine	Jones, Timothy F., McMillian, Marcy, Frenzen, Paul D., Cronquist, Alicia B., Thomas, Stephanie M., Angulo, Fredrick J.	Health Care Utilization Among Persons Who Have Recently Experienced Gastrointestinal Illness			
	107	Voetsch, Andrew C.		Analysis of Trends in Listeriosis in the FoodNet Sites, 1996-2003		11/9/2005	

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Status	#	Lead	Coauthors	Title	Journal	Updated	Comment
	119	Watt, James P.	Bales, Michael, Dannenberg, Andrew L., Imhoff, Beth, Mullins, Scott R., Dowell, Scott F.	Impact of a Health-Related Internet Hoax on a Public Health Agency and the Public: Implications for Health Communication			
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	323	DeBess, Emilio E.		Food Handler Survey: Knowledge and Attitudes of Foodborne Illnesses in Two Oregon Counties			
	360	Voetsch, Andrew C.	Henao, Olga L., Cronquist, Alicia B., Hurd, Sharon, Thomas, Stephanie M., Scheftel, Joni M., McMillian, Marcy, Megginson, Melanie, Hatch, Julie, Angulo, Fredrick J., EIP FoodNet Working Group	Surveillance Trends for Vibrio Infections in FoodNet sites, 1996-2004		11/9/2005	
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	103	Ailes, Elizabeth	Nelson, Jennifer M.	Foodborne Diseases Active Surveillance Network Surveillance Summary, 1996-2003			
	115	Bair, Heather	FoodNet Education Working Group	Foodborne Diseases in the United States: Lessons Learned from FoodNet, 1996-2002			
	116	Cheung, Michelle	Ray, Susan M., Shiferaw, Beletshachew,	Foodborne Pathogens Causing Illness in the First 7 Days of Life: FoodNet, 1996-2001			
	22	Crump, John A.	Crump, John A., Joyce, Kevin W., Vugia, Duc J., Megginson, Melanie, Segler, Suzanne D., Hurd, Sharon, Luedeman, Jeff, Shiferaw, Beletshachew, Hanna, Samir S., Stevenson, Jennifer E., Angulo, Fredrick J.	Clinical Consequences of Typhoid Fever due to Salmonella Typhi with Decreased Susceptibility to Ciprofloxacin		11/9/2005	
	109	Demma, Linda	Snider, Cynthia J., Shiferaw, Beletshachew, Vugia, Duc J., Hurd, Sharon, Zansky, Shelley M., Scheftel, Joni, Voetsch, Andrew C., Angulo, Fredrick J., Griffin, Patricia M., EIP FoodNet Working Group	Risk Factors for Developing Hemolytic Uremic Syndrome or Death Among Persons with Escherchia coli O157 Infection, FoodNet sites, 1997-2002			
	363	Hassan,Valley	Kirk, Martyn D., Scallan, Elaine, Angulo, Fredrick J., Hall, Gillian,	Reporting Rates of Campylobacter Infections in Australia and the United States - Exploring Reasons for the Difference			
	344	Henao, Olga L.	Ryan, Patricia A., Scallan, Elaine, Choudhuri, Julie, Norton, Dawn M., Edge, Karen, Ryan, Patricia A., Tobin-D'Angelo, Melissa, Nelson, Jennifer M., Hanna, Samir S., Jones, Timothy F., Angulo, Fredrick J., EIP FoodNet Working Group	Proportion of Visits to Health Care Providers Resulting in Request of Stool Samples: Data from the National Ambulatory Medical Care Survey (NAMCS) and the Foodborne Diseases Active Surveillance Network (FoodNet) Population Survey			
	26	Majowicz, Shannon E.	Scallan, Elaine, Hall, Gillian, Banerjee, Anyana, Kirk, Martyn D., Angulo, Fredrick J.	Respiratory Symptoms Among Persons with Gastrointestinal Illness		11/16/2005	

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Status	#	Lead	Coauthors	Title	Journal	Updated	Comment
	432	Maldonado, George		Blending Project		1/3/2006	
	325	Shiferaw, Beletshachew		Comparison of Three Surveillance Systems for Hemolytic Uremic Syndrome in Oregon			
	25	Snider, Cynthia J.	Vugia, Duc J., Burnite, Steve, Hurd, Sharon, Hayes, Tameka, Scheftel, Joni M., Smith, Glenda, Shiferaw, Beletshachew, Boothe, Effie, Griffin, Patricia M., EIP FoodNet Working Group	Post-Diarrheal Hemolytic (D+HUS) in Adults, FoodNet, 1997-2002			
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	326	Boxrud, David		Salmonella Enteritidis Case-Control Study PFGE Comparison			
	364	Daly, Leslie	Scallan, Elaine, Majowicz, Shannon E., Hall, Gillian, Angulo, Fredrick J.	Estimating the Duration of Illnes from Population Surveys of Acute Gastroenteritis			
	110	Frenzen, Paul D.		Consumer Interest in Irradiated Foods			
	321	Hedberg, Craig W.		Look at EFORS Data from FoodNet Sites to Determine the Value of the Contributing Factors			
	88	Nelson, Jennifer M.	Hurd, Sharon	Multiple Pathogens Isolated Over a Short Period, FoodNet 1996-2002			
	101	Scallan, Elaine	Vugia, Duc J., Cronquist, Alicia B., Marcus, Ruthanne, Thomas, Stephanie M., Blythe, David, Fuller, Candace, Zansky, Shelley M., Cieslak, Paul R., Jones, Timothy F.	Burden of Bacterial Foodborne Illness in the United States			
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	102	Dunn, John R.		Substantial Decline in the Incidence of Escherichia coli O157:H7 Infections in FoodNet, 2003			
	322	Hoekstra, Robert M.		Protective Exposures in Matched Case-Control Studies of Foodborne Illness			
	100	Scallan, Elaine	Frenzen, Paul	The Economic Cost of Diarrheal Illness in the United States			

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Epidemiology of Non-O157 Shiga Toxin-Producing *Escherichia coli* (STEC*)* Cases in FoodNet Surveillance in CT, MN and NY, 2000-2004

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Background: STEC is an important cause of diarrhea and the major cause of hemolytic uremic syndrome (HUS). The most common serogroup implicated in severe illness is O157, but non-O157 STEC serotypes are being recognized with increasing frequency in persons with diarrheal illness. The epidemiology of non-O157 STEC infection in the US is not well described.

Methods: Few clinical laboratories test stool specimens for non-O157 STEC. However, the Foodborne Diseases Active Surveillance Network (FoodNet) collects data on those that are reported. A case was defined as isolation of non-O157 STEC from the stool of a resident of the CT, MN or NY FoodNet catchment areas (12.9 million persons). Only isolates with a known O antigen were included. State surveillance data were merged with FoodNet data.

Results: From 2000-04, FoodNet ascertained 213 cases of non-O157 STEC infection in CT (97), MN (83) and NY (33), a 3.3 per million annual incidence. Median age of cases was 13 years old (range 1 month to 88 yrs); 57% were female. Of cases with known race and ethnicity, 93% were non-Hispanic white.

Clinical data were available for 76% of cases. Diarrhea (98%), abdominal cramps (83%) and bloody stool (50%) were the most common manifestations. Four (2%) had HUS. Symptoms lasted a median of 7 days, with 27% receiving antibiotic therapy and 15% hospitalized for a median of 3 days. No deaths were reported.

Of the 27 non-O157 serogroups detected: O111 was the most common (37%), followed by O103 (17%), O26 (16%), O45 (9%), and O145 (5%). Each of the remaining non-O157 serotypes contributed less than 2%. HUS was associated with O111 and O145 (2 cases each). O145 (OR 3.9; CI, 1.2-12.4) and O45 (OR 2.6; CI, 1.1-8.2) cases were hospitalized more often than all other non-O157 serotypes. O145 cases also had the longest median hospital stays compared to all other serotypes (10.5 vs. 3.0 days).

Conclusions: Five serogroups were responsible for 84% of illness due to non-O157 STEC. As laboratories switch to non-culture based methods of detecting STEC, these results are a reminder that public health surveillance needs can be met only when isolates are obtained so serogroup can be determined.

Is *Campylobacter coli* increasing? The importance of accurate speciation by clinical laboratories, FoodNet 1997-2004.

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Background: *Campylobacter jejuni* and *C. coli* are important causes of gastroenteritis in humans. The proportion of *C. coli* isolates received and identified by the National Antimicrobial Resistance Monitoring System (NARMS) laboratory at CDC increased from 0.9% in 1997 to 6.7% in 2004. Because *Campylobacter* species trends may be changing, accurate routine speciation in clinical diagnostic and state public health (SPH) laboratories is essential to determine the incidence of human illness attributed to different *Campylobacter* species.

Methods: The Foodborne Disease Active Surveillance Network (FoodNet) conducted active surveillance for laboratory-confirmed *Campylobacter* infection at >600 clinical diagnostic laboratories in 10 states from 1997 through 2004. *Campylobacter* isolates were speciated in clinical diagnostic or SPH laboratories, and a subset (1 per week) of these isolates was forwarded to the NARMS laboratory for speciation by multiplex PCR and susceptibility testing. FoodNet and NARMS data were linked and speciation in clinical diagnostic and SPH laboratories was evaluated, assuming NARMS speciation is accurate.

Results: Of 37,293 laboratory-confirmed cases of *Campylobacter* ascertained in FoodNet between 1997 and 2004, 2,776 (7.4%) isolates were submitted to NARMS. Information on 1,623 (58%) could be linked between the two datasets. 1,198 (74%) isolates were identical in the submitting laboratory and NARMS; 253 were not speciated prior to submission. Accuracy ranged from 49-97%, in SPH laboratories, compared to 1-35% in clinical diagnostic laboratories. For *C. jejuni* and *C. coli*, respectively, 1142 (82%) of 1395 and 28 (35%) of 79 isolates were identified correctly.

Conclusions: SPH laboratories more accurately speciate *Campylobacter* isolates than clinical diagnostic laboratories. Overall, FoodNet data are reliable for monitoring trends in *C. jejuni* incidence due to high accuracy of speciation in reporting laboratories, but insufficient *C. coli* identification suggests a need for more careful study of *C. coli* and other less common species to monitor the changing epidemiology of *Campylobacter* infection in humans.

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Activity: ICEID Abstract
Current Date/Time: 11/30/2005 9:07:54 AM

Changes in incidence of foodborne outbreaks reported to eFORS by FoodNet sites, 1998-2004

Author Block: K. E. Fullerton[1], D. Vugia[2], A. Cronquist[3], Q. Phan[4], C. Burnett[5], K. Larson[6], E. S. Laine[7], D. Nicholas[8], W. Keene[9], T. F. Jones[10], C. Braden[11], O. Henao[1];

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Background: The Foodborne Diseases Active Surveillance Network (FoodNet) has documented substantial declines in the incidence of several bacterial infections that are commonly transmitted through food (*E. coli* O157, *Campylobacter,* and *Listeria monocytogenes)*. We investigated whether these trends might also be evident in the incidence of foodborne disease outbreaks.
Methods: We used data reported to CDC's electronic Foodborne Outbreak Reporting System (eFORS) from FoodNet sites for outbreaks involving ≥5 persons. Multistate outbreaks were not included in our analysis. Negative binomial regression was used to examine changes over time in the incidence of reported foodborne outbreaks with a bacterial, viral, and undetermined etiology.
Results: From 1998 to 2004, FoodNet sites reported 1227 outbreaks involving ≥ 5 persons to eFORS. Of 655 outbreaks with confirmed etiology, 198 (30%) were bacterial and 372 (57%) were viral. Of the bacterial outbreaks, the etiologies were: 139 (70%) *Salmonella*, 28 (14%) Shiga toxin-producing *E. coli*, 14 (7%) *Shigella*, 11 (6%) *Campylobacter*, 3 (2%) *Yersinia*, 2 (1%) *Vibrio*, and 1 (0.5%) *Listeria*. There were 27 reported bacterial outbreaks in 2004 (0.61 cases per 100,000 persons), compared to 20 reported bacterial outbreaks in 1998 (0.97 cases per 100,000 persons), a 20% decrease in incidence. However, the number of reported outbreaks was not sufficient for this decrease to be statistically significant or to model the change in incidence of outbreaks due to specific bacterial pathogens. From 1998 to 2004 there was a 312% increase in incidence of viral outbreaks, and a simultaneous 54% decrease in incidence in outbreaks with undetermined etiology.
Conclusions: While there was a downward trend in reported bacterial outbreaks, further study is needed to better understand this in the context of significant declines in the overall incidence of several important bacterial pathogens during the same time period. The coincident increase in reported viral outbreaks and decrease in reported outbreaks of undetermined etiology is likely a consequence of the increased availability of viral diagnostics.

Category (Complete): K. Foodborne infections
Presentation Preference (Complete): Oral or Poster
Status: Complete

Correlates of Campylobacter incidence among FoodNet sites

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Background: Data collected over the past decade from nine Foodborne Diseases Active Surveillance Network (FoodNet) sites show a consistently high incidence of laboratory-confirmed *Campylobacter* cases in the California Bay area. Case control studies and outbreak analyses suggest that *Campylobacter* infections are associated with consumption of poultry, contaminated water, milk, and other meats. An ecological analysis was performed to determine if these and other foods contribute to sporadic (i.e. non-outbreak) *Campylobacter* cases.

Methods: This study utilized data from the 2002 CDC FoodNet Population Survey summary and the 2002 FoodNet surveillance summary of *Campylobacter* cases. Chi-square tests identified 27 out of 107 food and water variables that differed between California Bay area residents and residents of other FoodNet sites. Ecological associations between these 27 variables and *Campylobacter* incidence were determined using Spearman correlation coefficients (r).

Results: We did not find any significant differences between living in California and consumption of poultry, contaminated water, milk, and other meats. Statistically significant associations ($p < 0.05$) were found between living in California and consumption of a variety of fresh fruits and vegetables, cheeses, nuts, cilantro, raw fish, and lamb. Correlation analysis suggests that *Campylobacter* in FoodNet sites is positively associated with consumption of raw apples ($r = 0.883$; $p = .0031$), raw berries ($r = 0.8619$; $p = .0047$), raw alfalfa sprouts ($r = 0.817$; $p = .0108$), and walnuts ($r = .8667$; $p = .0045$).

Conclusions: We did not find any geographical difference between consumption of any previously identified risk factors, including poultry, contaminated water, milk, and other meats, that would explain geographical differences in *Campylobacter* infection. This study noted increased consumption of other foods in California and their significant associations with *Campylobacter* infection. Further studies are needed to determine if these food items may contribute to sporadic *Campylobacter* infection.

The Emergence and Antimicrobial Resistance of *Salmonella* Serotype I 4,[5],12:i:- in the United States

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Background: Non-typhoidal *Salmonella* infections cause an estimated 1.4 million illnesses and 400 deaths in the U.S. annually. Among the > 2,500 serotypes of *Salmonella*, a monophasic *S.* Typhimurium variant (*S.* I 4,[5],12:i:-) recently emerged in Europe. To characterize *S.* I 4,[5],12:i:- epidemiology in the U.S., data were reviewed from 3 separate surveillance systems: the National *Salmonella* Surveillance System (NSSS), the Foodborne Diseases Active Surveillance Network (FoodNet), and the human and retail meat components of the National Antimicrobial Resistance Monitoring System (NARMS).

Methods: State public health laboratories serotype *Salmonella* isolates from clinics and report results to CDC via NSSS. Ten FoodNet sites interviewed patients infected with *S.* I 4,[5],12:i:- about international travel history. The susceptibility of NARMS human isolates was tested to 16 antimicrobial agents. Chicken breasts, ground turkey, ground beef, and pork chops were purchased at grocery stores in 8 states and tested for *Salmonella* in the NARMS/FoodNet Retail Food Study.

Results: *S.* I 4,[5],12:i:- increased from 0.2% (62/41,222) of *Salmonella* isolates reported in 1995 to 2.1% (739/35,662) in 2004. In 2004, only 1 of 124 patients interviewed reported international travel in the 7 days before illness onset. Of the 114 human *S.* I 4,[5],12:i:- isolates tested in NARMS, 1996-2003, 20 (18%) were resistant to at least one antimicrobial agent. Four were resistant to ceftiofur, a 3rd-generation cephalosporin, and 3 others were R-type ACSSuT. Of 365 meats positive for *Salmonella* in 2002-2003, 9 (3%) of 331 chicken breast and ground turkey products (but no beef or pork) yielded *S.* I 4,[5],12:i:-; no resistance was found in the 9 isolates.

Conclusions: *S.* I 4,[5],12:i:- is emerging in the U.S., although previous reporting practices limit precise trend description. Infections seem to be almost exclusively domestically acquired, and some isolates are highly resistant. Uniform laboratory-based surveillance is critical for monitoring *S.* I 4,[5],12:i:-and all emerging serotypes. Further studies should determine whether poultry and other food animals are reservoirs for this serotype and develop interventions.

Trends in Hospitalization for Selected Foodborne Pathogens: Data from the National Hospital Discharge Survey (NHDS).

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Background: In recent years, the Foodborne Diseases Active Surveillance Network (FoodNet) has documented significant decreases in the incidence of laboratory-confirmed *Campylobacter*, *Listeria* and, to a lesser extent, *Salmonella.* The changes in the incidence for these infections might be attributed to fewer persons with self-limited illness seeking medical care and fewer submitted diagnostic specimens. If this were the case, because persons with severe infection would still seek care, the number of hospitalizations for these infections should be largely unchanged from year to year. We, therefore, examined national trends in number of hospitalizations from 1996 through 2003 for *Campylobacter*, *Listeria* and *Salmonella.*

Methods: The annual number of hospitalizations for *Campylobacter (*ICD-9-CM*:* 008.43), *Listeria (*ICD-9-CM: 027.0), and *Salmonella* (ICD-9-CM: 003.0 through 003.9) were determined from listed diagnoses in the National Hospital Discharge Survey (NHDS) of CDC's National Center for Health Statistics. To examine patterns in hospitalizations over time, we fit pathogen-specific regression models to compare the number of hospitalizations for each year relative to 1996. All analyses were adjusted for age, gender, geographic region, marital status and payment source.

Results: The NHDS collected approximately 300,000 records per year from 1996 to 2003. During the 8 year period, 57,564 patients were hospitalized for *Campylobacter*, 28,416 were hospitalized for *Salmonella*, and 3,736 were hospitalized for *Listeria*. From 1996 to 2003, decreases in the number of hospitalizations were seen for *Campylobacter* and *Listeria* but not for *Salmonella*. In 2003, compared to 1996, the number of hospitalizations was significantly lower for *Campylobacter* (OR: 0.37, 95%CI: 0.14, 0.94) and *Listeria* (OR: 0.10, 95%CI: 0.02-0.51) but not significantly different for *Salmonella.*

Conclusion: The patterns observed in the number of hospitalizations for *Campylobacter*, *Listeria*, and *Salmonella* infections from 1996 to 2003 are similar to patterns observed in incidence reported by the FoodNet. These similarities serve as validation of reports of continued decrease in the occurrence of specific foodborne pathogens.

2006 ICEID Abstract

Title: Comparison of travel-related, outbreak-associated, and sporadic cases of Salmonellosis among residents of FoodNet sites.

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Background: One objective of the Foodborne Diseases Active Surveillance Network (FoodNet) is to attribute the burden of foodborne illness to specific foods and settings. A number of modeling projects are currently underway to help estimate illness caused by various food commodities. Data needed to model salmonellosis include observed human cases by serotype and estimates of sporadic and domestically-acquired cases. The objective of this analysis is to determine the proportion of travel and outbreak-related cases and identify any variation in clinical outcomes.

Methods: FoodNet conducts active laboratory-based surveillance for *Salmonella* in 10 sites and began ascertaining outbreak-association and foreign travel in 2004. Sporadic domestically acquired cases were defined as cases with no known foreign travel history or outbreak association. Cases with unknown or missing data on travel or outbreak association were excluded from analysis.

Results: A total of 8689 *Salmonella* cases were reported to FoodNet between January 2004 and June 2005. Among cases with known travel status and outbreak association (n= 5147), 12% had traveled internationally and 9% were part of an outbreak. Sporadic domestically acquired (SDA) cases had significantly higher rates of hospitalization compared to travel related cases (RR=1.6, CI=1.3-1.9) and outbreak cases (RR=1.6, CI=1.3-2.0). Compared to outbreak cases, SDA cases were more likely to have *Salmonella* isolated from blood or CSF (RR=2.1, CI=1.2-3.5) and less likely compared to travel-related cases (RR=0.5, CI=0.4-0.7). No travel-related cases died and there was no significant difference in mortality rate between SDA and outbreak cases. S. typhimurium and S. enteriditis were the most common serotypes reported among travel, outbreak, and SDA cases; however, the serotype distribution (top 5) differed (Table 1).

Conclusion: Cases of outbreak-associated, travel-related and sporadic-domestically acquired salmonellosis differ on rates of hospitalization, specimen source and serotype distribution. Collecting data on travel history and outbreak association is an important component of foodborne disease surveillance.

Table 1. Top 5 Serotypes by Group

Outbreak Associated Cases,% (n=441)		International Travel Related Cases, % (n=605)		Sporadic-Domestically Acquired Cases, % (n=4101)	
1. Enteritidis	22.2	1. Enteritidis	49.7	1. Typhimurium	32.1
2. Typhimurium	19.1	2. Typhimurium	14.5	2. Enteritidis	24.1
3. Javiana	12.8	3. Typhi	9.9	3. Newport	11.6
4. Newport	11.7	4. Agona	5.3	4. Heidelberg	9.5
5. Heidelberg	9.1	5. Saintpaul	4.8	5. Javiana	6.9

Clinical Laboratory Practices for the Isolation and Identification of *Campylobacter* in FoodNet Sites: Do Differences Explain Variation in Incidence Rates?

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Abstract

Background: In 2004, the overall incidence (cases/100,000 persons) of laboratory-confirmed *Campylobacter* infections reported by the Foodborne Diseases Active Surveillance Network (FoodNet) was 13 (range 5 in MD to 29 in CA). Previous surveys of clinical laboratories have found no measurable differences in frequency of culture as an explanation for regional differences. We conducted a *Campylobacter* Laboratory Survey to determine whether specific laboratory practices correlate with variation in laboratory-confirmed incidence observed in FoodNet.

Methods: Microbiologists in clinical laboratories in the FoodNet catchment area were surveyed about their laboratory practices used for *Campylobacter* isolation and identification. The sites were divided into low (L=GA, MD, NY, TN) and high (H=CA, CO, CT, MN, OR) incidence categories based on 2004 FN data. Factors potentially affecting isolation rates were examined including routine use of transport media, selective media, temperature, and incubation time. Speciation and antimicrobial susceptibility testing were also assessed.

Results: Responses were received from 499 (86%) of the 582 laboratories surveyed. Preliminary analysis showed that among the 401 laboratories reporting on-site stool testing, 390 (97%) tested specimens for *Campylobacter*, 352 (90%) routinely. Three hundred (77%) reported receiving stools in transport media; 194 (52 %) used CampyBAP for primary isolation; 362 (95%) incubated plates at 42^0C; 203 (53%) held plates for 48 hours. Sites with higher incidence rates were more likely to test routinely for *Campylobacter* (95% vs 87%, $p<0.01$), hold plates for 72 compared to 48 hours (54% vs 39%, $p<0.01$) and use transport media (87% vs 69%, $p<0.01$). Only 3% of all labs reported doing antimicrobial testing, and 31% reported routine speciation.

Conclusions: This survey showed differences in methods such as routine culturing, length of incubation and use of transport media that might explain the regional variation in incidence rates among the FN sites. Use of data from this survey as well as comparisons with surveys done internationally could be the foundation for recommendations for clinical laboratories for *Campylobacter* testing.

Salmonella outcomes differ by serotype, FoodNet, 1996-2003

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Background: Over 2,500 *Salmonella* serotypes are known. The propensity of some serotypes to cause bacteremia is well established. However, few recent data exist on differences in clinical outcome among many serotypes.

Methods: FoodNet is a population-based active surveillance network covering all or parts of 9 states. Data on death, hospitalization and specimen source were collected for all cases of laboratory-confirmed *Salmonella* infection in the surveillance area from 1996-2003. Other serotypes were compared to *S.* Typhimurium as a baseline.

Results: Of 30,472 ascertained *Salmonella* cases with known serotype, 7,387 (24.2%) were *S.* Typhimurium. Among *S.* Typhimurium cases in which data were available, 22.6% were hospitalized, 5.7% were isolated from extra-intestinal sites and 0.7% died. As expected, *S.* Dublin, *S.* Typhi, *S.* Cholerasuis and *S.* Paratyphi A had significantly higher rates of hospitalization than *S.* Typhimurium. Among lesser known serotypes and subspecies, significantly higher rates of hospitalization were reported in patients with *S.* IIIa 18:z4,z23:- (N=7, 85.7%, RR=20.5, 95% CI=2.5-170.6) and *S.* Abony infections, whereas significantly lower rates were reported in patients with *S.* Ohio, *S.* Rubislaw and *S.* Adelaide infections. Isolates of *S.* IIIa 18:z4,z23:- were also more likely to have been from a sterile site (71.4%, RR=41.5, 95% CI=8.0-214.4), as were *S.* Lomalinda and *S.* Arechavaleta; lower rates of invasive disease were observed for *S.* Miami, *S.* Muenchen and *S.* Newport infections. Compared to *S.* Typhimurium, mortality was significantly higher for patients with *S.* IIIa 18:z4,z23:- (14.3%, RR=24.5, 95% CI=2.9-206.9) and *S.* Lomalinda, but lower for patients with *S.* Javiana and *S.* Newport infections.

Conclusions: We found significant differences in severity of clinical outcomes among many *Salmonella* serotypes in addition to those that are well characterized. These observations are limited by the low numbers of some serotypes and the comparison of multiple serotypes to the baseline. Further studies are needed to understand the reasons for these differences. Care must be taken to distinguish among *Salmonella* serotypes in studies of clinical outcomes.

***Yersinia pseudotuberculosis* infections in FoodNet 1996-2004**

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Background: Relatively little is know about the epidemiology of *Yersinia. pseudotuberculosis*. A recent outbreak in Finland associated with salad consumption established this species as a foodborne pathogen. We describe the epidemiology of *Y. pseudotuberculosis* cases ascertained through FoodNet surveillance.

Methods: FoodNet conducted population-based active surveillance for laboratory-confirmed cases of yersiniosis in 5 sites in the US in 1996 expanding to 10 sites by 2004. Demographic, clinical, and outcome data was collected for each case. To describe differences in the epidemiology of yersiniosis by species, we analyzed these data using case-case comparisons by species.

Results: Between 1996 and 2004, 1410 *Yersinia* cases were ascertained; 391 (28%) cases with unknown species were excluded from the analysis. Of the remaining 1019 cases, 943 (93%) were YE, 34 were *Y. frederiksenii*, 15 were *Y. intermedia*, 11 were *Y. pseudotuberculosis*, 6 were *Y. kristensenii*, 5 were *Y. aldovae*, 3 were *Y. ruckeri*, 1 was *Y. bercovieri*, and 1 was *Y. pestis*. Among non-YE cases, *Y. pseudotuberculosis* cases were more likely to be male (64% vs. 45%), live in the western US (73% vs. 16%), admitted to hospital (73% vs. 25%), diagnosed in the winter months, and have blood isolate compared to the other non-YE cases (73% vs. 6%). Four of the 11 *Y. pseudotuberculosis* cases were diagnosed in 2003.

Conclusion: *Yersinia pseudotuberculosis* is a serious and potentially emerging infection in the US. Further research is needed to determine the role of this species in gastroenteritis of unknown etiology and the extent of foodborne transmission.

Development of a Common, Symptom-Based Case Definition for Gastroenteritis: An International Analysis

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Background. Population-based studies often define gastroenteritis (GE) clinically, with symptom-based case definitions classifying individuals as cases or non-cases. Comparing results between studies is difficult since different definitions are used. Our objective was to evaluate the impact of using different case definitions for GE, and to develop a common symptom-based case definition and a set of results to facilitate future inter-country comparisons.

Methods. We applied four published symptom-based definitions for GE to population-based survey data from several countries to assess the effect of case definition on the observed burden of illness. The definitions were: (1) ≥3 loose stools in 24 hours lasting >1 day, or resulting in activity restriction; excluding those with chronic diarrheal illness; (2) ≥3 loose stools; or bloody stool; or vomiting with one of diarrhea, cramps/abdominal pain, or fever in 24 hours; excluding those reporting their illness was due to non-infectious causes; (3) ≥1 loose stool or vomiting in 24 hours, excluding those reporting their illness was due to non-infectious causes; and (4) ≥3 loose stools in 24 hours; or ≥3 of vomiting, nausea, abdominal cramps, or fever; excluding those with chronic diarrheal illness.

Results. The definition used impacted the burden of illness observed. Within country, the monthly prevalence differed by 1.5 to 2.5 times under the four case definitions. The observed prevalence ranged as follows: Australia, 4.0% to10.1%; Canada, 6.5% to10.0%; Ireland, 3.3% to 5.8%; Malta, 2% to 3%, and the United States, 7.2% to 12.4%. Other variables impacted included mean age of cases, and the proportion seeking health care.

Conclusions. To ensure comparability of results among international studies, a standard definition and a minimum set of results for reporting population-based data on the burden of GE is being developed in consultation with the International Collaboration on Enteric Disease 'Burden of Illness' Studies Network.

DRAFT updated 1/6/06

Title: Risk Factors for Shigellosis among Residents of FoodNet Sites, 2005

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Background: Since 1996, FoodNet has conducted active laboratory-based surveillance for *Shigella* spp. The aim of this study was to estimate the prevalence of risk factors for sporadic shigellosis, including international travel, day care center exposure, recreational water exposure, or household or sexual contact with someone having diarrhea.

Methods: We ascertained all laboratory-confirmed *Shigella* infections in 10 participating FoodNet sites. During 2005, patients with shigellosis were interviewed about risk factors in the week before illness onset.

Results: Between January 1 and September 23, 2005, 1043 *Shigella* spp. cases were identified. Interview information was available for 58% (605) of patients [*S. sonnei* (408) *S. flexneri* (129) *S. boydii* (4) *S. dysenteriae* (4), unknown species (60)]. Of 566 cases with known travel status, 26% (148) reported international travel [*S. dysenteriae* (100%), *S. boydii* (75%), *S. flexneri* (30%), *S. sonnei* (26%)]. Among 457 non-travelers, 35% (161) reported contact with a person in daycare or school with diarrhea, 28% (130) reported working in or attending a child care setting, 20% (92) reported contact with a household member with diarrhea, 12% (53) reported recreational water exposure, and 5% (22) reported contact with a sexual partner with diarrhea; 34% did not indicate any of the above exposures. Some exposures did vary by species. Compared to 95 *S. flexneri* non-travel cases, more of the 306 non-travel *S. sonnei* cases reported contact with a person in daycare or school with diarrhea (4% vs. 43%), working in or attending a child care setting (2% vs. 34%), and recreational water exposure (8% vs. 12%).

Conclusions: International travel plays an important role in the acquisition of all *Shigella*, including *S. sonnei* and *S. flexneri*. Transmission among day care center attendees, their family members and friends likely accounts for a majority of *S. sonnei* infections. While the proportion of shigellosis attributable to foodborne infections could not be directly characterized, the data suggest that as many as 34% of *Shigella* infections in non-travelers may be acquired through consumption of contaminated food.

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Contributing Factors (CFs) Identified in Produce-Associated Outbreaks, FoodNet, 1999-2002

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Background: FoodNet sites report foodborne outbreaks to CDC's national electronic Foodborne Outbreak Reporting System (eFORS), which provides a standard format for public health investigators to report epidemiologic, laboratory, environmental, and contributing factor (CF) data. CFs provide information on how pathogens contaminate food, how they increase in number or produce toxin, or how mechanisms to reduce or eliminate them failed.

