

2012 Annual Report for the Emerging Infections Program for *Clostridium difficile* Infection

In 2012, a total of 16,449 cases of *C. difficile* infection (CDI) were reported to the Emerging Infections Program (EIP) in 35 counties with continuous reporting in 10 US states (California, Colorado, Connecticut, Georgia, Maryland, Minnesota, New Mexico, New York, Oregon, and Tennessee).

Table 1. Reported Number of CDI Cases and Crude Incidence by Sex, Age Group, Race, and Epidemiological Classification^a

Demographic Characteristic	Population ≥1 Year of Age	Community Associated CDI		Healthcare Associated CDI		All CDI	
		No.	Incidence ^b	No.	Incidence ^b	No.	Incidence ^b
Sex							
Male	5533992	2243	40.53	4497	81.26	6740	121.79
Female	5749334	3724	64.77	5985	104.10	9709	168.87
Age group							
1-17 years	2506177	414	16.52	187	7.46	601	23.98
18-44 years	4467587	1444	32.32	975	21.82	2419	54.15
45-64 years	2974510	1991	66.94	2566	86.27	4557	153.20
≥65 years	1335052	2118	158.65	6754	505.90	8872	664.54
Race							
White	7854051	4924	62.69	8135	103.58	13059	166.27
Non-white	3429275	1043	30.41	2347	68.44	3390	98.85
Total^c	11283326	5967	52.88	10482	92.90	16449	145.78

^a The epidemiologic classification was statistically imputed for 0.7% of the observed CDI cases, and race was statistically imputed for 21.1% of the observed CDI cases. The weighted frequency of cases in Colorado and Georgia were based on 33% random sampling.

^b Cases per 100,000 persons.

^c Data presented in the table excludes cases from Olmsted County, Minnesota, where CDI surveillance began mid-year. The total number of reported CDI cases in 2012 would be 16,564 if CDI cases from Olmsted County, Minnesota were included.

The estimated national CDI burden using EIP data was first reported in 2011 [1]. Since 2011, increased diagnostic use of nucleic acid amplification tests (NAAT), which are more sensitive than other test methods, has required the use of an adjustment factor to appropriately compare changes in the national burden in recent years. In 2011, 52% of all CDI cases reported across the EIP sites were diagnosed with NAAT, compared with 74% of cases in 2012. To compare the national estimates between 2011 and 2012, the reported estimate in 2011 [1] was adjusted upward to account for the increased use of NAAT in 2012. Table 2 shows the national CDI burden estimate in 2012 and the adjusted CDI estimate from 2011 based on a NAAT usage rate of 74%. The impact of the rate of NAAT usage on the 2011 national CDI estimate is depicted in Figure 1.

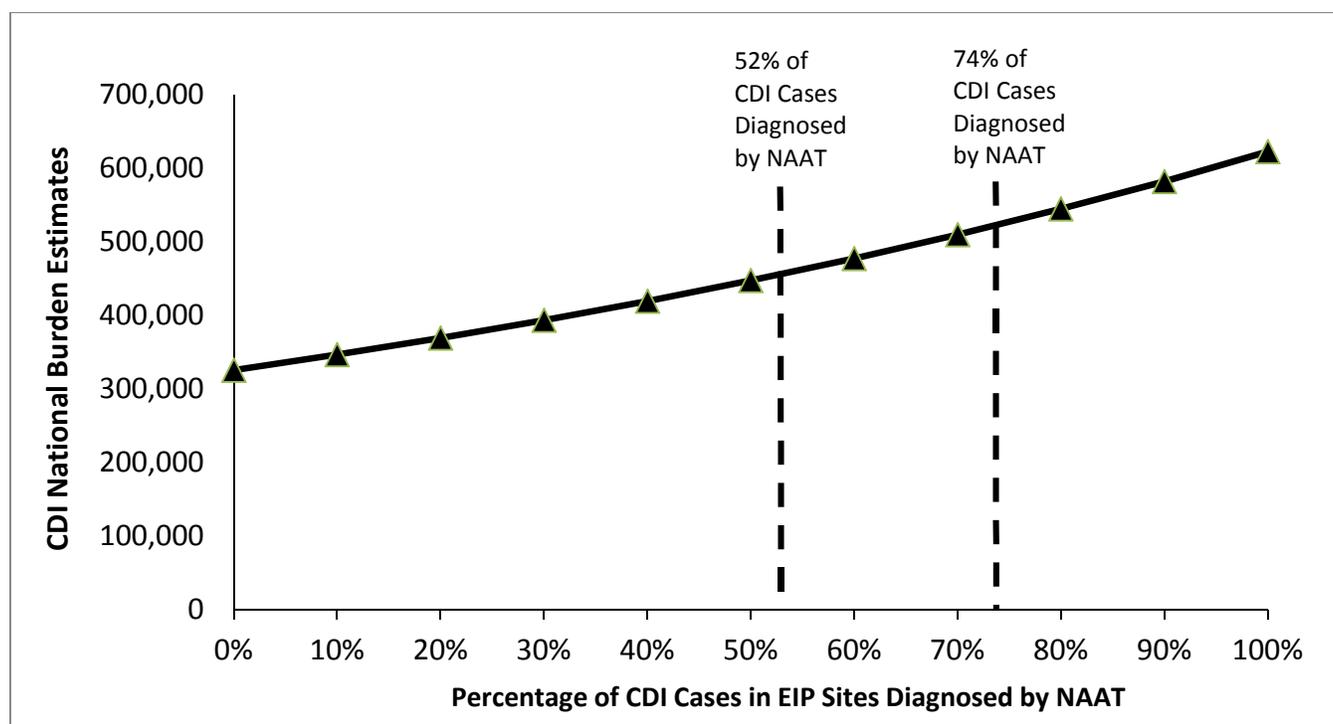
Table 2. Adjusted National Estimates of CDI Burden and Incidence Based on a NAAT Usage Rate of 74%^a

