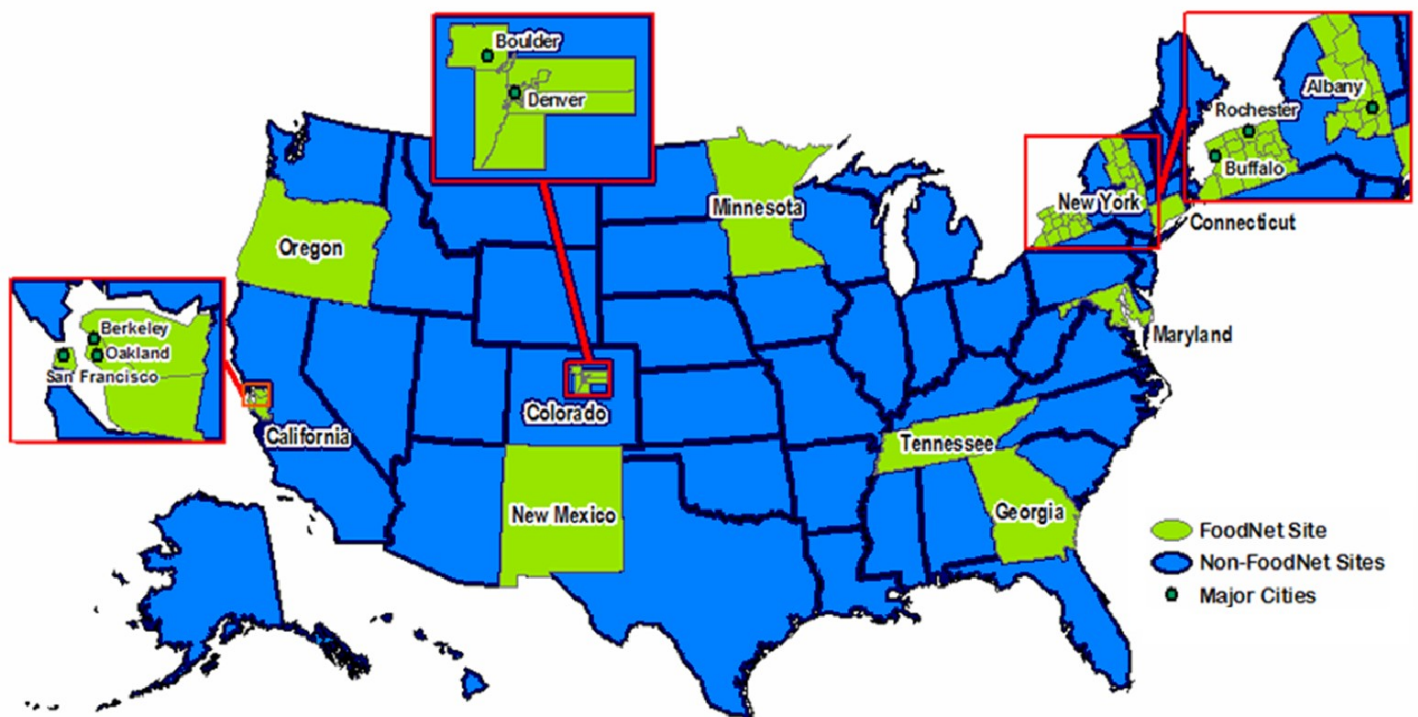


Foodborne Active Disease Surveillance Network

FoodNet

2010 Surveillance Report



US Department of Health & Human Services
Centers for Disease Control and Prevention



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Background

The Foodborne Diseases Active Surveillance Network (FoodNet) tracks important illnesses transmitted commonly by food, generating information that provides a foundation for food safety policy and prevention efforts. FoodNet provides information that contributes to food safety efforts by estimating numbers of foodborne illnesses, monitoring trends in incidence of specific illnesses over time, attributing illnesses to specific sources and settings, and disseminating information. A collaborative program of the US Centers for Disease Control and Prevention (CDC), 10 state health departments, the US Department of Agriculture's Food Safety and Inspection Service (USDA-FSIS), and the US Food and Drug Administration (FDA), FoodNet conducts population-based active surveillance for laboratory-confirmed infections caused by 7 bacterial pathogens (*Campylobacter*, *Listeria monocytogenes*, *Salmonella*, Shiga toxin-producing *Escherichia coli* [STEC], *Shigella*, *Vibrio*, and *Yersinia*) and 2 parasitic pathogens (*Cyclospora* and *Cryptosporidium*). This report describes final FoodNet active surveillance data for *Campylobacter*, *Cryptosporidium*, *Cyclospora*, *Listeria*, *Salmonella*, *Shigella*, Shiga toxin-producing *Escherichia coli* (STEC) O157, STEC non-O157, *Vibrio*, *Yersinia* for 2010, HUS for 2009, and trends in incidence of these infections since 1996.

When established in 1996, FoodNet included the states of Minnesota and Oregon and selected counties in California, Connecticut, and Georgia. From 1997 to 2004, the FoodNet surveillance area expanded several times to ultimately include the entire states of Connecticut, Georgia, Maryland, Minnesota, New Mexico, Oregon, and Tennessee, and selected counties in California, Colorado and New York (Figure 1). The FoodNet surveillance area in 2010 included 47.1 million persons, which was 15.2% of the United States population (Table 2). The sex, race, and ethnic distribution of the 2010 FoodNet surveillance population was similar to that of the United States population except that the Hispanic population was under-represented (Table 3).

Methods

Active Surveillance for laboratory-confirmed illness

FoodNet has conducted active, population-based surveillance for laboratory-confirmed cases of infection caused by *Campylobacter*, *Listeria*, *Salmonella*, STEC O157, *Shigella*, *Vibrio*, and *Yersinia* since 1996; *Cryptosporidium* and *Cyclospora* since 1997; and STEC non-O157 since 2000. A case is defined as isolation (for bacteria) or identification (for parasites) of an organism from a clinical specimen. To identify cases, FoodNet personnel regularly communicate with more than 650 clinical laboratories serving the surveillance area. Once a case is identified, FoodNet personnel at each site obtain information about a set of core variables and enter it into an electronic database. Hospitalizations occurring within 7 days of the specimen collection date are recorded, as is the patient's outcome (dead or alive) at hospital discharge (or at 7 days after the specimen collection date if the patient was not hospitalized). International travel within 7 days of illness onset is captured routinely for all *Salmonella* and STEC O157 cases.

Surveillance for Hemolytic Uremic Syndrome (HUS)

Active surveillance is conducted for cases of pediatric HUS (i.e., HUS in persons <18 years of age at time of diagnosis) through a network of pediatric nephrologists and infection-control practitioners who report all suspected cases. For the purpose of this report we define a case as any illness diagnosed as HUS by a physician or any hospitalized illness with ICD-9-CM or ICD-10CM codes consistent with HUS. FoodNet also conducts passive surveillance for cases of adult post-diarrheal HUS (i.e., HUS in persons aged ≥ 18 years of age).

Since 2000, FoodNet sites conduct an annual review of hospital discharge data for pediatric HUS cases to validate existing HUS surveillance activities and identify additional HUS cases among persons <18 years of age; with the exception of New Mexico. HUS cases are identified using ICD-9 codes specifying HUS, acute renal failure with the hemolytic anemia and thrombocytopenia, or thrombotic thrombocytopenic purpura with diarrhea caused by STEC (or another unknown pathogen). Because reviewing discharge data and validating HUS diagnosis through medical-record reviews are time-intensive, complete HUS surveillance results are reported later than those obtained through FoodNet's active surveillance activities.

Analysis

Incidence rates were calculated by dividing the number of laboratory-confirmed infections by U.S. Census Bureau population estimates for 2010. Case fatality rates (CFRs) were calculated by dividing the number of deaths by the number of laboratory-confirmed infections and multiplying by 100. Age groups were defined as <1 years, 1-4 years, 5-9 years, 10-19 years, 20-29 years, 30-39 years, 40-49 years, 50-59 years, 60-69 years, 70-79 years and ≥ 80 years of age.

Estimates of change in incidence of infections in 2010 compared with previous years were calculated using a main-effects, log-linear Poisson regression model. The model accounts for site-to-site variation and changes in the size of the population under surveillance in FoodNet over time. The 2010 incidence was compared with the annual average incidence data from two other periods: the first 3 years of FoodNet surveillance (1996-1998) and 2006-2008; the estimated change in incidence between 2010 and the comparison periods was calculated with 95% confidence intervals (95% CIs). FoodNet surveillance data from 2008 and 2009 used the preceding 3 years, a moving period, for comparison; this report initiates use of 2006-2008 as a stable comparison period. As a measure of overall change in incidence of infection transmitted commonly by food, data were combined for *Campylobacter*, *Listeria*, *Salmonella*, STEC O157, *Yersinia*, and *Vibrio*, six key bacterial pathogens for which >50% of illnesses are estimated to be transmitted by food, weighting by incidence of infection for each pathogen. For HUS surveillance, the average annual incidence for 2006-2008 was used as the comparison period. Due to the small number of cases, changes over time were not evaluated for STEC non-O157 and *Cyclospora*.

Summary of Results

In 2010, a total of 19,129 laboratory-confirmed cases of infection were identified (Table 4). The overall incidence for the six key pathogens (*Campylobacter*, *Listeria*, *Salmonella*, STEC O157, *Yersinia*, and *Vibrio*) was 23% lower in 2010 than during 1996-1998. For individual pathogens, the incidence was significantly lower for *Campylobacter*, *Listeria*, Shiga toxin-producing *Escherichia coli* (STEC) O157, *Shigella*, and *Yersinia* (Figures 8-9). Incidence was significantly higher for *Vibrio* and did not change for *Salmonella* and *Cryptosporidium*. Compared with 2006-2008, the measure of overall incidence was not different in 2010. The incidence was significantly lower for *Shigella* and STEC O157 and higher for *Salmonella* and *Vibrio* (Figure 10). The incidence did not change significantly for *Campylobacter*, *Cryptosporidium*, *Listeria*, and *Yersinia*. For most infections, reported incidence was highest among children aged <5 years, whereas the percentage of persons hospitalized and the case fatality rates (CFRs) were highest among persons aged ≥ 60 years (Tables 6, 6a, 13, 13a, 16, 16a).

In 2009, FoodNet ascertained 98 HUS cases, including 86 (88%) post-diarrheal cases. Among post-diarrheal HUS cases, 2 (2%) persons died. Seventy-two (84%) pediatric post-diarrheal HUS cases were reported; among these, 42 (59%) cases were in children aged <5 years. Of all post-diarrheal HUS cases, 61 (71%) had evidence of STEC infection, defined as isolation of STEC by stool culture, stool positive for Shiga toxin or detection of antibodies to *E. coli* O157 or O111 lipopolysaccharide in serum; 49% of cases were diagnosed during June through September.

Detailed information about active surveillance and HUS data can be found in Tables 20-22 and Figure 11.

Publications and Abstracts, 2010

All publications and abstracts listed used data from FoodNet surveillance.

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Further information concerning FoodNet, including previous surveillance reports, *MMWR* articles, and other FoodNet publications, can be obtained by visiting www.cdc.gov/foodnet, emailing FoodNet at foodnet@cdc.gov or contacting the Enteric Diseases Epidemiology Branch at (404) 639-2206.

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TABLE 1. Foodborne Diseases Active Surveillance Network (FoodNet) Surveillance Area, by State and County — 1996-2010

State	County	Year								2010 Total Catchment Population	
		1996	1997	1998	1999	2000	2001	2002	2003		2004 - Present
California	Original counties (Alameda and San Francisco)	•	•	•	•	•	•	•	•	•	3,372,242
	Added county (Contra Costa)					•	•	•	•	•	
Colorado	Original counties (Adams, Arapahoe, Denver, Douglas, and Jefferson)						•	•	•	•	2,796,988
	Added counties (Boulder and Broomfield)							•	•	•	
Connecticut	Original counties (Hartford and New Haven)	•	•	•	•	•	•	•	•	•	3,577,073
	Rest of state			•	•	•	•	•	•	•	
Georgia	Original counties (Clayton, Cobb, DeKalb, Douglas, Fulton, Gwinnett, Newton, and Rockdale)	•	•	•	•	•	•	•	•	•	9,712,587
	Added counties (Barrow, Bartow, Carroll, Cherokee, Coweta, Fayette, Forsyth, Henry, Paulding, Pickens, Spalding, and Walton)		•	•	•	•	•	•	•	•	
	Rest of state				•	•	•	•	•	•	
Maryland	Original counties (Anne Arundel, Baltimore, Baltimore City, Carroll, Harford, and Howard)			•	•	•	•	•	•	•	5,785,982
	Added counties (Montgomery and Prince George's)						•	•	•	•	
	Rest of state							•	•	•	
Minnesota	All counties	•	•	•	•	•	•	•	•	•	5,310,584
New Mexico	All counties									•	2,065,932
New York	Original sites (Genesee, Livingston, Monroe, Ontario, Orleans, Wayne, and Yates)			•	•	•	•	•	•	•	4,328,131
	Added counties (Albany, Columbia, Greene, Montgomery, Rensselaer, Saratoga, Schenectady, and Schoharie)				•	•	•	•	•	•	
	Added counties (Erie, Niagara, and Wyoming)							•	•	•	
	Added counties (Allegany, Cattaraugus, Chautauqua, Chemung, Schuyler, Seneca, Steuben, Warren, and Washington)								•	•	
	Added counties (Clinton, Delaware, Essex, Franklin, Fulton, Hamilton, and Otsego)									•	
Oregon	All counties	•	•	•	•	•	•	•	•	•	3,838,957
Tennessee	Original counties (Cheatham, Davidson, Dickson, Hamilton, Knox, Robertson, Rutherford, Shelby, Sumner, Williamson, and Wilson)					•	•	•	•	•	6,356,897
	Rest of state								•	•	