Methods: We analyzed 1999-2002 outbreak data from FoodNet sites involving two or more cases in which an epidemiologic investigation implicated the same uncooked fruit, vegetable, salad, or juice to evaluate completeness of CF information and to determine the CFs identified in produce-associated outbreaks with a viral versus bacterial etiology.

Results: FoodNet sites reported 890 outbreaks; 469 (53%) had an etiology identified, 365 (41%) had CFs identified, and 457 (51%) had a food implicated. Produce was implicated in 97 (21%) of the 457 outbreaks. Of the produce-associated outbreaks, 63 (66%) had a confirmed or suspected etiology; of these 43 (68%) were due to norovirus and 20 (32%) were due to bacteria.
One or more CFs were reported in 27 (63%) of the 43 produce/norovirus outbreaks, and included handling food by an infected person or pathogen carrier in 18 (42%), bare-handed food contact by a worker in 14 (33%), and inadequate cleaning of processing / preparation equipment / utensils leading to contamination of food in 7 (16%) outbreaks.
One or more CFs were reported in 12 (60%) of the 20 produce/bacterial outbreaks, and included raw product or ingredient contaminated by pathogen from animal or environment in 7 (35%), handling food by an infected person or pathogen carrier in 4 (20%) and process failures that permitted agent survival in 4 (20%).

Conclusions: Contributing factors were reported for over 60% of produce-associated norovirus or bacterial outbreaks. For produce-associated norovirus outbreaks, bare-handed food contact and food handling by an infected person are the CFs most often cited. For produce-associated bacterial outbreaks, raw product or ingredient contamination from an animal or environmental source is the most often cited contributing factor.

Category (Complete): K. Foodborne infections
Presentation Preference (Complete): Oral or Poster
Status: Complete

Foods Associated with *Listeria monocytogenes* Infections Are Common at Long-Term Care Facilities in Eight States, FoodNet 2005

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Background: *Listeria monocytogenes* (LM) causes approximately 2,500 illnesses and 500 deaths annually in the U.S. Persons ≥65 years of age are at higher risk of LM infection and are, therefore, advised to avoid foods known to be associated with LM infection, such as unpasteurized milk and ready-to-eat deli meats unless the meat is heated steaming hot. We surveyed long-term care facilities (LTCFs) to assess food safety practices aimed at preventing LM infection.

Methods: Food service directors at LTCFs certified to receive Medicare and/or Medicaid reimbursement in 8 states (CA, CO, CT, GA, NM, NY, OR, and TN) participating in the Foodborne Diseases Active Surveillance Network (FoodNet) were surveyed using a mailed, self-administered questionnaire. The questionnaire asked about food preparation practices and the frequency of which residents were served foods known to be associated with LM infection.

Results: Surveys were distributed to 1630 LTCFs; 877 (54%) returned a completed questionnaire. Soft cheeses made from unpasteurized milk were served at 73 (9%) of 831 LTCFs. Most LTCFs reported routinely serving ready-to-eat deli meats; 655 (81%) of 812 served turkey, 677 (84%) of 807 ham, and 403 (57%) of 710 roast beef. Few LTCFs, however, reported always heating deli meats until steaming hot; 13% turkey, 11% ham, and 19% roast beef. Hot dogs were served at 563 (69%) of 817 LTCFs; of which, 95% reported always heating hot dogs until steaming hot.

Conclusions: Although it is advised that persons ≥ 65 years of age avoid eating foods known to be associated with LM infections, several of these foods, including ready-to-eat deli meats, are commonly served at LTCFs and institutions with many elderly persons. Enhanced educational efforts of food safety practices aimed at LTCFs are needed.

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Foodborne Outbreak of Emerging *Salmonella* Serotype I 4,[5],12:i:- Infections—California, 2004

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Background: While surveillance data show an overall decline in salmonellosis in the US, *Salmonella* serotype I 4,[5],12:i:- infections nearly doubled from 2002-2003. This monophasic serotype, likely a variant of *S.* Typhimurium, first emerged in Europe and is associated with multi-drug resistance. Its epidemiology in the US, however, is poorly understood. In November, 2004, an outbreak of *S.* I 4,[5],12:i:- infections occurred among guests of a party in California. We conducted an investigation to determine the extent of the outbreak and risk factors for illness.

Methods: We initiated case surveillance in the community, conducted a retrospective cohort study among guests and inspected the restaurant that catered the party. We defined a case as onset of diarrhea ($\geq$3 stools/24 hr) in a guest within seven days after the party. Clinical isolates were serotyped and screened for chloramphenicol susceptibility as an indicator for multi-drug resistance.

Results: Contemporaneous illness complaints were not reported among other community members. Twenty-five of 34 party guests enrolled in the study reported illness meeting the case definition, for an attack rate (AR) of 74%. Stool cultures from two ill persons yielded chloramphenicol-sensitive *S.* I 4,[5],12:i:-. Guests who consumed homemade chicken enchiladas were 2.19 times more likely to become ill than those who did not (95% Confidence Interval [CI] 1.01 - 4.74, P=0.009, food-specific AR 88%). Those who consumed restaurant-supplied tortilla chips were 2.98 times more likely to become ill than those who did not (95% CI 0.91- 9.72, P=0.007, food-specific AR 85%). Chips are fried onsite daily, serving regular patrons and catered events. However, two ill persons consumed only chicken enchiladas and a guest reported that some were not thoroughly heated.

Conclusions: Based on our findings and on national surveillance data showing isolation of *S.* I 4,[5],12:i:- from chickens, we believe that chicken enchiladas are the more likely vehicle of transmission for this outbreak. Further investigation into risk factors for this emerging *Salmonella* serotype will facilitate development of targeted intervention and prevention strategies.

Hemolytic Uremic Syndrome surveillance in FoodNet: supplemental active surveillance to monitor HUS trends

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Background: Hemolytic uremic syndrome (HUS) can be a severe consequence of *Escherichia coli* O157 infection, with a mortality rate of 3-5%. To monitor trends in HUS, the Foodborne Disease Active Surveillance Network (FoodNet) conducted surveillance for pediatric and adult cases. Active surveillance among pediatric nephrologists and infection control practitioners (ICPs) was supplemented by a review of hospital discharge data (HDD) to determine the ability of HDD review to capture pediatric and adult cases not previously reported through active surveillance.

Methods: FoodNet conducted population-based active surveillance among pediatric nephrologists and ICPs for pediatric cases (age < 18 years) of HUS, between 2000 and 2002 in 9 states. Eight FoodNet sites also reviewed HDD to identify pediatric and adult HUS cases not previously identified by active surveillance (CO completed HDD for pediatric HUS cases only).

Results: From 2000 through 2002, 367 HUS cases were identified in the 8 states that participated in HDD review and active surveillance. Of these, 241 (66%) were identified through the active surveillance network and 126 (34%) were identified through HDD. Of the 265 pediatric cases, 212 (80%) were ascertained through active surveillance and 53 (20%) were identified from HDD. HDD increased pediatric HUS case ascertainment by 25% (range: 3% in Oregon to 83% in Maryland). Of 98 adult cases, 73 (74%) were identified from HDD and 25 (26%) were ascertained through active surveillance.

Conclusion: Supplementing active HUS surveillance with HDD review is valuable for population-based pediatric HUS surveillance. Moreover, HDD review is essential for capturing a large proportion of adult HUS cases. These results demonstrate that multiple methods for population-based HUS surveillance are important for accurately monitoring and understanding HUS epidemiologic trends in the United States.

Incidence of laboratory-confirmed *Cryptosporidium* in FoodNet, 1997-2004

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Background: *Cryptosporidium* infections cause an estimated 300,000 illnesses annually in the U.S. Outbreaks of *Cryptosporidium* have been well described; however, few studies have examined trends in sporadic cryptosporidiosis in the U.S.

Methods: The Foodborne Diseases Active Surveillance Network (FoodNet) has conducted active surveillance at >600 clinical laboratories for laboratory–confirmed *Cryptosporidium* since 1997. Personnel in participating FoodNet sites routinely contact clinical laboratories to ascertain all laboratory-confirmed cases among residents of the catchment area. A negative binomial regression model was used to estimate the change in incidence in 2004 compared to a 1997 baseline.

Results: From 1997 to 2004, 4,220 laboratory-confirmed cases of *Cryptosporidium* were reported. The overall incidence of *Cryptosporidium* infection was 1.8 (cases/100,000 persons) (range: 0.46 in Maryland to 2.0 in California). The incidence of *Cryptosporidium* infection was higher in males (0.99) than females (0.66); this disparity was greatest in California (1.2 vs. 0.47) and Georgia (1.3 vs. 0.53). When comparing age groups, incidence was lowest in persons $\geq$ 65 years of age and highest in persons 25 to 44 years of age (0.07 vs. 0.64). When modeled, the incidence of *Cryptosporidium* infection was 44% lower in 2004 (95% CI: -58% to -26%) compared to 1997; when each site was modeled individually, the greatest decline was observed in California.

Conclusions: Since 1997, the incidence of *Cryptosporidium* has declined significantly. The incidence of infection was consistently higher in males compared to females, with a two-fold difference observed in California and Georgia and in persons 25-44 years of age. Further investigation is warranted to explain the decline in *Cryptosporidium* incidence and the variation by gender among different demographic groups, but may be related to advancements in HIV therapy in HIV/AIDS patients.

Domestically acquired, sporadic Shiga toxin-producing *E. coli* O157:H7 infection in FoodNet, 2004-2005

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BACKGROUND: Infections from *E. coli* O157 cause 73,480 illnesses each year in the United States, leading to an estimated 2,168 hospitalizations and 61 deaths annually. When attributing the burden of disease to food-settings in U.S. and food-products, it is important to know the number of cases that are domestically acquired and sporadic. Using active surveillance data from the Foodborne Disease Active Surveillance Network (FoodNet), we determined the proportion of STEC O157 infections acquired internationally and the proportion of domestically acquired infections that were outbreak-associated.

METHODS: FoodNet sites conduct active surveillance for laboratory-confirmed cases of STEC O157 infections in 10 states (CA, CO, CT, GA, MD, MN, NM, NY, OR, & TN). Since 2004, FoodNet personnel have attempted to interview all cases regarding international travel in the 7 days preceding their illness onset (travel-associated), and systematically document STEC O157 cases known to be part of an outbreak (outbreak-associated).

RESULTS: From January 2004 to September 2005, FoodNet ascertained 663 laboratory-confirmed cases of STEC O157. Of these, 21/663 (3%) were travel-associated (range: 33% in NY to 0% cases in CO). Most travel-associated cases were female (71%). Of 642 domestically-acquired cases, 84 (13%) were associated with a known outbreak (range: 21% in MN to 0% cases in NM). Most outbreak-associated cases (81%) were from 4 northern states (CT, MN, NY, and OR). Therefore, of 663 cases of STEC O157, 558 (84%) were domestically-acquired and sporadic (range: 35/40 (88%) in CO to 28/38 (73%) in MD). Among these cases, 357 (67%) were from 4 northern states, 291 (52%) were female, and 288 (52%) occurred during the summer months (June, July, August).

CONCLUSIONS: Most cases (84%) of all laboratory-confirmed STEC O157 ascertained by FoodNet were domestically-acquired sporadic infections. Travel-associated cases were predominately female. Most outbreak-associated cases occurred in northern states. The burden of these domestically acquired sporadic infections can be linked to specific sources by coordinating data from outbreak investigations and sporadic case-control studies, and other data sources.

Estimate of the burden of acute gastroenteritis in the United States

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Background: In 1999, CDC estimated 211 million episodes of acute gastroenteritis (AGI) each year in the U.S., including 76 million episodes of foodborne illness. This estimate was based on the prevalence of diarrheal illness from the 1996 FoodNet Population Survey and the prevalence of vomiting and respiratory symptoms from earlier U.S. studies. We provide a revised estimate of AGI using data from more recent cycles of the FoodNet Population Survey.

Methods: FoodNet conducted two 12-month population-based telephone surveys in 2000 and 2002. AGI was defined as diarrheal illness (defined as ≥3 loose stools lasting >1 day or resulting in activity restriction) and/or vomiting in the absence of respiratory symptoms. Respondents reporting non-infectious causes of AGI were excluded.

Results: Of 29,717 respondents, 8.8% reported diarrheal illness and/or vomiting in the previous month. Of these, 39.1% reported concurrent respiratory symptoms. Therefore, the prevalence of AGI was 5.4% or 0.65 episodes per person-year (5.1% in 2000 and 5.6% in 2002). Overall, females reported a higher prevalence than males (6.1% versus 4.7%). The highest prevalence was in children <5 years (8.3%); the lowest in persons ≥65 years (2.6%). African Americans (4.2%) and Hispanics (4.1%) respondents reported a lower prevalence of AGI than whites (5.7%). The prevalence was higher in winter (5.8%) than summer (5.2%).

Conclusion: AGI remains an important cause illness in the U.S. A review of epidemiological studies is needed to determine the proportion of AGI transmitted through food and other routes.

Use of Antimicrobial Agents and Resistance in Non-Typhi *Salmonella* Infections in Infants, FoodNet 2002-2004

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Background Trimethoprim-sulfamethoxazole (TMP-SMX) and ceftriaxone are recommended for treatment of severe non-Typhi *Salmonella* infections in infants, yet little is known about the prevalence of resistance to these antimicrobial agents among infants. We describe the use and resistance to these antimicrobial agents among non-Typhi *Salmonella* isolates in infants.

Methods The Foodborne Diseases Active Surveillance Network (FoodNet) conducts active surveillance for laboratory-confirmed *Salmonella* infections. From 2002-2004, infants <1 year of age with a laboratory-confirmed non-Typhi *Salmonella* infection were enrolled in a case-control study that included questions about antimicrobial agent use. The National Antimicrobial Resistance Monitoring System for Enteric Bacteria (NARMS) tested isolates from a sample of non-Typhi *Salmonella* FoodNet cases. FoodNet and NARMS surveillance data were linked to identify a subset of cases with questionnaire data and susceptibility testing results.

Results The case-control study included 442 infants with *Salmonella* infections from 2002-2004. Of these cases, 222 (50%) were treated with an antimicrobial agent; including 41 (18%) treated with TMP-SMX and 16 (7%) treated with ceftriaxone. Additionally, 29 (7%) of the 442 cases had an isolate submitted to CDC for susceptibility testing. Of these cases, 6 (21%) were resistant to at least one antimicrobial agent; 3 (10%) *S.* Typhimurium isolates were resistant to ampicillin, chloramphenicol, streptomycin, sulfamethoxazole, and tetracycline (R-type ACSSuT), 1 (3%) *S.* Newport isolate was resistant to nalidixic acid, 1 (3%) *S.* Derby isolate was resistant to sulfamethoxazole, streptomycin, and tetracycline, and 1 (3%) *S.* Derby isolate was resistant to streptomycin. None of the isolates were resistant to TMP-SMX or ceftriaxone.

Conclusions These data suggest that TMP-SMX and ceftriaxone, the two recommended antimicrobial agents for treatment of non-Typhi *Salmonella* infection in children, are still effective treatment options. Of concern, 10% of non-Typhi *Salmonella* isolates with susceptibility results were R-type ACSSuT and 3% were resistant to nalidixic acid.

Salmonella Javiana in the Southeastern United States: A hypothesis generating study

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Introduction: *Salmonella* serotype Javiana infections have increased 167% between 1996 and 2004 in the FoodNet sites and *S*. Javiana is now the fourth most common *Salmonella* serotype in the United States. Amphibian exposure and consumption of Roma tomatoes grown in the Southeast have been associated with outbreaks of *S.* Javiana infection.

Methods: To identify risk factors for sporadic *S*. Javiana infections, we interviewed patients with laboratory-confirmed *S*. Javiana infection who were identified between August and October 2004 in Georgia, South Carolina, and Tennessee. We collected information regarding food consumption, drinking water, animal contact, and environmental exposures. Responses from cases in GA and TN were compared to population-based survey data collected in these states in 2004. Stratified analyses to adjust for age, rural residence, and gender were performed to evaluate exposures.

Results: One hundred one cases were identified. Of these, 83 (82%) were interviewed (58 in GA, 14 in TN and 11 in SC). Overall, 26% of cases drank private well water in the 7 days before illness onset, compared with 11% of controls (Odds Ratio=3.0, 95% CI=1.7-5.3). In addition, 27% of cases had contact with reptiles or amphibians compared with 6% of controls (Odds Ratio=5.6, 95% CI=2.5-13). No dietary risk factors were identified.

This preliminary study suggests several environmental factors are associated with *S.* Javiana infections in GA and TN. A formal case-control study is needed to further explore the relationships between living in a rural area, gender, age, and environmental risk factors for *S.* Javiana to provide a basis for prevention measures.

Decline in Risky Food Consumption in the Foodborne Diseases Active Surveillance Network (FoodNet) Population: 1998 to 2002

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Background: Foodborne infections can cause severe illness in children, immunocompromised persons, and the elderly. There are certain "risky foods," such as pink hamburger, raw oysters, and runny eggs, associated with an increased risk of foodborne illness.
Methods: The Foodborne Diseases Active Surveillance Network (FoodNet) conducted two 12-month population-based telephone surveys of the general population in 1998 and 2002 to determine consumption patterns for a variety of foods in the previous week as well as demographic information. We designated 7 foods as "risky foods" based on our knowledge of the foodborne disease literature and recent outbreaks. These 7 items were: (1) pink hamburgers; (2) pink ground pork; (3) raw fresh fish; (4) raw shellfish (a composite of raw clams, mussels, scallops, or oysters); (5) raw/unpasteurized milk; (6) runny eggs; and (7) alfalfa sprouts. Using multivariate logistic regression, we assessed the association of consumption of ≥1 of the 7 risky foods with: survey year, gender, ethnicity, education, age-group, and immunocompromised status.
Results: Overall, consumption of ≥1 risky food decreased from 31% in 1998 to 21% in 2002 ($p<0.001$). A significant decrease occurred in all age groups, both genders, the healthy, the immunocompromised, whites, Hispanics, and African-Americans. Despite the overall decline, in 2002 some groups continued to consume risky foods at a relatively high rate. Men 18-64 years old more often reported consuming risky foods than women 18-64 years old (38% vs. 30%, $p<0.001$), Asian/Pacific Islanders were more likely to consume risky foods than whites (32% vs. 21%, $p<0.001$), and immunocompromised subjects <18 years old were more likely to consume risky foods than healthy subjects <18 years old (21% vs. 14%, $p<0.001$).
Conclusion: Consumption of risky foods declined significantly in 2002 compared to 1998. However, adult men, Asian/Pacific Islanders, and immunocompromised children could still be targeted for messages to further reduce consumption of risky foods.

Pregnancy-associated listeriosis in Hispanic women in FoodNet Sites, 1996-2003

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Background. Listeriosis is a serious infection most commonly caused by eating food contaminated with *Listeria monocytogenes*. Each year in the United States, nearly 2,500 persons are infected with *L. monocytogenes* resulting in approximately 500 deaths. About one-third of *L. monocytogenes* infections occur during pregnancy. Infections during pregnancy commonly result in miscarriage, stillbirth, premature delivery, or infection of the newborn. Foods associated with listeriosis include deli meat and unpasteurized soft cheeses. In recent years, several outbreaks of listeriosis caused by Mexican-style cheese (e.g., queso fresco) made from unpasteurized milk have been identified, predominantly among Hispanic women.

Methods. We examined population-based surveillance data collected via the Foodborne Diseases Active Surveillance Network (FoodNet) from 1996 through 2003 to determine the burden of disease and trends in pregnancy-associated *Listeria monocytogenes* infection. Infections were classified as "pregnancy-associated" if illness occurred in a pregnant woman or an infant <31 days old.

Results. A total of 766 invasive cases (3.6 cases per million population per year) of *L. monocytogenes* infection were ascertained in the surveillance population from 1996 through 2003. Of these, 122 (4.3 cases per million) were pregnancy-associated. From 1996 to 2003, the incidence of pregnancy-associated listeriosis declined by 37%. Pregnancy-associated disease was much more common among Hispanic women of child-bearing age (11.6 cases per million) than among non-Hispanic women of child-bearing age (3.5 cases per million).

Conclusion. Pregnancy-associated listeriosis disproportionately affects Hispanic women. Further declines in listeriosis incidence require continued efforts of industry and government to reduce contamination of the food supply and to educate clinicians and consumers, particularly pregnant and/or Hispanic women, about risks factors for *Listeria* infection.

	FoodNet/NARMS/GSS Contact Information (updated: 1/5/06)	
		404-639-
	Name	**NEW EXT**
General	Main number	3680
	FAX	3535
	FAX	3545
	Intern	3474
	Intern	3520
	Angulo, Fred	3315
	Robinson, Felecia	3485
	Barzilay, Ezra	3330
	Greene, Sharon	3373
FoodNet	Scallan, Elaine	3494
	Demma, Linda	3343
	Fullerton, Katie	3363
	Henao, Olga	3393
	Jain, Anurag	3410
	Long, Cherie	3411
	Nelson, Jennifer M	3433
	Ong, Liane	3435
	Oosmanally, Nadine	3479
	Rosenblum, Ida	3493
	Teates, Kathryn	3458
	Wilmore, Sridevi	3463
NARMS/GSS/Health Education		
	Chiller, Tom	3331
	Bair-Brake, Heather	TBD
	DeLong, Stephanie	3332
	Holzbauer, Stacy	TBD
	Maxwell, Nikki	3412
	May ThurdeKoos, Amie	3422
	Medalla, Felicita	3426
	Miller, Terrell	3429
	Smith, Julie	TBD
	Stancik Rosenthal, Lauren	3510
	Stuart, Andrew	3519
	Bronner, Courtney	3530

FoodNet
2005 Goals and Objectives Update

Elaine Scallan
FoodNet Chief

1. Continue to conduct and improve the quality of active surveillance data
    - Use performance standards to provide feedback to sites on data quality
        i. Bi-annual, site-specific Performance Standards are provided to the sites.
    - Create interactive data analysis enhancement to the FoodNet application
        i. A request for an interactive enhancement was included in the FoodNet IT proposal to the Office of Surveillance; these proposals are still under review.
    - Document laboratory audit results
        i. The proportion of clinical laboratories that are audited and the number of cases ascertained during those audits is counted on an annual basis. The FoodNet Coordinators looked into obtaining documentation for computer queries from the clinical laboratories; these queries are not obtainable.
    - Integrate surveillance data collected through NEDSS into FoodNet
        i. We are working to incorporate NEDSS data from Tennessee into the FoodNet application.
    - Collect *Shigella* risk factors as part of surveillance
        i. All sites are interviewing *Shigella* cases to collect risk factor information for a 12-month period.
    - Integrate Texas EIP site into FoodNet
        i. Texas will not be conducting FoodNet activities.

2. Continue surveillance for hemolytic-uremic syndrome
    - Initiate a prospective cohort study of *E. coli* O157 cases to quantify the risk of HUS from antibiotic use.
        i. FoodNet has submitted to the Internal Review Board (IRB) a prospective cohort study to provide an estimate of the association between antibiotic exposure and HUS among persons infected with *E. coli* O157. Other putative risk factors and predictors of HUS will be evaluated including other therapies, the microbiologic characteristics of infecting *E. coli* O157 strains, and host factors. This study is targeted to begin January 1, 2006.
    - Conduct retrospective hospital discharge review for adult and pediatric HUS cases
        i. As an additional HUS surveillance tool, we are conducting retrospective hospital discharge review in several of the FoodNet states. These data will be used to capture a larger proportion of adult HUS cases, and to enhance all HUS surveillance activities within FoodNet. Currently, HDD data has been collected in the participating states through 2002.

3. Continue to improve estimates of the burden of foodborne illness
    - Revise estimates of Mead et al for the number of bacterial pathogens that are usually transmitted by food.

        i. Burden WG has submitted to the *American Journal of Public Health* a paper comparing the four cycles of the population survey.
        ii. Burden WG has drafted a paper using data from the population survey to examine the factors associated with seeking medical care and submitting a stool sample. This will be presented as a poster presentation at IDSA.
        iii. Interdivisional group, including Parasitic, Viral and Hepatitis, has been convened and is holding monthly conference calls.
        iv. Abstract on revised estimates to be submitted to ICEID 2006.
- Validate 'multipliers' for burden of illness calculations from the population survey using external data sources.
    i. Initial calculations for frequency of stool cultures among patients visiting a physician for GI symptoms done using NAMCS and submitted in abstract form for IDSA
    ii. Identification of other potential data sources under way (National Inpatient sample)
    iii. TN will examine proportion of visits to TN providers for GI symptoms that result in stool cultures using TENNcare data

4. Attribution- Estimate the proportion of foodborne illness that is caused by specific food commodities.
    - Continue collaboration with the University of Minnesota
        i. FoodNet continues to collaborate with the University of Minnesota.
            1. Carrie Rigdon is due to complete her PhD thesis comparing data from PHLIS and HACCP by the end of this academic year.
            2. George Maldondo is working on a paper describing the 'blending project'.
        ii. FSIS is funding an external consulting agency to replicate the Danish Attribution model using PHILS and HACCP data.

    - Expand the collaboration with the Food Safety Research Consortium at the University of Maryland
        i. FoodNet has attend and participated in all FSRC workshops

5. Develop and implement and information technology plan for managing FoodNet data
    - Hire an IT lead to develop an information technology plan.
        i. Beau Bannerman, Business Analyst from the Office of Informatics, worked with FoodNet to develop an information technology plan.
            1. Based on these recommendations, FoodNet submitted a proposal to the Office of Surveillance for funding FDDB data integration efforts; these proposals are under review.
        ii. A lead analytical epidemiologist was hired to help coordinate data integration and NEDSS efforts.

6. Continue the integration of FoodNet active surveillance case data with isolate results from NARMS and PulseNet, with outbreak data in eFORS, and with hemolytic uremic syndrome surveillance data.
        i. Prospective and retrospective linking of FoodNet and NARMS data continues. Efforts are currently being made to link NARMS and PulseNet data.

ii. A variable was added to the FoodNet application to collect EFORS ID for *Salmonella* and *E. coli* foodborne outbreaks.
iii. HUS surveillance data is linked with *E. coli* active surveillance data, 1996-2004.

7. Develop and launch the 5th cycle of the population survey.
    i. Questionnaire draft completed and sent out for review
    ii. Contract has been signed
    iii. Cognitive survey under way (to be completed by end of August 2005)
    iv. Clearance process to start September 2005
    v. Projected launch date – January 2006

8. Publish manuscripts for completed FoodNet case-control studies
    - *S*. Newport - In clearance (August 2005)
    - *S*. Enteritidis - In clearance (August 2005)
    - *E*. coli O157 - In clearance (July 2005); IDSA 2005 poster (Drake, et al)
    - *Listeria monocytogenes* - In clearance (July 2005)
    - Infant *Salmonella* - Expected to be in clearance (September 2005); IDSA 2005 poster (Ingram, et al)
    - Infant *Campylobacter* - Expected to be in clearance (September 2005); IDSA 2005 poster and talk (Fullerton, et al)

9. Launch new studies that were identified in the 2004 vision meeting as priorities.
    - Complete the food safety in Nursing Homes survey - Data collection completed (July 2005) and preliminary data analysis has been initiated (August 2005).
    - Complete the *Campylobacter* retail food survey –The microbiological component of this survey should launch before January 1, 2006
    - Complete the *Campylobacter* laboratory survey – Launched (August 2005)
    - Initiate study of the adverse human health consequences of antimicrobial resistant enteric infections –Scheduled to launch January 1, 2006
    - Initiate the *Salmonella* Javiana case-control study --In the early development stage

10. Continue international collaborations related to describing the burden and causes of foodborne diseases
    - Facilitate International Collaboration of Foodborne Disease Network conference calls and listserv
        i. FoodNet continues quarterly conference calls and moderate the collaboration's list-serv.
    - Plan annual international meeting related to burden of foodborne disease
        i. A face-to-fact meeting was held in Madrid, Spain in June 2005
    - Consult with health Canada establish C-Enternet
        i. FoodNet continues to collaboration with C-EnterNet and receives regular updates on their activities. The second annual meeting on C-EnterNet is due to take place in November 2005.

FoodNet

Elaine Scallan
FoodNet Chief

1. Continue to conduct and improve the quality of active surveillance data
    - Use performance standards to provide feedback to sites on data quality
        i. Develop and review targets for all performance standards
    - Continue development of Negative Binomial Regression Model
        ii. Evaluate including age in the model
        iii. Examine trends over time for outbreak data within FoodNet sites
    - Create data analysis tool for analyzing trends in FoodNet data using the Negative Binomial Regression model (for internal use).
    - Integrate surveillance data collected via NEDSS into FoodNet
    - Finalize Standard Operating Procedures for surveillance activities

2. Continue integration of FoodNet surveillance data with other Foodborne and Diarrheal Diseases Branch (FDDB) data sources
    - Develop procedures to ensure state laboratory isolate ID's are in the correct format by sharing algorithms with NARMS and PulseNet.
    - Share results and strategy with FoodNet Coordinators at 2006 FoodNet Vision Meeting.
    - Work with Listeria and Vibrio surveillance teams to implement similar changes as with the Typhi surveillance team that will facilitate linking in the future.
    - Ensure that all 2006 FoodNet study databases are developed to facilitate linking with NARMS.
    - Create documentation of linking processes (e.g., linking FoodNet and NARMS surveillance data, linking FoodNet and NARMS data with pathogen-specific case report form data).

3. Continue to improve surveillance for hemolytic-uremic syndrome (HUS)
    - Evaluate HUS surveillance data:
        i. Compare Hospital Discharge Data (HDD) and active surveillance data and assess the relative contribution of each;
        ii. Determine the scope of FoodNet HUS surveillance by describing all pathogens in FoodNet HUS database (in addition to *E. coli*) and comparing with Active Bacterial Core (ABC) surveillance;
        iii. Evaluate laboratory methods for determining the etiology of a HUS case.
    - Examine trends over time for HUS using regression models.

2. Continue to improve estimates of the burden of foodborne illness
    - Work with DPD, VR and DVHP to revise estimates of Mead et al. (1999) of foodborne illness and death in the United States.

- Validate 'multipliers' for burden of illness calculations using external data sources.

3. Continue attribution efforts to estimate the proportion of foodborne illness caused by specific food commodities.
    - Continue to work with the University of Minnesota to complete:
        i. Salmonella Attribution project
        ii. Blending project
    - Continue to work with UDSA-FSIS and Decisionalysis to apply the Danish Food Attribution model to FoodNet data.
    - Make recommendations for improving FoodNet case-control study methodologies based on working group and Vision meeting discussions.
    - Continue to collaboration with the Food Safety Research Consortium and other groups on food attribution
    - Complete analysis of 12-month *Shigella* case report form data.

4. Develop and assess interventions to reduce the burden of foodborne illness.
    - Finalize FoodNet brochure
    - Identify and develop four 'FoodNet lessons learned' brochures
    - Work with Health Communications to identify potential messages, venues and target audiences for dissemination of information on FoodNet surveillance and studies.
        i. Establish partnerships to disseminate messages about queso fresco and *Listeria* to pregnant Hispanic women
        ii. Continue work with FDDB WG to assess potential interventions regarding *Listeria*

5. Develop and launch FoodNet special studies
    - Continue development of the *Campylobacter* Grocery Store survey
    - Develop and launch Selected *Salmonella* Serotypes Case-control study
    - Launch study Clinical Outcomes study
    - Launch study to determine genetic predictors of developing HUS following infection with *E. coli* O157:H7
    - Launch prospective cohort study of *E. coli* O157 cases to quantify the risk of HUS from antibiotic use.
    - Launch the 5th cycle of the population survey.
    - Coordinate database development for FoodNet special studies in order to streamline process and make variables consistent across studies
    - Develop patient and specimen tracking tools for FoodNet special studies.

