Emerging Infections Program
Healthcare-Associated Infections–Community Interface Report
Clostridioides difficile Infection Surveillance, 2024

Surveillance Catchment Areas

California (1 county San Francisco area); Colorado (5 county Denver area); Connecticut (2 planning regions in the New Haven area); Georgia (8 county Atlanta area); Maryland (9 Eastern Shore and 2 western counties); Minnesota (5 counties); New Mexico (1 county Albuquerque area); New York (1 county Rochester area); Oregon (1 rural county); and Tennessee (1 county Nashville area).

Population

The surveillance area represents 12,546,589 persons.

Source: U.S. Census Bureau, Population Division, Vintage 2024 Special Tabulation.

Case Definition

An incident case of *Clostridioides difficile* infection (CDI) was defined as a *C. difficile*-positive stool test (toxin or molecular assay) from a person ≥1 year old with no positive test in the prior 8 weeks.

Methods

Case finding was active, laboratory-based, and population-based. Laboratories serving the surveillance areas reported positive *C. difficile* tests to Emerging Infections Program (EIP) staff and were routinely audited with a goal of complete case ascertainment.

Sampling of cases for medical record abstraction was performed as follows: in eight EIP sites, an initial review of inpatient and outpatient medical records using a standardized case report form (CRF) was performed on all CDI cases to collect patient demographics and selected healthcare exposures. A subsequent comprehensive chart review with full CRF completion was performed on 75% of cases from each epidemiologic category (defined below) to collect additional healthcare exposures, clinical syndrome, outcome of illness, and treatment. In the two remaining EIP sites with the largest surveillance areas (Colorado and Georgia), a full CRF was completed on all pediatric cases and a 25% age- and sex-stratified random sample of cases aged 18 years and older. For all CDI cases, address information was geocoded to its corresponding census tract.

A CDI case was classified as community-associated (CA) 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 did not meet these criteria were

classified as healthcare-associated (HA). HA cases with disease onset outside of a healthcare facility but with documented overnight stay in a healthcare facility in the preceding 12 weeks were classified as community-onset, healthcare-facility associated (CO-HCFA). HA cases with disease onset in a healthcare facility were classified as healthcare-facility onset (HCFO). HCFO cases were further classified into hospital onset or long-term care facility onset.

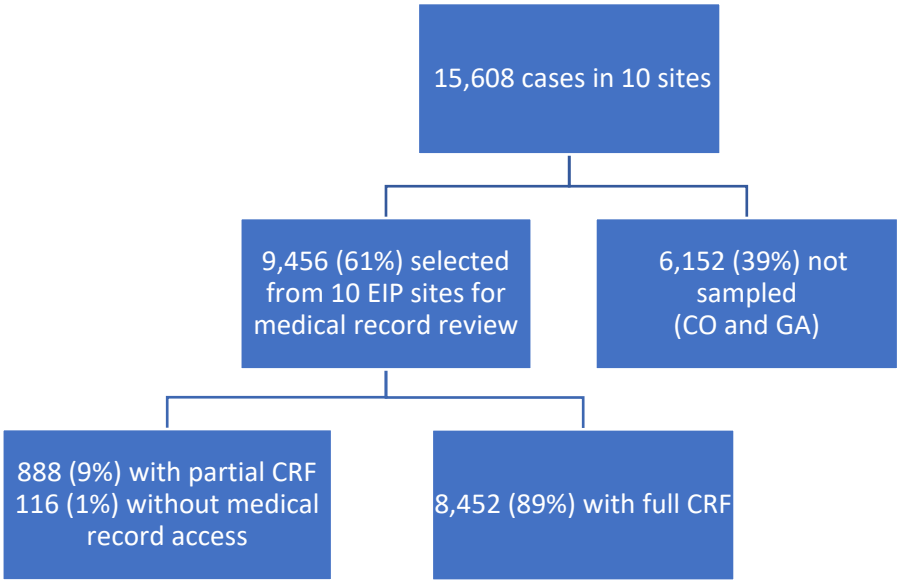
Race/ethnicity was considered missing if a patient had unknown ethnicity (regardless of reported race) or if a patient had unknown race and was not Hispanic or Latino. Bayesian Improved Surname Geocoding (BISG) was used to impute missing race/ethnicity [1]. BISG applies Bayes' Theorem to calculate a patient's probability of identifying with each racial/ethnic group given their surname and home census tract or county. Probabilities for patients with known race/ethnicity were set to 1 for their reported race/ethnicity group and 0 for all other racial/ethnic groups. Race/ethnicity-stratified case counts were calculated by summing the probabilities for each racial/ethnic group.

