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2016 Annual Report for the Emerging Infections Program for *Clostridium difficile* Infection

In 2016, a total of 16,796 cases of *C. difficile* infection (CDI) were reported to the Emerging Infections Program (EIP) in 35 counties in 10 US states (California, Colorado, Connecticut, Georgia, Maryland, Minnesota, New Mexico, New York, Oregon, and Tennessee).

The overall distribution of EIP CDI cases and crude incidence by selected demographic factors and epidemiologic classification are presented in Table 1. Data in this report are not intended to be directly compared to annual reports from other years, and should not be used to determine annual changes in EIP CDI incidence rates because single year calculations do not account for changes in testing practices by reporting facilities.

Table 1. Reported Number of CDI Cases and Crude Incidence by Sex, Age Group, Race, and Epidemiologic Classification Among the 10 EIP Sites[a]

Demographic Characteristic	Population ≥1 Year of Age	Community-Associated CDI[b]		Healthcare-Associated CDI[b]		All CDI	
		No.	Incidence[c]	No.	Incidence[c]	No.	Incidence[c]
Sex							
Male	5,762,583	3016	52.34	4090	70.97	7106	123.31
Female	6,014,899	4899	81.45	4791	79.65	9690	161.10
Age group							
1-17 years	2,541,378	631	24.83	254	9.99	885	34.82
18-44 years	4,595,566	1977	43.03	1078	23.45	3055	66.48
45-64 years	3,085,858	2563	83.06	2545	82.47	5108	165.53
≥65 years	1,554,680	2744	176.50	5004	321.87	7748	498.37
Race							
White	7,997,290	6242	78.06	6522	81.55	12764	159.61
Other	3,780,192	1673	44.26	2359	62.40	4032	106.66
Total	11,777,482	7915	67.20	8881	75.41	16796	142.61

[a] The epidemiologic classification was statistically imputed for 1.0% of the observed CDI cases, and race was statistically imputed for 17.9% of the observed CDI cases. The weighted frequency of cases in Colorado and Georgia was based on 33% random sampling for cases aged ≥18 years.
[b] A CDI case was classified as community-associated if the *C. difficile*-positive stool specimen was collected on an outpatient basis or within 3 days after hospital admission in a person with no documented overnight stay in a healthcare facility in the preceding 12 weeks. All CDI cases that do not meet the aforementioned criteria were classified as healthcare-associated.
[c] Cases per 100,000 persons.

Laboratory Characterization of *C. difficile* Isolates

In 2016, 969 *C. difficile* isolates were submitted to CDC for further analysis. The total number of isolates received from each site ranged from 26 to 278, with a median of 75.5. The majority of the isolates (97%) were collected in metropolitan areas.

Among all isolates submitted, 138 distinct ribotypes were detected. Ribotype 106 was the most common ribotype among community-associated *C. difficile* isolates, followed by 027, 002, and 014 (Table 2). Among healthcare-associated *C. difficile* isolates, ribotype 027 predominated, followed by 106, 014 and 020 (Table 3).

The prevalence of ribotype 027 among healthcare-associated *C. difficile* isolates was lower in 2016 (16%) than in 2015 (19%), although this difference was not statistically significant (p=0.25). Ribotype 027 remained relatively stable among community-associated *C. difficile* isolates between 2015 (8%) and 2016 (9%). In contrast, the

prevalence of ribotype 106 among community-associated *C. difficile* isolates was higher in 2016 (13%) than in 2015 (9%), although this difference also was not statistically significant (p=0.08).

Twenty-six percent of the isolates harbored a deletion in *tcdC.* Twenty-six percent of the isolates were binary toxin-positive, and among these, ribotypes 027, 019, and 078 predominated.

Table 2. Frequency of Ribotypes Among Community-Associated *C. difficile* Isolates, 2016 (n=460)

Ribotype	No of isolates	% isolates[a]
106	62	13%
027	42	9%
002	33	7%
014	27	6%
020	20	4%
056	18	4%
054	16	3%
019	16	3%
015	14	3%
087	12	3%
Others	200	43%

[a] Percentages may not add to 100% due to rounding

Table 3. Frequency of Ribotypes Among Healthcare-Associated *C. difficile* Isolates, 2016 (n=509)

Ribotype	No of isolates	% isolates[a]
027	79	16%
106	56	11%
014	35	7%
020	30	6%
002	30	6%
015	18	4%
056	14	3%
054	13	3%
078	12	2%
076	11	2%
017	11	2%
019	11	2%
Others	189	37%

[a] Percentages may not add to 100% due to rounding