6. Manuscripts
    - Publish/accepted for publication
        i. Infant *Campylobacter* case-control study (Fullerton et al.)
        ii. Infant *Salmonella* case-control study (Jones et al.)
        iii. Clinical outcomes of MDR *S.* Newport infections (Devasia et al.)

iv. Diarrheal illness from 4 pop survey cycles (Jones et al.)
v. Second *E. coli* O157 case-control study (Kennedy et al.)
vi. *Salmonella* in spices (Klontz et al.)
vii. *S.*Enteritidis case-control study (Marcus et al.)
viii. *S.* Newport case-control study (Varma et al.)
ix. *Listeria* case-control study (Varma et al.)
x. *Listeria* and hot dogs (Patrick et al.)
xi. Pediatric HUS (Dunn et al.)
xii. KAP of Irradiation (Hoefer et al.)
xiii. Risky food consumption (Samuel et al.)
xiv. Medical care seeking behavior paper (Scallan et al.)

- Submit to CDC clearance/journal
  i. Long-term Care Facility Survey (Nelson et al.)
  ii. Validation of stool testing using NAMCS (Henao et al.)
  iii. *Campylobacter* Laboratory Survey (Hurd et al.)
  iv. Outbreak supplemental for paper (Snider et al.)
  v. Trends in listeriosis (Voetch et al.)
  vi. Trends in *Campylobacter* (Ailes et al.)
  vii. Clinical consequences of *S.* Typhi (Crump et al.)
  viii. *Campylobacter* infection in Australia and U.S. (Valley et al.)
  ix. Post-Diarrheal HUS in adults (Snider et al.)
  x. Risk factors for HUS among *E. coli* infections (Drake et al.)

- Develop mature draft
  i. Trends in *Vibrio* (??)
  ii. Trends in *E. coli* O157 infections (Dunn et al.)
  iii. International *Campylobacter* Laboratory Survey (??)
  iv. FoodNet methodology (Henao et al.)
  v. Revised estimate of Foodborne Illness in the U.S. (Scallan et al.)

8. Continue international collaborations related to describing the burden and causes of foodborne diseases
   - Facilitate International Collaboration of Foodborne Disease Network conference calls and listserv
   - Plan annual international meeting related to burden of foodborne disease
   - Consult with health Canada establish C-Enternet

What is FoodNet?

The Foodborne Diseases Active Surveillance Network (FoodNet) is the principal foodborne disease component of CDC's Emerging Infections Program (EIP). FoodNet is a collaborative project of the CDC, ten sites, the U.S. Department of Agriculture (USDA), and the Food and Drug Administration (FDA).

FoodNet Partners

US Department of Agriculture (USDA)
www.usda.gov

Food and Drug Administration (FDA)
www.fda.gov

FoodNet Sites

California	www.ceip.us/foodnet.htm
Colorado	www.cdphe.state.co.us
Connecticut	www.dph.state.ct.us
Georgia	www.health.state.ga.us
Maryland	www.dhmh.state.md.us
Minnesota	www.health.state.mn.us
New Mexico	www.health.state.nm.us
New York	www.health.state.ny.us
Oregon	www.oregon.gov/ddhs/ph
Tennessee	www.tennessee.gov/health

Contact Information

FoodNet publication and annual reports are available at:

www.cdc.gov/foodnet

FoodNet/NARMS Unit
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FoodNet

Foodborne Diseases Active Surveillance Network

www.cdc.gov/foodnet

FoodNet Objectives

1 Measure the burden of foodborne illness in the United States

FoodNet is an active surveillance system providing comprehensive and timely data on 9 foodborne pathogens. FoodNet staff routinely contact all clinical laboratories in the 10 FoodNet sites to collect information on every laboratory-confirmed case under surveillance.

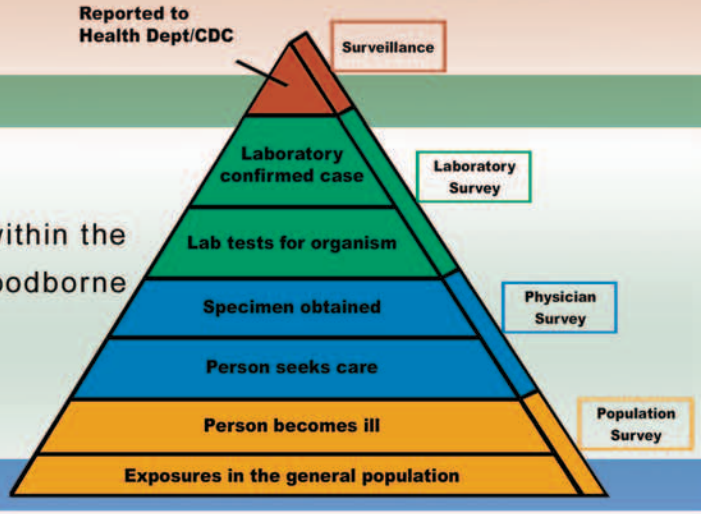
For a case to be ascertained in surveillance, the ill person must seek medical care and submit a stool sample in which a pathogen is identified. To account for underreporting, FoodNet surveys the general population and clinical laboratories to determine the portion of reporting at each level.

2 Monitor trends in the burden of specific foodborne illnesses over time.

FoodNet tracks the progress towards Healthy People 2010 National Health Objectives by monitoring trends in foodborne pathogens over time.

3 Attribute the burden of foodborne illness to specific foods and settings.

FoodNet conducts numerous studies within the population to attribute the burden of foodborne illness to specific foods or settings.



4 Develop and assess interventions to reduce the burden of foodborne illness.

Determining the burden of foodborne illness, monitoring trends and attributing illness to specific items or behaviors allows FoodNet to recognize need for different interventions. FoodNet and its partners work together to develop and assess interventions at many points in the “farm to table” continuum.

Data Analysis Request and Use Form
Centers for Disease Control and Prevention
Emerging Infections Program
Foodborne Diseases Active Surveillance Network (FoodNet)

Phone: (404)-371-5409 Fax:(404)-371-5444

Nicole Steinmuller_____ _____
Requestor's Name (please print) Date Approved by Steering Committee

Foodborne and Diarrheal Branch
CDC Experience Fellow- MD/MPH student_____ January/February 2006
Organization /Affiliation (please print) Date Analysis/Data Needed By

404-639-0232 404-639-2205 esw3@cdc.gov
Requestor's Contact Phone Requestor's Contact Fax Requestor's Contact E-mail

Description of Data Request:

Research Question/Interest:
I would like to do a descriptive analysis of the population that goes to petting zoos, fairs, and farms; looking at state, month, year, sex, age, immunocompromised status, income, education level, setting, race from the population survey data. I would like to compare this with the reports of diarrhea from this dataset; and with the number of STEC cases in each FoodNet state, the number of STEC cases that are associated with animal contact/exposure and if these cases were sporatic or outbreak related if this information is available. This information along with possible demographic information associated with these cases would need to be obtained from the FoodNet states and their supplemental forms.

Dataset: Population survey data and STEC cases in each Food Net state and their supplemental STEC forms
(from case control study, surveillance, population survey, etc.)
Pathogen(s) Ecoli 0157:H7 (STEC)
Year(s): 2002-2003
Other Variables of Interest (e.g. sex, race, ethnicity): See above for population survey data; for STEC cases would only need state, month of onset, year, sex, age, and possibly income, educational level, and race if available.
Denominator:_____

Proposed Publication:

Publication: X Yes □ No
If yes:
Publication Timeline: Spring 2006
Proposed Publication:
Review article about Ecoli outbreaks and cases associated with animals in public settings. This review article would discuss recent outbreaks and the lessons learned from these outbreaks, a description of the population the attends petting zoos and its relation to STEC cases and rates to illuminate possible risk factors; and a discussion about current recommendations and possible changes that need to take place to prevent these outbreaks and cases in the future.

Data Use Policy:

I understand that I am responsible for the integrity and management of these datasets. The datasets will not be provided to a third party without the permission of the FoodNet Steering Committee. In the spirit of collaboration, I agree to keep the FoodNet Steering Committee informed of the results of analyses. In accordance with the FoodNet publication guidelines, I will not distribute the results of these analyses, electronically or otherwise, in the form of a poster, abstract, manuscript, report, press release, or other public presentation without the approval of the FoodNet Steering Committee.

_____ _____

If you have any questions about the data use or authorship policy, please contact FoodNet at 404-371-5465
http://www.cdc.gov/foodnet

Modified 10/19/05

Schmitz, Ann M., DVM, Division of Bacterial and Mycotic Diseases Branch, Foodborne and Diarrheal Diseases Branch, Mailstop A-38, 404/639-2206
EIS Class Year of Entry—2005
Mackel Award consideration: no
Peavy Award consideration: no
Willing to present at International Night: no
Number of abstracts submitted: 1

Ann M. Schmitz, M. Adams, C. Waters, Q. Phan, S. Hurd, A. Kimura, A. Kao, A. Gallagher, P. Jenkins, K. Simeonsson, L. Nathan, D. Leschinsky, E. Salehi, M. Lynch

Use of Detailed Food Exposures Collected as Part of Routine Surveillance in Investigation of a Multistate Listeriosis Outbreak Linked to Turkey Deli Meat – United States, 2005

Background: *Listeria monocytogenes* (LM) causes approximately 2,500 illnesses and 500 deaths annually in the U.S. Although lessons from listeriosis outbreak investigations have helped guide regulatory policy, delays in food vehicle identification have hindered timely public heath intervention. In August 2005, we investigated an outbreak of LM infections using information routinely gathered with a questionnaire piloted in multiple states following a large LM outbreak in 2002.

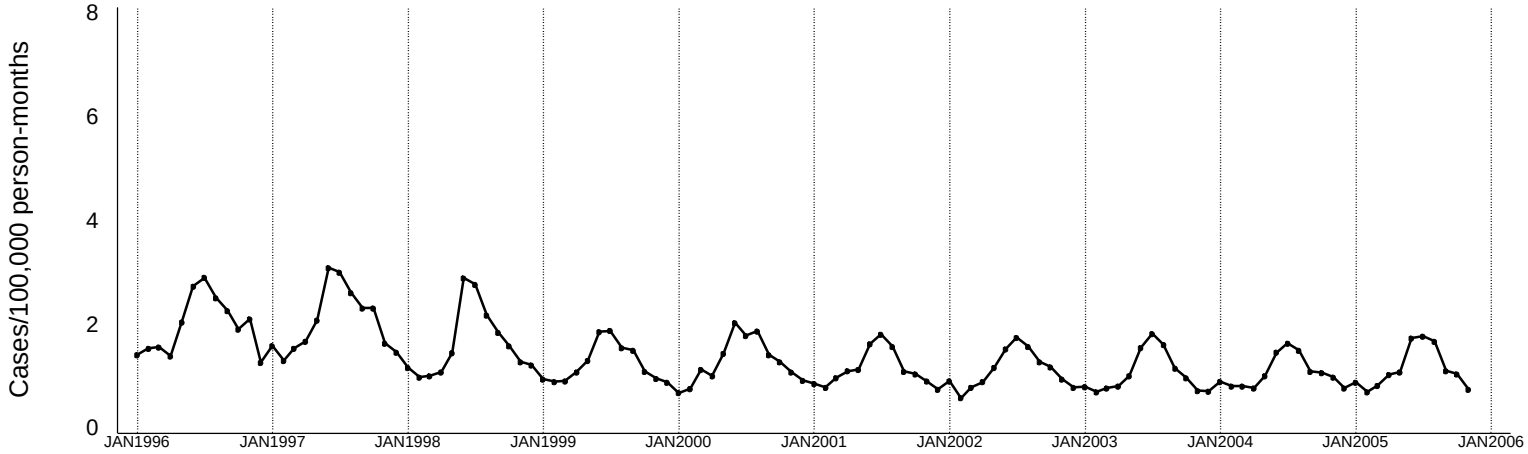
Methods: Cases were identified from pulse-field gel electrophoresis (PFGE) patterns of LM reported to CDC. For the case-control study, we defined a case as infection with LM that was indistinguishable from the outbreak strain by two PFGE enzymes and illness onset between June 1 and September 30, 2005. Controls were from the same region as cases and infected with non-outbreak LM strains. Food exposures collected as part of routine LM case surveillance were compared to identify a food vehicle. Product traceback was done by state health officials.

Results: We identified 13 cases. There was one death and one fetal death. The case-control study began August 19. In preliminary results for 8 case patients and 32 controls available August 30,. patients were more likely than controls to have consumed turkey deli meat (7 of 8 case patients (88%) and 13 of 32 control patients (41%), OR=10.2, 95%CI=1.1-93.3). Traceback of the source of turkey deli meat led to multiple processing plants.

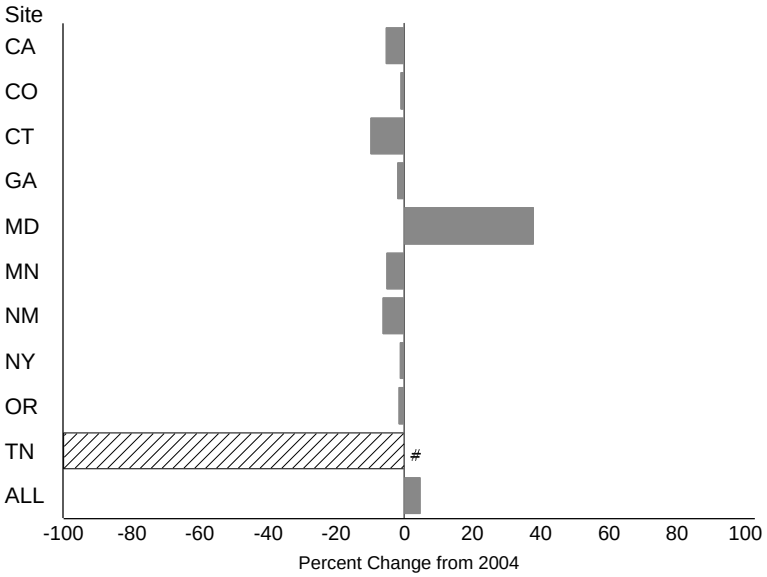
Conclusions: Turkey deli meat was the source of a multistate listeriosis outbreak. Use of routinely gathered food exposures facilitated rapid identification of the food vehicle in a small outbreak of listeriosis. Further efforts to improve investigations of listeriosis outbreaks could reduce delays in public health intervention.

Campylobacter

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 by site

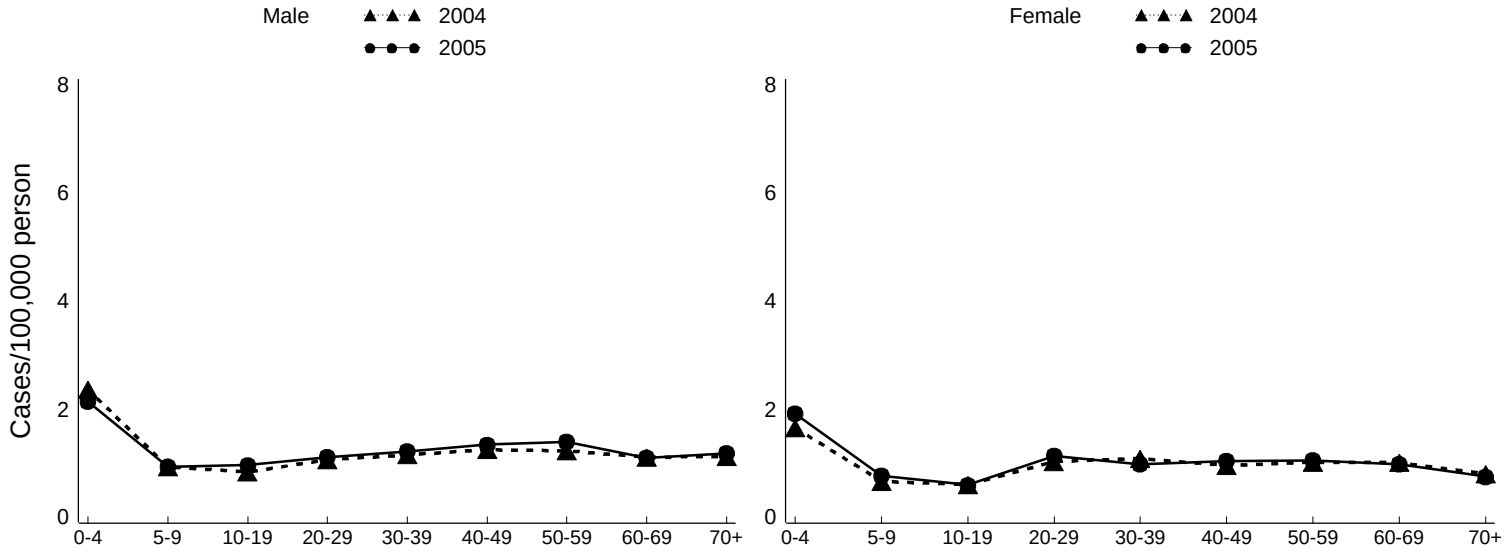


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	**Cases**	**Rate^**	**Cases**	**Rate^**	**Cases**	**Rate^**
CA	810	25.24	856	26.68	931	29.00
CO	471	18.43	476	18.63	373	15.28
CT	501	14.30	556	15.87	520	15.03
GA	531	6.014	542	6.139	578	6.771
MD	368	6.621	267	4.804	298	6.502
MN	807	15.82	851	16.68	907	18.07
NM	303	15.92	323	16.97	323	16.97
NY	461	10.68	467	10.82	376	12.16
OR	597	16.61	607	16.89	553	15.73
TN	0	0.000	397	6.728	275	6.668
ALL	4849	12.57	5342	12.01	5134	12.76

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

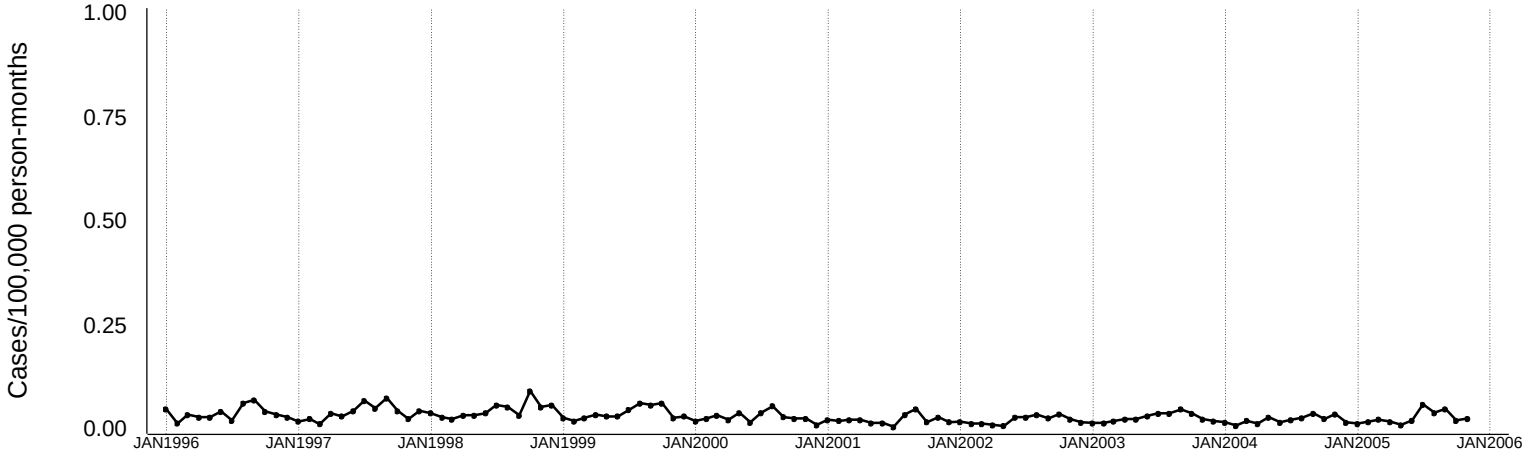
Calendar year through November: Rates for 2004 and 2005 by age group and sex



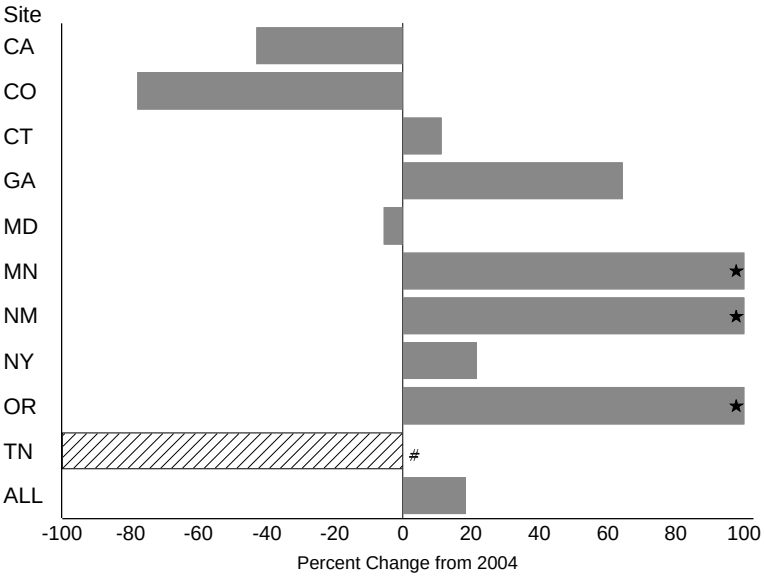
Data source: Preliminary FoodNet data, subject to change, not for public distribution.
Note: 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction. Report date: 10-January-2006

Listeria

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 bv site

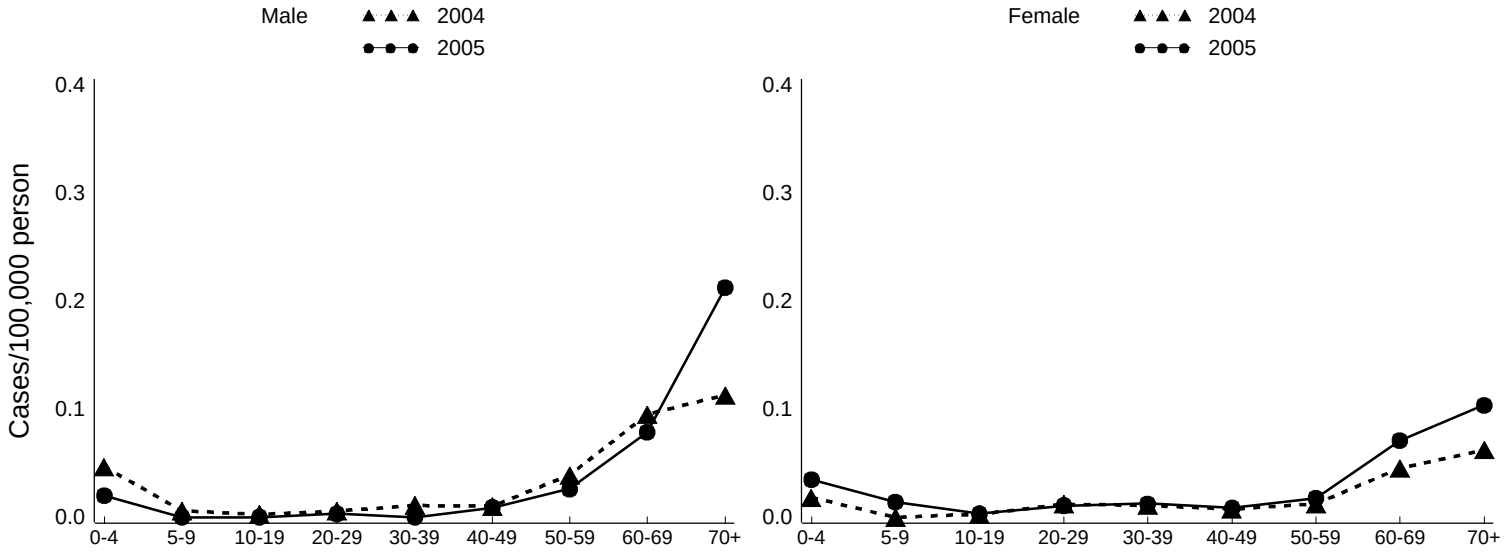


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	Cases	Rate^	Cases	Rate^	Cases	Rate^
CA	8	0.249	14	0.436	13	0.405
CO	2	0.078	9	0.352	5	0.215
CT	20	0.571	18	0.514	17	0.480
GA	23	0.260	14	0.159	19	0.227
MD	17	0.306	18	0.324	18	0.377
MN	13	0.255	5	0.098	5	0.100
NM	4	0.210	1	0.053	1	0.053
NY	17	0.394	14	0.324	13	0.466
OR	11	0.306	5	0.139	7	0.205
TN	0	0.000	14	0.237	8	0.198
ALL	115	0.298	112	0.252	107	0.278

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

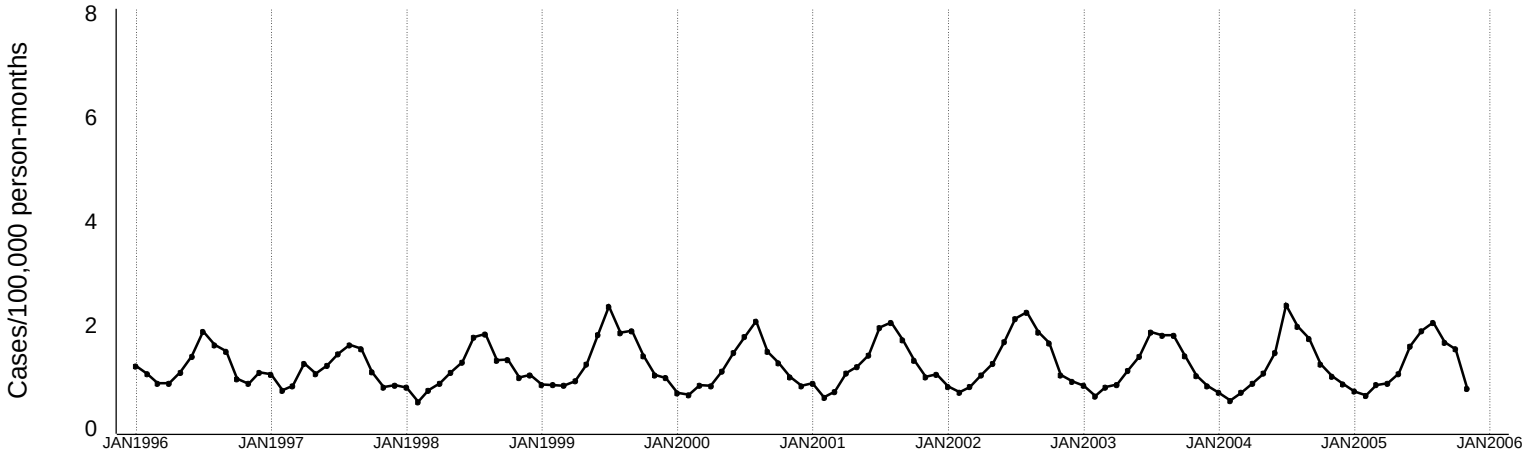
Calendar year through November: Rates for 2004 and 2005 by age group and sex



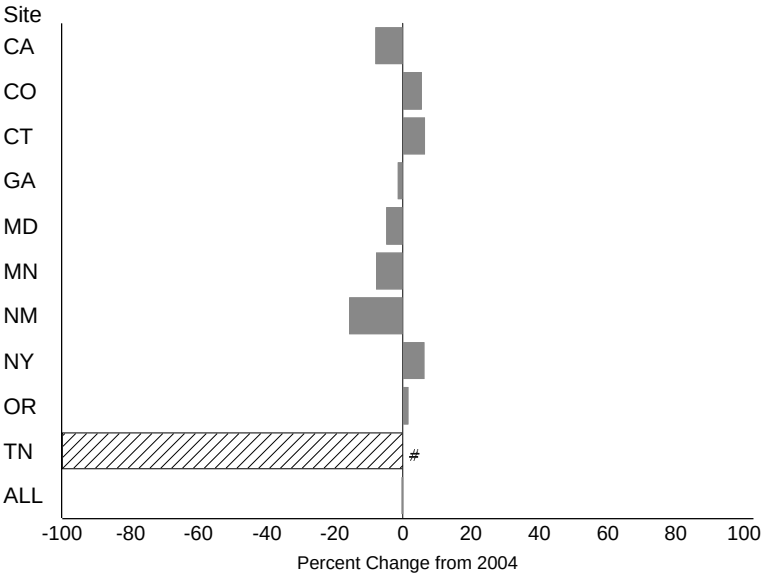
Data source: Preliminary FoodNet data, subject to change, not for public distribution.
Note: 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction. Report date: 10-January-2006

Salmonella, all serotypes

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 bv site

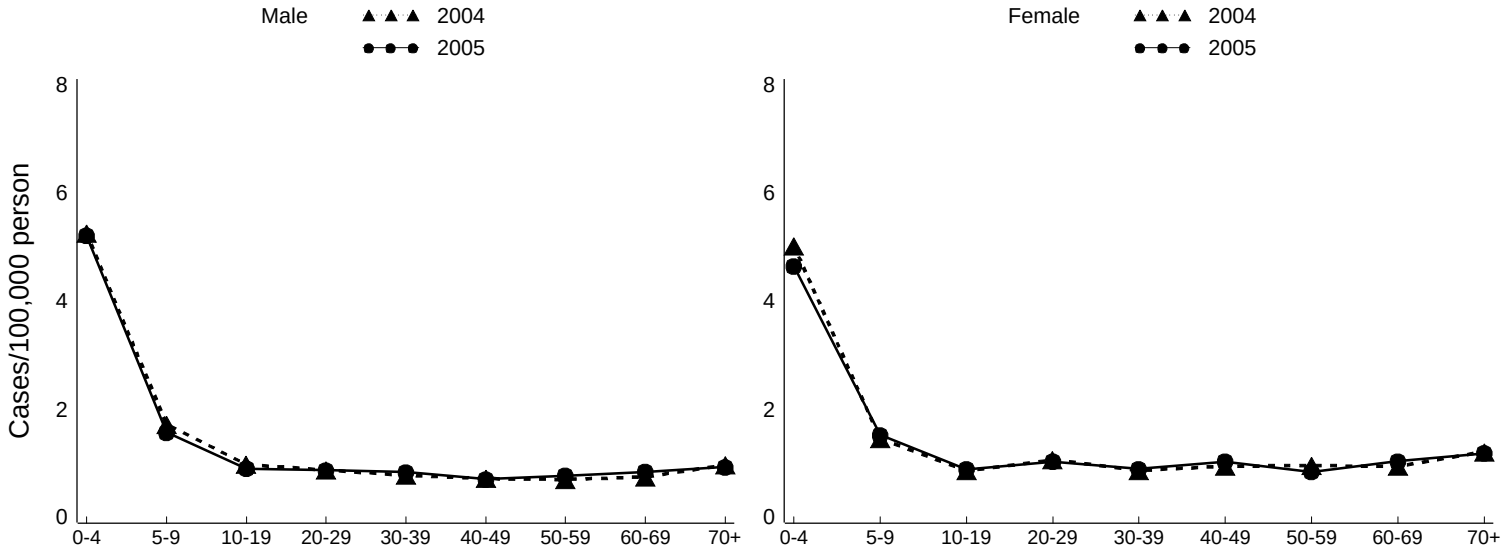


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	Cases	Rate^	Cases	Rate^	Cases	Rate^
CA	421	13.1	457	14.2	455	14.2
CO	318	12.4	302	11.8	281	11.6
CT	453	12.9	426	12.2	412	11.9
GA	1790	20.3	1816	20.6	1687	19.7
MD	719	12.9	755	13.6	670	14.4
MN	548	10.7	594	11.6	585	11.7
NM	227	11.9	269	14.1	269	14.1
NY	450	10.4	424	9.83	362	11.7
OR	357	9.93	352	9.79	311	8.84
TN	0	0.00	718	12.2	545	14.0
ALL	5283	13.7	6113	13.7	5579	14.0