Total Surveillance	47,145,373
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TABLE 2. Population under Surveillance, by Site — FoodNet, 1996-2010

FoodNet Site	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
California	2,087,032	2,113,195	2,142,806	2,162,359	3,180,535	3,221,301	3,214,691	3,207,854	3,199,470	3,203,574	3,213,968	3,243,540	3,291,704	3,338,351	3,372,242
Colorado	-	-	-	-	-	2,149,813	2,494,509	2,511,607	2,532,539	2,560,644	2,605,859	2,653,222	2,701,638	2,749,198	2,796,988
Connecticut	1,622,809	2,453,483	3,272,563	3,282,031	3,411,777	3,432,835	3,458,749	3,484,336	3,496,094	3,506,956	3,517,460	3,527,270	3,545,579	3,561,807	3,577,073
Georgia	2,720,443	3,632,206	3,744,022	7,788,240	8,227,303	8,377,038	8,508,256	8,622,793	8,769,252	8,925,922	9,155,813	9,349,988	9,504,843	9,620,846	9,712,587
Maryland	-	-	2,441,279	2,450,566	2,517,195	4,243,342	5,440,389	5,496,269	5,546,935	5,592,379	5,627,367	5,653,408	5,684,965	5,730,388	5,785,982
Minnesota	4,647,723	4,687,726	4,726,411	4,775,508	4,933,692	4,982,796	5,018,935	5,053,572	5,087,713	5,119,598	5,163,555	5,207,203	5,247,018	5,281,203	5,310,584
New Mexico	-	-	-	-	-	-	-	-	1,903,808	1,932,274	1,962,137	1,990,070	2,010,662	2,036,802	2,065,932
New York	-	-	1,105,062	2,084,453	2,115,057	2,119,971	3,332,739	3,981,730	4,328,097	4,320,853	4,318,715	4,319,290	4,323,449	4,326,495	4,328,131
Oregon	3,195,087	3,243,254	3,282,055	3,316,154	3,429,708	3,467,937	3,513,424	3,547,376	3,569,463	3,613,202	3,670,883	3,722,417	3,768,748	3,808,600	3,838,957
Tennessee	-	-	-	-	2,826,381	2,852,904	2,878,873	5,847,812	5,910,809	5,991,057	6,088,766	6,175,727	6,247,411	6,306,019	6,356,897
Total	14,273,094	16,129,864	20,714,198	25,859,311	30,641,648	34,847,937	37,860,565	41,753,349	44,344,180	44,766,459	45,324,523	45,842,135	46,326,017	46,759,709	47,145,373
FoodNet population as % of U.S. population	5.4	6.0	7.7	9.5	10.9	12.2	13.2	14.4	15.2	15.2	15.2	15.2	15.2	15.2	15.2

Bold indicates active surveillance was conducted statewide, including all counties within a state; otherwise, surveillance was conducted in select counties.

“-” Indicates state was not a FoodNet site during indicated year.

TABLE 3. Comparison of FoodNet Surveillance Population to U.S. Population, Overall and by Site —2010

	Total FoodNet Surveillance Population	U.S. Population	CA*	CO*	CT	GA	MD	MN	NM	NY*	OR	TN
	#	#	#	#	#	#	#	#	#	#	#	#
Total population	47,145,373	309,349,689	3,372,242	2,796,988	3,577,073	9,712,587	5,785,982	5,310,584	2,065,932	4,328,131	3,838,957	6,356,897
Age												
<1	589,595	3,952,444	39,334	37,900	38,063	133,587	71,693	69,128	28,242	46,313	46,142	79,193
1–4	2,440,625	16,248,085	160,456	157,136	163,775	554,288	293,131	286,025	116,807	189,174	191,293	328,540
5–9	3,082,044	20,382,409	195,756	198,442	222,734	696,313	367,265	355,714	143,881	251,922	237,628	412,389
10–19	6,387,649	42,653,098	400,579	365,996	489,899	1,397,477	783,555	718,526	291,655	589,420	496,647	853,895
20–29	6,446,711	42,821,185	494,705	404,910	443,029	1,359,901	790,095	730,485	282,926	573,943	519,705	847,012
30–39	6,222,787	40,176,072	516,278	419,564	428,414	1,362,210	746,947	671,430	251,317	485,467	510,676	830,484
40–49	6,829,442	43,547,101	509,095	408,937	551,910	1,421,166	878,705	757,379	270,277	625,509	510,577	895,887
50–59	6,555,395	42,144,524	460,405	378,908	526,208	1,248,661	822,441	754,133	285,747	648,598	552,047	878,247
60–69	4,529,388	29,502,524	309,563	237,285	355,415	860,252	549,603	486,209	210,036	454,680	409,514	656,831
70–79	2,418,546	16,639,410	164,852	113,339	194,939	434,845	285,102	274,394	116,420	260,463	212,328	361,864
80+	1,643,191	11,282,837	121,219	74,571	162,687	243,887	197,445	207,161	68,624	202,642	152,400	212,555
Sex												
Male	23,118,500	152,107,993	1,664,544	1,391,375	1,741,464	4,742,276	2,798,368	2,635,949	1,020,992	2,124,024	1,900,216	3,099,292
Female	24,026,873	157,241,696	1,707,698	1,405,613	1,835,609	4,970,311	2,987,614	2,674,635	1,044,940	2,204,107	1,938,741	3,257,605
Ethnicity												
Hispanic	5,297,108	50,810,213	721,334	613,783	481,903	859,895	473,849	252,008	959,414	189,626	453,140	292,156
Non-Hispanic	41,848,265	258,539,476	2,650,908	2,183,205	3,095,170	8,852,692	5,312,133	5,058,576	1,106,518	4,138,505	3,385,817	6,064,741
Race												
White	35,607,846	242,295,420	1,966,031	2,413,916	2,951,850	6,156,314	3,545,775	4,627,324	1,726,766	3,748,521	3,408,941	5,062,408
Black	7,499,565	40,357,516	353,862	154,474	392,959	3,003,873	1,736,441	281,651	49,140	381,219	74,669	1,071,277
Asian/Pacific Islander	2,401,349	15,916,664	860,556	114,314	144,643	336,101	334,086	221,883	34,523	94,721	160,631	99,891
Indian/Native Alaskan	566,882	3,753,858	35,211	39,146	16,794	48,880	31,029	67,509	209,287	25,621	67,045	26,360
Multiple	1,069,731	7,026,231	156,582	75,138	70,827	167,419	138,651	112,217	46,216	78,049	127,671	96,961

*This FoodNet site includes only selected counties; California includes Alameda, San Francisco, and Contra Costa; Colorado includes Adams, Arapahoe, Denver, Douglas, Jefferson, Boulder, and Broomfield; New York includes Albany, Allegany, Cattaraugus, Chautauqua, Chemung, Clinton, Columbia, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Livingston, Monroe, Montgomery, Niagara, Ontario, Orleans, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, Steuben, Warren, Washington, Wayne, Wyoming, and Yates.

FIGURE 1. Foodborne Disease Active Surveillance (FoodNet) Sites, 2010

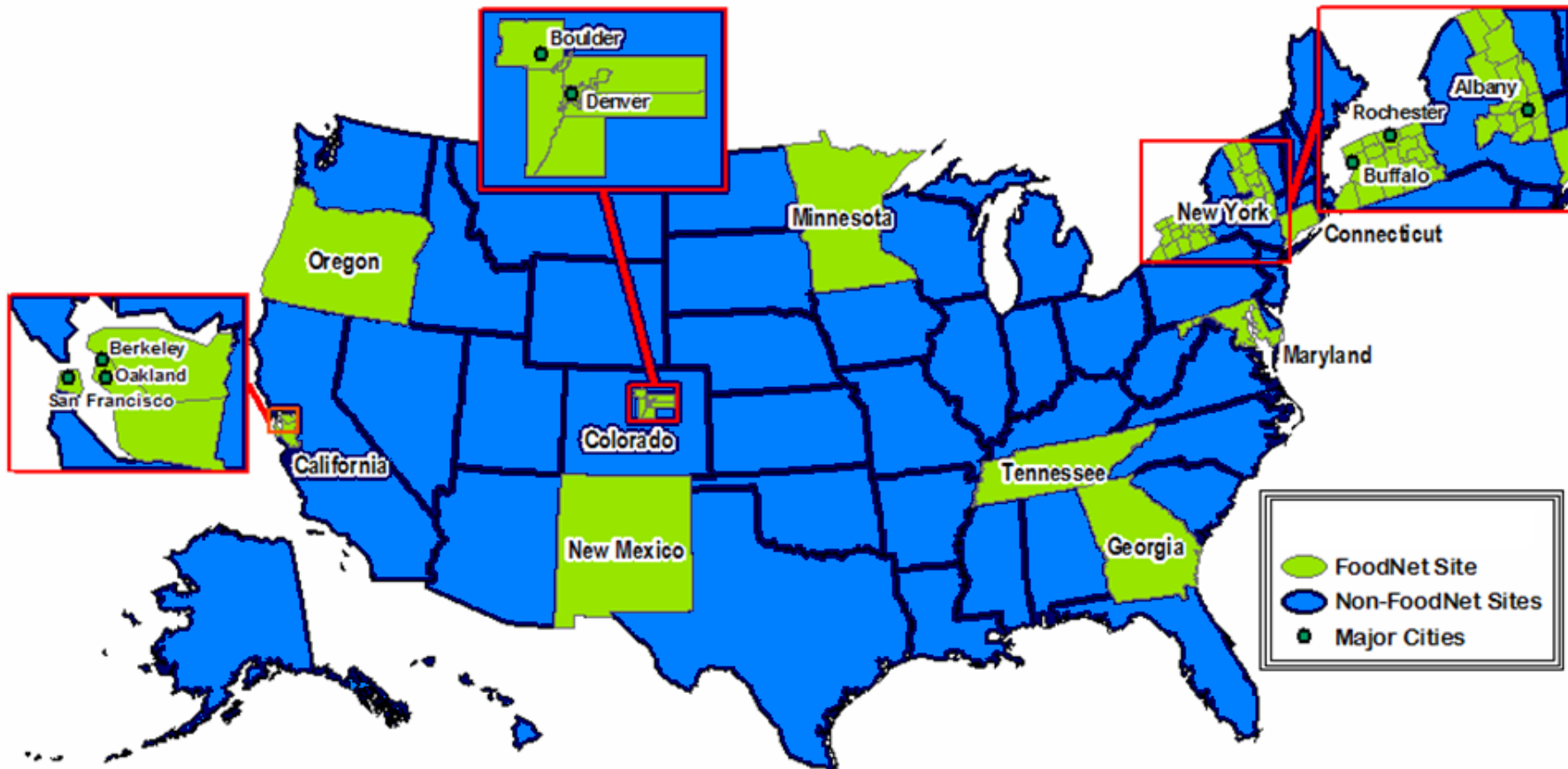


TABLE 4. Number of Laboratory-Confirmed Bacterial and Parasitic Infections, by Site and Pathogen — FoodNet, 2010

	CA*	CO*	CT	GA	MD	MN	NM	NY*	OR	TN	Total
Bacterial											
<i>Campylobacter</i>	1,096	397	532	598	504	1,007	357	642	848	391	6,372
<i>Listeria</i>	19	8	18	20	11	9	5	11	16	14	131
<i>Salmonella</i>	601	299	492	2,806	1,021	695	341	482	457	1,079	8,273
<i>Shigella</i>	156	57	68	787	112	66	158	62	53	260	1,779
STEC† O157	25	35	30	25	27	140	10	33	73	48	446
STEC NON O157	13	79	25	60	28	106	34	38	30	37	450
<i>Vibrio</i>	28	6	32	28	47	14	2	4	24	10	195
<i>Yersinia</i>	8	4	13	53	14	13	1	15	17	21	159
Parasitic											
<i>Cryptosporidium</i>	24	33	77	268	34	389	138	87	192	54	1,296
<i>Cyclospora</i>			11	10	3	1		2		1	28
Total	1,970	918	1,298	4,655	1,801	2,440	1,046	1,376	1,710	1,915	19,129

*This FoodNet site includes only selected counties; California includes Alameda, San Francisco, and Contra Costa; Colorado includes Adams, Arapahoe, Denver, Douglas, Jefferson, Boulder, and Broomfield; New York includes Albany, Allegany, Cattaraugus, Chautauqua, Chemung, Clinton, Columbia, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Livingston, Monroe, Montgomery, Niagara, Ontario, Orleans, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, Steuben, Warren, Washington, Wayne, Wyoming, and Yates.

†Shiga toxin-producing *Escherichia coli*.