Multiple imputation analysis was performed for missing epidemiologic class variables (community-associated versus healthcare-associated) using the Fully Conditional Specification method [2], with the logistic regression incorporating race/ethnicity, age, sex, and EIP site as predictors. Due to the sampling scheme for Colorado and Georgia, the total case counts for each epidemiologic class were estimated based on the stratified random sampling scheme described above. Post-stratification weighting was applied to adjust the estimated counts, ensuring alignment with the total CDI cases across each race/ethnicity, age, and sex stratum, so that the estimates accurately reflect the distribution of these demographic characteristics within the overall population. Incidence rates for all cases and by demographic groups were calculated using US Census population estimates.

A convenience sample of stool specimens or swabs was sent to reference laboratories for *C. difficile* isolation. Recovered isolates were sent to CDC for molecular typing and characterization.

CDI surveillance data undergo regular data cleaning to ensure accuracy and completeness. Patients with case data as of 2/9/2026 were included in this analysis. Because data can be updated as needed, analyses of datasets generated on a different date may yield slightly different results.

Figure. Flow diagram depicting the selection of *Clostridioides difficile* infection cases for medical record review, Emerging Infections Program, 2024



Abbreviations: CO, Colorado; GA, Georgia; CRF, case report form

Results

Table 1 – Reported Number of *Clostridioides difficile* Infection Cases and Crude Incidence by Sex, Age Group, Race, and Epidemiologic Classification Among the 10 Emerging Infections Program Sites, 2024

Sex	Population ≥1 Year of Age	Community-Associated CDI[a], No.[c]	Community-Associated CDI[a], Incidence[b]	Healthcare-Associated CDI[a], No.[c]	Healthcare-Associated CDI[a], Incidence[b]	All CDI, No.[c]	All CDI, Incidence[b]
Male	6,170,435	3363	54.5	3231	52.4	6594	106.9
Female	6,376,154	5090	79.8	3925	61.6	9014	141.4

Age group	Population ≥1 Year of Age	Community-Associated CDI[a], No.[c]	Community-Associated CDI[a], Incidence[b]	Healthcare-Associated CDI[a], No.[c]	Healthcare-Associated CDI[a], Incidence[b]	All CDI, No.[c]	All CDI, Incidence[b]
1-17 years	2,504,075	596	23.8	208	8.3	804	32.1
18-44 years	4,951,358	2140	43.2	841	17.0	2981	60.2
45-49 years	783,093	413	52.8	311	39.7	724	92.5
50-54 years	785,464	513	65.3	353	45.0	866	110.3
55-59 years	753,270	624	82.8	533	70.8	1157	153.6
60-64 years	749,878	755	100.7	690	92.0	1445	192.7
65-70 years	656,463	779	118.7	921	140.2	1700	259.0
70-74 years	531,127	751	141.3	877	165.2	1628	306.5
75-79 years	394,773	759	192.3	879	222.6	1638	414.9
80+ years	437,088	1122	256.6	1543	353.1	2665	609.7

Race[d]	Population ≥1 Year of Age	Community-Associated CDI[a], No.[c]	Community-Associated CDI[a], Incidence [b]	Healthcare-Associated CDI[a], No.[c]	Healthcare-Associated CDI[a], Incidence[b]	All CDI, No.[c]	All CDI, Incidence[b]
Hispanic or Latino, any race	2,319,084	974	42.0	777	33.5	1751	75.5
Not Hispanic or Latino - Asian or Native Hawaiian/Other Pacific Islander[e]	999,264	313	31.3	276	27.6	589	59.0
Not Hispanic or Latino - Asian only[f]	986,287	N/A	N/A	N/A	N/A	462	46.8
Not Hispanic or Latino - Native Hawaiian/Other Pacific Islander only[f]	12,977	N/A	N/A	N/A	N/A	17	131.0
Not Hispanic or Latino – Black or African American	2,612,148	1303	49.9	1775	68.0	3078	117.8
Not Hispanic or Latino – White	6,239,171	5725	91.8	4196	67.2	9920	159.0

Not Hispanic or Latino – American Indian or Alaska Native or Multiracial	376,922	138	36.6	131	34.7	269	71.3
Not Hispanic or Latino – American Indian or Alaska Native only[f]	63,518	N/A	N/A	N/A	N/A	86	135.4
Not Hispanic or Latino – Multiracial only[f]	313,404	N/A	N/A	N/A	N/A	125	39.9

Total	**Population ≥1 Year of Age**	**Community-Associated CDI[a], No.[c]**	**Community-Associated CDI[a], Incidence[b]**	**Healthcare-Associated CDI[a], No.[c]**	**Healthcare-Associated CDI[a], Incidence[b]**	**All CDI, No.[c]**	**All CDI, Incidence[b]**
Total	12,546,589	8453	67.4	7155	57.0	15608	124.4

Abbreviations: CDI, *Clostridioides difficile* infection; N/A, Not applicable (refer to corresponding footnote).