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

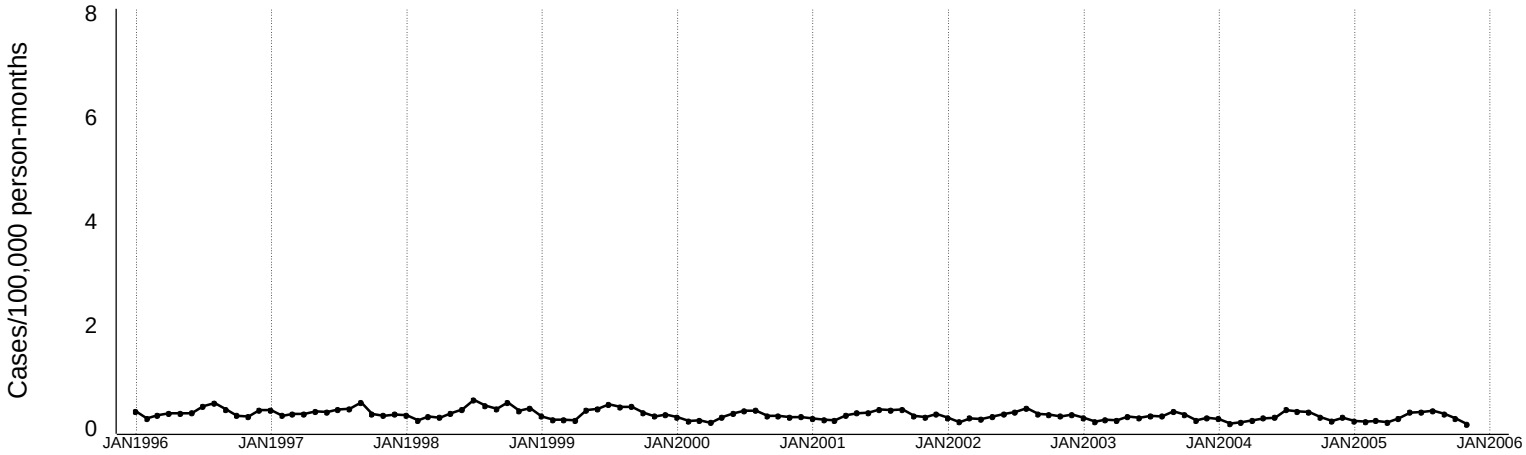
Calendar year through November: Rates for 2004 and 2005 by age group and sex



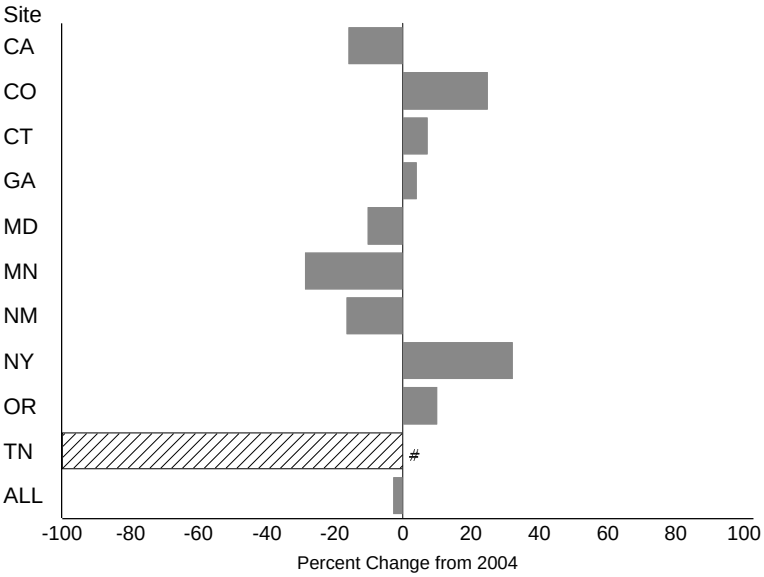
Data source: Preliminary FoodNet data, subject to change, not for public distribution.
Note: 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction. Report date: 10-January-2006

Salmonella Typhimurium

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 bv site

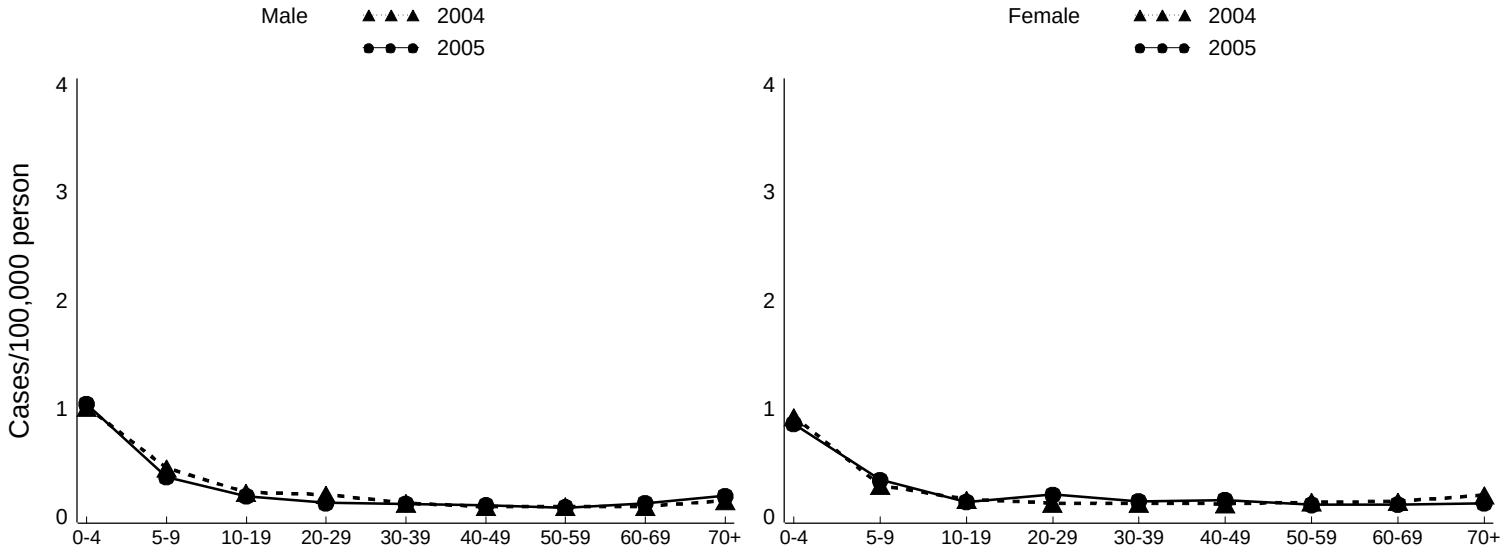


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	**Cases**	**Rate^**	**Cases**	**Rate^**	**Cases**	**Rate^**
CA	69	2.15	82	2.56	73	2.28
CO	86	3.37	69	2.70	67	2.80
CT	92	2.63	86	2.45	89	2.57
GA	242	2.74	233	2.64	255	2.99
MD	105	1.89	117	2.11	118	2.59
MN	107	2.10	150	2.94	148	2.96
NM	46	2.42	55	2.89	55	2.89
NY	95	2.20	72	1.67	75	2.55
OR	78	2.17	71	1.98	71	2.01
TN	0	0.00	156	2.64	120	3.12
ALL	920	2.39	1091	2.45	1071	2.69

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

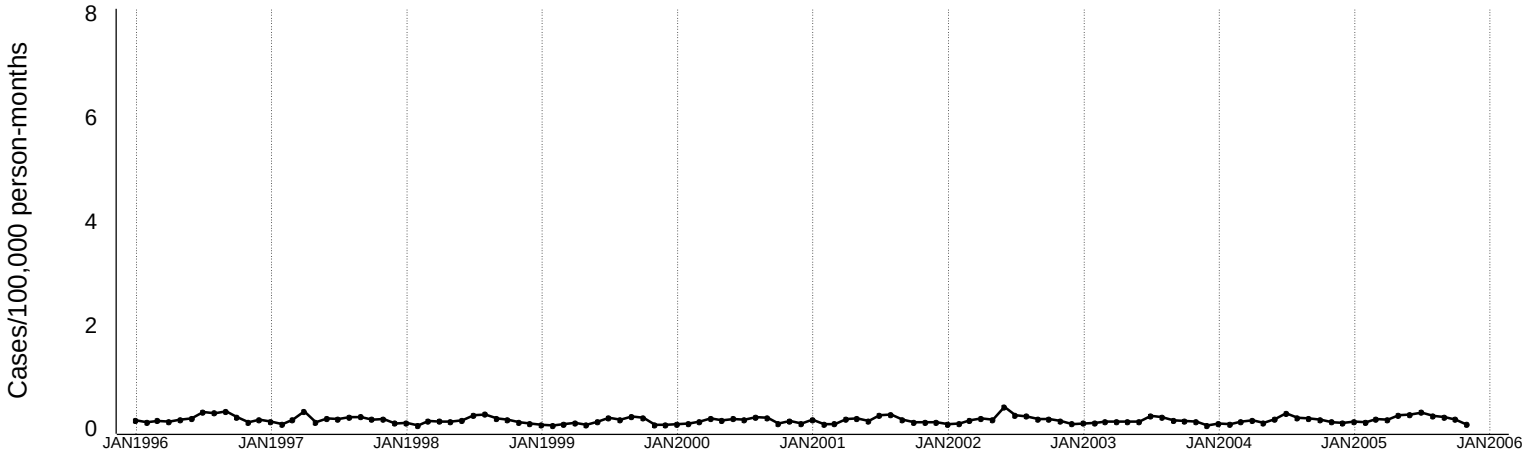
Calendar year through November: Rates for 2004 and 2005 by age group and sex



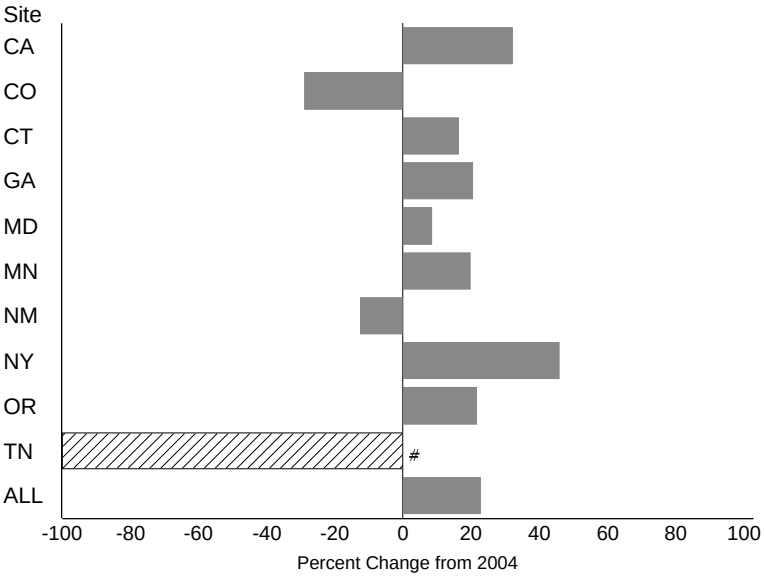
Data source: Preliminary FoodNet data, subject to change, not for public distribution.
Note: 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction. Report date: 10-January-2006

Salmonella Enteritidis

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 bv site

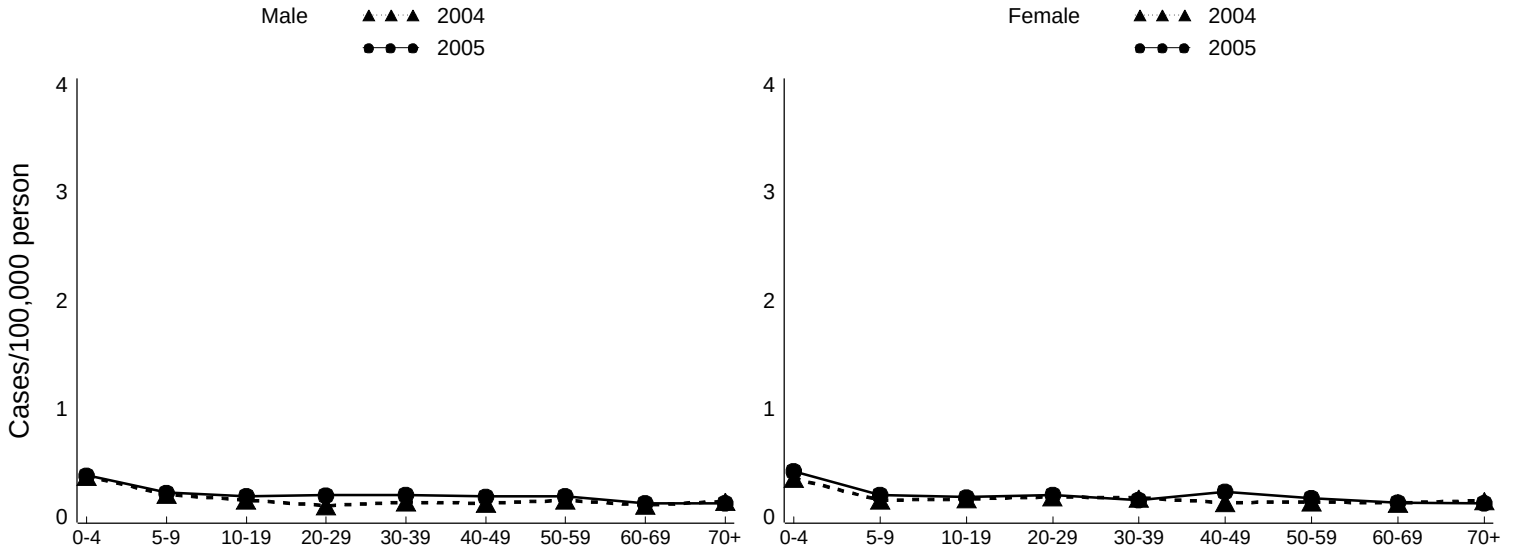


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	Cases	Rate^	Cases	Rate^	Cases	Rate^
CA	95	2.961	72	2.244	63	1.960
CO	47	1.839	66	2.583	50	2.046
CT	115	3.282	99	2.826	91	2.627
GA	124	1.404	103	1.167	85	0.993
MD	206	3.706	190	3.418	180	3.977
MN	122	2.392	102	2.000	107	2.132
NM	14	0.736	16	0.841	16	0.841
NY	86	1.993	59	1.367	69	2.173
OR	68	1.892	56	1.558	45	1.287
TN	0	0.000	62	1.051	41	1.002
ALL	877	2.274	825	1.855	746	1.907

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

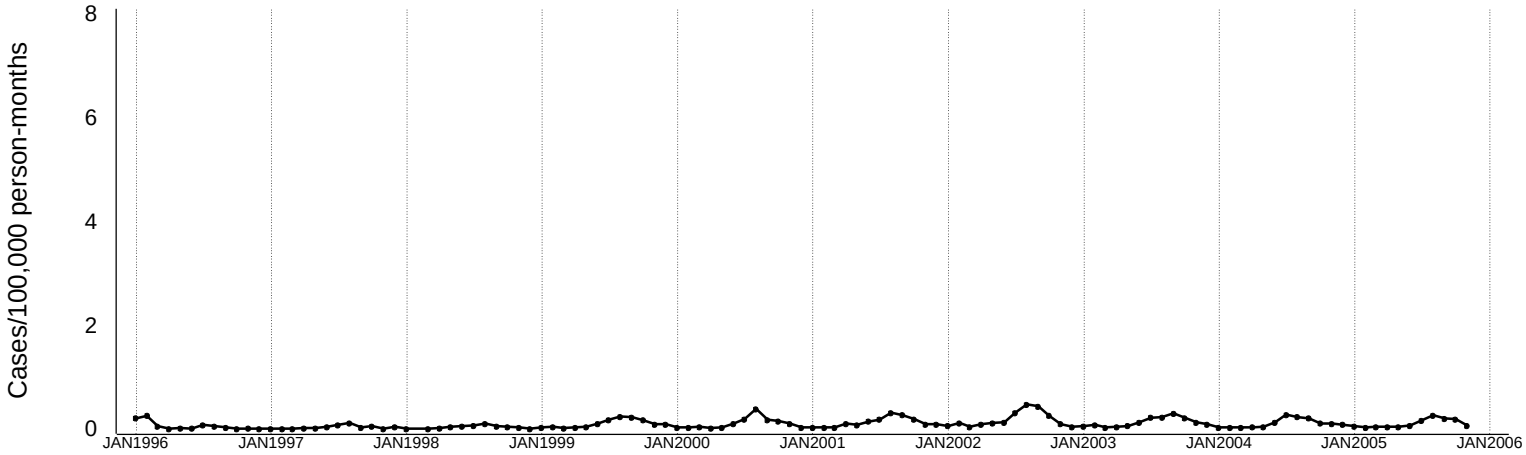
Calendar year through November: Rates for 2004 and 2005 by age group and sex



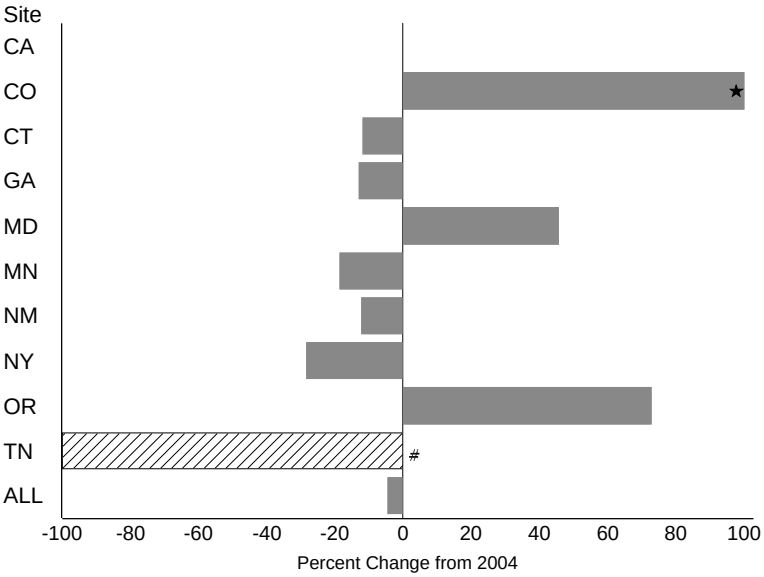
Data source: Preliminary FoodNet data, subject to change, not for public distribution.
Note: 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction. Report date: 10-January-2006

Salmonella Newport

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 bv site

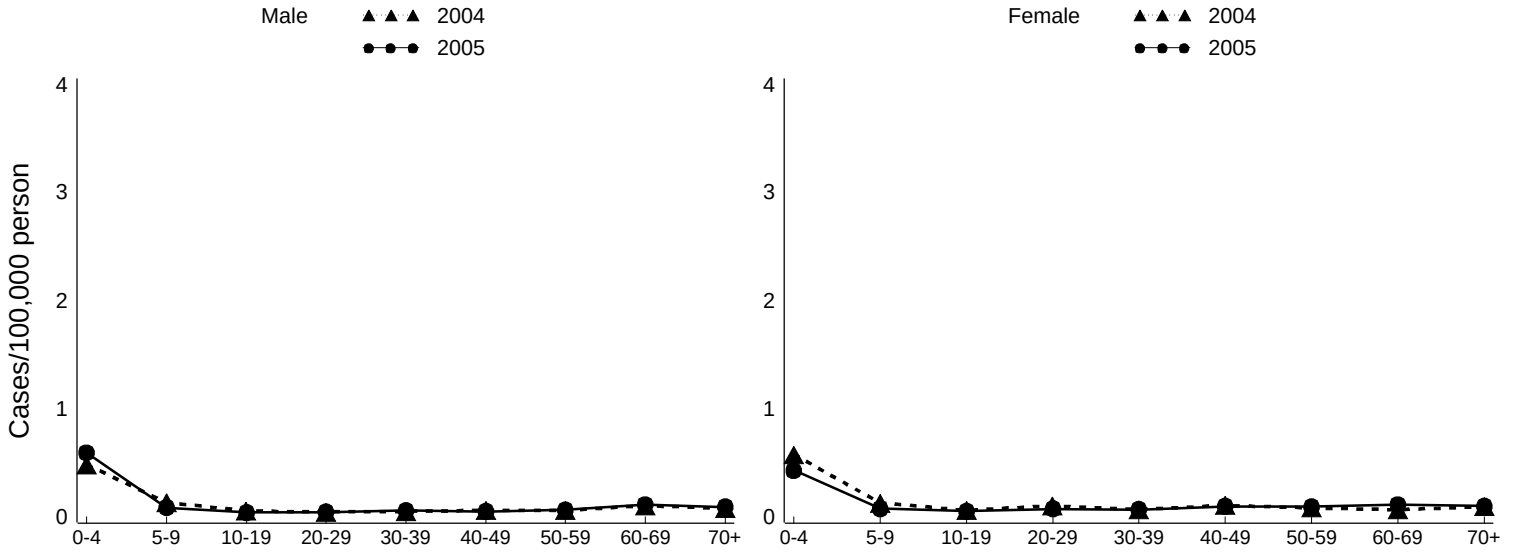


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	Cases	Rate^	Cases	Rate^	Cases	Rate^
CA	18	0.561	18	0.561	28	0.864
CO	34	1.330	12	0.470	22	0.893
CT	15	0.428	17	0.485	35	1.007
GA	231	2.616	265	3.001	276	3.226
MD	48	0.864	33	0.594	45	0.926
MN	44	0.863	54	1.059	43	0.851
NM	22	1.156	25	1.314	25	1.314
NY	28	0.649	39	0.904	42	1.290
OR	19	0.529	11	0.306	20	0.578
TN	0	0.000	80	1.356	73	2.040
ALL	459	1.190	554	1.246	609	1.541

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

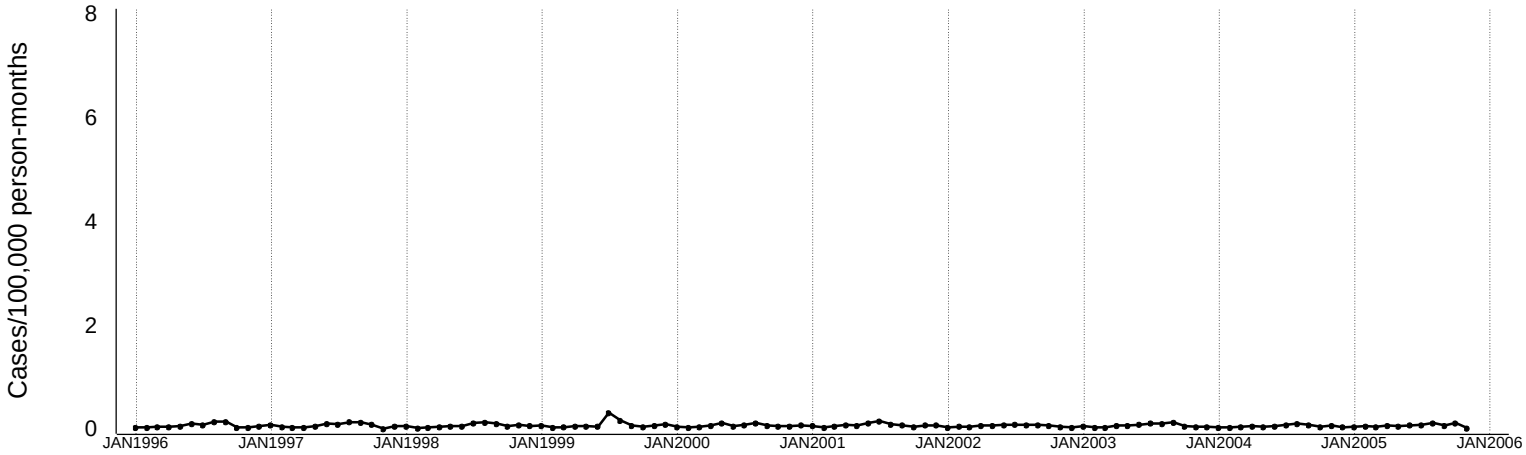
Calendar year through November: Rates for 2004 and 2005 by age group and sex



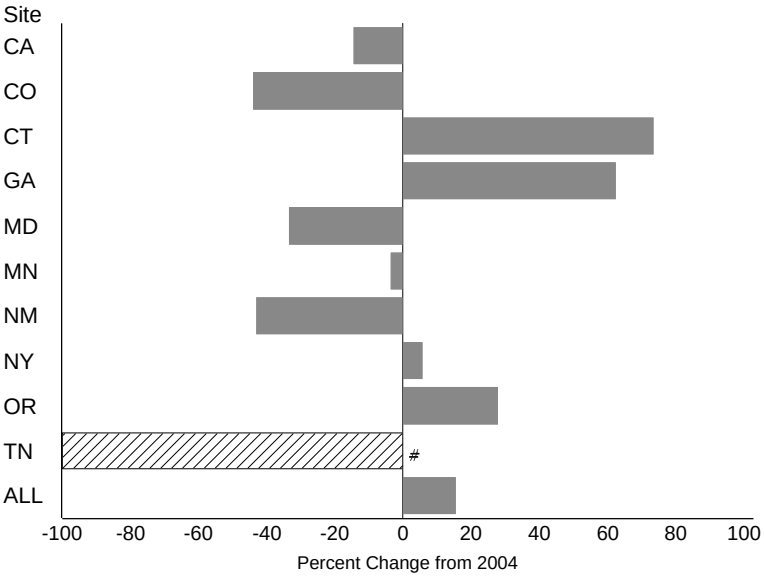
Data source: Preliminary FoodNet data, subject to change, not for public distribution.
Note: 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction. Report date: 10-January-2006

Salmonella Heidelberg

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 bv site

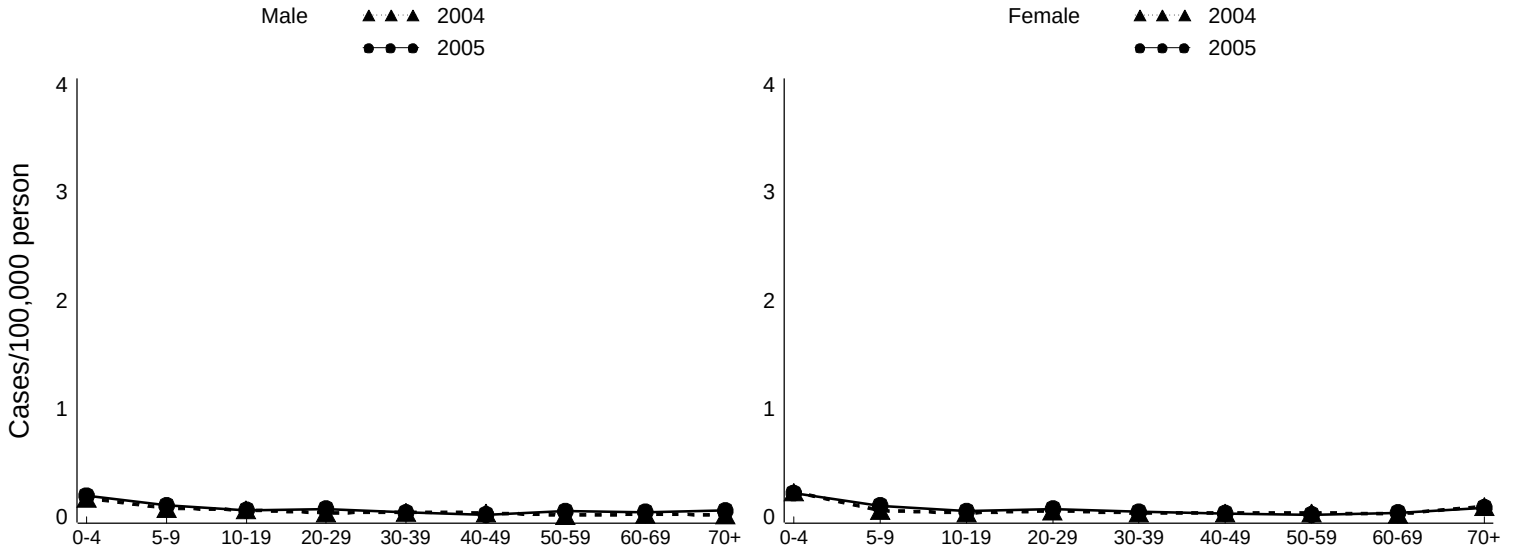


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	Cases	Rate^	Cases	Rate^	Cases	Rate^
CA	36	1.122	42	1.309	40	1.244
CO	9	0.352	16	0.626	18	0.743
CT	26	0.742	15	0.428	18	0.514
GA	86	0.974	53	0.600	65	0.763
MD	18	0.324	27	0.486	27	0.602
MN	28	0.549	29	0.569	44	0.873
NM	4	0.210	7	0.368	7	0.368
NY	38	0.881	36	0.834	30	1.037
OR	46	1.280	36	1.002	21	0.606
TN	0	0.000	30	0.508	24	0.583
ALL	291	0.754	291	0.654	294	0.754

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

Calendar year through November: Rates for 2004 and 2005 by age group and sex



Data source: Preliminary FoodNet data, subject to change, not for public distribution.
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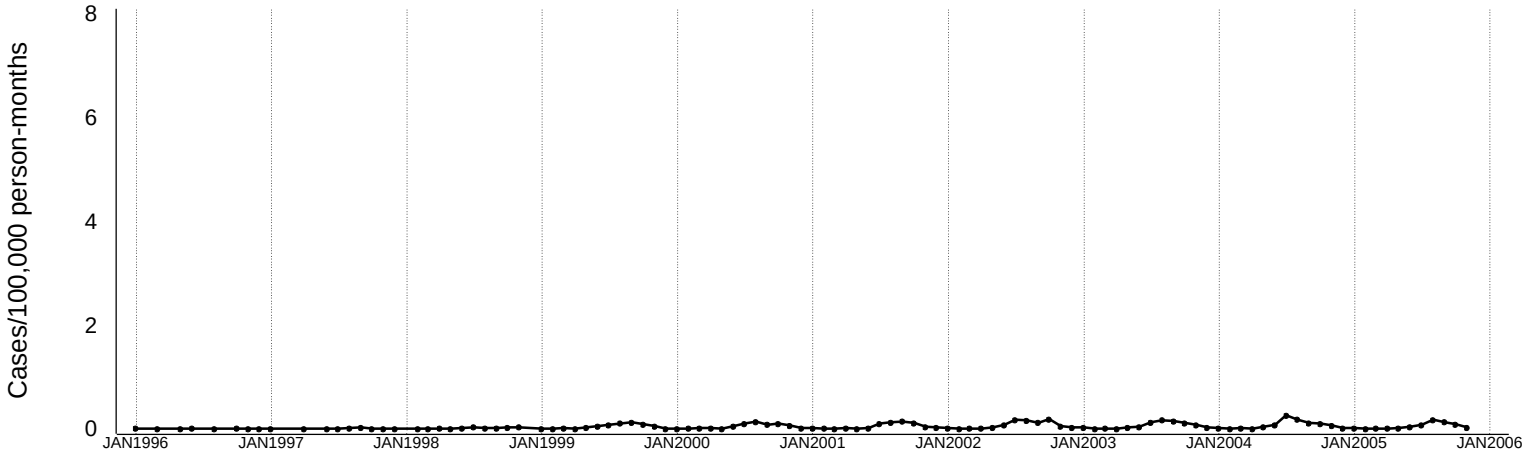
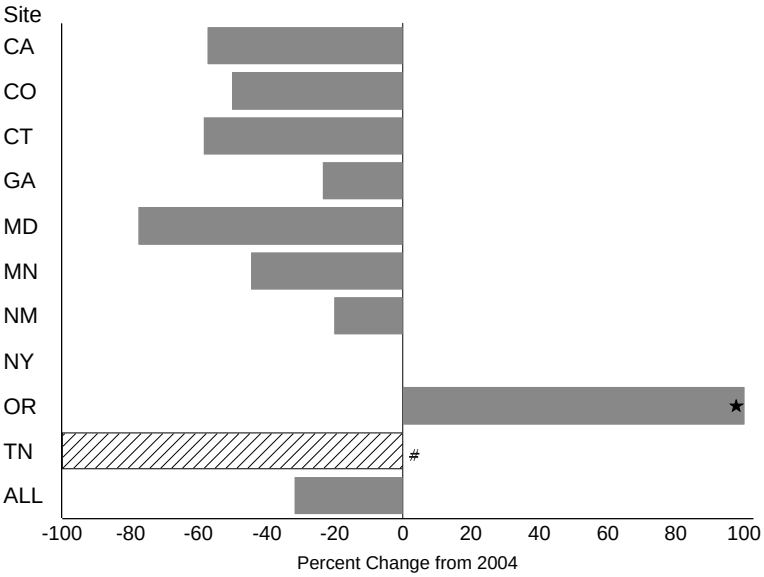
Salmonella Javiana