TABLE 5. Incidence* of Cases of Bacterial and Parasitic Infections Compared with National Health Objectives, by Site and Pathogen — FoodNet, 2010**

	CA [†]	CO [†]	CT	GA	MD	MN	NM	NY [†]	OR	TN	Overall 2010	National 2010 health objective [§]
Bacteria												
<i>Campylobacter</i>	32.50	14.19	14.87	6.16	8.71	18.96	17.28	14.83	22.09	6.15	13.52	12.30
<i>Listeria</i>	0.56	0.29	0.50	0.21	0.19	0.17	0.24	0.25	0.42	0.22	0.28	0.24
<i>Salmonella</i>	17.82	10.69	13.75	28.89	17.65	13.09	16.51	11.14	11.90	16.97	17.55	6.28
<i>Shigella</i>	4.63	2.04	1.90	8.10	1.94	1.24	7.65	1.43	1.38	4.09	3.77	N/A [¶]
STEC [†] O157	0.74	1.25	0.84	0.26	0.47	2.64	0.48	0.76	1.90	0.76	0.95	1.00
STEC non-O157	0.39	2.82	0.70	0.62	0.48	2.00	1.65	0.88	0.78	0.58	0.95	N/A
<i>Vibrio</i>	0.83	0.21	0.89	0.29	0.81	0.26	0.10	0.09	0.63	0.16	0.41	N/A
<i>Yersinia</i>	0.24	0.14	0.36	0.55	0.24	0.24	0.05	0.35	0.44	0.33	0.34	N/A
Parasites												
<i>Cryptosporidium</i>	0.71	1.18	2.15	2.76	0.59	7.32	6.68	2.01	5.00	0.85	2.75	N/A
<i>Cyclospora</i>	0.00	0.00	0.31	0.10	0.05	0.02	0.00	0.05	0.00	0.02	0.06	N/A
Surveillance population (millions)	3.37	2.80	3.58	9.71	5.79	5.31	2.07	4.33	3.84	6.36	47.15	

*Rate per 100,000 population

**This FoodNet site includes only selected counties; California includes Alameda, San Francisco, and Contra Costa; Colorado includes Adams, Arapahoe, Denver, Douglas, Jefferson, Boulder, and Broomfield; New York includes Albany, Allegany, Cattaraugus, Chautauqua, Chemung, Clinton, Columbia, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Livingston, Monroe, Montgomery, Niagara, Ontario, Orleans, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuylar, Seneca, Steuben, Warren, Washington, Wayne, Wyoming, and Yates.

§Healthy People 2010 objectives for incidence of *Campylobacter*, *Salmonella*, and Shiga toxin-producing *Escherichia coli* O157 infections for year 2010 and for incidence of *Listeria* infections for year 2010.

¶Not applicable, because no national health objective exists regarding infection with this pathogen.

†Shiga toxin-producing *Escherichia coli*.

TABLE 6. Number and Incidence* of FoodNet Pathogens, by Age, Sex, Race and Ethnicity—2010

	<i>Campylobacter</i>		<i>Listeria</i>		<i>Salmonella</i>		<i>Shigella</i>		STEC [†] O157		STEC [†] non O157	
	#	Rate	#	Rate	#	Rate	#	Rate	#	Rate	#	Rate
Age (years)												
<1	150	25.44	9	1.53	842	142.81	32	5.43	5	0.85	22	3.73
1-4	631	25.85	0	0.00	1,391	56.99	491	20.12	102	4.18	134	5.49
5-9	329	10.67	1	0.03	668	21.67	367	11.91	77	2.50	37	1.20
10-19	635	9.94	3	0.05	775	12.13	138	2.16	68	1.06	83	1.30
20-29	918	14.24	6	0.09	811	12.58	201	3.12	58	0.90	51	0.79
30-39	813	13.06	7	0.11	740	11.89	187	3.01	27	0.43	31	0.50
40-49	839	12.29	8	0.12	801	11.73	164	2.40	24	0.35	23	0.34
50-59	904	13.79	7	0.11	836	12.75	107	1.63	26	0.40	27	0.41
60-69	639	14.11	27	0.60	688	15.19	63	1.39	24	0.53	20	0.44
70-79	317	13.11	31	1.28	438	18.11	20	0.83	23	0.95	14	0.58
80+	195	11.87	32	1.95	281	17.10	8	0.49	12	0.73	8	0.49
Unknown	2	-	0	-	2	-	1	-	0	-	0	-
Sex												
Female	2,845	11.84	70	0.29	4,375	18.21	862	3.59	229	0.95	250	1.04
Male	3,523	15.24	61	0.26	3,892	16.84	916	3.96	217	0.94	200	0.87
Unknown	4	-	0	-	6	-	1	-	0	-	0	-
Ethnicity												
Hispanic	607	11.46	16	0.30	774	14.61	278	5.25	32	0.60	69	1.30
Non-Hispanic	3,769	9.01	100	0.24	5,716	13.66	1,150	2.75	377	0.90	323	0.77
Unknown	1,996	-	15	-	1,783	-	351	-	37	-	58	-
Race												
Asian/Pacific Islander	205	8.54	9	0.37	375	15.62	40	1.67	13	0.54	9	0.37
Black	224	2.99	14	0.19	1,214	16.19	596	7.95	29	0.39	17	0.23
Indian/Native Alaskan	106	18.70	1	0.18	71	12.52	64	11.29	1	0.18	5	0.88
Multiple	32	2.99	0	0.00	63	5.89	11	1.03	3	0.28	10	0.93
Other	147	-	2	-	203	-	65	-	11	-	26	-
Unknown	1,597	-	10	-	1,134	-	285	-	23	-	56	-
White	4,061	11.40	95	0.27	5,213	14.64	718	2.02	366	1.03	327	0.92
Total	6,372	13.52	131	0.28	8,273	17.55	1,779	3.77	446	0.95	450	0.95

*Rate per 100,000 population.

†Shiga toxin-producing *Escherichia coli*.

TABLE 6a. Number and Incidence* of FoodNet Pathogens, by Age, Sex, Race, and Ethnicity—2010

	<i>Vibrio</i>		<i>Yersinia</i>		<i>Cryptosporidium</i>		<i>Cyclospora</i>	
	#	Rate	#	Rate	#	Rate	#	Rate
Age (years)								
<1	0	0.00	41	6.95	17	2.88	0	0.00
1–4	0	0.00	19	0.78	146	5.98	0	0.00
5–9	8	0.26	13	0.42	85	2.76	0	0.00
10–19	12	0.19	14	0.22	157	2.46	1	0.02
20–29	17	0.26	16	0.25	212	3.29	4	0.06
30–39	23	0.37	8	0.13	189	3.04	6	0.10
40–49	40	0.59	10	0.15	161	2.36	9	0.13
50–59	28	0.43	6	0.09	117	1.78	3	0.05
60–69	39	0.86	15	0.33	97	2.14	4	0.09
70–79	16	0.66	11	0.45	64	2.65	1	0.04
80+	12	0.73	6	0.37	51	3.10	0	0.00
Unknown	0	-	0	-	0	-	0	-
Sex								
Female	52	0.22	77	0.32	670	2.79	16	0.07
Male	143	0.62	82	0.35	626	2.71	12	0.05
Unknown	0	-	0	-	0	-	0	-
Ethnicity								
Hispanic	14	0.26	12	0.23	121	2.28	2	0.04
Non-Hispanic	156	0.37	118	0.28	955	2.28	22	0.05
Unknown	25	-	29	-	220	-	4	-
Race								
Asian/Pacific Islander	8	0.33	9	0.37	14	0.58	0	0.00
Black	18	0.24	45	0.60	133	1.77	1	0.01
Indian/Native Alaskan	1	0.18	1	0.18	19	3.35	0	0.00
Multiple	1	0.09	2	0.19	13	1.22	0	0.00
Other	0	-	1	-	15	-	0	-
Unknown	22	-	23	-	162	-	5	-
White	145	0.41	78	0.22	940	2.64	22	0.06
Total	195	0.41	159	0.34	1,296	2.75	28	0.06

*Rate per 100,000 population.

TABLE 7. Number and Incidence* of Laboratory-Confirmed *Salmonella* Infections Caused by the Top 20 *Salmonella* Serotypes, by Rank - FoodNet, 2010

Rank		<i>Salmonella</i> serotype	Number of cases	% of total <i>Salmonella</i> cases	Incidence per 100,000 persons
2005 - 2009	2010				
1	1	Enteritidis	1,663	20.1	3.5
3	2	Newport	1,087	13.1	2.3
2	3	Typhimurium**	1,012	12.2	2.1
4	4	Javiana	842	10.2	1.8
5	5	S. I 4,[5],12:i:-***	280	3.4	0.6
6	6	Heidelberg	194	2.3	0.4
8	7	Saintpaul	183	2.2	0.4
9	8	Muenchen	166	2.0	0.4
13	9	Infantis	159	1.9	0.3
7	9	Montevideo	159	1.9	0.3
20	11	S. I 13,23:b:-	141	1.7	0.3
10	12	Braenderup	121	1.5	0.3
19	13	Bareilly	95	1.1	0.2
11	14	Oranienburg	83	1.0	0.2
14	15	Agona	76	0.9	0.2
17	15	Typhi	76	0.9	0.2
15	17	Thompson	55	0.7	0.1
12	18	Mississippi	52	0.6	0.1
27	19	Berta	46	0.6	0.1
34	20	Norwich	42	0.5	0.1
Sub total			6,532	79.0	13.9
All other serotyped			1,163	14.1	2.5
Not serotyped			358	4.3	0.8
Partially serotyped			178	2.2	0.4
Rough or nonmotile			42	0.5	0.1
Total			8,273	100	17.5

*Rate per 100,000 persons

**Includes I 4,[5],12:i:- and I 4,5,12:i:-

*** Typhimurium includes var.5- (Formerly var. Copenhagen)

TABLE 8. Number and Incidence* of Laboratory-Confirmed *Shigella* Infections, by Species — FoodNet, 2010

<i>Shigella</i> species	Number of cases	% of total <i>Shigella</i> cases	Incidence per 100,000 persons
<i>S. sonnei</i>	1,368	76.9	2.90
<i>S. flexneri</i>	292	16.4	0.62
<i>S. boydii</i>	17	1.0	0.04
<i>S. dysenteriae</i>	8	0.4	0.02
Unknown	94	5.3	0.20
Total	1,779	100	3.77

*Rate per 100,000 persons

TABLE 9. Number and Incidence* of Laboratory-Confirmed *Vibrio* Infections, by Species — FoodNet, 2010

<i>Vibrio</i> species	Number of cases	% of total <i>Vibrio</i> cases	Incidence per 100,000 persons
<i>V. parahaemolyticus</i>	109	55.9	0.23
<i>V. vulnificus</i>	25	12.8	0.05
<i>V. alginolyticus</i>	19	9.7	0.04
<i>V. fluvialis</i>	19	9.7	0.04
<i>V. cholerae non-01. non-0139</i>	8	4.1	0.02
<i>V. mimicus</i>	4	2.1	0.01
<i>V. damsela</i>	2	1.0	0.00
<i>V. cholerae unspecified</i>	1	0.5	0.00
<i>V. hollisae</i>	1	0.5	0.00
Unknown	7	3.6	0.01
Total	195	100	0.41

*Rate per 100,000 persons

TABLE 10. Number and Incidence* of Laboratory-Confirmed STEC[†] non O157 Infections Caused by the Ten Most Common Serogroups of STEC — FoodNet, 2010

Rank	STEC O Antigen	% total STEC		Incidence per 100,000 persons
		Number of cases	non O157 cases	
1	O26	131	29.1	0.28
2	O103	87	19.3	0.18
3	O111	68	15.1	0.14
4	O145	21	4.7	0.04
5	O121	19	4.2	0.04
6	O45	16	3.6	0.03
7	O118	8	1.8	0.02
8	O181	3	0.7	0.01
8	O69	3	0.7	0.01
8	O8	3	0.7	0.01
8	O91	3	0.7	0.01
	Undetermined	29	6.4	
	Unknown	34	7.6	
	All other	25	5.6	
Total		450		

*Rate per 100,000 persons

[†]Shiga toxin-producing *Escherichia coli*.

Table 11. Number of Laboratory-confirmed *Campylobacter* infection by Species*, FoodNet 2010

<i>Campylobacter</i> species	Number of cases*	% of <i>Campylobacter</i> cases
<i>C. jejuni</i>	1043	88.39
<i>C. coli</i>	101	8.56
<i>C. upsaliensis</i>	7	0.59
<i>C. fetus</i>	2	0.17
<i>C. hyointestinalis</i>	2	0.17
<i>C. lari</i>	1	0.08
unknown	24	2.04
Total	1180	100

*Species information represent the subset of *Campylobacter* isolates that were speciated at CDC.

