

2013 Annual Report for the Emerging Infections Program for *Clostridium difficile* Infection

In 2013, a total of 16,379 cases of *C. difficile* infection (CDI) were reported to the Emerging Infections Program (EIP) in 36 counties 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 Epidemiologic 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	5663849	2401	42.39	4308	76.06	6709	118.45
Female	5889106	4040	68.60	5630	95.60	9670	164.20
Age group							
1-17 years	2546460	494	19.40	193	7.58	687	26.98
18-44 years	4549306	1592	34.99	983	21.61	2575	56.60
45-64 years	3040854	2063	67.84	2546	83.73	4609	151.57
≥65 years	1416335	2292	161.83	6216	438.88	8508	600.71
Race							
White	8033940	5255	65.41	7611	94.74	12866	160.15
Non-white	3519015	1186	33.70	2327	66.13	3513	99.83
Total	11552955	6441	55.75	9938	86.02	16379	141.77

^a The epidemiologic classification was statistically imputed for 0.6% of the observed CDI cases, and race was statistically imputed for 21.8% 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.

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 76% of cases in 2013. To compare the national estimates between 2011 and 2013, the reported estimate in 2011 [1] was adjusted upward to account for the increased use of NAAT in 2013. Table 2 shows the national CDI burden estimate in 2013 and the adjusted CDI estimate from 2011 based on a NAAT usage rate of 76%. The impact of the rate of NAAT usage on the 2011 national CDI estimate is depicted in Figure 1.

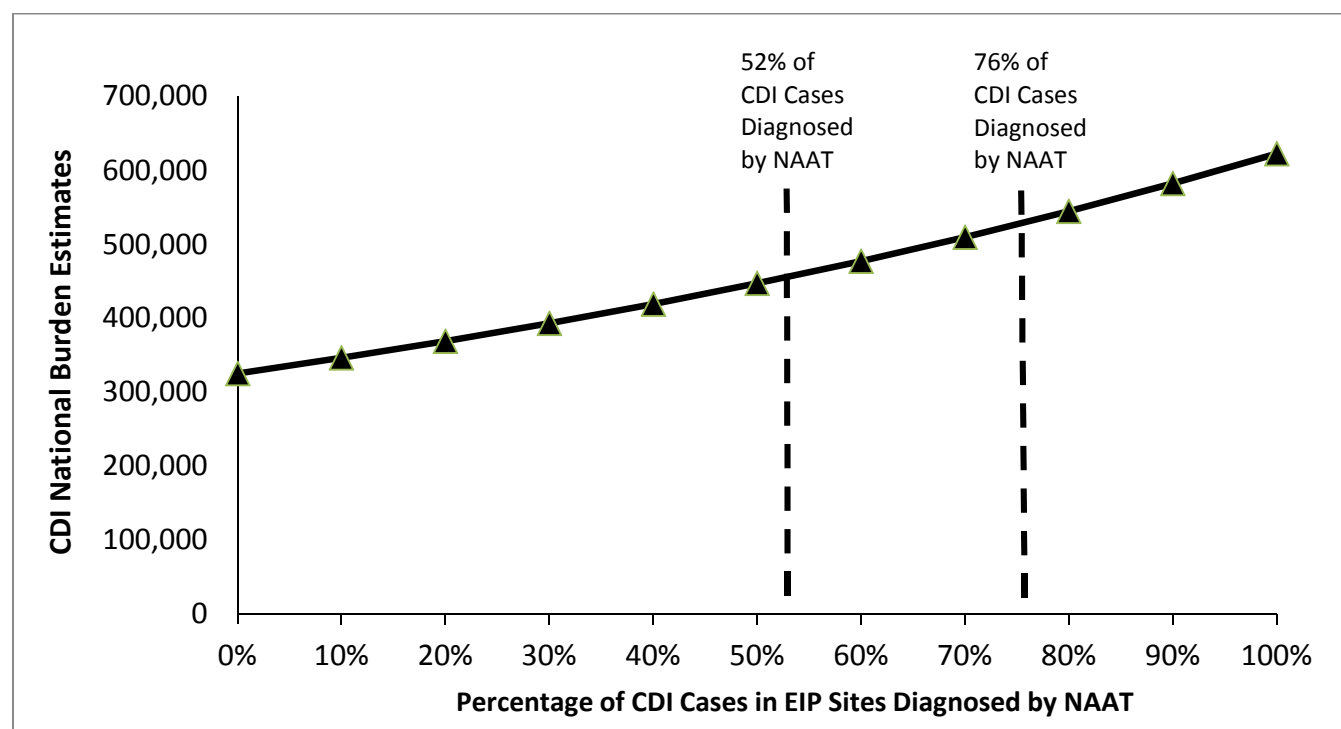
Table 2. Adjusted National Estimates of CDI Burden and Incidence Based on a NAAT Usage Rate of 76%^a

National CDI Estimates	Year		Percent Change
	2011	2013	
Estimated no. of Cases	530,100 (463,700–596,000)	469,200 (409,200–529,100)	-12%
Incidence per 100,000 Persons	172.34 (150.75–193.76)	150.29 (131.08–169.48)	-13%

NOTE. Ranges in parentheses are 95% confidence intervals.

^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 2013 (76%). 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 2013.

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 2013, a total of 1,228 *C. difficile* isolates were available for further analysis. The total number of isolates received from each site ranged from 49 to 274 with a median of 94.5. The majority of the isolates (95%) were collected in metropolitan areas.

Among all available isolates, 146 distinct ribotypes were detected. The 20 most frequent ribotypes are listed in Table 3. Ribotypes 027, 106, 020, 002 and 014 were the most common observed in both community- and healthcare-associated *C. difficile* isolates (Tables 4 and 5). Although the overall prevalence of ribotype 027 did not change between 2012 and 2013 (19 vs 17%), a significant decrease in ribotype 027 occurred from 17% in 2012 to 12% in 2013 among community-associated *C. difficile* isolates.

Twenty-nine percent of the isolates harbored a deletion in *tcdC*. Twenty-nine 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, 2013 (n= 1,228)

Ribotype	No of isolates	% isolates
027	210	17%
106	108	9%
020	83	7%
002	81	7%
014	70	6%
078	34	3%
001_072	33	3%
056	32	3%
015	32	3%
017	29	2%
054	28	2%
005	27	2%
076	27	2%
A12	25	2%
010	21	2%
019	17	1%
053	16	1%
046	14	1%
A27	14	1%
A05	14	1%
Others	313	25%

Table 4. Frequency of Ribotypes Among Community-Associated *C. difficile* Isolates, 2013 (n=689)

Ribotype	No of isolates	% isolates
027	82	12%
106	65	9%
020	54	8%
002	52	8%
014	33	5%
078	23	3%
076	21	3%
015	21	3%
001_072	19	3%
056	18	3%
Others	301	44%

Table 5. Frequency of Ribotypes Among Healthcare-Associated *C. difficile* Isolates, 2013 (n=539)

Ribotype	No of isolates	% isolates
027	128	24%
106	43	8%
014	37	7%
002	29	5%
020	29	5%
017	15	3%
005	14	3%
056	14	3%
001_072	14	3%
078	11	2%
Others	205	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.