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 bv site

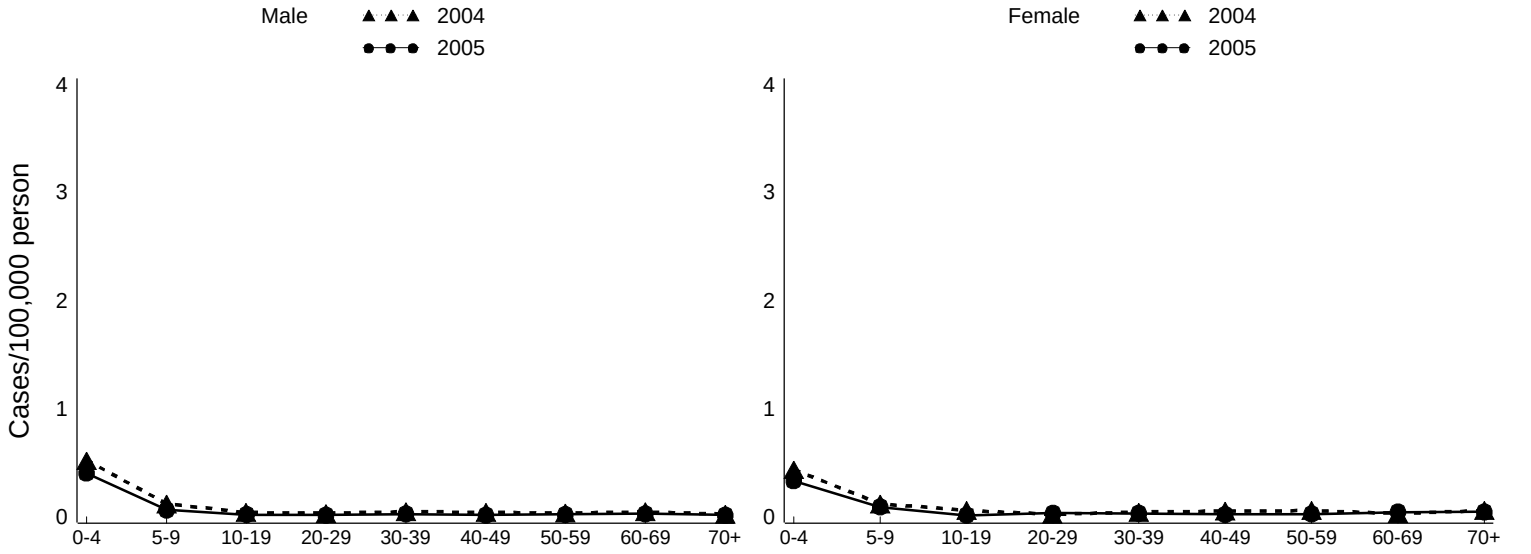


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	Cases	Rate^	Cases	Rate^	Cases	Rate^
CA	3	0.093	7	0.218	5	0.156
CO	2	0.078	4	0.157	4	0.160
CT	5	0.143	12	0.343	5	0.144
GA	183	2.073	239	2.707	212	2.478
MD	19	0.342	84	1.511	30	0.590
MN	5	0.098	9	0.176	6	0.127
NM	16	0.841	20	1.051	20	1.051
NY	6	0.139	6	0.139	4	0.099
OR	4	0.111	1	0.028	3	0.091
TN	0	0.000	28	0.474	26	0.716
ALL	243	0.630	410	0.922	316	0.775

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

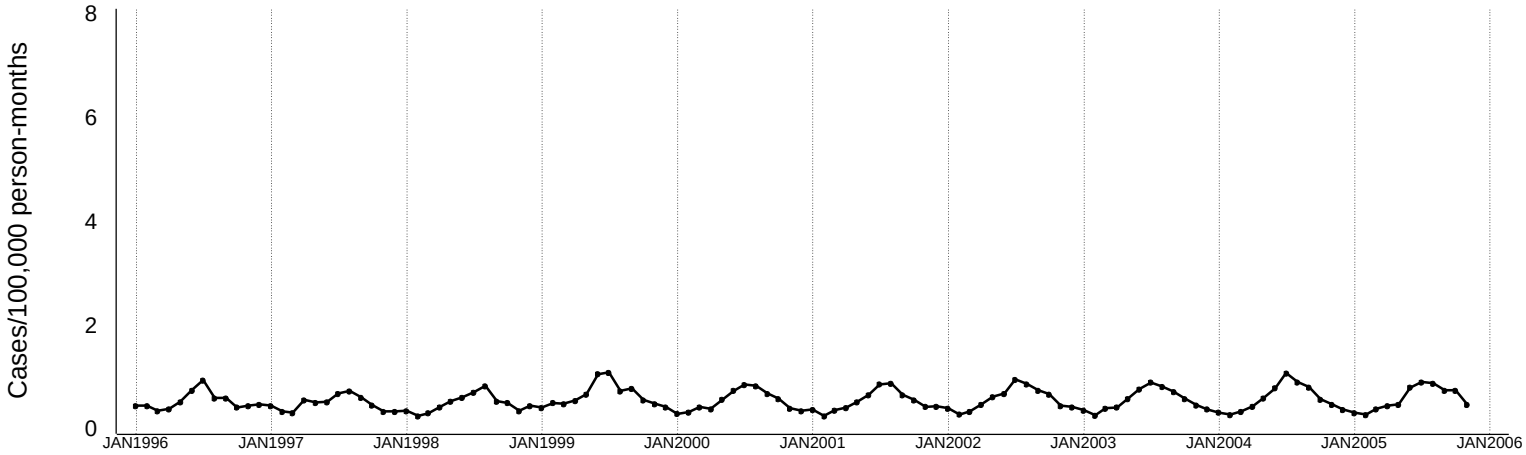
Calendar year through November: Rates for 2004 and 2005 by age group and sex



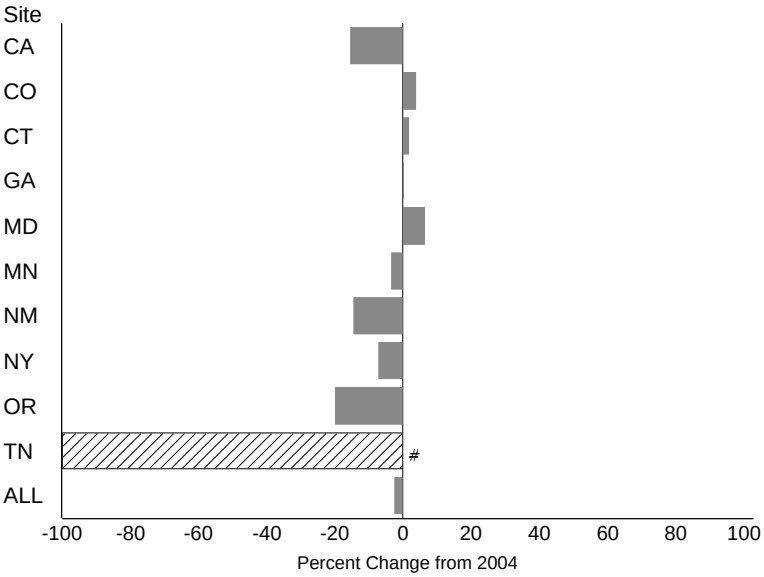
Data source: Preliminary FoodNet data, subject to change, not for public distribution.
Note: 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction. Report date: 10-January-2006

Salmonella, all others

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 bv site

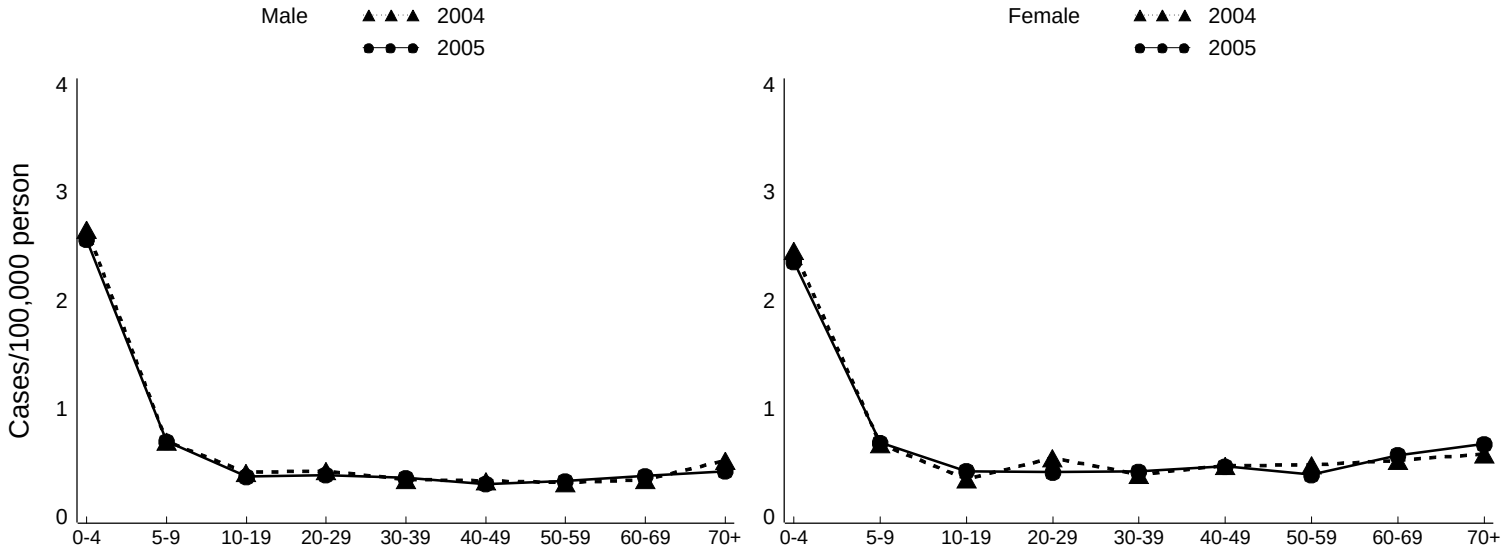


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	Cases	Rate^	Cases	Rate^	Cases	Rate^
CA	200	6.23	236	7.36	246	7.65
CO	140	5.48	135	5.28	121	4.98
CT	200	5.71	197	5.62	175	5.06
GA	924	10.5	923	10.5	793	9.26
MD	323	5.81	304	5.47	269	5.66
MN	242	4.74	250	4.90	237	4.72
NM	125	6.57	146	7.67	146	7.67
NY	197	4.57	212	4.91	142	4.51
OR	142	3.95	177	4.92	150	4.27
TN	0	0.00	362	6.13	263	6.55
ALL	2493	6.46	2942	6.62	2542	6.30

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

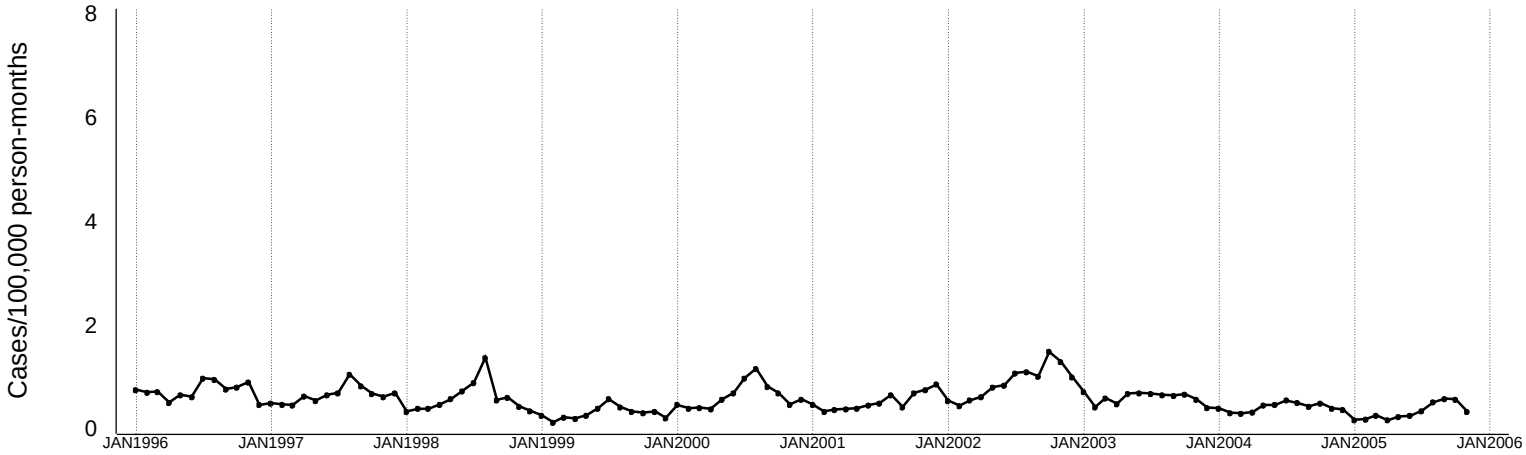
Calendar year through November: Rates for 2004 and 2005 by age group and sex



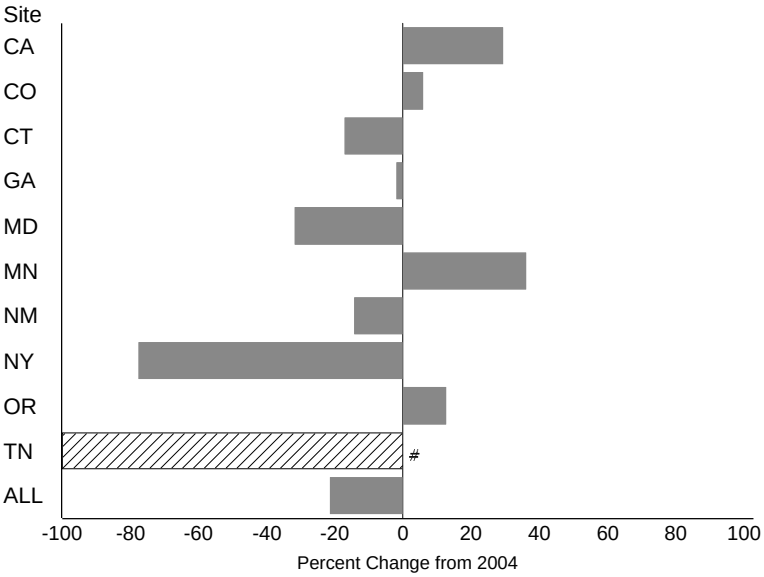
Data source: Preliminary FoodNet data, subject to change, not for public distribution.
Note: 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction. Report date: 10-January-2006

Shigella, all species

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 bv site

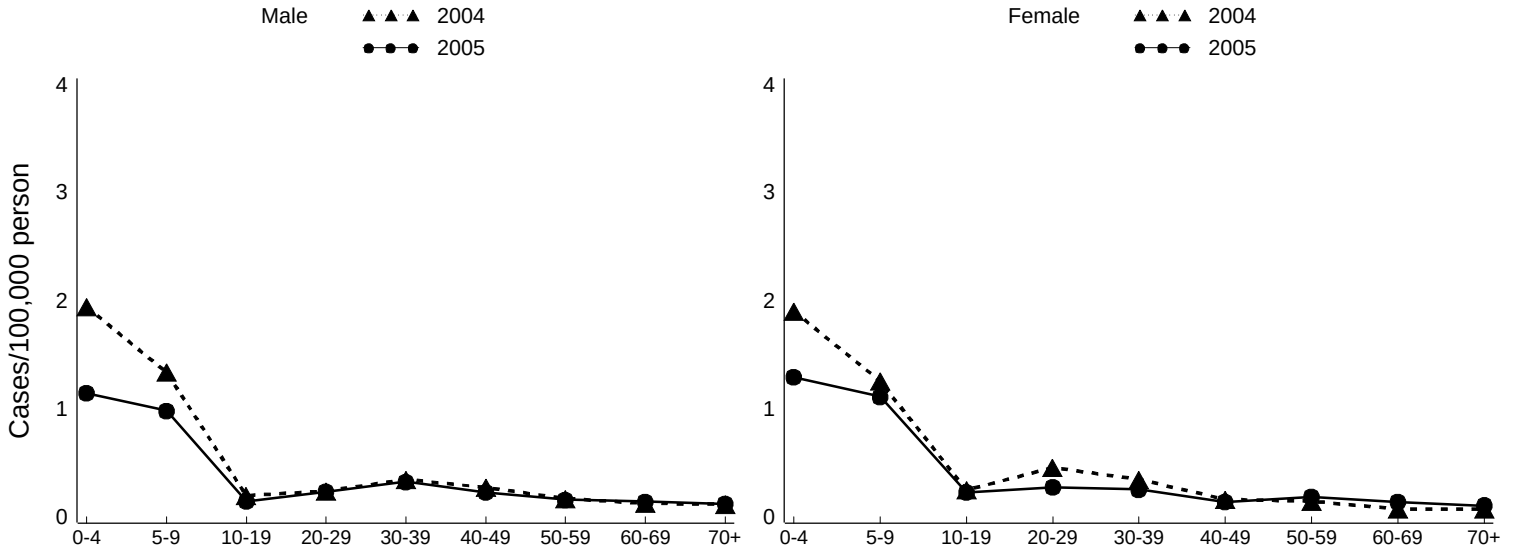


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	Cases	Rate^	Cases	Rate^	Cases	Rate^
CA	265	8.26	205	6.39	351	10.9
CO	92	3.60	87	3.40	146	6.02
CT	54	1.54	65	1.86	69	1.99
GA	587	6.65	598	6.77	826	9.62
MD	91	1.64	133	2.39	370	7.21
MN	87	1.71	64	1.25	328	6.60
NM	116	6.09	135	7.09	135	7.09
NY	48	1.11	213	4.94	102	2.72
OR	81	2.25	72	2.00	95	2.70
TN	0	0.00	510	8.64	270	6.29
ALL	1421	3.68	2082	4.68	2691	6.79

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

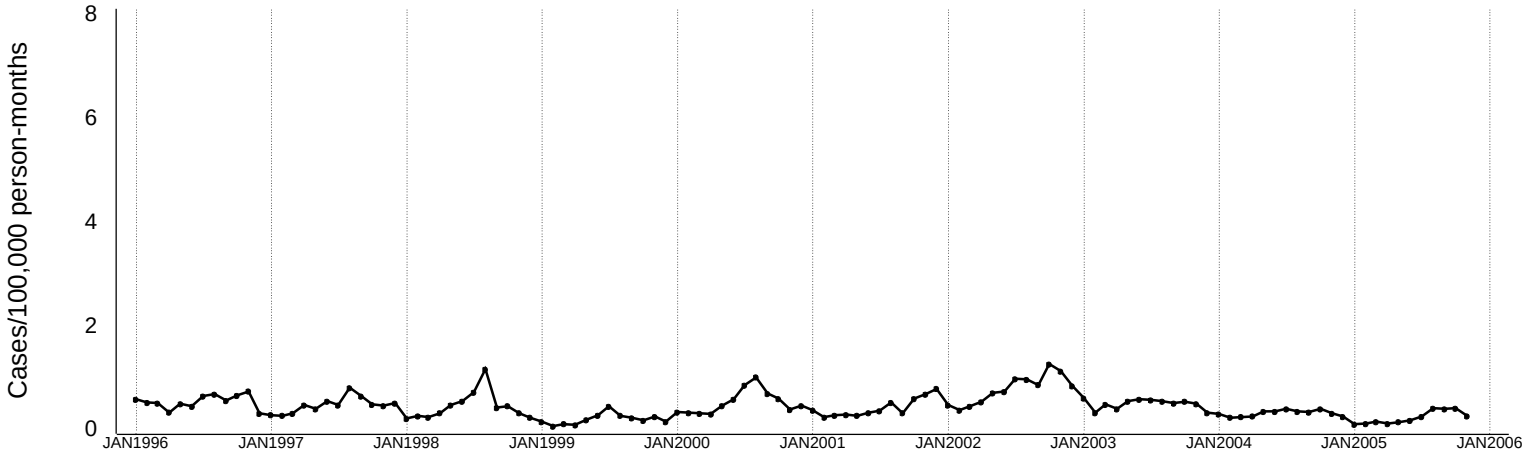
Calendar year through November: Rates for 2004 and 2005 by age group and sex



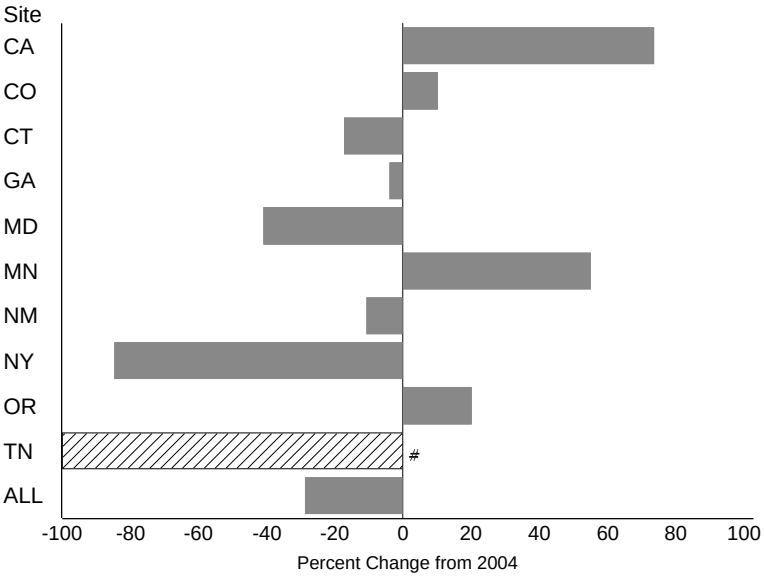
Data source: Preliminary FoodNet data, subject to change, not for public distribution.
Note: 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction. Report date: 10-January-2006

Shigella sonnei

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 bv site

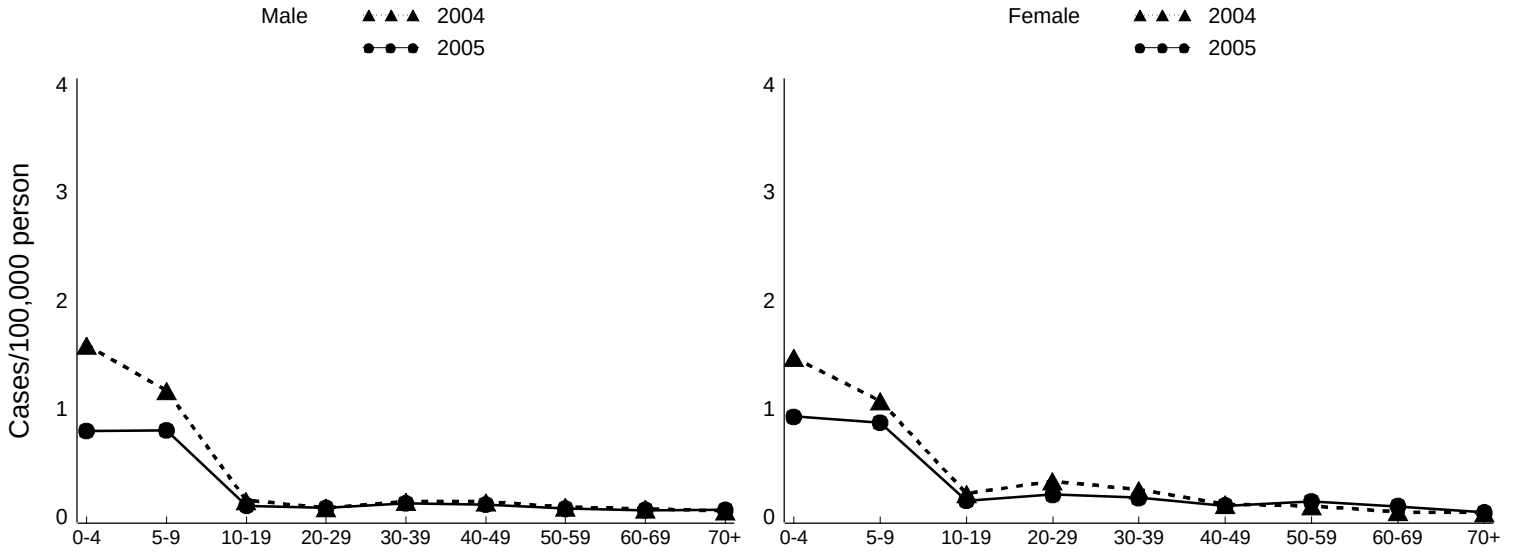


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	Cases	Rate^	Cases	Rate^	Cases	Rate^
CA	151	4.706	87	2.711	221	6.891
CO	55	2.152	50	1.956	107	4.414
CT	34	0.970	41	1.170	49	1.423
GA	434	4.915	451	5.108	670	7.798
MD	48	0.864	81	1.457	326	6.286
MN	62	1.215	40	0.784	298	5.999
NM	68	3.573	76	3.993	76	3.993
NY	31	0.718	200	4.635	92	2.388
OR	60	1.669	50	1.391	56	1.601
TN	0	0.000	448	7.592	229	5.307
ALL	943	2.445	1524	3.427	2124	5.438

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

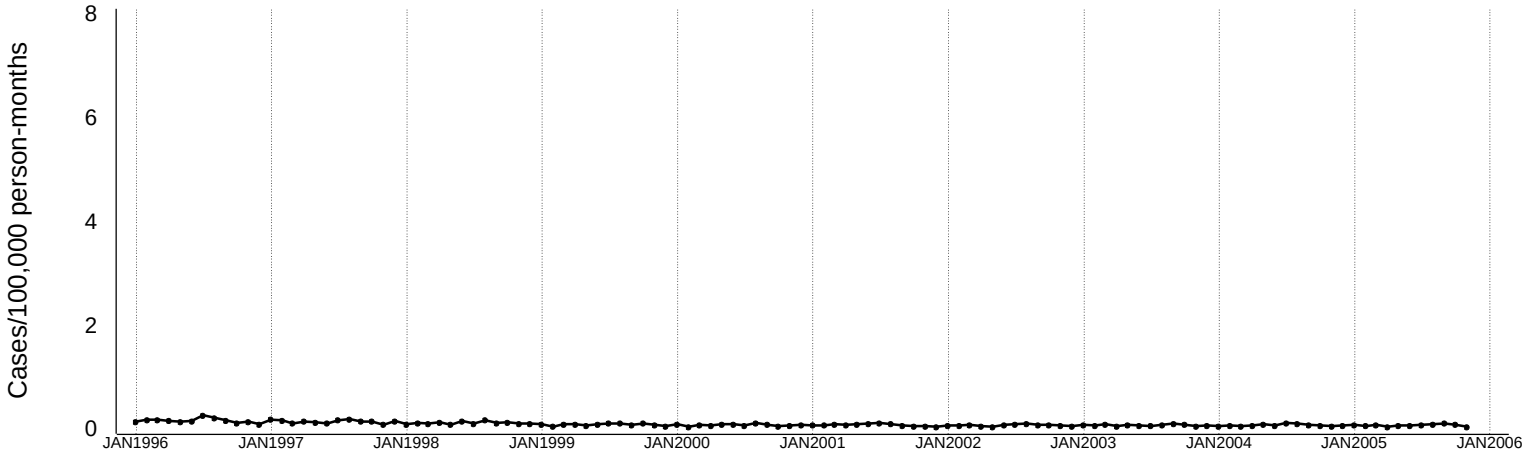
Calendar year through November: Rates for 2004 and 2005 by age group and sex



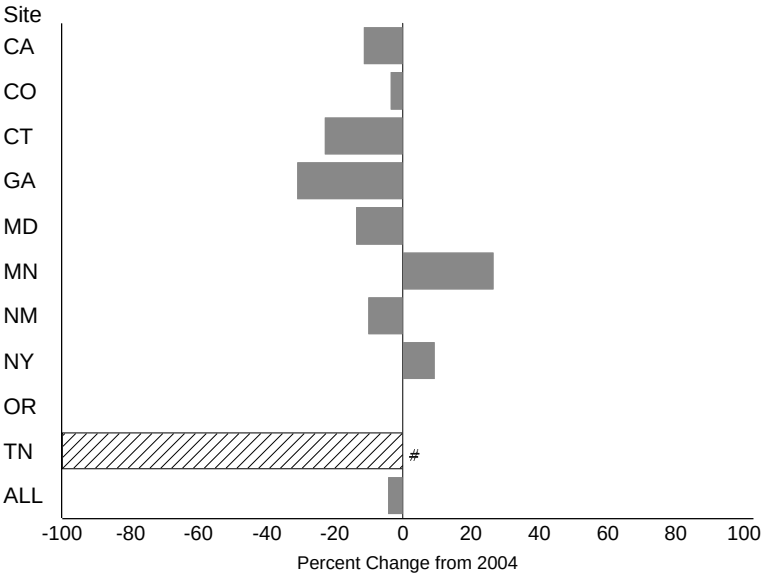
Data source: Preliminary FoodNet data, subject to change, not for public distribution.
Note: 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction. Report date: 10-January-2006