FIGURE 2. Incidence of *Campylobacter*, *Salmonella*, and *Shigella* Infections, by Age Group — FoodNet, 2010

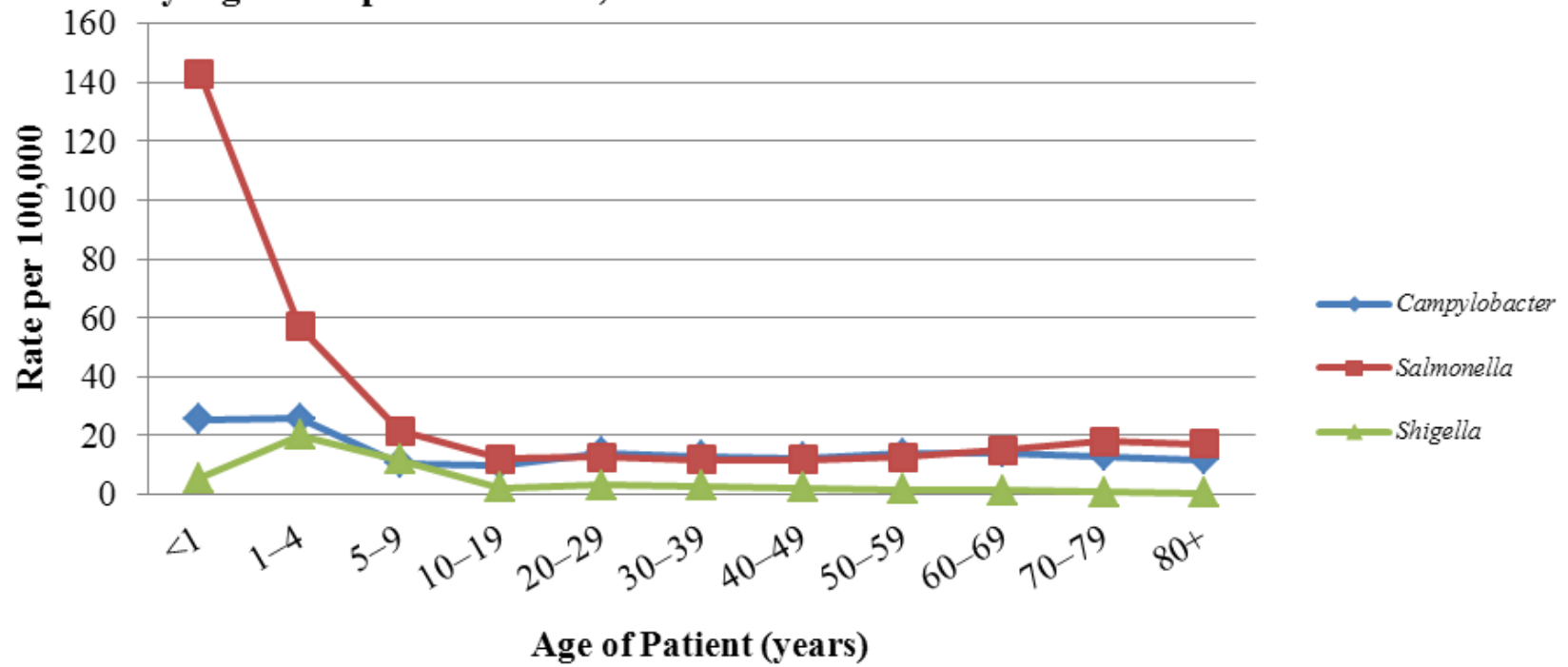


FIGURE 3. Incidence of *Cryptosporidium*, *Listeria*, and *Yersinia* Infections, by Age Group — FoodNet, 2010

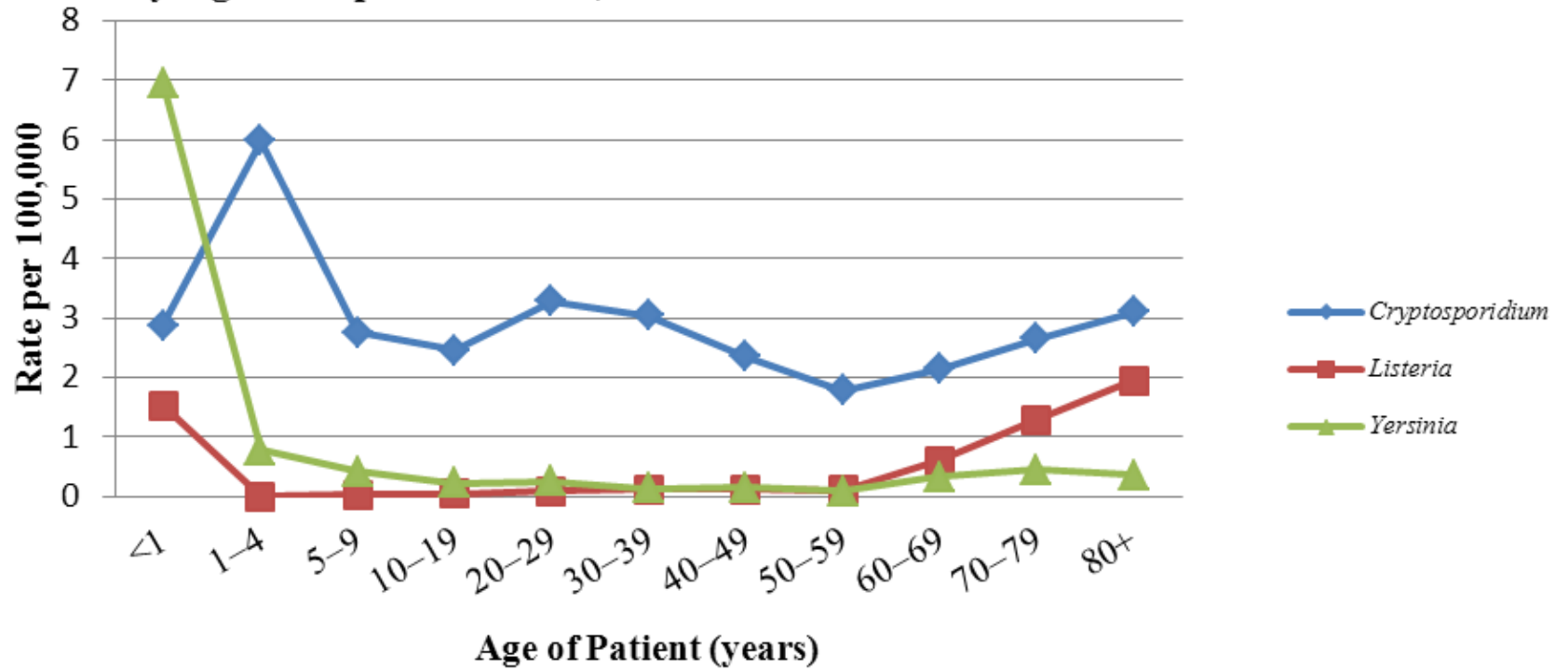
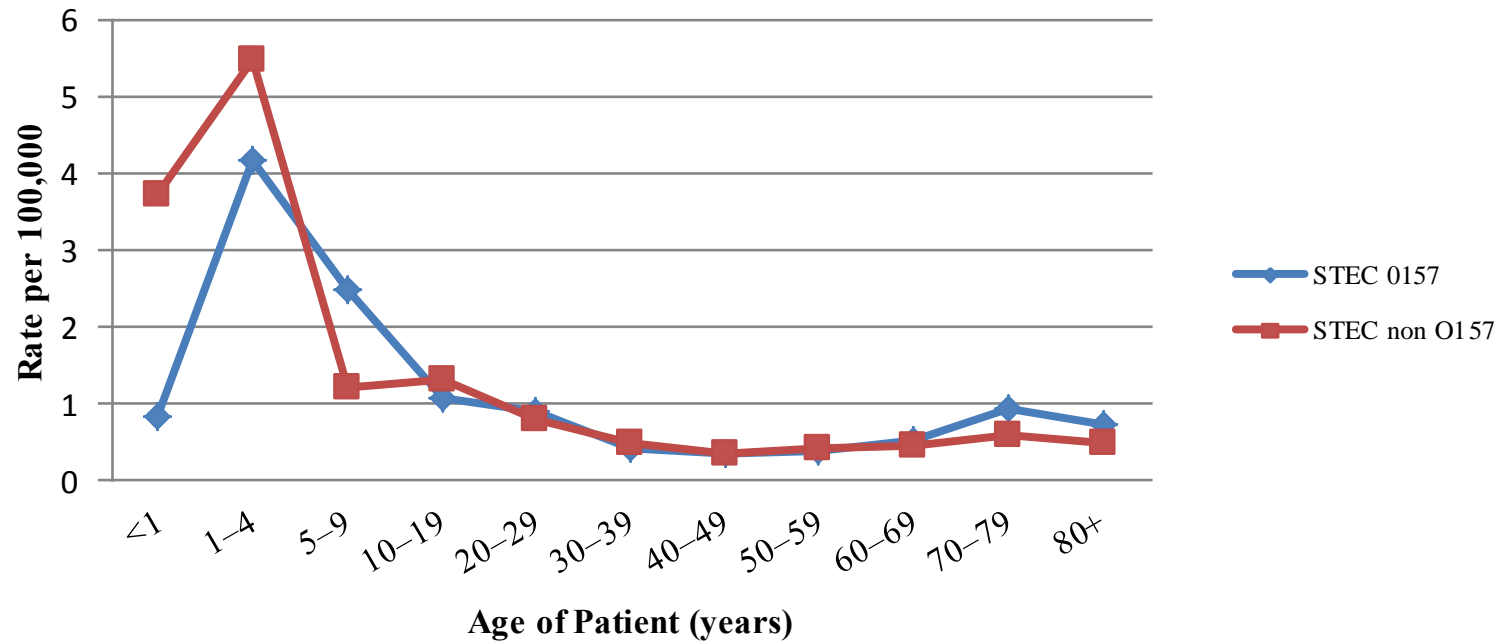


FIGURE 4. Incidence of STEC* O157 and STEC non-O157 Infections, by Age Group — FoodNet, 2010



*Shiga toxin-producing *Escherichia coli* .

TABLE 12. Number and Percentage of Hospitalizations, by Pathogen — FoodNet, 2010

	# Hospitalized	# Outpatient	# Unknown	Total # of Cases	% Hospitalized
Bacteria					
<i>Campylobacter</i>	974	4,883	515	6,372	15.3
<i>Listeria</i>	120	11	0	131	91.6
<i>Salmonella</i>	2,342	5,738	193	8,273	28.3
<i>Shigella</i>	336	1,394	49	1,779	18.9
STEC [†] O157	190	255	1	446	42.6
STEC non-O157	68	375	7	450	15.1
<i>Vibrio</i>	45	147	3	195	23.1
<i>Yersinia</i>	54	98	7	159	34.0
Parasites					
<i>Cryptosporidium</i>	241	1,039	16	1,296	18.6
<i>Cyclospora</i>	0	28	0	28	0.0
Total	4,370	13,968	791	19,129	22.8

[†]Shiga toxin-producing *Escherichia coli*.

TABLE 13. Number and Percentage of Hospitalizations, by Age Group and Pathogen — FoodNet, 2010

	<1 year				1–4 years				5–9 years			
	# Hospitalized	# Unknown	Total # of Cases	% Hospitalized	# Hospitalized	# Unknown	Total # of Cases	% Hospitalized	# Hospitalized	# Unknown	Total # of Cases	% Hospitalized
Bacteria												
<i>Campylobacter</i>	23	11	150	15.3	52	43	631	8.2	36	23	329	10.9
<i>Listeria</i>	9	0	9	100.0	0	0	0	-	1	0	1	100.0
<i>Salmonella</i>	243	15	842	28.9	247	27	1,391	17.8	114	16	668	17.1
<i>Shigella</i>	5	3	32	15.6	59	15	491	12.0	49	11	367	13.4
STEC [†] O157	0	0	5	0.0	37	0	102	36.3	33	0	77	42.9
STEC non-O157	3	0	22	13.6	9	0	134	6.7	3	0	37	8.1
<i>Vibrio</i>	0	0	0	0.0	0	0	0	-	0	1	8	0.0
<i>Yersinia</i>	15	3	41	36.6	2	0	19	10.5	4	0	13	30.8
Parasites												
<i>Cryptosporidium</i>	3	0	17	17.6	18	1	146	12.3	13	2	85	15.3
<i>Cyclospora</i>	0	0	0	0.0	0	0	0	-	0	0	0	-
Total	301	32	1,118	27.7	424	86	2,914	15.0	253	53	1,585	16.0

	10–19 years				20–29 years				30–39 years			
	# Hospitalized	# Unknown	Total # of Cases	% Hospitalized	# Hospitalized	# Unknown	Total # of Cases	% Hospitalized	# Hospitalized	# Unknown	Total # of Cases	% Hospitalized
Bacteria												
<i>Campylobacter</i>	86	43	635	13.5	99	84	918	10.8	98	82	813	12.1
<i>Listeria</i>	2	0	3		5	0	6	83.3	7	0	7	100.0
<i>Salmonella</i>	175	23	775	22.6	151	27	811	18.6	169	18	740	22.8
<i>Shigella</i>	25	3	138	18.1	55	4	201	27.4	36	6	187	19.3
STEC [†] O157	32	0	68	47.1	21	0	58	36.2	9	1	27	33.3
STEC non-O157	17	0	83	20.5	6	2	51	11.8	9	2	31	29.0
<i>Vibrio</i>	1	1	12	8.3	3	0	17	17.6	1	0	23	4.3
<i>Yersinia</i>	4	0	14	28.6	2	1	16	12.5	3	1	8	37.5
Parasites												
<i>Cryptosporidium</i>	28	2	157	17.8	37	2	212	17.5	26	2	189	13.8
<i>Cyclospora</i>	0	0	1	0.0	0	0	4	0.0	0	0	6	0.0
Total	370	72	1,886	19.6	379	120	2,294	17.4	358	112	2,031	17.6

[†]Shiga toxin-producing *Escherichia coli*.