National CDI Estimates	Year		Percent Change
	2011	2012	
Estimated no. of Cases	521,500 (456,200–585,300)	474,600 (418,800–530,600)	-9%
Incidence per 100,000 Persons	169.54 (148.31–190.61)	153.11 (135.10–171.17)	-10%

NOTE. Ranges in parentheses are 95% confidence intervals (CI).

^a Comprises the total national estimate of community-associated and healthcare-associated CDI cases. The national estimate of community-associated cases was adjusted for age, sex, and race of the U.S. population, as well as the percentage of cases diagnosed by nucleic acid amplification test (NAAT) across EIP sites in 2012 (74%). The national estimate of healthcare-associated CDI cases was adjusted for the age of the U.S. population, the volume of inpatient days, and the percentage of cases diagnosed by NAAT across EIP sites in 2012.

Figure 1. Changes to the 2011 National CDI Burden Estimate Based on Varying Rates of NAAT Use for CDI Diagnosis^a



^a Similar figure is available in the Supplementary Appendix [1].

Laboratory Characterization of *C. difficile* Isolates

In 2012, a total of 1,443 *C. difficile* isolates were available for further analysis. The total number of isolates received from each geographical site ranged from 55 to 232 with a median of 154.5. The majority of the isolates (96%) were collected in metropolitan areas.

Among all available isolates, 156 distinct ribotypes were detected. The 20 most frequent ribotypes observed are listed in Table 3. Ribotypes 027, 106, 002, 020 and 014 were the most common observed in both community and healthcare-associated *C. difficile* isolates (Tables 4 and 5).

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

Table 3. Frequency of Ribotypes Among All *C. difficile* Isolates, 2012 (n= 1,443)

Ribotype	No of isolates	% isolates
027	273	19%
106	129	9%
002	106	7%
020	86	6%
014	71	5%
056	48	3%
078	43	3%
054	37	3%
001_072	37	3%
015	32	2%
017	30	2%
046	29	2%
076	24	2%
103	23	2%
012	22	2%
053	20	1%
A12	20	1%
009	19	1%
A05	19	1%
005	18	1%
Others	357	25%

Table 4. Frequency of Ribotypes Among Community-Associated *C. difficile* Isolates, 2012 (n=801)

Ribotype	No of isolates	% isolates
027	137	17%
106	74	9%
002	70	9%
020	52	6%
014	42	5%
056	36	4%
001_072	26	3%
078	24	3%
015	20	2%
019	17	2%
Others	303	38%

Table 5. Frequency of Ribotypes Among Healthcare-Associated *C. difficile* Isolates, 2012 (n=642)

Ribotype	No of isolates	% isolates
027	136	21%
106	55	9%
002	36	6%
020	34	5%
014	29	5%
054	21	3%
078	19	3%
017	19	3%
053	18	3%
A12	15	2%
046	15	2%
Others	245	38%

References

1. Lessa FC, Mu Y, Bamberg WM et al. Burden of *Clostridium difficile* infection in the United States. *N Engl J Med.* 2015;372(9):825-34.