Shigella flexneri

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 bv site

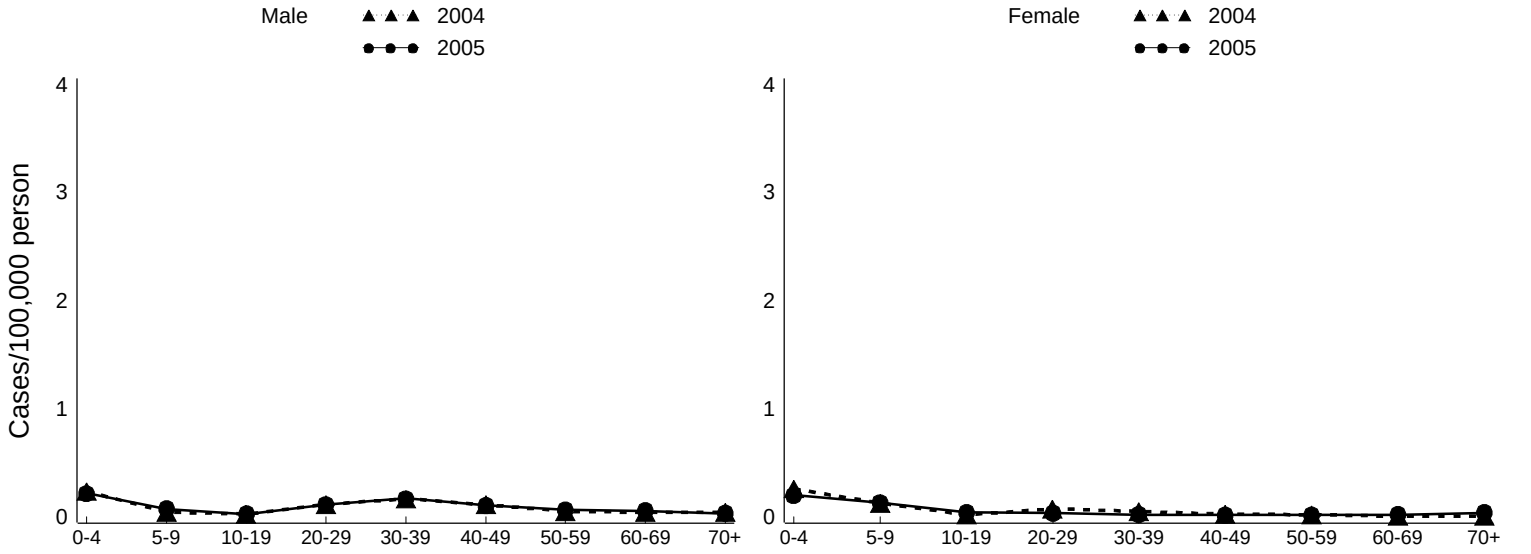


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	Cases	Rate^	Cases	Rate^	Cases	Rate^
CA	78	2.431	88	2.743	95	2.972
CO	28	1.096	29	1.135	31	1.249
CT	17	0.485	22	0.628	18	0.508
GA	58	0.657	84	0.951	71	0.834
MD	38	0.684	44	0.792	33	0.692
MN	24	0.470	19	0.372	24	0.486
NM	45	2.364	50	2.627	50	2.627
NY	12	0.278	11	0.255	8	0.254
OR	20	0.556	20	0.556	34	0.959
TN	0	0.000	18	0.305	11	0.288
ALL	320	0.830	385	0.866	375	0.868

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

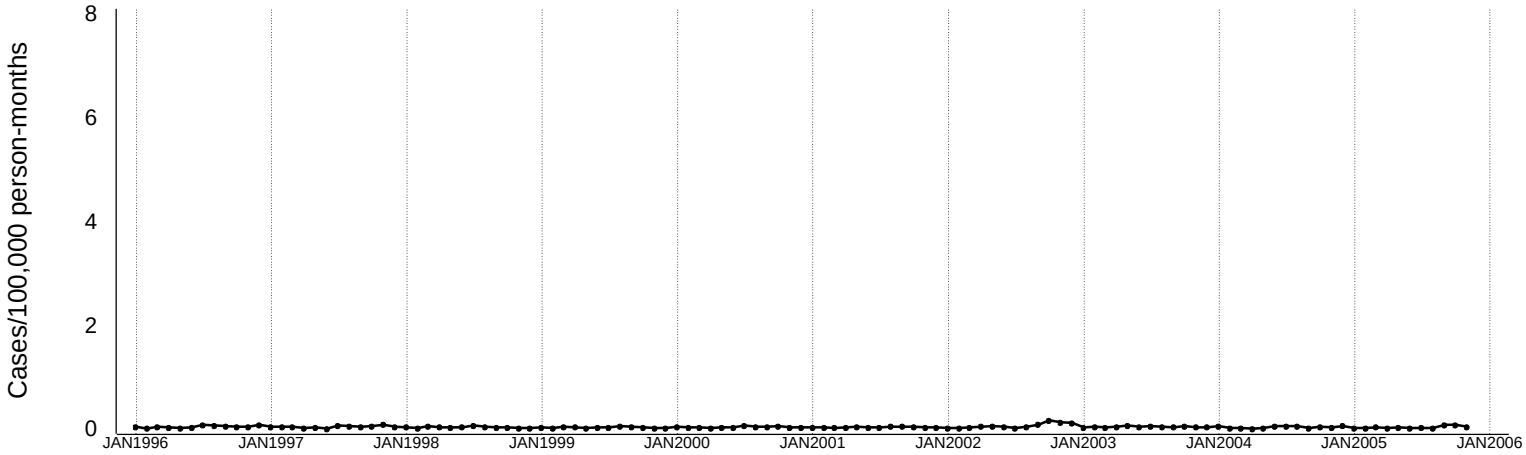
Calendar year through November: Rates for 2004 and 2005 by age group and sex



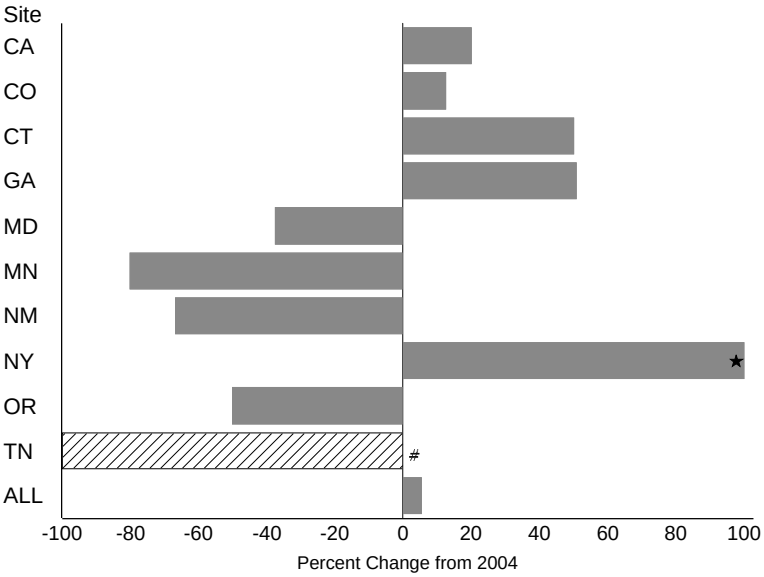
Data source: Preliminary FoodNet data, subject to change, not for public distribution.
Note: 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction. Report date: 10-January-2006

Shigella, all others

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 bv site

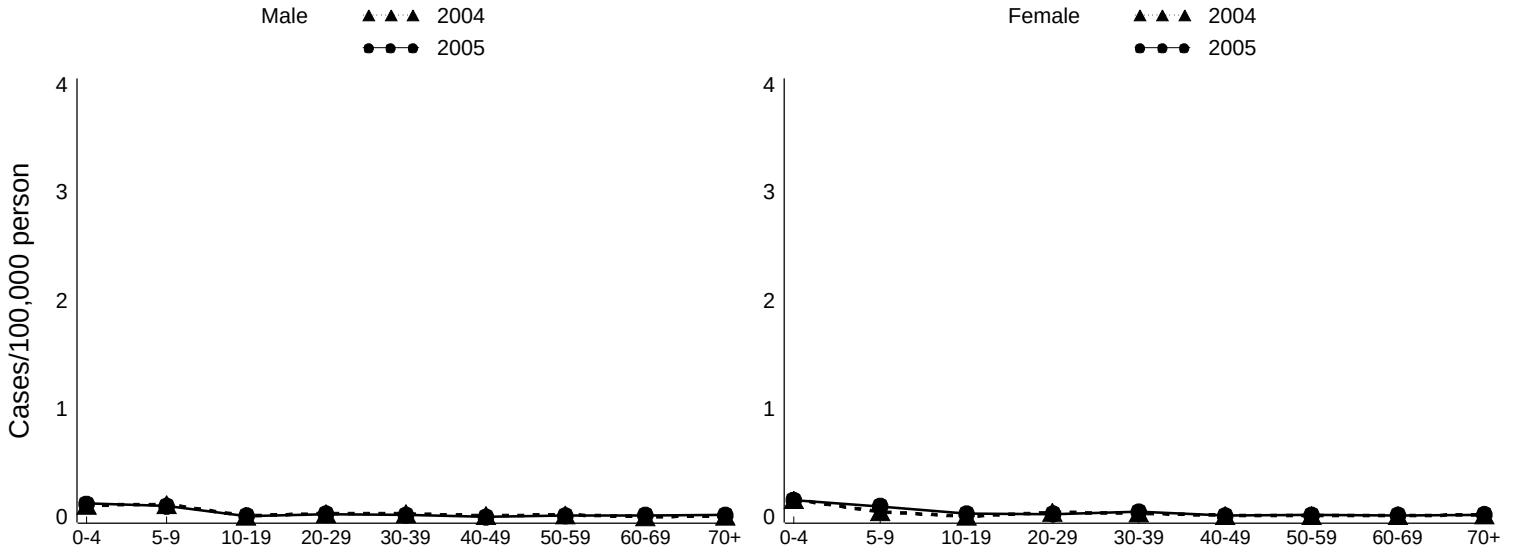


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	Cases	Rate^	Cases	Rate^	Cases	Rate^
CA	36	1.122	30	0.935	34	1.065
CO	9	0.352	8	0.313	9	0.358
CT	3	0.086	2	0.057	2	0.064
GA	95	1.076	63	0.714	85	0.987
MD	5	0.090	8	0.144	11	0.233
MN	1	0.020	5	0.098	6	0.120
NM	3	0.158	9	0.473	9	0.473
NY	5	0.116	2	0.046	2	0.082
OR	1	0.028	2	0.056	5	0.137
TN	0	0.000	44	0.746	30	0.697
ALL	158	0.410	173	0.389	192	0.483

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

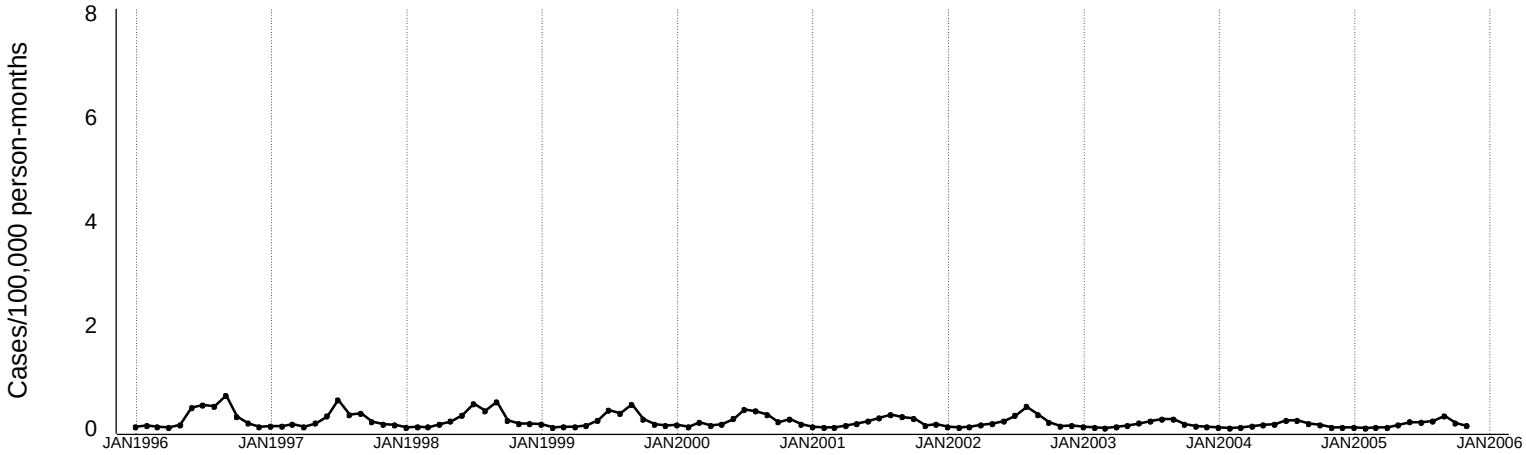
Calendar year through November: Rates for 2004 and 2005 by age group and sex



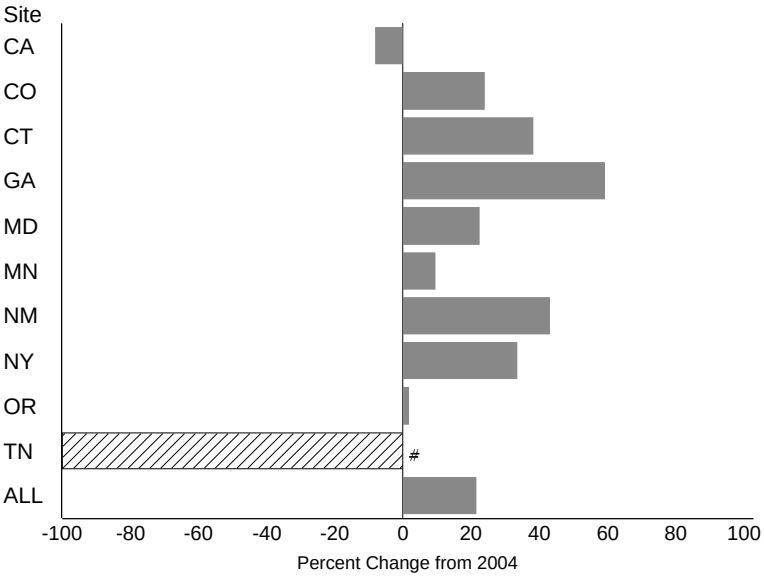
Data source: Preliminary FoodNet data, subject to change, not for public distribution.
Note: 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction. Report date: 10-January-2006

E. coli O157

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 bv site

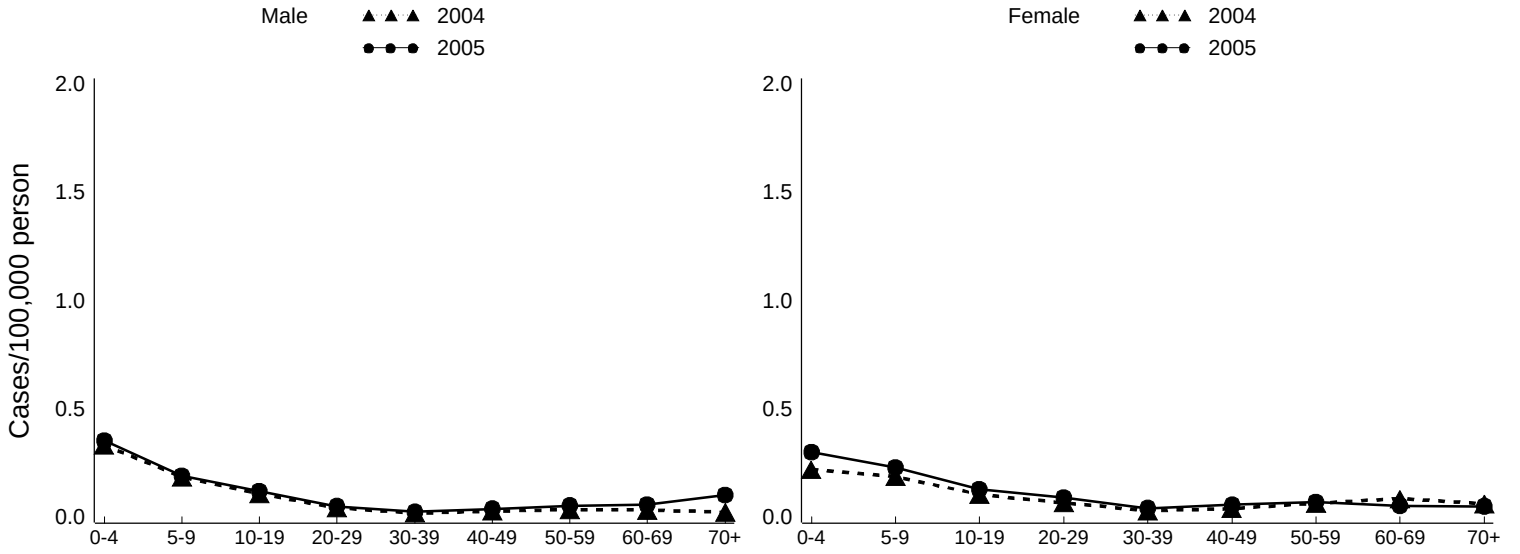


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	Cases	Rate^	Cases	Rate^	Cases	Rate^
CA	23	0.717	25	0.779	34	1.046
CO	26	1.017	21	0.822	38	1.569
CT	40	1.142	29	0.828	46	1.340
GA	35	0.396	22	0.249	33	0.391
MD	22	0.396	18	0.324	20	0.455
MN	117	2.294	107	2.098	159	3.184
NM	10	0.525	7	0.368	7	0.368
NY	72	1.668	54	1.251	49	1.728
OR	62	1.725	61	1.697	99	2.832
TN	0	0.000	43	0.729	33	0.870
ALL	407	1.055	387	0.870	519	1.379

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

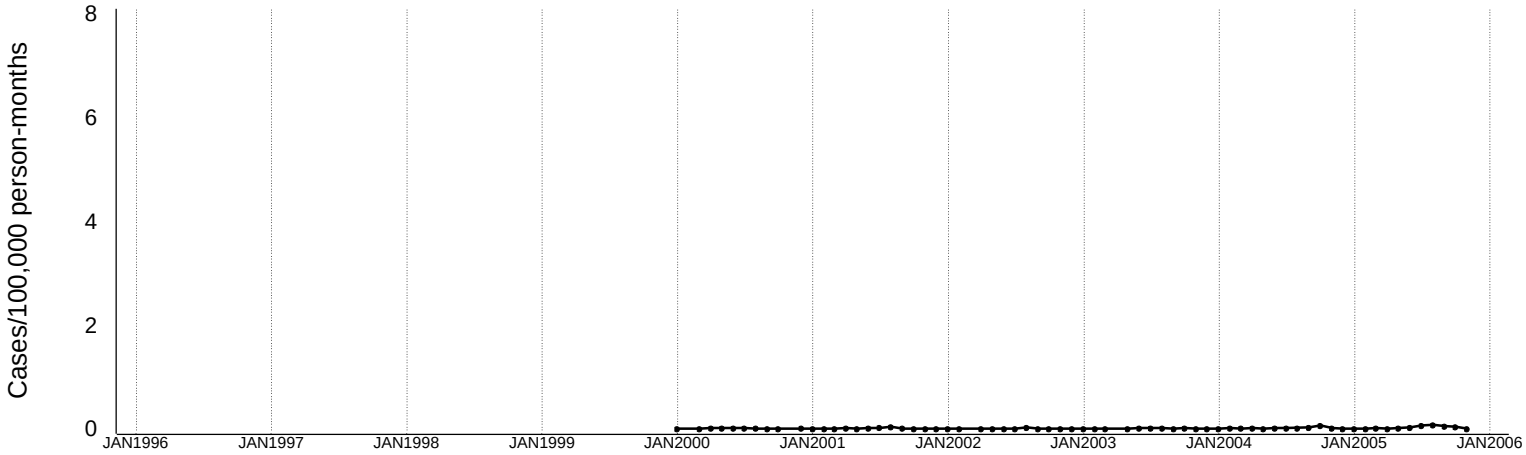
Calendar year through November: Rates for 2004 and 2005 by age group and sex



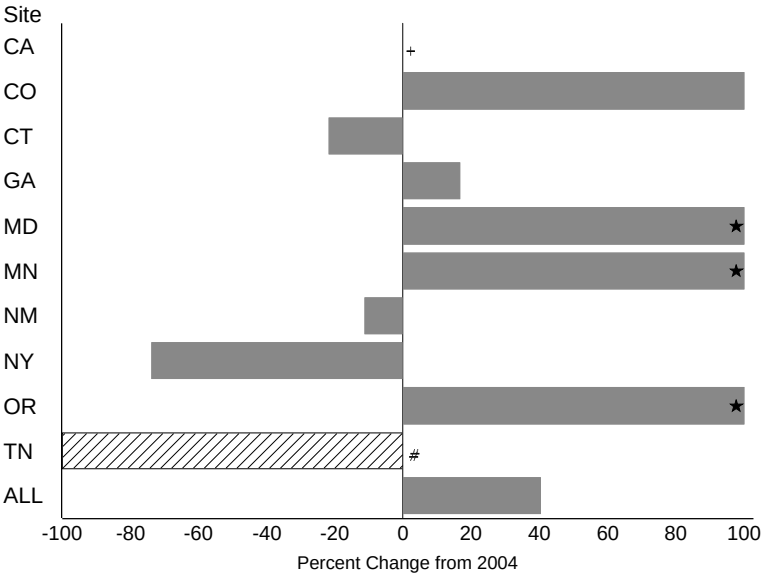
Data source: Preliminary FoodNet data, subject to change, not for public distribution.
Note: 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction. Report date: 10-January-2006

STEC Non-O157

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 bv site

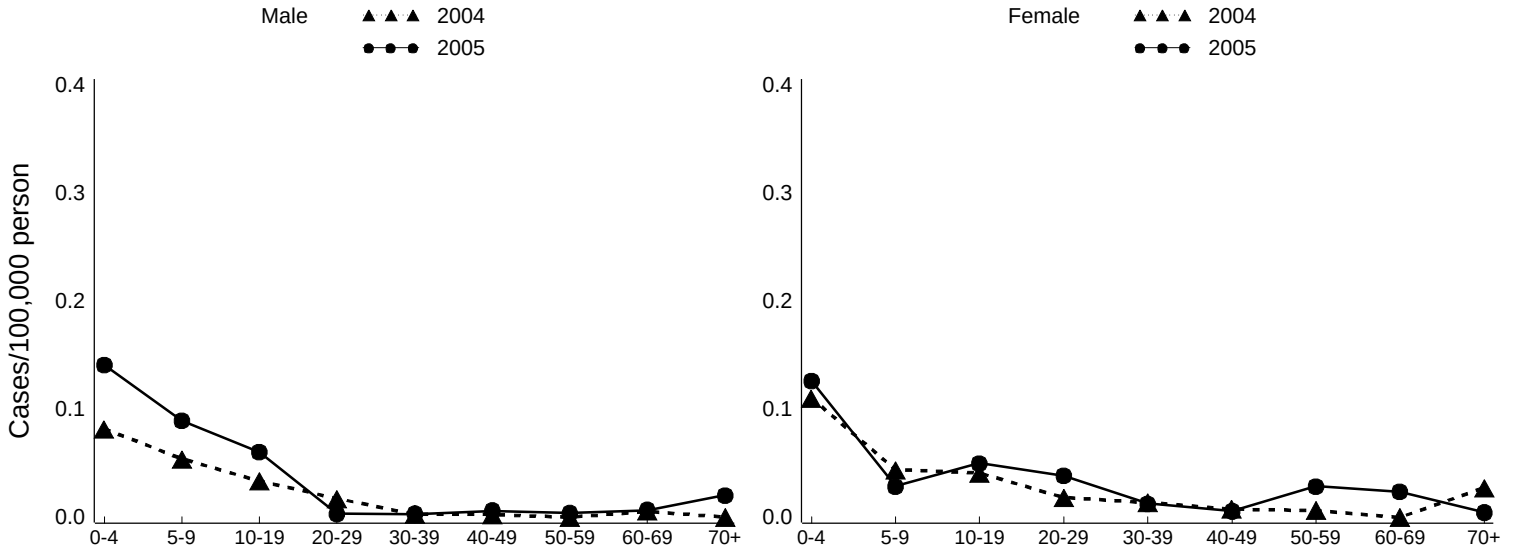


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	Cases	Rate^	Cases	Rate^	Cases	Rate^
CA	3	0.093	0	0.000	0	0.000
CO	2	0.078	1	0.039	2	0.076
CT	18	0.514	23	0.656	19	0.554
GA	7	0.079	6	0.068	3	0.039
MD	37	0.666	10	0.180	2	0.044
MN	37	0.725	15	0.294	16	0.315
NM	8	0.420	9	0.473	9	0.473
NY	10	0.232	38	0.881	8	0.181
OR	7	0.195	1	0.028	3	0.074
TN	0	0.000	3	0.051	1	0.024
ALL	129	0.334	106	0.238	63	0.142

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

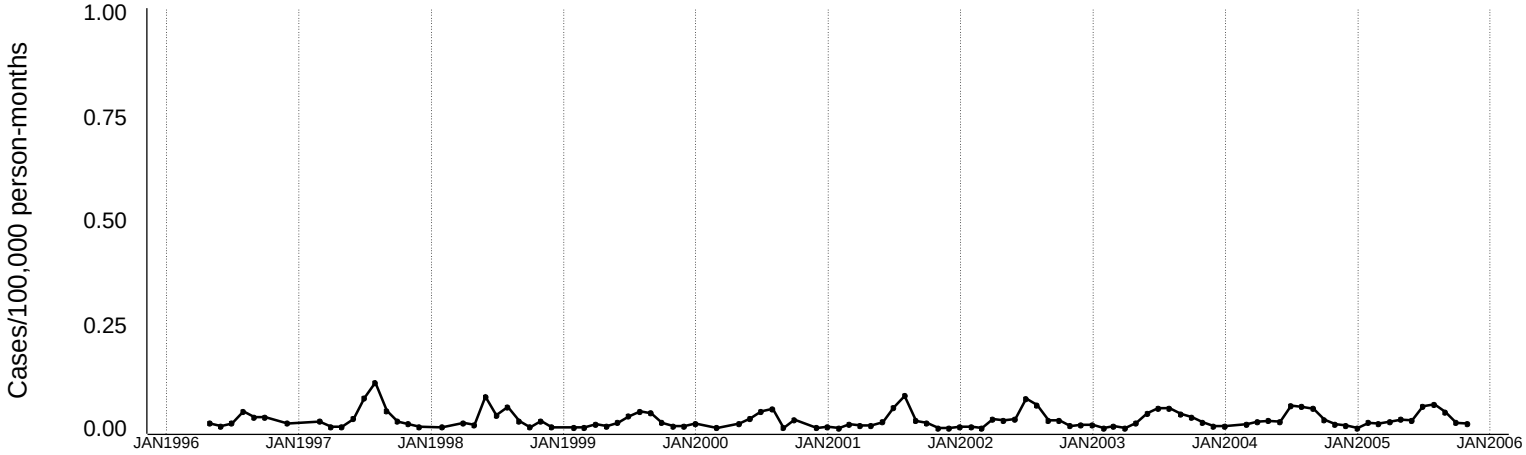
Calendar year through November: Rates for 2004 and 2005 by age group and sex



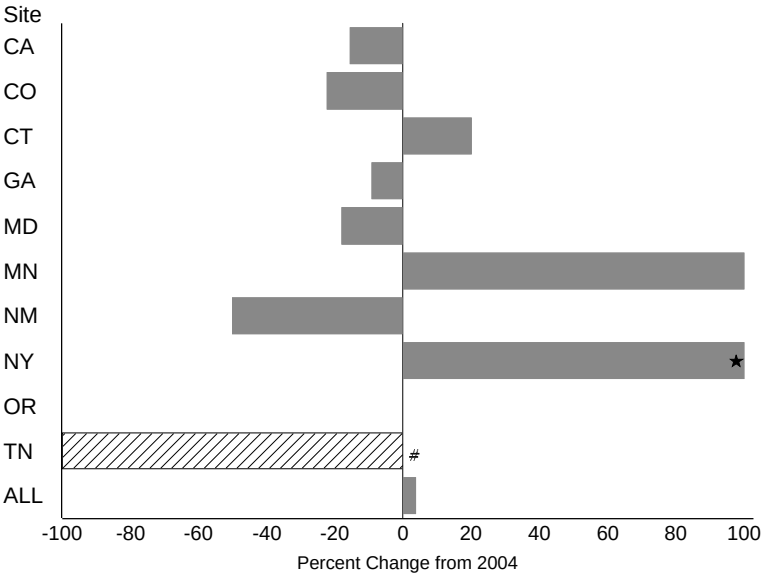
Data source: Preliminary FoodNet data, subject to change, not for public distribution.
Note: 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction. Report date: 10-January-2006

Vibrio, all species

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 bv site

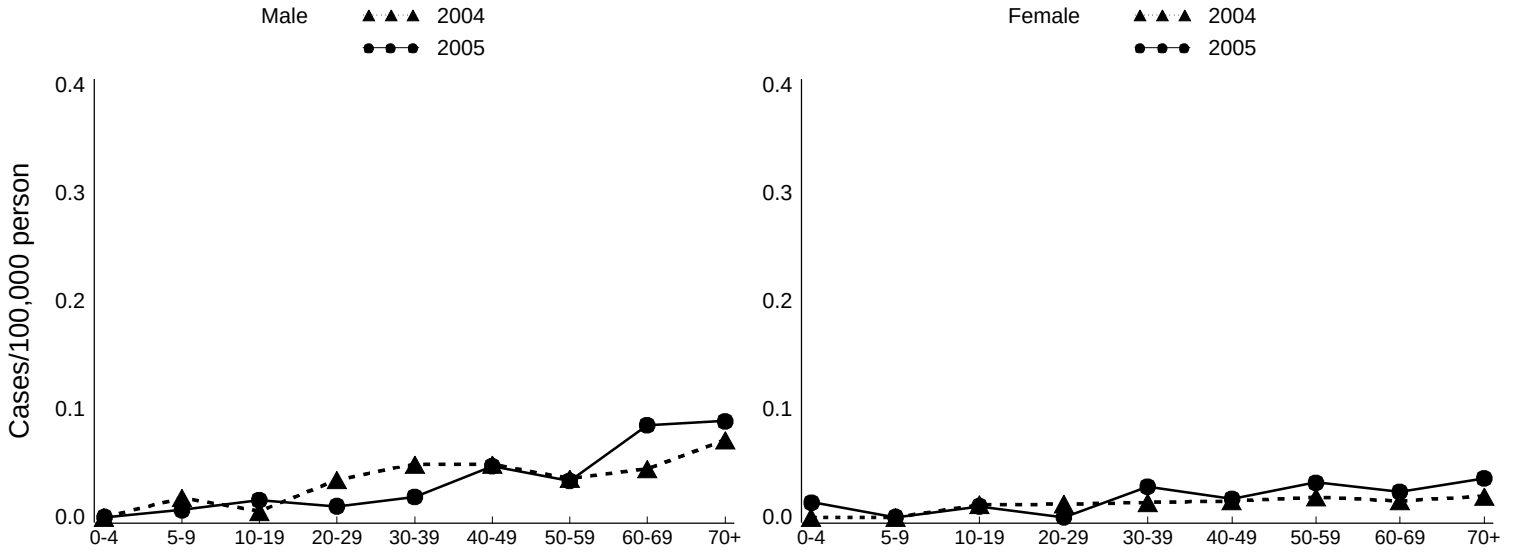


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	**Cases**	**Rate^**	**Cases**	**Rate^**	**Cases**	**Rate^**
CA	22	0.686	26	0.810	19	0.586
CO	7	0.274	9	0.352	5	0.186
CT	12	0.343	10	0.285	9	0.271
GA	20	0.227	22	0.249	21	0.242
MD	23	0.414	28	0.504	18	0.371
MN	6	0.118	3	0.059	3	0.068
NM	1	0.053	2	0.105	2	0.105
NY	7	0.162	1	0.023	3	0.078
OR	9	0.250	9	0.250	9	0.244
TN	0	0.000	9	0.153	6	0.135
ALL	107	0.277	119	0.268	94	0.237