TABLE 13a. Number and Percentage of Hospitalizations, by Age Group and Pathogen — FoodNet, 2010

	40–49 years				50–59 years				60–69 years			
	#	#	Total #	%	#	#	Total #	%	#	#	Total #	%
Bacteria	Hospitalized	Unknown	of Cases	Hospitalized	Hospitalized	Unknown	of Cases	Hospitalized	Hospitalized	Unknown	of Cases	Hospitalized
<i>Campylobacter</i>	119	77	839	14.2	130	70	904	14.4	138	44	639	21.6
<i>Listeria</i>	8	0	8	100.0	6	0	7	85.7	21	0	27	77.8
<i>Salmonella</i>	238	23	801	29.7	326	18	836	39.0	289	8	688	42.0
<i>Shigella</i>	40	6	164	24.4	30	1	107	28.0	24	0	63	38.1
STEC†O157	9	0	24	37.5	9	0	26	34.6	16	0	24	66.7
STEC non-O157	3	0	23	13.0	5	1	27	18.5	3	0	20	15.0
<i>Vibrio</i>	9	1	40	22.5	6	0	28	21.4	14	0	39	35.9
<i>Yersinia</i>	5	1	10	50.0	2	1	6	33.3	8	0	15	53.3
Parasites												
<i>Cryptosporidium</i>	37	3	161	23.0	21	0	117	17.9	19	2	97	19.6
<i>Cyclospora</i>	0	0	9	0.0	0	0	3	0.0	0	0	4	0.0
Total	468	111	2,079	22.5	535	91	2,061	26.0	532	54	1,616	32.9

	70–79 years				80+ years			
	#	#	Total #	%	#	#	Total #	%
Bacteria	Hospitalized	Unknown	of Cases	Hospitalized	Hospitalized	Unknown	of Cases	Hospitalized
<i>Campylobacter</i>	99	26	317	31.2	94	11	195	48.2
<i>Listeria</i>	29	0	31	93.5	32	0	32	100.0
<i>Salmonella</i>	220	9	438	50.2	170	9	281	60.5
<i>Shigella</i>	9	0	20	45.0	4	0	8	50.0
STEC†O157	14	0	23	60.9	10	0	12	83.3
STEC non-O157	7	1	14	50.0	3	1	8	37.5
<i>Vibrio</i>	5	0	16	31.3	6	0	12	50.0
<i>Yersinia</i>	6	0	11	54.5	3	0	6	50.0
Parasites								
<i>Cryptosporidium</i>	20	1	64	31.3	19	1	51	37.3
<i>Cyclospora</i>	0	0	1	0.0	0	0	0	-
Total	409	37	935	45.5	341	22	605	56.4

†Shiga toxin-producing *Escherichia coli*.

TABLE 14. Number and Percentage of Hospitalizations, by Site and Pathogen — FoodNet, 2010

	California*					Colorado*					Connecticut				
	# Hospitalized	# Outpatient	# Unknown	Total # of Cases	% Hospitalized	# Hospitalized	# Outpatient	# Unknown	Total # of Cases	% Hospitalized	# Hospitalized	# Outpatient	# Unknown	Total # of Cases	% Hospitalized
Bacteria															
<i>Campylobacter</i>	88	731	277	1096	8.0	63	334	0	397	15.9	82	443	7	532	15.4
<i>Listeria</i>	18	1	0	19	94.7	7	1	0	8	87.5	18	0	0	18	100.0
<i>Salmonella</i>	112	435	54	601	18.6	72	224	3	299	24.1	109	374	9	492	22.2
<i>Shigella</i>	27	120	9	156	17.3	11	46	0	57	19.3	17	50	1	68	25.0
STEC†O157	13	12	0	25	52.0	14	21	0	35	40.0	14	16	0	30	46.7
STEC non-O157	0	10	3	13	0.0	6	73	0	79	7.6	4	21	0	25	16.0
<i>Vibrio</i>	2	24	2	28	7.1	0	6	0	6	0.0	5	27	0	32	15.6
<i>Yersinia</i>	3	4	1	8	37.5	0	4	0	4	0.0	6	7	0	13	46.2
Parasites															
<i>Cryptosporidium</i>	4	17	3	24	16.7	8	24	1	33	24.2	10	66	1	77	13.0
<i>Cyclospora</i>	0	0	0	0		0	0	0	0		0	11	0	11	0.0
Total	267	1,354	349	1,970	13.6	181	733	4	918	19.7	265	1,015	18	1,298	20.4

	Georgia					Maryland				
	# Hospitalized	# Outpatient	# Unknown	Total # of Cases	% Hospitalized	# Hospitalized	# Outpatient	# Unknown	Total # of Cases	% Hospitalized
Bacteria										
<i>Campylobacter</i>	141	455	2	598	23.6	89	387	28	504	17.7
<i>Listeria</i>	19	1	0	20	95.0	10	1	0	11	90.9
<i>Salmonella</i>	841	1937	28	2806	30.0	338	654	29	1021	33.1
<i>Shigella</i>	146	637	4	787	18.6	24	85	3	112	21.4
STEC†O157	4	21	0	25	16.0	13	14	0	27	48.1
STEC non-O157	6	53	1	60	10.0	2	26	0	28	7.1
<i>Vibrio</i>	11	17	0	28	39.3	17	30	0	47	36.2
<i>Yersinia</i>	18	35	0	53	34.0	6	7	1	14	42.9
Parasites										
<i>Cryptosporidium</i>	91	175	2	268	34.0	14	20	0	34	41.2
<i>Cyclospora</i>	0	10	0	10	0.0	0	3	0	3	0.0
Total	1,277	3,341	37	4,655	27.4	513	1,227	61	1,801	28.5

*This FoodNet site includes only selected counties; California includes Alameda, San Francisco, and Contra Costa; Colorado includes Adams, Arapahoe, Denver, Douglas, Jefferson, Boulder, and Broomfield.

†Shiga toxin-producing *Escherichia coli*.

TABLE 14a. Number and Percentage* of Hospitalizations, by Site and Pathogen — FoodNet, 2010

	Minnesota					New Mexico					New York*				
	# Hospitalized	# Outpatient	# Unknown	Total # of Cases	% Hospitalized	# Hospitalized	# Outpatient	# Unknown	Total # of Cases	% Hospitalized	# Hospitalized	# Outpatient	# Unknown	Total # of Cases	% Hospitalized
Bacteria															
<i>Campylobacter</i>	152	855	0	1007	15.1	84	270	3	357	23.5	119	513	10	642	18.5
<i>Listeria</i>	7	2	0	9	77.8	4	1	0	5	80.0	11	0	0	11	100.0
<i>Salmonella</i>	176	518	1	695	25.3	99	236	6	341	29.0	138	343	1	482	28.6
<i>Shigella</i>	9	57	0	66	13.6	27	131	0	158	17.1	17	45	0	62	27.4
STEC [†] O157	62	78	0	140	44.3	2	8	0	10	20.0	18	15	0	33	54.5
STEC non-O157	25	81	0	106	23.6	4	30	0	34	11.8	10	27	1	38	26.3
<i>Vibrio</i>	4	10	0	14	28.6	1	1	0	2	50.0	0	4	0	4	0.0
<i>Yersinia</i>	3	10	0	13	23.1	0	1	0	1	0.0	6	9	0	15	40.0
Parasites															
<i>Cryptosporidium</i>	49	340	0	389	12.6	18	120	0	138	13.0	18	68	1	87	20.7
<i>Cyclospora</i>	0	1	0	1	0.0	0	0	0	0	-	0	2	0	2	-
Total	487	1,952	1	2,440	20.0	239	798	9	1,046	22.8	337	1,026	13	1,376	24.5

	Oregon					Tennessee				
	# Hospitalized	# Outpatient	# Unknown	Total # of Cases	% Hospitalized	# Hospitalized	# Outpatient	# Unknown	Total # of Cases	% Hospitalized
Bacteria										
<i>Campylobacter</i>	76	597	175	848	9.0	80	298	13	391	20.5
<i>Listeria</i>	16	0	0	16	100.0	10	4	0	14	71.4
<i>Salmonella</i>	98	358	1	457	21.4	359	659	61	1079	33.3
<i>Shigella</i>	13	40	0	53	24.5	45	183	32	260	17.3
STEC [†] O157	25	48	0	73	34.2	25	22	1	48	52.1
STEC non-O157	3	27	0	30	10.0	8	27	2	37	21.6
<i>Vibrio</i>	2	22	0	24	8.3	3	6	1	10	30.0
<i>Yersinia</i>	3	13	1	17	17.6	9	8	4	21	42.9
Parasites										
<i>Cryptosporidium</i>	13	175	4	192	6.8	16	34	4	54	29.6
<i>Cyclospora</i>	0	0	0	0	-	0	1	0	1	0.0
Total	249	1,280	181	1,710	14.6	555	1,242	118	1,915	29.0

*This FoodNet site includes only the Greene, Hamilton, Livingston, Monroe, Montgomery, Niagara, Ontario, Orleans, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, Steuben, Warren, Washington, Wayne, Wyoming, and Yates.

[†]Shiga toxin-producing *Escherichia coli*.

TABLE 15. Number of Deaths and Case Fatality Rate (CFR), by Pathogen — FoodNet, 2010

	# Deaths	# Unknown	Total # of Cases	CFR
Bacteria				
<i>Campylobacter</i>	6	679	6,372	0.09
<i>Listeria</i>	15	0	131	11.45
<i>Salmonella</i>	30	316	8,273	0.36
<i>Shigella</i>	0	125	1,779	0.00
STEC [†] O157	2	3	446	0.45
STEC non-O157	0	5	450	0.00
<i>Vibrio</i>	5	4	195	2.56
<i>Yersinia</i>	1	14	159	0.63
Parasites				
<i>Cryptosporidium</i>	5	45	1,296	0.39
<i>Cyclospora</i>	0	1	28	0.00
Total	64	1,192	19,129	0.33

[†]Shiga toxin-producing *Escherichia coli*.

TABLE 16. Number of Deaths and Case Fatality Rate (CFR), by Age Group and Pathogen — FoodNet, 2010

	<1 years				1–4 years				5–9 years			
	# Deaths	# Unknown	Total # of Cases	CFR	# Deaths	# Unknown	Total # of Cases	CFR	# Deaths	# Unknown	Total # of Cases	CFR
Bacteria												
<i>Campylobacter</i>	0	14	150	0.00	1	73	631	0.16	0	34	329	0.00
<i>Listeria</i>	0	0	9	0.00	0	0	0	-	0	0	1	0.00
<i>Salmonella</i>	1	32	842	0.12	1	66	1391	0.07	0	41	668	0.00
<i>Shigella</i>	0	1	32	0.00	0	30	491	0.00	0	21	367	0.00
STEC [†] O157	0	0	5	0.00	0	0	102	0.00	0	0	77	0.00
STEC non-O157	0	0	22	0.00	0	1	134	0.00	0	1	37	0.00
<i>Vibrio</i>	0	0	0	-	0	0	0	-	0	0	8	0.00
<i>Yersinia</i>	0	9	41	0.00	0	2	19	0.00	0	0	13	0.00
Parasites												
<i>Cryptosporidium</i>	0	0	17	0.00	0	2	146	0.00	0	1	85	0.00
<i>Cyclospora</i>	0	0	0	-	0	0	0	-	0	0	0	-
Total	1	56	1,118	0.09	2	174	2,914	0.07	0	98	1,585	0.00

	10–19 years				20–29 years				30–39 years			
	# Deaths	# Unknown	Total # of Cases	CFR	# Deaths	# Unknown	Total # of Cases	CFR	# Deaths	# Unknown	Total # of Cases	CFR
Bacteria												
<i>Campylobacter</i>	0	63	635	0.00	0	112	918	0.00	0	110	813	0.00
<i>Listeria</i>	0	0	3	-	0	0	6	0.00	1	0	7	14.29
<i>Salmonella</i>	2	30	775	0.26	0	36	811	0.00	0	27	740	0.00
<i>Shigella</i>	0	9	138	0.00	0	20	201	0.00	0	21	187	0.00
STEC [†] O157	0	1	68	0.00	0	0	58	0.00	0	2	27	0.00
STEC non-O157	0	0	83	0.00	0	1	51	0.00	0	2	31	0.00
<i>Vibrio</i>	0	1	12	0.00	0	0	17	0.00	0	1	23	0.00
<i>Yersinia</i>	0	0	14	0.00	0	0	16	0.00	0	1	8	0.00
Parasites												
<i>Cryptosporidium</i>	0	2	157	0.00	1	13	212	0.47	1	11	189	0.53
<i>Cyclospora</i>	0	1	1	0.00	0	0	4	0.00	0	0	6	0.00
Total	2	107	1,886	0.11	1	182	2,294	0.04	2	175	2,031	0.10

[†]Shiga toxin-producing *Escherichia coli*.

