2017 Annual Report for the Emerging Infections Program for *Clostridioides difficile* Infection

In 2017, a total of 15,512 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	5,828,894	2829	48.53	3672	63.00	6501	111.53
Female	6,077,618	4710	77.49	4301	70.77	9011	148.27
Age group							
1-17 years	2,538,020	601	23.68	206	8.12	807	31.80
18-44 years	4,649,874	1787	38.44	974	20.94	2761	59.38
45-49 years	821,951	461	56.14	321	39.00	782	95.14
50-54 years	799,021	584	73.06	471	58.98	1055	132.04
55-59 years	788,083	601	76.22	684	86.84	1285	163.05
60-64 years	690,026	676	97.99	823	119.25	1499	217.24
≥65 years	1,619,537	2829	174.69	4494	277.48	7323	452.17
Race							
White	8,034,967	6135	76.35	5802	72.21	11937	148.56
Other	3,871,545	1404	36.27	2171	56.07	3575	92.35
Total	11,906,512	7539	63.32	7973	66.96	15512	130.28

[a] The epidemiologic classification was statistically imputed for 1.7% of the observed CDI cases, and race was statistically imputed for 15.3% 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 2017, a total of 1050 *C. difficile* isolates were submitted to CDC for further analysis. The total number of isolates received from each site ranged from 11 to 285, with a median of 85.5. The majority of the isolates (98%) were collected in metropolitan areas.

Among all isolates submitted, 143 distinct ribotypes were detected. Ribotype 106 was the most common ribotype among community-associated *C. difficile* isolates, followed by 002, 020, and 027 (Table 2). Among healthcare-associated *C. difficile* isolates, ribotype 027 predominated, followed by 106, 002 and 014 (Table 3).

Note: Data in this report were generated on March 27, 2019.

A decrease in ribotype 027 occurred from 9% in 2016 to 6% in 2017 among community-associated *C. difficile* isolates (p=0.07), whereas ribotype 027 remained relatively stable among healthcare-associated *C. difficile* isolates between 2016 (16%) and 2017 (15%). A significant overall decline in ribotype 027 has been observed since 2012 among both community-associated (17% vs. 6%; p<0.0001) and healthcare-associated (21% vs. 15%; p=0.02) isolates. Additionally, ribotype 076, which was observed in 8 EIP sites, increased from 2% in 2016 to 5% in 2017 (p=0.05) among healthcare-associated isolates and replaced ribotype 020 as one of the top 5 healthcare-associated isolates in 2017.

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

Table 2. Frequency of Ribotypes Among Community-Associated *C. difficile* Isolates, 2017 (n=495)

Ribotype	No of isolates	% isolates
106	60	12%
002	48	10%
020	32	6%
027	28	6%
014	26	5%
054	16	3%
076	15	3%
019	13	3%
015	12	2%
017	11	2%
078	11	2%
Others	223	45%

Table 3. Frequency of Ribotypes Among Healthcare-Associated *C. difficile* Isolates, 2017 (n=555)

Ribotype	No of isolates	% isolates
027	81	15%
106	54	10%
002	38	7%
014	37	7%
076	26	5%
020	24	4%
054	20	4%
015	19	3%
056	18	3%
078	15	3%
001_072	14	3%
Others	209	38%

Appendix

Diagnostic testing

In 2017, 83% of CDI cases identified through EIP were diagnosed by a laboratory that used a nucleic acid amplification test (NAAT) either alone or as part of a multistep testing algorithm. Among all CDI cases in 2017, 47% were diagnosed by a laboratory that used NAAT alone. By epidemiologic classification, 45% of all community-associated CDI cases as well as 45% of all healthcare-associated CDI cases were diagnosed by a laboratory that used NAAT alone.

C. difficile Recurrences, Hospitalizations, and In-Hospital Deaths

As previously described, an initial chart review was performed on all CDI cases in eight EIP sites and on a random sample of cases in the two remaining EIP sites with the largest surveillance catchment areas (CO and GA).[1] A subsequent comprehensive chart review was performed on all community-associated cases and a subset of healthcare-associated cases. The percentages of CDI cases with *C. difficile* recurrence, hospitalization, and in-hospital death stratified by age group and epidemiologic classification are presented in Table 4.

Note: Data in this report were generated on March 27, 2019.

Table 4. Percentage of CDI Cases with First Recurrence, Hospitalization, and In-hospital Death by Age Group and Epidemiologic Classification Among the 10 EIP Sites, 2017

Age group and Epidemiologic Classification	First Recurrence	Hospitalization	In-hospital Death
Community-associated CDI cases[a]			
1-49 years	10.2%	17.2%	0.1%
50-54 years	13.8%	28.0%	2.3%
55-59 years	13.2%	38.3%	2.9%
60-64 years	12.1%	39.4%	0.6%
≥65 years	15.5%	48.3%	4.4%
Healthcare-associated CDI cases[a]			
1-49 years	14.2%	75.0%	3.6%
50-54 years	19.2%	77.1%	7.3%
55-59 years	13.3%	72.7%	5.2%
60-64 years	16.7%	70.1%	7.3%
≥65 years	15.1%	64.6%	8.4%

[a] 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.

NOTE: First recurrence refers to the first recurrent CDI episode, defined as a positive stool specimen within 2 to 8 weeks after the initial positive test. Hospitalization includes admission at the time of or within seven days of CDI diagnosis. In-hospital deaths refer to deaths that occurred during hospitalization.

References

[1]Centers for Disease Control and Prevention. Healthcare-Associated Infections - Community Interface (HAIC). *Clostridioides difficile* infection (CDI) tracking. Available at: https://www.cdc.gov/hai/eip/cdiff-tracking.html Accessed May 11, 2020.