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

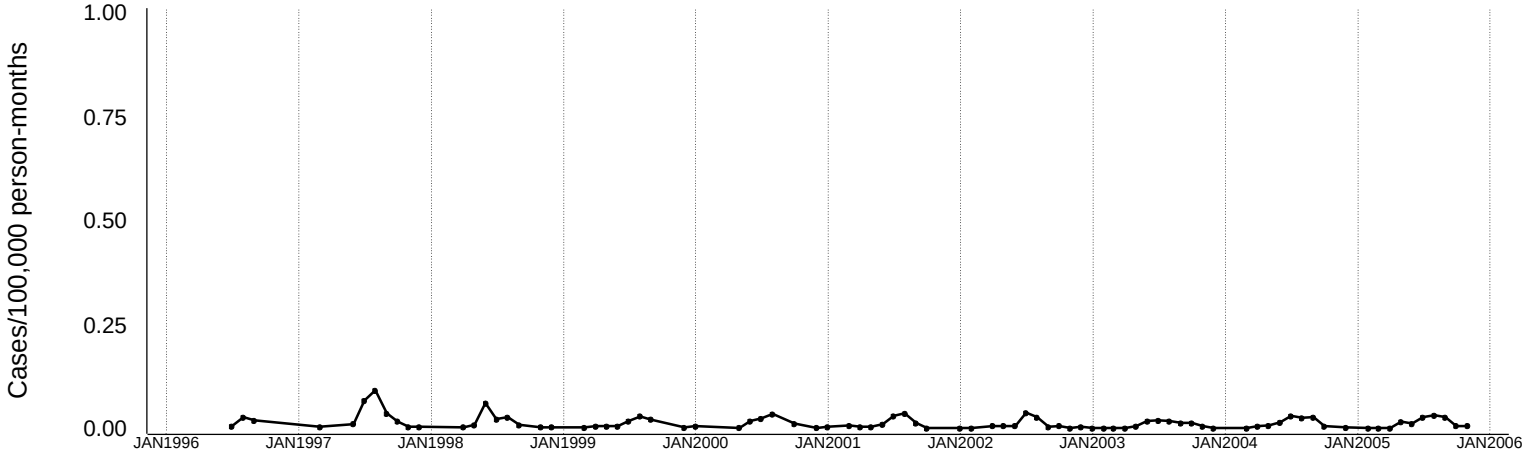
Calendar year through November: Rates for 2004 and 2005 by age group and sex



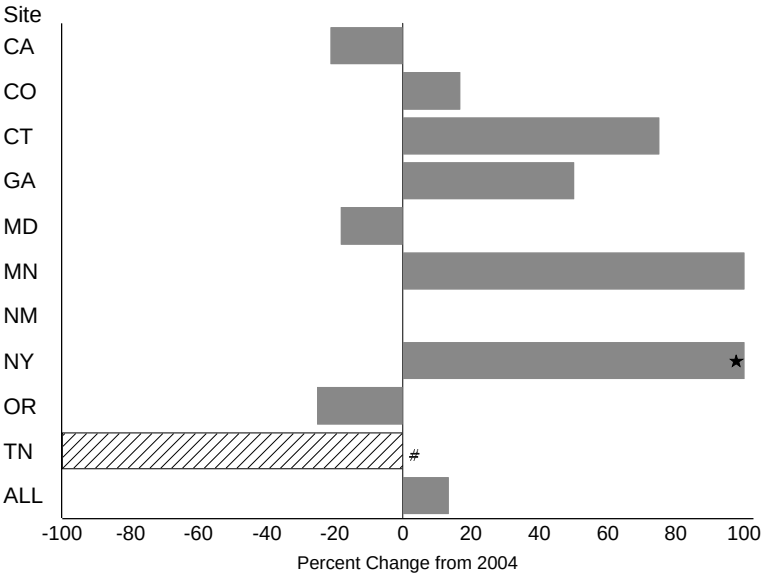
Data source: Preliminary FoodNet data, subject to change, not for public distribution.
Note: 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction. Report date: 10-January-2006

Vibrio parahaemolyticus

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 bv site

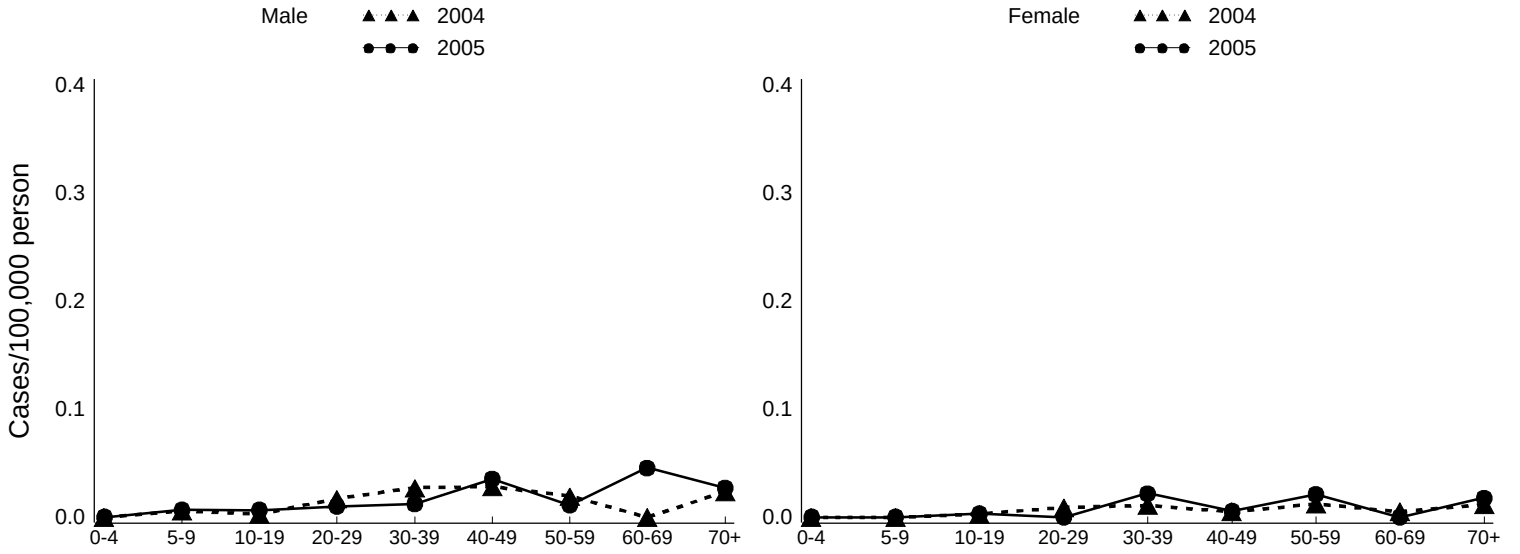


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	Cases	Rate^	Cases	Rate^	Cases	Rate^
CA	15	0.467	19	0.592	14	0.436
CO	7	0.274	6	0.235	3	0.115
CT	7	0.200	4	0.114	5	0.145
GA	6	0.068	4	0.045	4	0.051
MD	9	0.162	11	0.198	8	0.166
MN	2	0.039	1	0.020	1	0.028
NM	1	0.053	1	0.053	1	0.053
NY	3	0.070	1	0.023	1	0.027
OR	6	0.167	8	0.223	7	0.187
TN	0	0.000	2	0.034	2	0.034
ALL	56	0.145	57	0.128	46	0.116

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

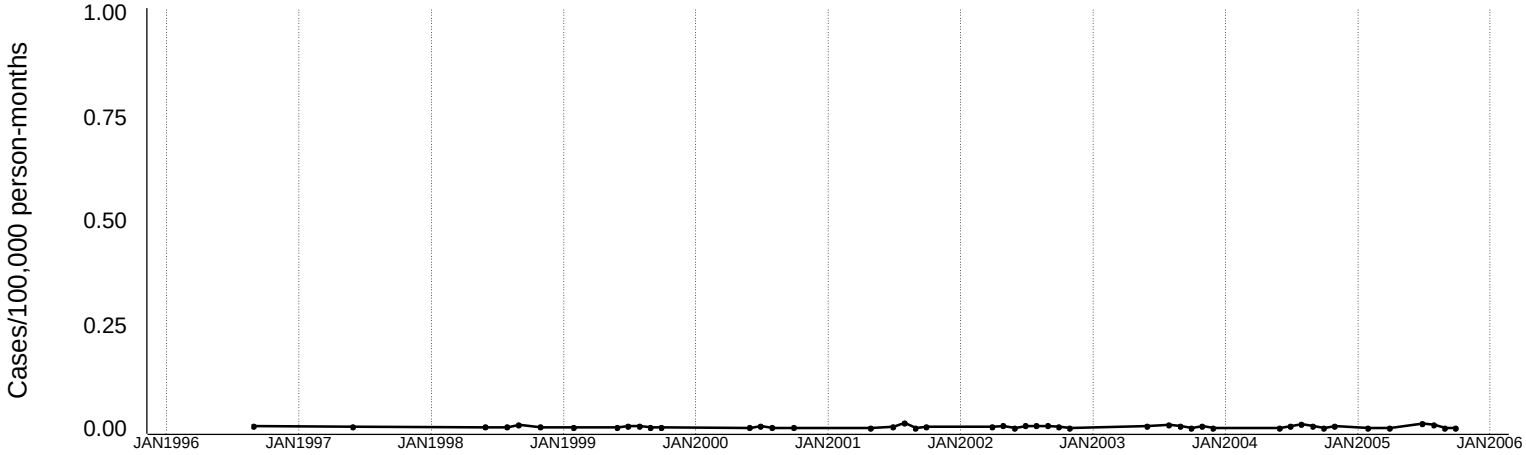
Calendar year through November: Rates for 2004 and 2005 by age group and sex



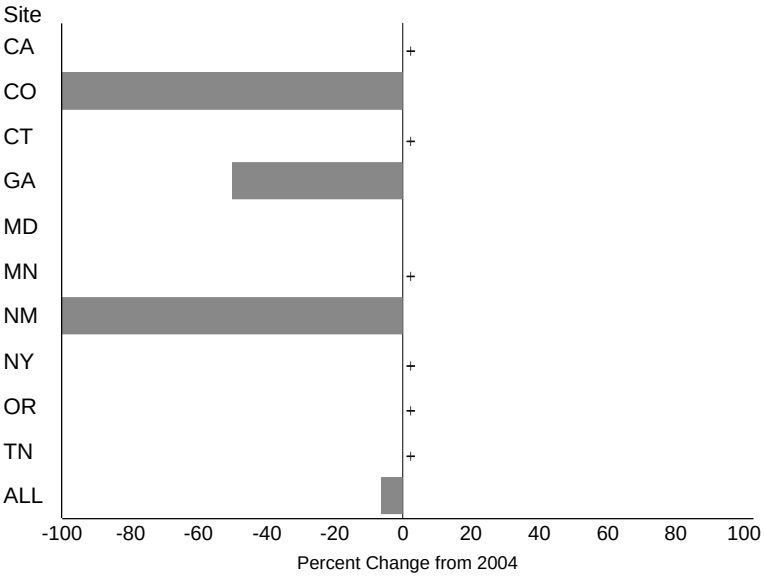
Data source: Preliminary FoodNet data, subject to change, not for public distribution.
Note: 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction. Report date: 10-January-2006

Vibrio vulnificus

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 bv site

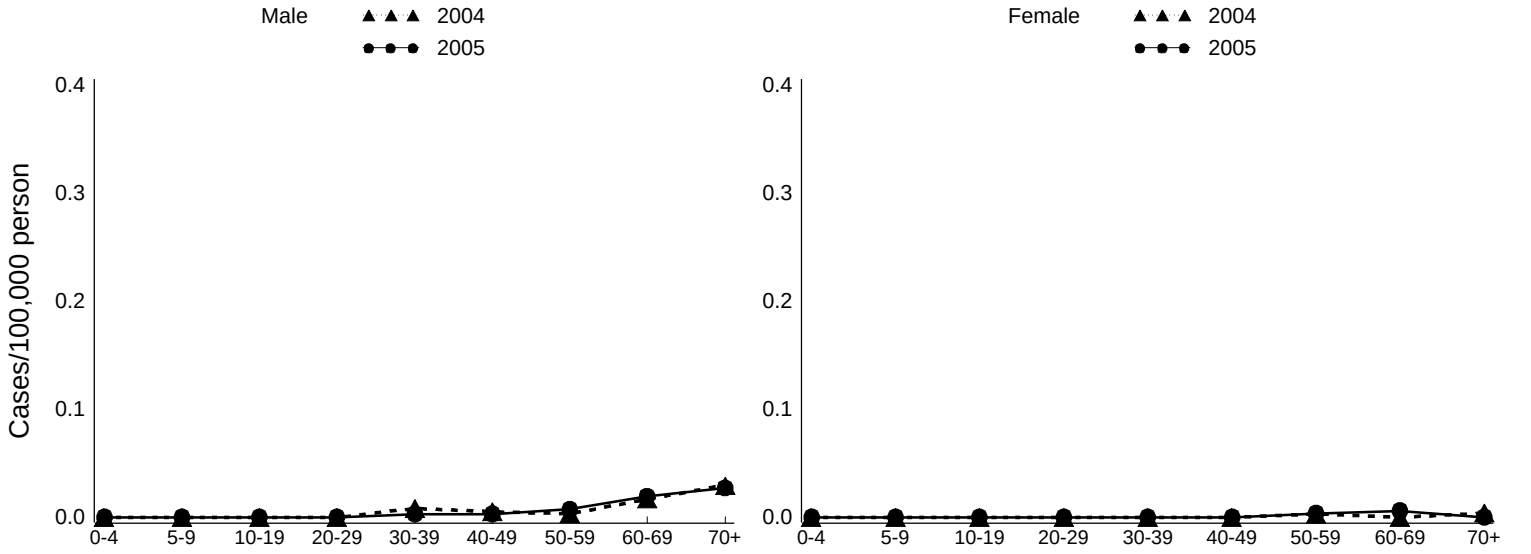


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	**Cases**	**Rate^**	**Cases**	**Rate^**	**Cases**	**Rate^**
CA	0	0.000	0	0.000	0	0.012
CO	0	0.000	2	0.078	1	0.030
CT	0	0.000	0	0.000	0	0.006
GA	3	0.034	6	0.068	6	0.065
MD	7	0.126	7	0.126	4	0.079
MN	1	0.020	0	0.000	0	0.000
NM	0	0.000	1	0.053	1	0.053
NY	2	0.046	0	0.000	0	0.000
OR	0	0.000	0	0.000	0	0.006
TN	0	0.000	0	0.000	2	0.045
ALL	13	0.034	16	0.036	14	0.033

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

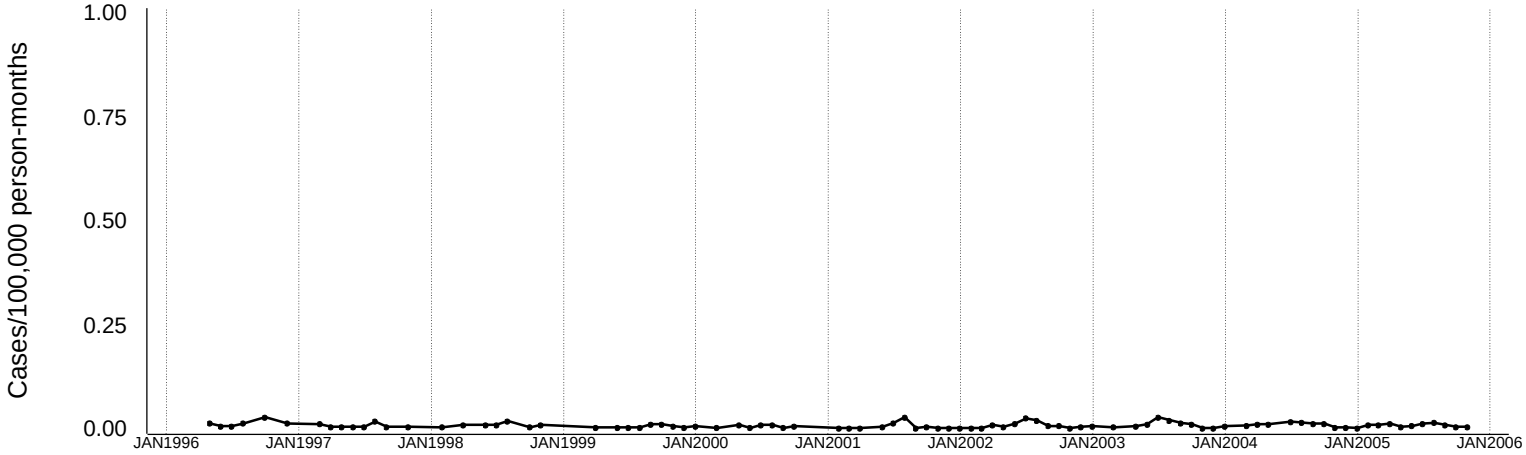
Calendar year through November: Rates for 2004 and 2005 by age group and sex



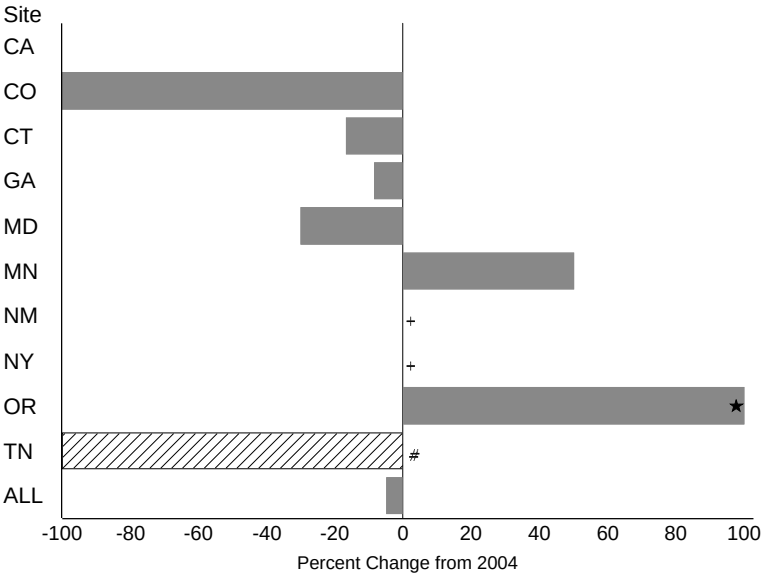
Data source: Preliminary FoodNet data, subject to change, not for public distribution.
Note: 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction. Report date: 10-January-2006

Vibrio, all others

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 bv site

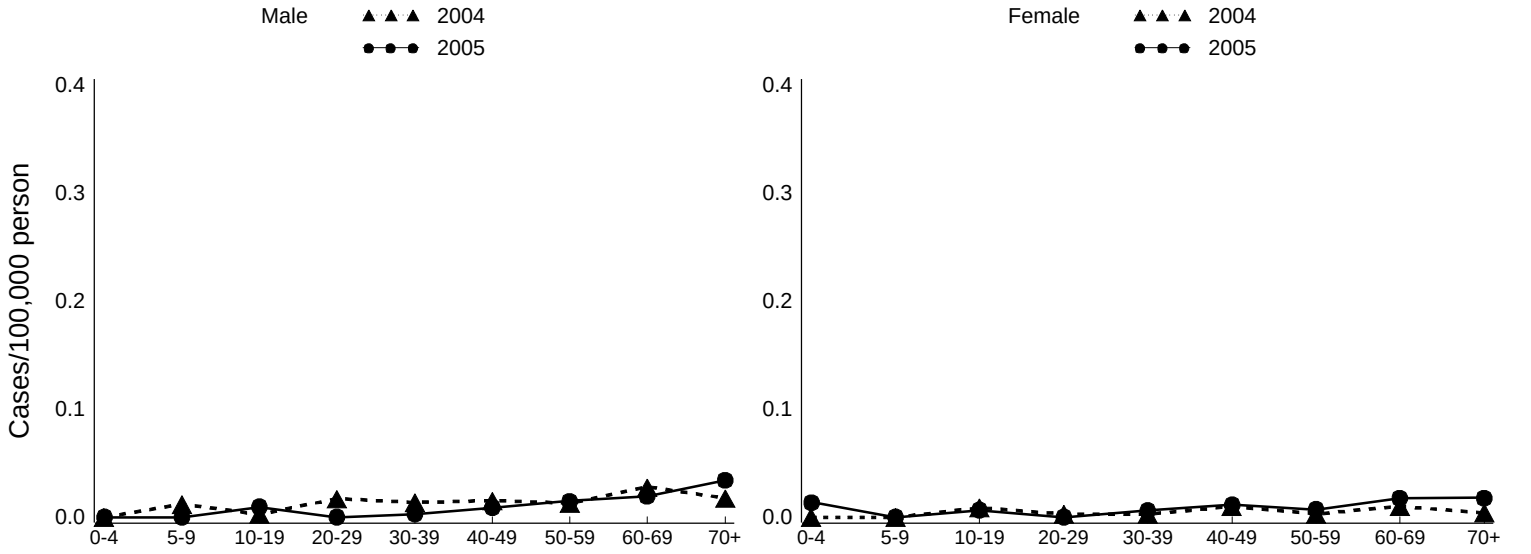


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	**Cases**	**Rate^**	**Cases**	**Rate^**	**Cases**	**Rate^**
CA	7	0.218	7	0.218	4	0.137
CO	0	0.000	1	0.039	1	0.041
CT	5	0.143	6	0.171	4	0.121
GA	11	0.125	12	0.136	11	0.126
MD	7	0.126	10	0.180	6	0.126
MN	3	0.059	2	0.039	2	0.040
NM	0	0.000	0	0.000	0	0.000
NY	2	0.046	0	0.000	2	0.051
OR	3	0.083	1	0.028	2	0.051
TN	0	0.000	7	0.119	3	0.055
ALL	38	0.099	46	0.103	34	0.087

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

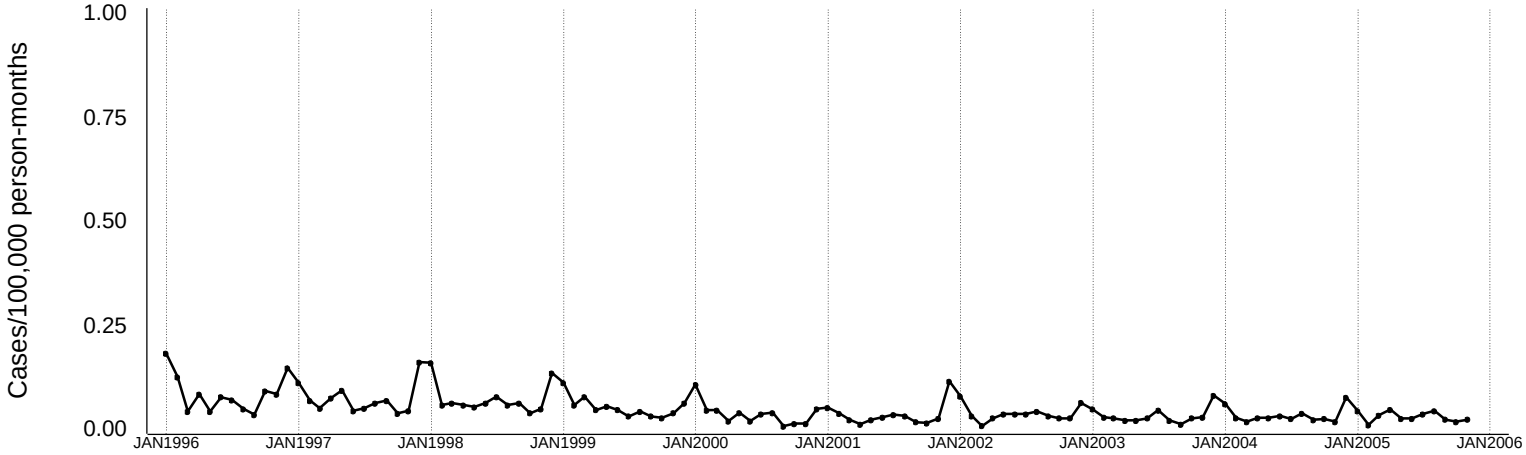
Calendar year through November: Rates for 2004 and 2005 by age group and sex



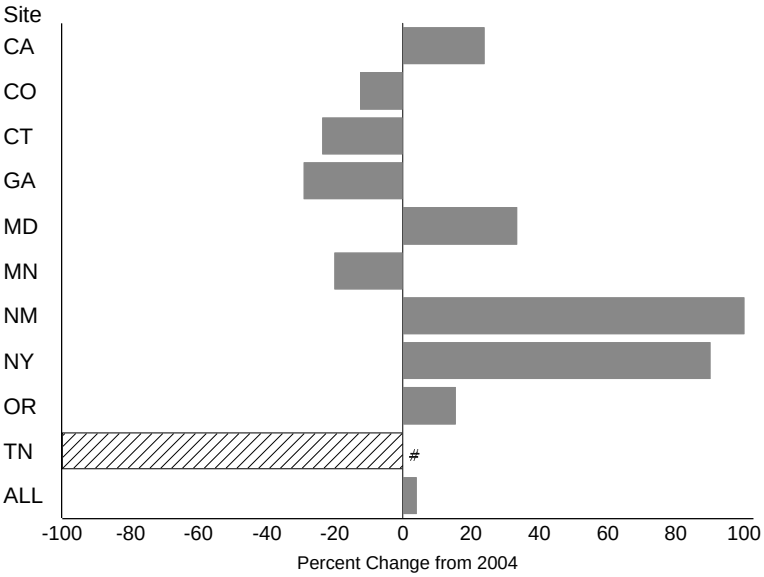
Data source: Preliminary FoodNet data, subject to change, not for public distribution.
Note: 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction. Report date: 10-January-2006

Yersinia

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 bv site

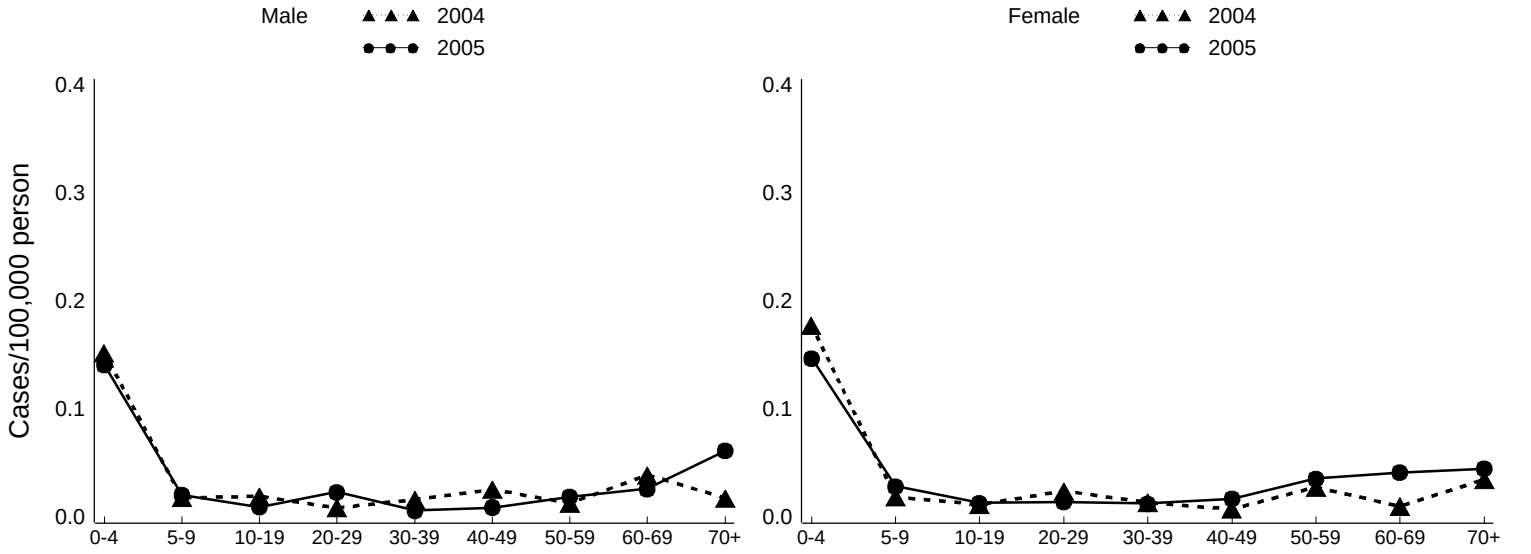


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	Cases	Rate^	Cases	Rate^	Cases	Rate^
CA	26	0.810	21	0.654	19	0.592
CO	7	0.274	8	0.313	6	0.262
CT	13	0.371	17	0.485	13	0.364
GA	22	0.249	31	0.351	32	0.375
MD	8	0.144	6	0.108	10	0.229
MN	16	0.314	20	0.392	15	0.298
NM	2	0.105	1	0.053	1	0.053
NY	19	0.440	10	0.232	10	0.327
OR	15	0.417	13	0.362	10	0.290
TN	0	0.000	15	0.254	13	0.329
ALL	128	0.332	142	0.319	129	0.338

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

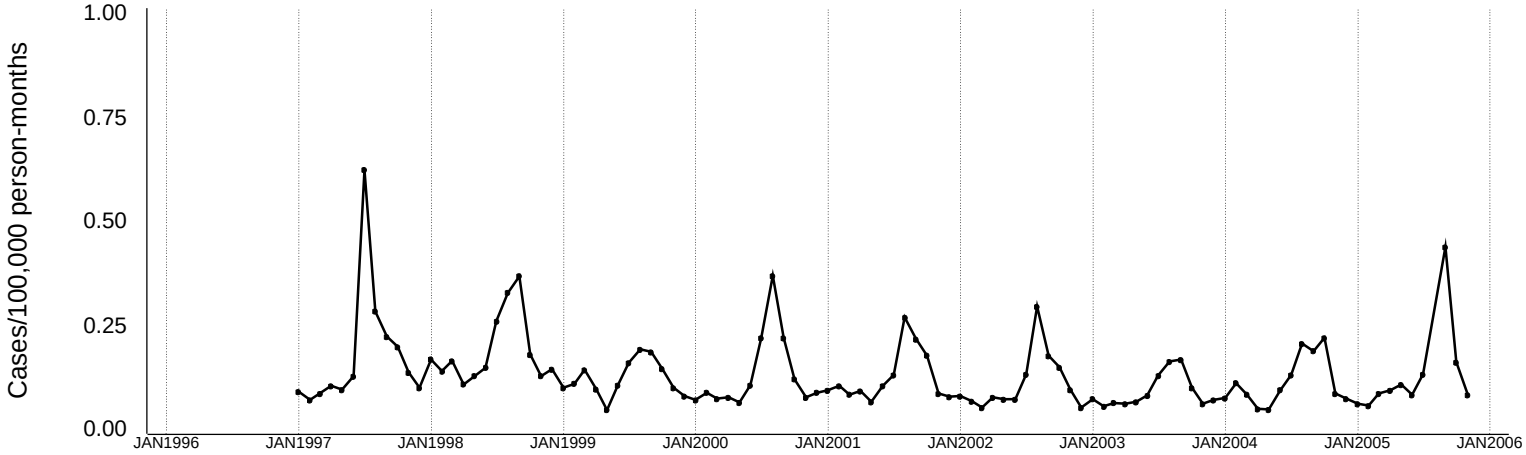
Calendar year through November: Rates for 2004 and 2005 by age group and sex



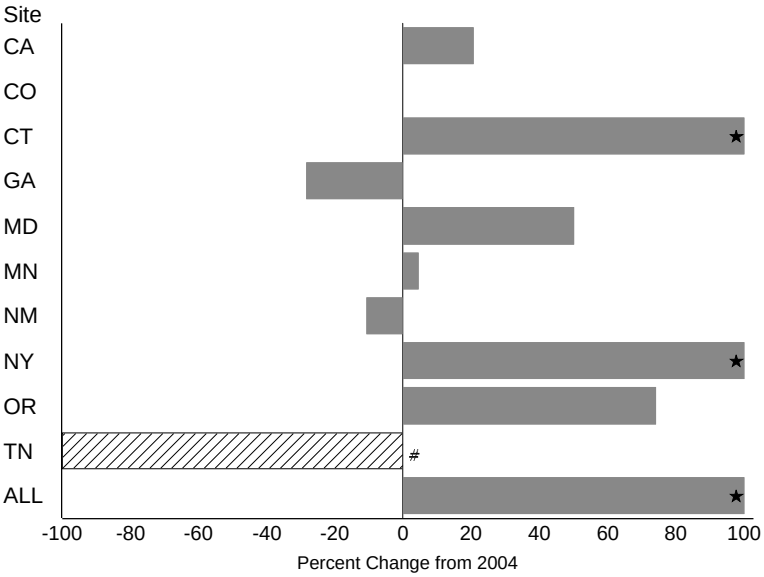
Data source: Preliminary FoodNet data, subject to change, not for public distribution.
Note: 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction. Report date: 10-January-2006