TABLE 16a. Number of Deaths and Case Fatality Rate, by Age Group and Pathogen — FoodNet, 2010

	40–49 years				50–59 years				60–69 years			
	# Deaths	# Unknown	Total # of Cases	CFR	# Deaths	# Unknown	Total # of Cases	CFR	# Deaths	# Unknown	Total # of Cases	CFR
Bacteria												
<i>Campylobacter</i>	0	87	839	0.00	1	79	904	0.11	1	62	639	0.16
<i>Listeria</i>	1	0	8	12.50	1	0	7	14.29	5	0	27	18.52
<i>Salmonella</i>	2	30	801	0.25	3	24	836	0.36	8	15	688	1.16
<i>Shigella</i>	0	17	164	0.00	0	5	107	0.00	0	0	63	0.00
STEC†O157	0	0	24	0.00	0	0	26	0.00	1	0	24	4.17
STEC non-O157	0	0	23	0.00	0	0	27	0.00	0	0	20	0.00
<i>Vibrio</i>	0	1	40	0.00	2	1	28	7.14	2	0	39	5.13
<i>Yersinia</i>	0	1	10	0.00	0	1	6	0.00	1	0	15	6.67
Parasites												
<i>Cryptosporidium</i>	2	8	161	1.24	1	1	117	0.85	0	6	97	0.00
<i>Cyclospora</i>	0	0	9	0.00	0	0	3	0.00	0	0	4	0.00
Total	5	144	2,079	0.24	8	111	2,061	0.39	18	83	1,616	1.11

	70–79 years				80+ years			
	# Deaths	# Unknown	Total # of Cases	CFR	# Deaths	# Unknown	Total # of Cases	CFR
Bacteria								
<i>Campylobacter</i>	2	32	317	0.63	1	12	195	0.51
<i>Listeria</i>	4	0	31	12.90	3	0	32	9.38
<i>Salmonella</i>	3	7	438	0.68	10	8	281	3.56
<i>Shigella</i>	0	0	20	0.00	0	1	8	0.00
STEC†O157	1	0	23	4.35	0	0	12	0.00
STEC non-O157	0	0	14	0.00	0	0	8	0.00
<i>Vibrio</i>	0	0	16	0.00	1	0	12	8.33
<i>Yersinia</i>	0	0	11	0.00	0	0	6	0.00
Parasites								
<i>Cryptosporidium</i>	0	0	64	0.00	0	1	51	0.00
<i>Cyclospora</i>	0	0	1	0.00	0	0	0	-
Total	10	39	935	1.07	15	22	605	2.48

†Shiga toxin-producing *Escherichia coli*.

TABLE 17. Number of Deaths and Case Fatality Rate (CFR), by Site and Pathogen — FoodNet, 2010

	California*				Colorado*				Connecticut				Georgia				Maryland			
	#	#	Total #	CFR	#	#	Total #	CFR	#	#	Total #	CFR	#	#	Total #	CFR	#	#	Total #	CFR
Bacteria	Deaths	Unknown	of Cases	CFR	Deaths	Unknown	of Cases	CFR	Deaths	Unknown	of Cases	CFR	Deaths	Unknown	of Cases	CFR	Deaths	Unknown	of Cases	CFR
<i>Campylobacter</i>	0	581	1096	0.00	0	0	397	0.00	0	2	532	0.00	2	63	598	0.33	3	19	504	0.60
<i>Listeria</i>	2	0	19	10.53	0	0	8	0.00	1	0	18	5.56	1	0	20	5.00	2	0	11	18.18
<i>Salmonella</i>	4	69	601	0.67	2	0	299	0.67	0	5	492	0.00	7	176	2,806	0.25	7	30	1021	0.69
<i>Shigella</i>	0	27	156	0.00	0	0	57	0.00	0	0	68	0.00	0	89	787	0.00	0	6	112	0.00
STEC†O157	0	0	25	0.00	0	0	35	0.00	0	0	30	0.00	0	2	25	0.00	0	0	27	0.00
STEC non-O157	0	1	13	0.00	0	0	79	0.00	0	0	25	0.00	0	2	60	0.00	0	1	28	0.00
<i>Vibrio</i>	0	2	28	0.00	0	0	6	0.00	0	0	32	0.00	2	2	28	7.14	0	0	47	0.00
<i>Yersinia</i>	0	1	8	0.00	0	0	4	0.00	0	0	13	0.00	0	10	53	0.00	1	1	14	7.14
Parasites																				
<i>Cryptosporidium</i>	1	8	24	4.17	0	0	33	0.00	0	1	77	0.00	2	32	268	0.75	0	1	34	0.00
<i>Cyclospora</i>	0	0	0	-	0	0	0	-	0	0	11	0.00	0	0	10	0.00	0	1	3	0.00
Total	7	689	1,970	0.36	2	0	918	0.22	1	8	1,298	0.08	14	376	4,655	0.30	13	59	1,801	0.72

	Minnesota				New Mexico				New York*				Oregon				Tennessee			
	#	#	Total #	CFR	#	#	Total #	CFR	#	#	Total #	CFR	#	#	Total #	CFR	#	#	Total #	CFR
Bacteria	Deaths	Unknown	of Cases	CFR	Deaths	Unknown	of Cases	CFR	Deaths	Unknown	of Cases	CFR	Deaths	Unknown	of Cases	CFR	Deaths	Unknown	of Cases	CFR
<i>Campylobacter</i>	0	0	1007	0.00	0	2	357	0.00	1	0	642	0.16	0	0	848	0.00	0	12	391	0.00
<i>Listeria</i>	1	0	9	11.11	3	0	5	0.16	1	0	11	9.09	1	0	16	6.25	3	0	14	21.43
<i>Salmonella</i>	4	0	695	0.58	0	3	341	0.00	1	0	482	0.21	2	0	457	0.44	3	33	1079	0.28
<i>Shigella</i>	0	0	66	0.00	0	0	158	0.00	0	0	62	0.00	0	0	53	0.00	0	3	260	0.00
STEC†O157	1	0	140	0.71	0	0	10	0.00	0	0	33	0.00	1	0	73	1.37	0	1	48	0.00
STEC non-O157	0	0	106	0.00	0	0	34	0.00	0	0	38	0.00	0	0	30	0.00	0	1	37	0.00
<i>Vibrio</i>	1	0	14	7.14	0	0	2	0.00	0	0	4	0.00	0	0	24	0.00	2	0	10	20.00
<i>Yersinia</i>	0	0	13	0.00	0	0	1	0.00	0	0	15	0.00	0	0	17	0.00	0	2	21	0.00
Parasites																				
<i>Cryptosporidium</i>	1	0	389	0.26	0	0	138	0.00	0	0	87	0.00	1	0	192	0.52	0	3	54	0.00
<i>Cyclospora</i>	0	0	1	0.00	0	0	0	-	0	0	2	-	0	0	0	-	0	0	1	0.00
Total	8	0	2,440	0.33	3	5	1,046	0.29	3	0	1,376	0.22	5	0	1,710	0.29	8	55	1,915	0.42

*This FoodNet site includes only selected counties; California includes Alameda, San Francisco, and Contra Costa; Colorado includes Adams, Arapahoe, Denver, Douglas, Jefferson, Boulder, and Broomfield; New York includes Albany, Allegany, Cattaraugus, Chautauqua, Chemung, Clinton, Columbia, Delaware, Erie, Essex, Franklin, Fulton, Genesee, Greene, Hamilton, Livingston, Monroe, Montgomery, Niagara, Ontario, Orleans, Otsego, Rensselaer, Saratoga, Schenectady, Schoharie, Schuyler, Seneca, Steuben, Warren, Washington, Wayne, Wyoming, and Yates.

†Shiga toxin-producing *Escherichia coli*

TABLE 18. Outbreak-related Cases, by Pathogen — FoodNet, 2010

	Total number of cases reported	Outbreak-related cases		Foodborne		Waterborne		Animal contact		Person-to-person		Environmental contamination other than food/water		Indeterminate/Other/Unknown	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%
Bacteria															
<i>Campylobacter</i>	6,372	26	0.4	17	65.4	0	0.0	0	0.0	0	0.0	0	0.0	9	34.6
<i>Listeria</i>	131	3	2.3	3	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
<i>Salmonella</i>	8,273	418	5.1	289	69.1	0	0.0	22	5.3	21	5.0	22	5.3	64	15.3
<i>Shigella</i>	1,779	79	4.4	10	12.7	0	0.0	0	0.0	46	58.2	0	0.0	23	29.1
STEC [†] O157	446	84	18.8	46	54.8	4	4.8	2	2.4	0	0.0	0	0.0	32	38.1
STEC non-O157	450	48	10.7	8	16.7	0	0.0	0	0.0	29	60.4	0	0.0	11	22.9
<i>Vibrio</i>	195	4	2.1	4	0.00	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
<i>Yersinia</i>	159	0	0.0	0	0.00	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Parasites														0	0.0
<i>Cryptosporidium</i>	1,296	30	2.3	10	33.3	8	26.7	0	0.0	0	0.0	0	0.0	12	40.0
<i>Cyclospora</i>	28	0	0.0	0	-	0	-	0	-	0	-	0	-	0	0.0
Total	19,129	692	3.6	387	55.9	12	1.7	24	3.5	96	13.9	22	3.2	151	21.8

[†]Shiga toxin-producing *Escherichia coli*.

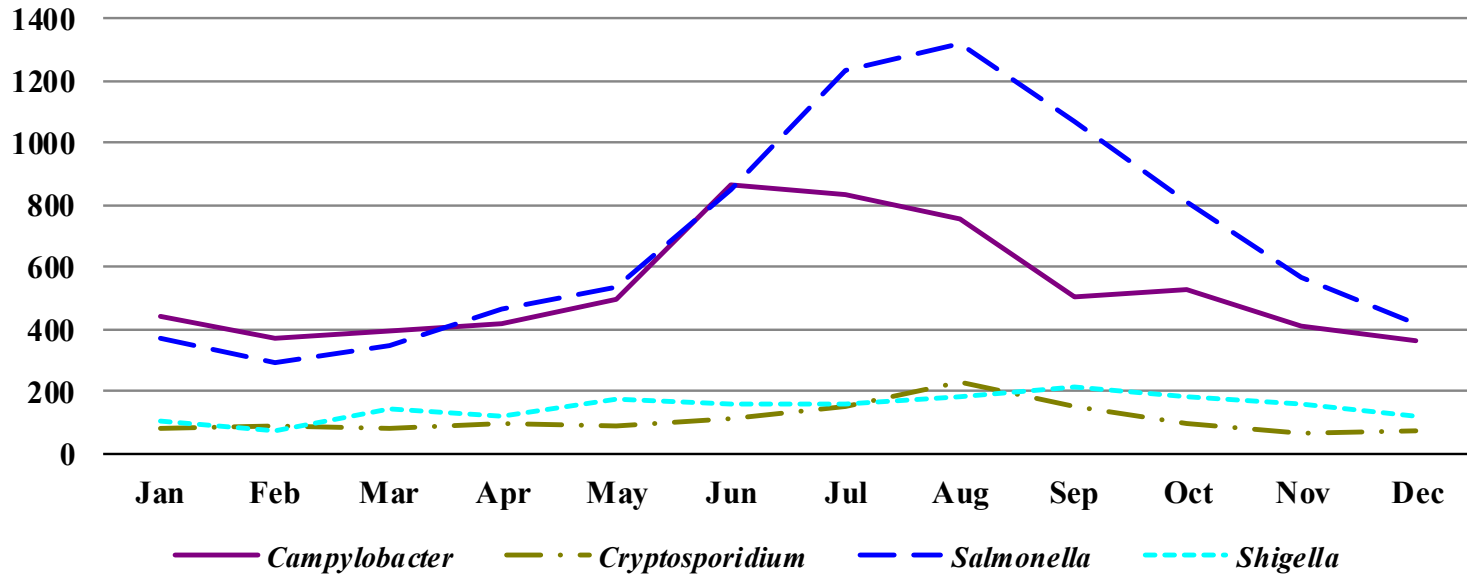
TABLE 19. Frequency of International Travel, by Pathogen — FoodNet, 2010

	Total cases reported #	Total cases with known travel information		Traveled		Did not travel		Unknown if traveled	
		#	%	#	%*	#	%*	#	%
Bacteria									
<i>Campylobacter</i>	6,372	4,060	63.7	697	17.2	3,363	82.8	2,312	36.3
<i>Listeria</i>	131	112	85.5	4	3.6	108	96.4	19	14.5
<i>Salmonella</i>	8,273	6,058	73.2	526	8.7	5,532	91.3	2,215	26.8
<i>Shigella</i>	1,779	1,210	68.0	166	13.7	1,044	86.3	569	32.0
STEC [†] O157	446	422	94.6	10	2.4	412	97.6	24	5.4
STEC non-O157	450	410	91.1	43	10.5	367	89.5	40	8.9
<i>Vibrio</i>	195	122	62.6	12	9.8	110	90.2	73	37.4
<i>Yersinia</i>	159	120	75.5	5	4.2	115	95.8	39	24.5
Parasites									
<i>Cryptosporidium</i>	1,296	998	77.0	90	9.0	908	91.0	298	23.0
<i>Cyclospora</i>	28	22	78.6	10	45.5	12	54.5	6	21.4
Total	19,129	13,534	70.8	1,563	11.5	11,971	88.5	5,595	29.2

*Among cases with known travel status.