Cryptosporidium

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 bv site

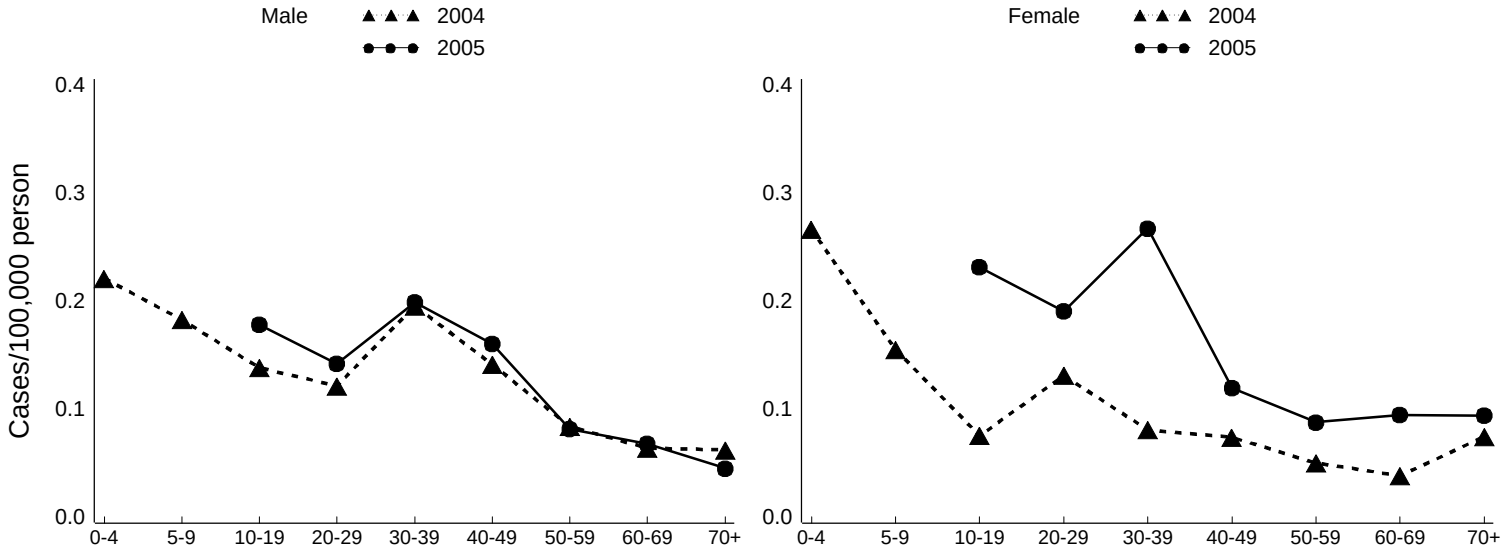


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	Cases	Rate^	Cases	Rate^	Cases	Rate^
CA	41	0.733	34	0.608	46	0.760
CO	23	0.900	23	0.900	17	0.684
CT	78	2.226	29	0.828	21	0.619
GA	120	1.359	167	1.891	142	1.661
MD	30	0.540	20	0.360	18	0.390
MN	144	2.823	138	2.705	173	3.455
NM	17	0.893	19	0.998	19	0.998
NY	597	13.83	95	2.201	43	1.244
OR	47	1.308	27	0.751	34	0.979
TN	0	0.000	51	0.864	27	0.633
ALL	1097	2.679	603	1.287	541	1.294

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

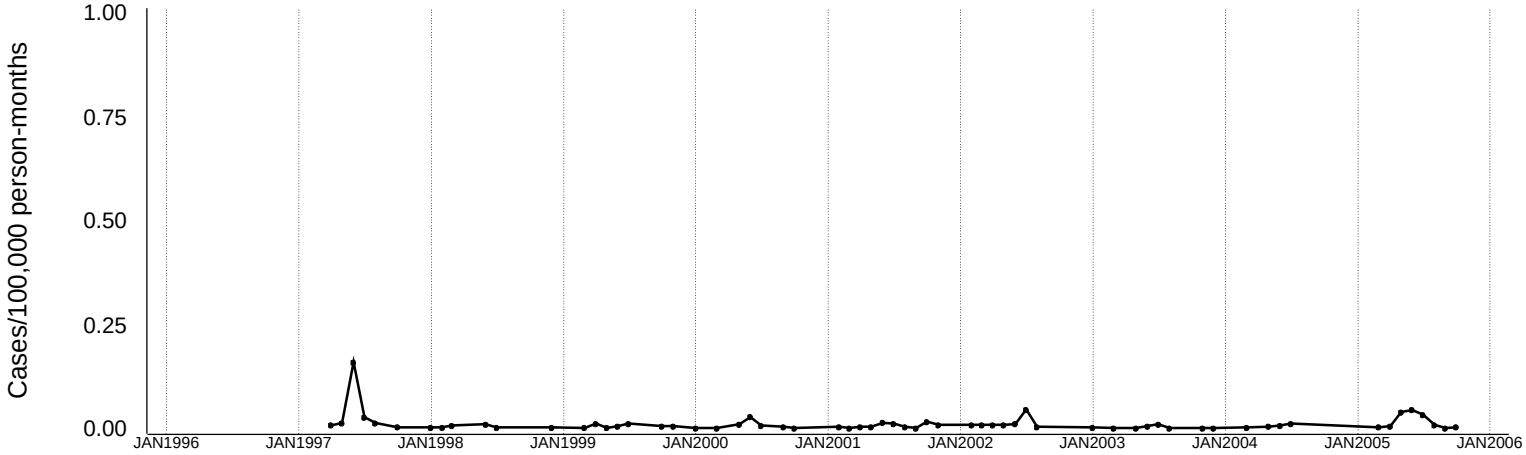
Calendar year through November: Rates for 2004 and 2005 by age group and sex



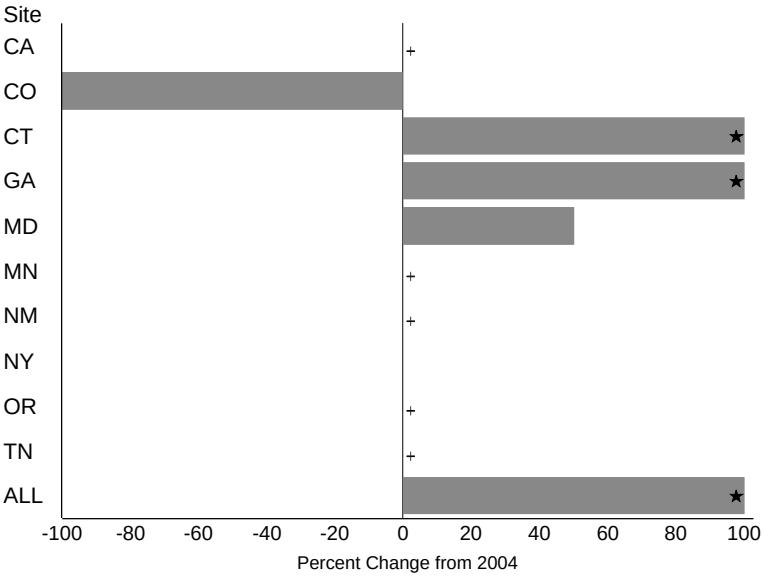
Data source: Preliminary FoodNet data, subject to change, not for public distribution.
Note: 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction. Report date: 10-January-2006

Cyclospora

Incidence rate of culture-confirmed infections, FoodNet sites, January 1996-November 2005



Calendar year through November: Percent change in rates between 2004 and 2005 bv site

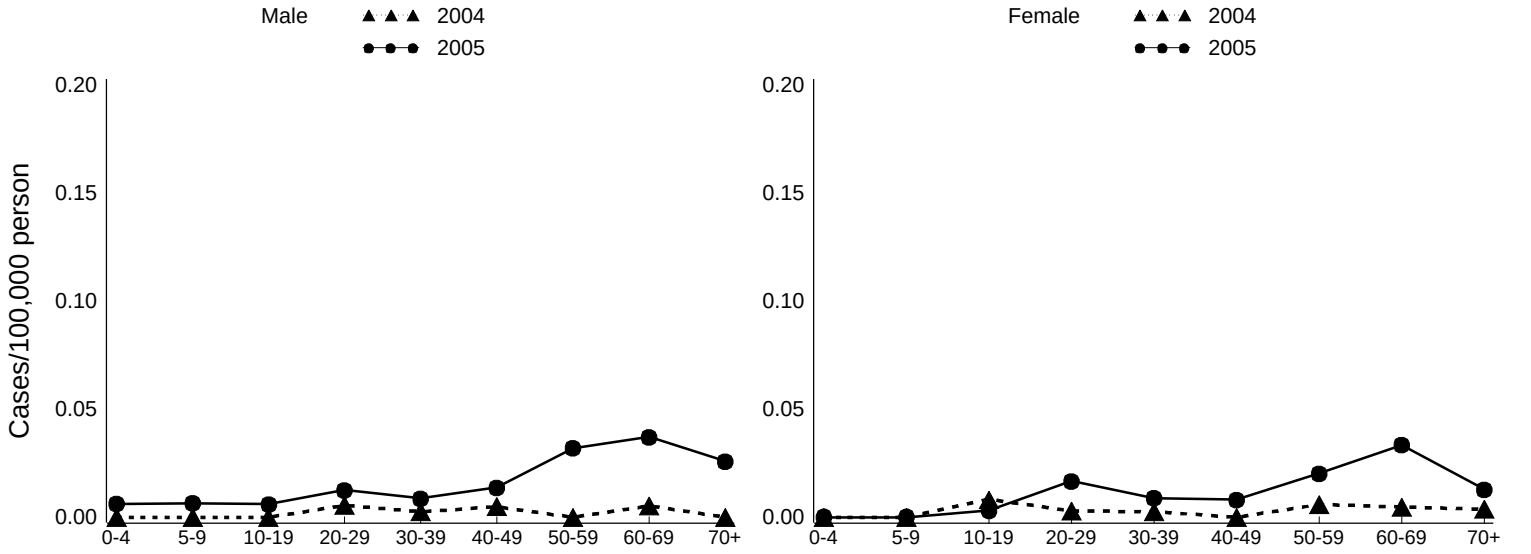


* Change exceeds 100%, +Percent increase cannot be calculated because 2004 rate is 0
# 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction.

	2005		2004		5 year mean*	
Site	Cases	Rate^	Cases	Rate^	Cases	Rate^
CA	2	0.036	0	0.000	2	0.029
CO	0	0.000	3	0.117	1	0.029
CT	35	0.999	7	0.200	5	0.138
GA	13	0.147	2	0.023	15	0.173
MD	3	0.054	2	0.036	1	0.018
MN	0	0.000	0	0.000	0	0.000
NM	4	0.210	0	0.000	0	0.000
NY	1	0.023	1	0.023	2	0.061
OR	4	0.111	0	0.000	0	0.000
TN	0	0.000	0	0.000	0	0.007
ALL	62	0.151	15	0.032	25	0.063

*year 2000-2004 except for CO (2001-2004), NM (2004-)
^cases/100,000 person

Calendar year through November: Rates for 2004 and 2005 by age group and sex



Data source: Preliminary FoodNet data, subject to change, not for public distribution.
Note: 2005 TN data entered but not available at CDC because of NEDSS PAM malfunction. Report date: 10-January-2006

YEAR	ISOLATE	CA			CO			CT			GA			MD			MN			NM			NY			OR			TN		
		FoodNet Cases Linked to NARMS	Isolates Submitted to NARMS	% FoodNet Cases Linked	FoodNet Cases Linked to NARMS	Isolates Submitted to NARMS	% FoodNet Cases Linked	FoodNet Cases Linked to NARMS	Isolates Submitted to NARMS	% FoodNet Cases Linked	FoodNet Cases Linked to NARMS	Isolates Submitted to NARMS	% FoodNet Cases Linked	FoodNet Cases Linked to NARMS	Isolates Submitted to NARMS	% FoodNet Cases Linked	FoodNet Cases Linked to NARMS	Isolates Submitted to NARMS	% FoodNet Cases Linked	FoodNet Cases Linked to NARMS	Isolates Submitted to NARMS	% FoodNet Cases Linked	FoodNet Cases Linked to NARMS	Isolates Submitted to NARMS	% FoodNet Cases Linked	FoodNet Cases Linked to NARMS	Isolates Submitted to NARMS	% FoodNet Cases Linked	FoodNet Cases Linked to NARMS	Isolates Submitted to NARMS	% FoodNet Cases Linked
2005	CAMPYLOBACTER	20	67	30	21	29	72	23	28	82	52	70	74	0	0		81	82	99	20	27	74	43	48	90	45	77	58	0	20	0
	E. COLI O157	0	4	0	0	1	0	0	0		11	18	61	8	8	100	1	1	100	1	1	100	2	4	50	1	2	50	0	0	
	S. NON TYPHI	5	104	5	2	7	29	12	15	80	48	66	73	11	11	100	12	14	86	4	5	80	8	67	12	12	12	100	0	12	0
	SHIGELLA	0	1	0	0	2	0	2	2	100	10	12	83	2	3	67	2	2	100	3	3	100	1	15	7	1	3	33	0	19	0
	S. TYPHI	5	32	16	0	0		3	4	75	1	2	50	6	6	100	3	3	100	1	1	100	0	21	0	1	2	50	0	1	0
2004	CAMPYLOBACTER	47	56	84	27	40	68	52	52	100	46	50	92	23	26	88	45	61	74	17	22	77	43	53	81	14	47	30	15	38	39
	E. COLI O157	0	11	0	1	2	50	5	5	100	17	21	81	3	3	100	5	5	100	1	1	100	4	12	33	3	3	100	1	2	50
	S. NON TYPHI	14	111	13	15	25	60	26	26	100	92	114	81	37	52	71	31	34	91	15	19	79	18	117	15	16	19	84	27	38	71
	SHIGELLA	0	3	0	5	6	83	4	4	100	20	24	83	6	8	75	2	2	100	9	10	90	11	22	50	4	4	100	29	30	97
	S. TYPHI	13	69	19	1	3	33	7	9	78	1	3	33	8	23	35	6	6	100	0	0		2	45	4	1	1	100	5	8	63
2003	CAMPYLOBACTER	45	49	92	12	29	41	49	51	96	40	50	80	32	35	91	59	60	98				46	52	88	1	31	3	37	40	93
	E. COLI O157	1	13	8	1	1	100	3	3	100	12	17	71	3	4	75	5	6	83				2	13	15	5	5	100	2	3	67
	S. NON TYPHI	18	155	12	7	22	32	25	25	100	90	113	80	39	57	68	27	29	93				11	120	9	7	19	37	37	50	74
	SHIGELLA	0	2	0	7	10	70	5	5	100	36	43	84	25	27	93	5	5	100				15	25	60	5	6	83	22	28	79
	S. TYPHI	15	80	19	3	4	75	7	17	41	6	7	86	7	12	58	2	2	100				1	56	2	1	4	25	3	4	75
2002	CAMPYLOBACTER	35	52	67	18	30	60	30	30	100	25	45	56	25	28	89	36	53	68				2	43	5	0	38	0	16	24	67
	E. COLI O157	8	8	100	8	20	40	11	11	100	25	48	52	7	8	88	29	29	100				1	44	2	0	37	0	3	7	43
	S. NON TYPHI	38	52	73	19	59	32	47	52	90	162	210	77	109	115	95	52	57	91				20	279	7	0	35	0	32	84	38
	SHIGELLA	8	10	80	9	17	53	11	12	92	72	109	66	94	105	90	21	21	100				2	63	3	0	8	0	14	17	82
	S. TYPHI	7	19	37	0	3	0	8	11	73	4	5	80	8	12	67	4	4	100				0	60	0	0	0		1	1	100
2001	CAMPYLOBACTER	17	50	34	9	40	23	41	45	91	6	53	11	1	38	3	38	49	78				0	38	0	0	28	0	17	22	77
	E. COLI O157	1	8	13	5	23	22	12	13	92	0	27	0	0	14	0	25	34	74				0	41	0	3	13	23	2	12	17
	S. NON TYPHI	9	54	17	16	61	26	43	51	84	0	187	0	11	95	12	41	63	65				0	253	0	15	26	58	39	85	46
	SHIGELLA	5	20	25	0	27	0	6	6	100	0	42	0	0	14	0	26	45	58				0	68	0	3	10	30	7	13	54
	S. TYPHI	2	21	10	0	1	0	4	7	57	0	10	0	1	14	7	6	7	86				0	60	0	6	9	67	0	2	0
2000	CAMPYLOBACTER	28	45	62				42	45	93	0	51	0	0	2	0	0	51	0				0	41	0	0	25	0	12	22	55
	E. COLI O157	3	10	30				21	25	84	0	37	0	0	9	0	0	46	0				0	57	0	0	24	0	1	12	8
	S. NON TYPHI	7	56	13				41	47	87	0	188	0	0	56	0	0	59	0				0	210	0	0	34	0	26	75	35
	SHIGELLA	1	9	11				5	7	71	0	24	0	0	10	0	0	85	0				0	79	0	0	9	0	16	34	47
	S. TYPHI	2	13	15				8	11	73	0	10	0	0	4	0	0	3	0				0	69	0	0	5	0	2	3	67
1999	CAMPYLOBACTER	0	48	0				48	53	91	0	52	0	0	22	0	0	42	0				0	49	0	0	29	0			
	E. COLI O157	2	6	33				13	20	65	0	14	0	0	5	0	0	32	0				0	59	0	0	12	0			
	S. NON TYPHI	28	55	51				53	63	84	0	130	0	0	48	0	0	62	0				0	320	0	0	44	0			
	SHIGELLA	0	13	0				5	7	71	0	19	0	0	2	0	0	19	0				0	63	0	0	9	0			
	S. TYPHI	3	31	10				6	8	75	0	3	0	0	3	0	0	4	0				0	66	0	0	7	0			
1998	CAMPYLOBACTER	0	46	0				45	49	92	0	52	0	0	26	0	41	53	77				0	32	0	0	51	0			
	E. COLI O157	5	6	83				10	13	77	0	48	0	0	7	0	12	55	22				1	41	2	0	22	0			
	S. NON TYPHI	30	49	61				46	60	77	0	172	0	0	53	0	15	71	21				0	325	0	0	37	0			
	SHIGELLA	0	0					0	0		0	0		0	0		0	0					0	0		0	0				
	S. TYPHI	0	0					0	0		0	0		0	0		0	0					0	0		0	0				
1997	CAMPYLOBACTER	0	43	0				39	44	89	0	31	0				37	53	70							0	38	0			
	E. COLI O157	2	2	100				5	6	83	0	11	0				6	33	18							0	23	0			
	S. NON TYPHI	32	62	52				38	56	68	0	113	0				7	66	11							0	37	0			
	SHIGELLA	0	0					0	0		0	0					0	0								0	0				
	S. TYPHI	0	0					0	0		0	0					0	0								0	0				
1996	CAMPYLOBACTER																														
	E. COLI O157	1	5	20				3	8	38	0	19	0				0	37	0							0	14	0			
	S. NON TYPHI	32	59	54				27	63	43	0	91	0				0	79	0							0	42	0			
	SHIGELLA	0	0					0	0		0	0					0	0								0	0				
	S. TYPHI	0	0					0	0		0	0					0	0								0	0				

HUS Surveillance, 2004

Data as of January 5, 2006

Site	All cases (N=65)												In catchment (N=52)											
	<1 yo		1-4 yo		5-9 yo		10-14 yo		15-59 yo		60+ yo		<1 yo		1-4 yo		5-9 yo		10-14 yo		15-59 yo		60+ yo	
	No.	Deaths (%)	No.	Deaths (%)	No.	Deaths (%)	No.	Deaths (%)	No.	Deaths (%)	No.	Deaths (%)	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*
CA	1	0 (0)	2	0 (0)	2	0 (0)	1	0 (0)	0	--	0	--	1	2.3	0	0.0	1	0.5	0	0.0	0	0.00	0	0.00
CO	0	--	4	0 (0)	1	0 (0)	1	0 (0)	0	--	0	--	0	0.0	2	1.3	0	0.0	1	0.6	0	0.00	0	0.00
CT	0	--	2	0 (0)	3	0 (0)	1	0 (0)	0	--	0	--	0	0.0	1	0.6	3	1.3	1	0.4	0	0.00	0	0.00
GA	0	--	5	0 (0)	0	--	0	--	1	0 (0)	0	--	0	0.0	5	1.0	0	0.0	0	0.0	1	0.02	0	0.00
MD	0	--	4	0 (0)	0	--	0	--	0	--	0	--	0	0.0	4	1.4	0	0.0	0	0.0	0	0.00	0	0.00
MN	0	--	5	0 (0)	2	0 (0)	2	0 (0)	0	--	1	0 (0)	0	0.0	5	1.9	2	0.6	2	0.5	0	0.00	1	0.12
NM	0	--	0	--	0	--	0	--	0	--	0	--	0	0.0	0	0.0	0	0.0	0	0.0	0	0.00	0	0.00
NY	0	--	2	0 (0)	0	--	0		0	--	0	--	0	0.0	2	1.0	0	0.0	0	0.0	0	0.00	0	0.00
OR	2	0 (0)	2	0 (0)	1	0 (0)	1	0 (0)	0	--	0	--	2	4.6	2	1.1	1	0.4	1	0.4	0	0.00	0	0.00
TN	1	0 (0)	10	1 (10)	5	1 (20)	1	0 (0)	1	0 (0)	1	0 (0)	0	0.0	9	3.0	4	1.1	0	0.0	1	0.03	1	0.10
Total	**4**	**0 (0)**	**36**	**1 (3)**	**14**	**1 (7)**	**7**	**0 (0)**	**2**	**0 (0)**	**2**	**0 (0)**	**3**	**0.5**	**29**	1.3	**11**	**0.4**	**5**	**0.2**	**2**	**0.01**	**2**	**0.03**

*per 100,000 persons

Site	Laboratory Testing (all cases included N=65)							
	Shiga toxin	O157			Non-O157			
	No. pos/ tested (%)	No. culture pos/tested (%)	No. seropos/ tested (%)	Total pos/total cases (by culture or serology)	Stx pos & SMAC-O157 neg No. pos/tested (%)	Non-O157 isolated	No. seropos/ tested for O111 or O26 (%)	Total pos/total cases (by culture or serology)
CA	4/4 (100)	4/6 (67)	0/0 (-)	4/6 (67)	0/4 (0)	-	0/0 (-)	0/6 (0)
CO	0/0 (-)	0/2 (0)	0/0 (-)	0/6 (0)	0/0 (-)	-	0/0 (-)	0/6 (0)
CT	2/4 (50)	4/6 (67)	2/2 (100)	6/6 (100)	0/4 (0)	-	0/2 (0)	0/6 (0)
GA	0/1 (-)	0/5 (0)	2/2 (100)	2/6 (33)	0/1 (-)	-	0/2 (0)	0/6 (0)
MD	1/1 (100)	0/2 (0)	0/0 (-)	0/4 (0)	1/1 (100)	Isolate not sent to SPHL (1)	0/0 (-)	1/4 (25)
MN	8/10 (78)	6/10 (60)	0/2 (0)*	6/10 (60)	2/10 (20)	Could not be serotyped (1) O 145:H28 (1)	0/0 (0)	2/10 (22)
NM	0/0 (-)	0/0 (-)	0/0 (-)	0/0 (-)	0/0 (-)	-	0/0 (-)	0/0 (-)
NY	0/0 (-)	2/2 (100)	0/0 (-)	2/2 (100)	0/0 (-)	-	0/0 (-)	0/2 (0)
OR	0/0 (-)	2/6 (33)	0/1 (-)*	2/6 (33)	0/0 (-)	-	0/1 (-)*	0/6 (0)
TN	2/4 (50)	10/18 (56)	7/10 (70)	17/19 (89)	0/4 (0)	-	0/10 (0)	0/19 (0)
Total	**17/24 (71)**	**28/57 (49)**	**11/17 (65)**	**39/65 (60)**	**3/24 (14)**	**-**	**0/15 (0)**	**3/65 (5)**

*Lab Results Pending: MN-1, OR-1

HUS Surveillance, 2005

Data as of January 5, 2006

Site	All cases (N=83)												In catchment (N=62)											
	<1 yo		1-4 yo		5-9 yo		10-14 yo		15-59 yo		60+ yo		<1 yo		1-4 yo		5-9 yo		10-14 yo		15-59 yo		60+ yo	
	No.	Deaths (%)	No.	Deaths (%)	No.	Deaths (%)	No.	Deaths (%)	No.	Deaths (%)	No.	Deaths (%)	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*	No.	Rate*
CA	1	--	9	--	2	0 (0)	0	--	0	--	0	--	1	2.3	5	3.1	0	0.0	0	0.0	0	0.00	0	0.00
CO	0	--	8	0 (0)	1	--	0	--	0	--	0	--	0	0.0	3	2.0	0	0.0	0	0.0	0	0.00	0	0.00
CT	0	--	1	0 (0)	1	0 (0)	1	0 (0)	1	0 (0)	0	--	0	0.0	1	0.6	1	0.4	1	0.4	1	0.05	0	0.00
GA	0	--	5	1 (20)	0	--	2	--	0	0 (0)	1	1 (100)	0	0.0	4	0.8	0	0.0	2	0.3	0	0.00	0	0.00
MD	0	--	2	0 (0)	1	0 (0)	0	--	0	--	0	--	0	0.0	1	0.3	1	0.3	0	0.0	0	0.00	0	0.00
MN	0	--	7	0 (0)	5	0 (0)	2	0 (0)	2	0 (0)	0	--	0	0.0	7	2.7	5	1.5	2	0.5	2	0.06	0	0.00
NM	1	1 (100)	0	--	0	--	0	--	0	--	0	--	1	3.8	0	0.0	0	0.0	0	0.0	0	0.00	0	0.00
NY	0	--	3	0 (0)	2	0 (0)	1	0 (0)	1	0 (0)	0	--	0	0.0	2	1.0	2	0.8	1	0.3	1	0.04	0	0.00
OR	0	--	6	0 (0)	0	--	0	--	0	--	0	--	0	0.0	6	3.3	0	0.0	0	0.0	0	0.00	0	0.00
TN	0	--	9	1 (100)	6	0 (0)	0	--	1	0 (0)	1	0 (0)	0	0.0	7	2.3	3	0.8	0	0.0	1	0.03	1	0.10
Total	**2**	**1 (100)**	**50**	**2 (5)**	**18**	**0 (0)**	**6**	**0 (0)**	**5**	**0 (0)**	**2**	**1 (50)**	2	0.3	36	1.5	12	0.2	6	0.19	5	0.018	1	**0.01**

*per 100,000 persons

Site	Laboratory Testing (all cases included N=83)							
	Shiga toxin	O157			Non-O157			
	No. pos/ tested (%)	No. culture pos/tested (%)	No. seropos[1]/ total serum collected[2] (%)	Total pos/total cases (by culture or serology)	Stx pos & SMAC-O157 neg No. pos/tested (%)	Non-O157 isolated	No. seropos[3]/ serum collected[2] (%)	Total pos/total cases (by culture or serology)
CA	5/7 (71)	6/12 (50)	0/4 (0)	6/12 (50)	0/7 (0)	-	0/4 (0)	0/12 (0)
CO	0/0 (-)	0/0 (-)	0/0 (-)	0/9 (0)	0/0 (-)	-	0/0 (-)	0/9 (0)
CT	1/1(100)	2/3 (67)	0/0 (50)	2/4 (50)	0/1 (0)	-	0/0 (-)	0/4 (0)
GA	0/0 (0)	3/5 (60)	0/0 (-)	3/8 (38)	0/0 (-)	-	0/0 (-)	0/8 (0)
MD	2/2 (100)	1/3 (33)	0/0 (-)	1/3 (33)	1/2 (50)	Couldn't be serotyped. Sent to CDC lab. Waiting results.	0/0 (-)	1/3 (33)
MN	8/16 (50)	8/16 (50)	5/9 (0)	13/16 (81)	0/16 (0)	-	0/9 (0)	0/16 (0)
NM	0/1 (0)	0/0 (-)	0/1 (0)	0/1 (0)	0/0 (-)	-	0/1 (0)	0/1 (0)
NY	1/1 (100)	4/6 (67)	0/2 (0)	4/7 (57)	0/1 (0)	-	0/2 (-)	0/7 (0)
OR	0/0 (-)	1/1 (100)	0/1 (0)	1/6 (17)	0/0 (-)	-	0/1 (0)	0/6 (0)
TN	1/1 (100)	9/15 (60)	0/4 (0)	9/17 (53)	0/1 (0)	-	0/4 (0)	0/17 (0)
Total	18/29 (62)	34/61 (56)	5/21 (24)	39/83 (47)	1/28 (4)	-	0/21 (0)	1/83 (1)

[1] No. seropos is from 1. a "yes" response to "Were significant levels of antibodies against an STEC detected?" 2. LPS type=O157 and 3. Titer IgG≥320 and a "positive" interpretation or Titer IgM ≥320 and a "positive" interpretation

[2] The denominator is a "yes" response to the question: "Was serum obtained from this patient?" It was assumed that each "yes" response resulted in a test.

[3] No. seropos is from 1. "yes" response to "Were significant levels of antibodies against an STEC detected?" 2. LPS type≠O157 and 3. Titer IgG≥320 and a "positive" interpretation or Titer IgM ≥ 320 and a "positive" interpretation

Data as of January 5, 2006

2005 Additional Tables

Site	Additional Tables (all cases included N=83)															
	O157				Non-O157				Serum							
	No. cultured/total cases		No. isolated/no. cultured		No. cultured for Non-O157/total cases		No. isolated/no. cultured		No. serum collected/ total cases		No. of significant Ab detected/ no. tested		No. tested Shiga/total cases		Outbreak related/total cases	
	#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
CA	12/12	100	6/12	50	0/12	0	0/0	0	4/12	33	2/4	50	7/12	58	0/12	0
CO	0/9	0	0/0	0	0/9	0	0/0	0	0/9	0	0/0	0	0/9	0	2/9	22
CT	3/4	75	2/3	67	0/4	0	0/0	0	0/4	0	0/0	0	1/4	25	1/4	25
GA	5/8	63	3/5	60	0/8	0	0/0	0	0/8	0	0/0	0	0/8	25	0/8	0
MD	3/3	100	1/3	33	1/3	33	1/1	100	0/3	0	0/0	0	2/3	67	0/3	0
MN	16/16	100	8/16	50	7/16	44	0/7	0	9/16	56	5/9	56	16/16	100	4/16	25
NM	0/1	0	0/0	0	0/1	0	0/0	0	1/1	100	0/1	0	1/1	100	0/1	0
NY	6/7	86	4/6	67	0/7	0	0/0	0	2/7	29	0/2	0	1/7	14	0/7	0
OR	1/6	17	1/1	100	0/6	0	0/0	0	1/6	17	0/1	0	0/6	0	1/6	17
TN	15/17	88	9/15	60	0/17	0	0/0	0	4/17	24	0/4	0	1/17	6	3/17	18
Total	61/83	73	34/61	56	8/83	10	1/8	13	21/83	25	7/21	33	29/83	35	11/83	13