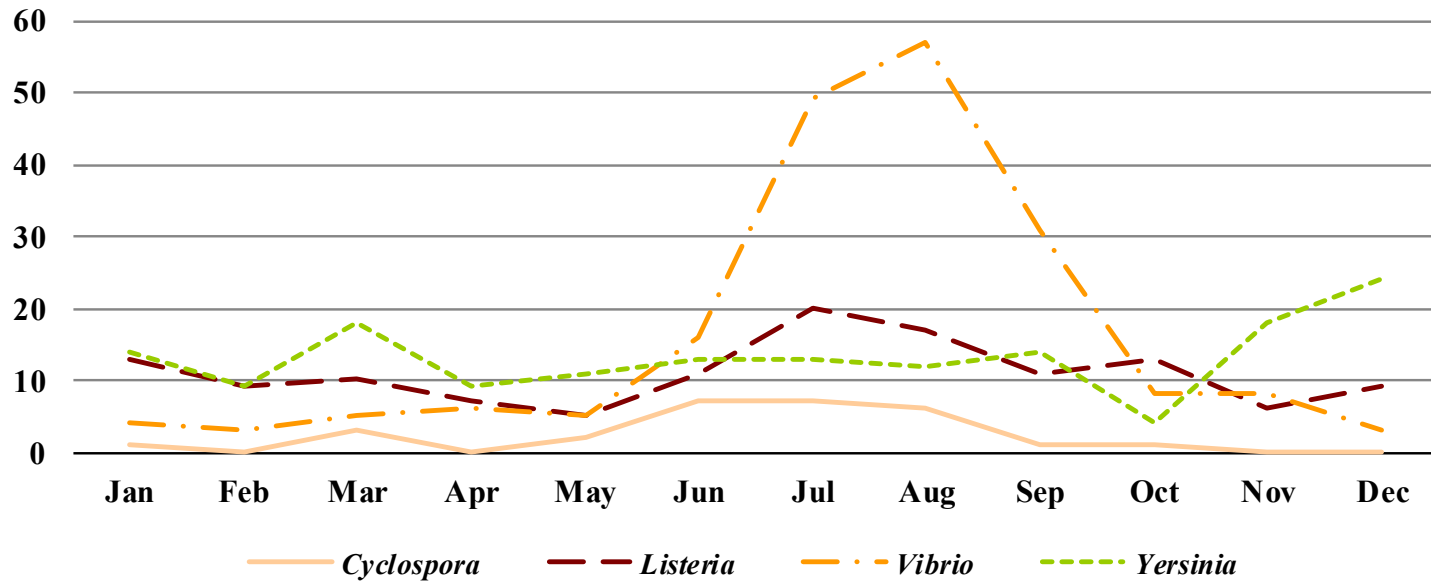
[†]Shiga toxin-producing *Escherichia coli*.

FIGURE 5. Seasonality of *Campylobacter*, *Cryptosporidium*, *Salmonella*, and *Shigella* Infections — FoodNet, 2010



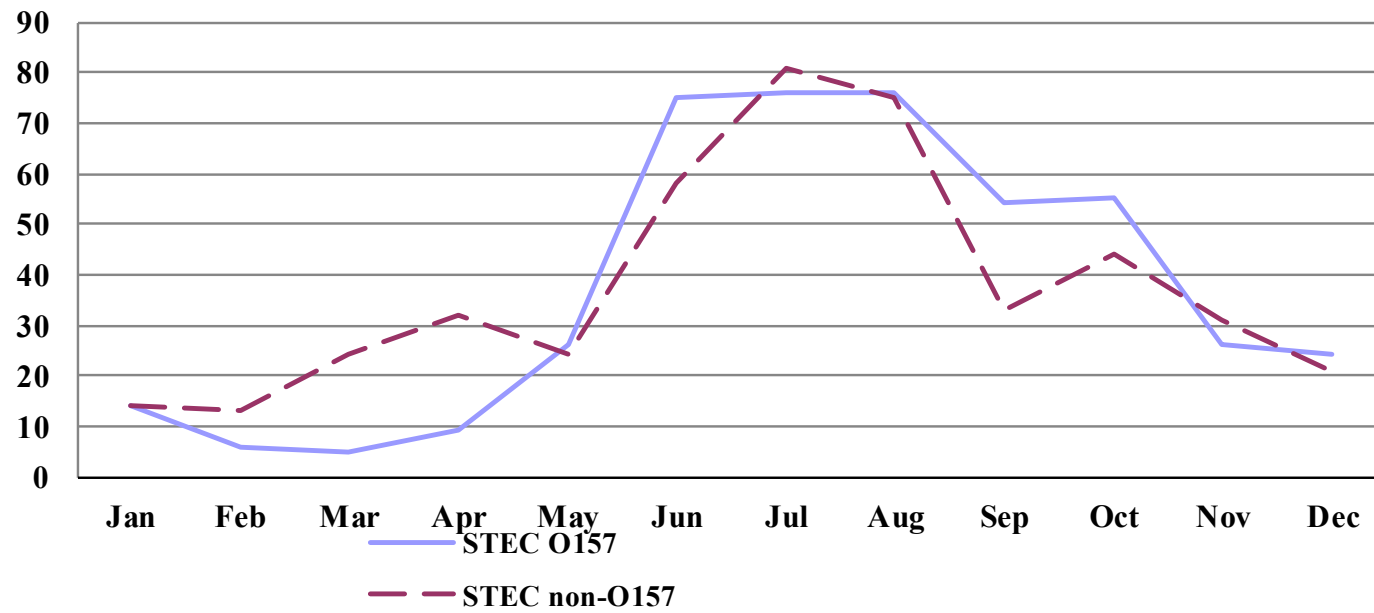
Pathogen	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Campylobacter</i>	443	367	395	420	497	862	833	751	503	524	411	366
<i>Cryptosporidium</i>	78	84	81	96	87	107	152	231	147	94	65	74
<i>Salmonella</i>	370	289	347	466	533	853	1,233	1,324	1,072	806	566	414
<i>Shigella</i>	105	71	141	120	172	155	159	183	213	180	160	120

FIGURE 6. Seasonality of *Cyclospora*, *Listeria*, *Vibrio*, and *Yersinia* Infections — FoodNet, 2010



Pathogen	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<i>Cyclospora</i>	1	0	3	0	2	7	7	6	1	1	0	0
<i>Listeria</i>	13	9	10	7	5	11	20	17	11	13	6	9
<i>Vibrio</i>	4	3	5	6	5	16	49	57	31	8	8	3
<i>Yersinia</i>	14	9	18	9	11	13	13	12	14	4	18	24

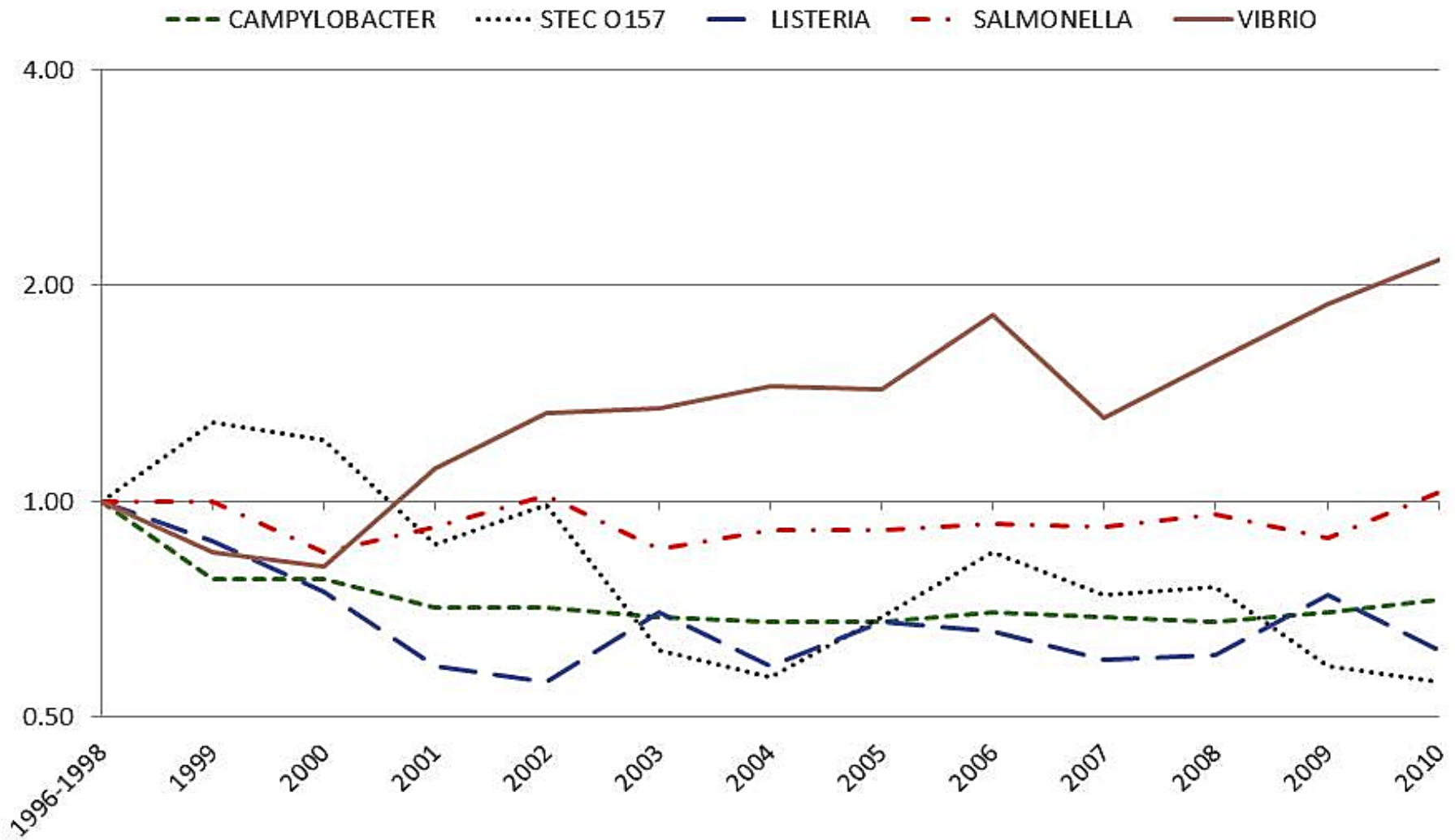
**FIGURE 7. Seasonality of STEC* O157 and STEC non-O157 Infections —
FoodNet, 2010**



* Shiga toxin-producing *Escherichia coli*.

Pathogen	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
STEC O157	14	6	5	9	26	75	76	76	54	55	26	24
STEC non-O157	14	13	24	32	24	58	81	75	33	44	31	21

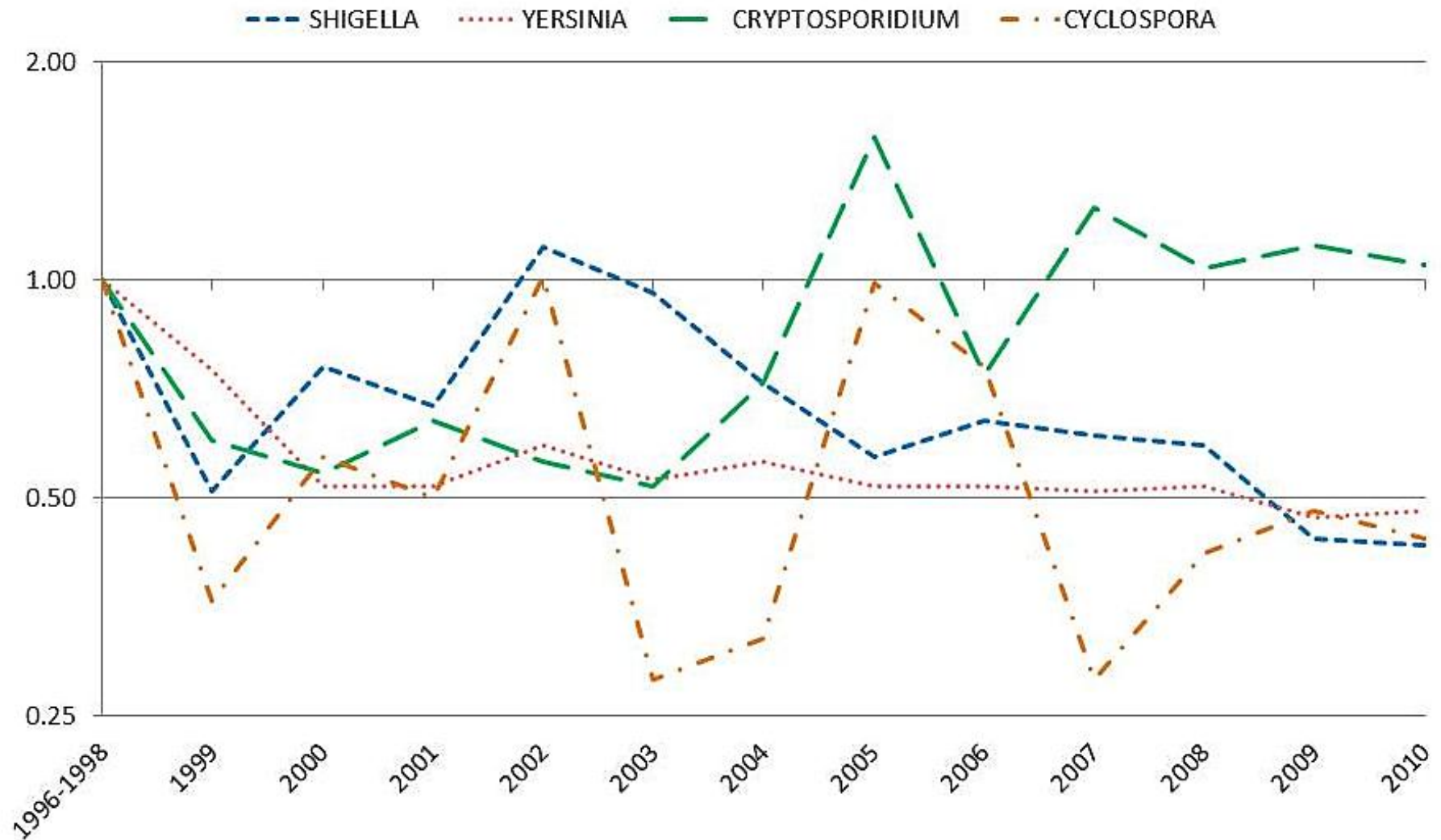
FIGURE 8. Relative Rates of Laboratory-confirmed Infections with *Campylobacter*, STEC* O157, *Listeria*, *Salmonella*, and *Vibrio* Compared with 1996-1998 Rates, by Year, FoodNet 1996-2010[†]



* Shiga toxin-producing *Escherichia coli*.

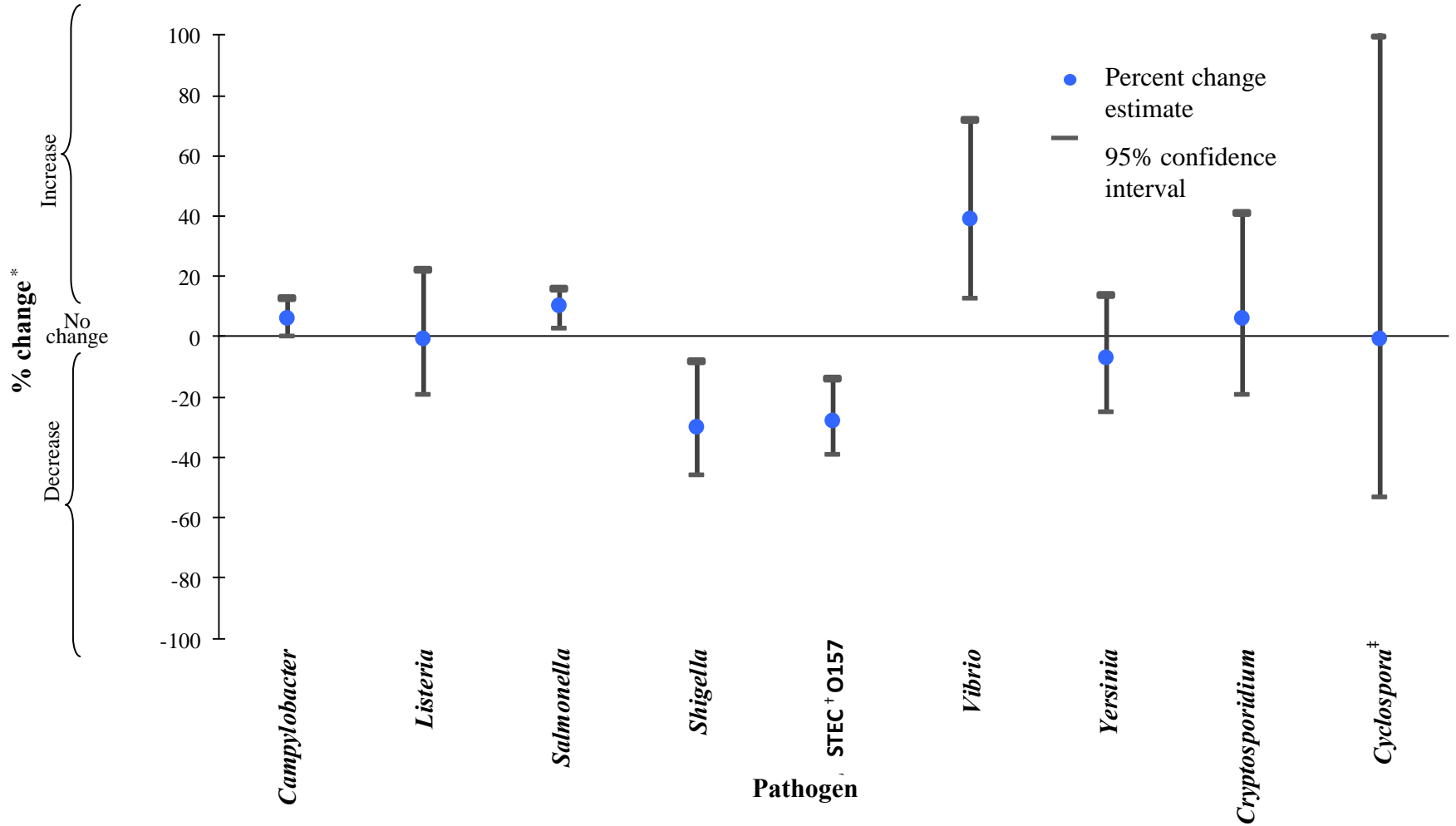
[†] The position of each line indicates the relative change in the incidence of that pathogen compared with 1996-1998. The actual incidences of these infections cannot be determined from this graph.

FIGURE 9. Relative Rates of Laboratory-confirmed Infections with *Shigella*, *Yersinia*, *Cryptosporidium*, and *Cyclospora* Compared with 1996-1998 Rates, by Year, FoodNet 1996-2010*



*The position of each line indicates the relative change in the incidence of that pathogen compared with 1996-1998. The actual incidences of these infections cannot be determined from this graph.

FIGURE 10. Percent Change in Incidence of Laboratory-Confirmed Bacterial and Parasitic Infections in 2010 Compared with Average Annual Incidence during 2006-2008, by Pathogen, FoodNet



*No significant change = 95% confidence interval is both above and below the no change line; significant increase = estimate and entire 95% confidence interval are above the no change line; significant decrease = estimate and entire 95% confidence interval are below the no change line.

† Shiga toxin-producing *Escherichia coli*.

‡ 95% confidence interval upper limit exceeds 100%

Table 20. Summary of Post-diarrheal Hemolytic Uremic Syndrome (HUS) Cases, All Ages — FoodNet, 1997-2009

	Number of Post-diarrheal HUS Cases	Median Age (range)	Number (%) Female	Median Days (range) of Hospitalization	Number (%) of Deaths	Number (%) of Cases occurring June-September
1997-2008	891	4.4 (0–89)	515 (58%)	12.0 (0–152)	50 (6%)	527 (59%)
2009	86	5.4 (0–74)	51 (59%)	11.0 (1–68)	2 (2%)	42 (49%)

Table 21. Results of Microbiologic Testing for Shiga Toxin-producing *Escherichia coli* (STEC) Infection among Post-diarrheal HUS Case-patients, 1997–2009

	1997-2008		2009	
	No. (%)	Total	No. (%)	Total
Diarrhea in 3 weeks before HUS diagnosis / Total patients	891 (88%)	1009	86 (88%)	98
Stool specimen obtained/ Total patients with diarrhea	850 (95%)	891	81 (94%)	86
Stool tested for Shiga toxin/ Patients with stool specimen obtained	397 (47%)	850	57 (70%)	81
Stool cultured for <i>E. coli</i> O157/ Patients with stool specimens obtained	805 (95%)	850	75 (93%)	81
<i>E. coli</i> O157 isolated from stool/ Patients with stool cultured for <i>E. coli</i> O157	458 (57%)	805	46 (61%)	75
Isolation of non-O157 STEC/ Patients with stool culture evaluated for non-O157 STEC and no evidence of <i>E. coli</i> O157	15 (36%)	42	3 (30%)	10
Serum positive for antibodies against <i>E. coli</i> / Patients with serum tested for antibodies against <i>E. coli</i> † and no evidence of STEC in stool	73* (20%)	361	11‡ (31%)	36
Stool positive for Shiga toxin/ Patients with stool tested for Shiga toxin and no evidence of STEC in stool	12 (13%)	96	1 (13%)	8
Total with evidence of STEC/Diarrhea in 3 weeks before HUS diagnosis	558 (63%)	891	61 (71%)	86

†Information on serum specimens was not collected before 2000

*Of the 73 positive serum samples 68 had antibodies against *E. coli* O157 lipopolysacchride (LPS); three had antibodies against *E. coli* O111 LPS; 2 Unknown

‡All 11 positive serum samples had antiobodies against *E. coli* O157 LPS

Table 22. Number and Incidence Rate* of Post-diarrheal Pediatric HUS cases[†], by Site and Age Group, 1997–2009

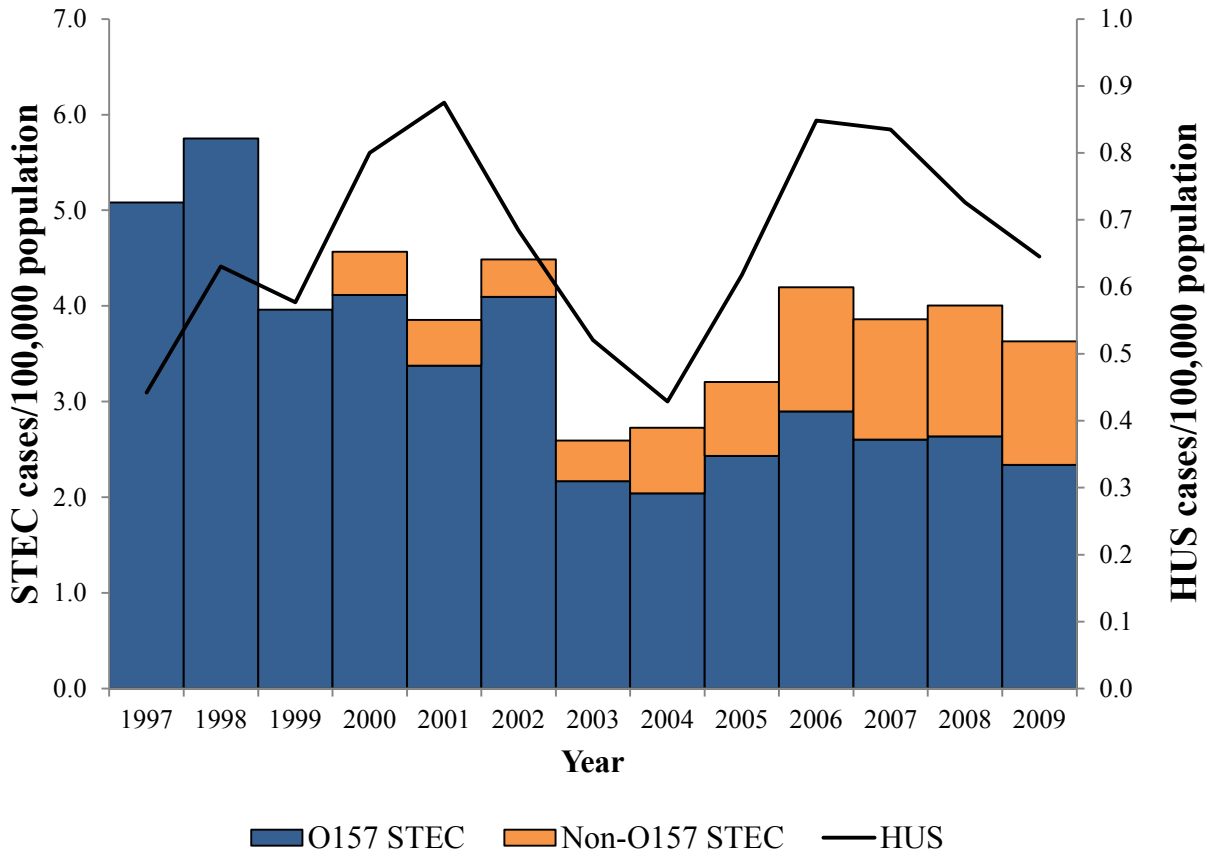
State	Age <5 years		Age 5–14 years		Age 15–17 years		Age <18 years	
	#	Rate	#	Rate	#	Rate	#	Rate
CA	35	1.43	16	0.33	0	0.00	51	0.59
CO	28	1.69	17	0.55	1	0.11	46	0.81
CT	33	1.19	33	0.53	2	0.11	68	0.62
GA	73	0.98	26	0.18	4	0.08	103	0.39
MD	26	0.73	19	0.24	3	0.10	48	0.35
MN	104	2.38	55	0.59	2	0.07	161	0.97
NM	11	1.28	4	0.24	0	0.00	15	0.49
NY	38	1.66	17	0.33	5	0.18	60	0.65
OR	82	2.79	26	0.42	5	0.25	113	1.02
TN	96	2.60	38	0.53	3	0.12	137	1.02
Total	526	1.67	251	0.39	25	0.10	802	0.69

*Cases per 100,000 population.

[†]Includes cases among persons residing within catchment area only.

[§]HUS surveillance started in CO in 2001; MD in 1999; NM in 2004; NY in 1998, and TN in 2000.

Figure 11. Comparison of Post-diarrheal Incidence Rates of Shiga Toxin-producing *E. coli* (STEC) and Pediatric Hemolytic Uremic Syndrome (HUS) — 1997-2009*



*Non-O157 STEC became a nationally notifiable disease in 2000.