[a] The epidemiologic classification was statistically imputed for 1% of the CDI cases that underwent medical record review.

[b] Cases per 100,000 persons.

[c] Subcategories may not add to total due to rounding.

[d] Race/ethnicity was imputed for cases with missing race/ethnicity (6.8%, n=1,057) using BISG, as described in the methods section. The number of cases reported (i.e., non- missing) by race/ethnicity were 1,657 (Hispanic or Latino, any race), 479 (not Hispanic or Latino – Asian or Native Hawaiian/Other Pacific Islander), 2,841 (Not Hispanic or Latino – Black or African American), 9,363 (Not Hispanic or Latino – White), and 211 (Not Hispanic or Latino – American Indian or Alaska Native or Multiracial).

[e] Case-patients with reported race/ethnicity of both "Not Hispanic or Latino – Asian" and "Not Hispanic or Latino – Native Hawaiian/Other Pacific Islander" were categorized as "Not Hispanic or Latino - Multiracial". This is consistent with the United States Census Bureau denominator data. However, the BISG method does not distinguish between these two racial/ethnic groups, so a small proportion of case-patients with missing race/ethnicity who are multiracial ("Not Hispanic or Latino – Asian" and "Not Hispanic or Latino – Native Hawaiian/Other Pacific Islander") may have been imputed as "Non-Hispanic or Latino – Asian or Native Hawaiian/Other Pacific Islander.

[f] Case counts include reported (i.e., non-missing) data only. Missing data for these racial/ethnic groups were not separately imputed because BISG combines each of these groups with another racial/ethnic group. Thus, since missing epidemiologic class data were imputed using BISG-imputed race/ethnicity data, incidence rates by epidemiologic class could not be calculated for these racial/ethnic groups.

Table 2 – Diagnostic Assay Results of *Clostridioides difficile* infection Cases (N=15608), Emerging Infections Program, 2024

Diagnostic assay	N	%
Toxin positive	4607	30
Nucleic acid amplification test (NAAT) positive/toxin negative	5830	37
NAAT positive/toxin result unknown[a]	5169	33
Unspecified assay	2	<1

[a] Includes cases diagnosed mainly by NAAT or multiplex PCR panel (i.e., toxin enzyme immunoassay or cell cytotoxicity assay was not performed) or by NAAT as part of a multistep algorithm where the toxin result was not readily known.

Table 3 – *Clostridioides difficile* infection Cases by Epidemiologic Classification (N=15608), Emerging Infections Program, 2024

Epidemiologic classification	N	%
Hospital onset	1685	11
Long-term care-facility onset	662	4
Community-onset, healthcare-facility associated	1942	12
Community-associated	5042	32
Unknown[a]	6277	40

[a] Includes 6152 non-sampled cases.

Table 4 – Location of *Clostridioides difficile* infection Cases on the Third Calendar Day Before Incident Specimen Collection, Emerging Infections Program, 2024 (N=9456)

Location of patient before incident specimen collection	N	%
Private residence	6855	72
Long-term care facility	672	7
Acute-care hospital (inpatient)	1641	17
Long-term care acute care hospital	36	<1
Homeless	98	1
Incarcerated	10	<1
Other	9	<1
Unknown	135	1

Table 5 – Location of *Clostridioides difficile* infection Cases at Time of Incident Specimen Collection, Emerging Infections Program, 2024 (N=9456)

Location of incident specimen collection	N	%
Outpatient setting or emergency department	5047	53
Acute care hospital	3937	42
Long-term care facility	314	3
Long-term acute care hospital	34	<1
Other	1	<1
Unknown	123	1

Table 6 – Selected Clinical Characteristics of *Clostridioides difficile* infection Cases, Emerging Infections Program, 2024 (N=8452, except where indicated)

Clinical characteristic	N	%
Charlson comorbidity index - 0	2766	33
Charlson comorbidity index - 1	1559	18
Charlson comorbidity index - ≥2	4127	49

Underlying conditions - Cardiovascular disease[a,b]	2479	29
Underlying conditions - Diabetes mellitus[a]	2203	26
Underlying conditions - Chronic pulmonary disease[a,c]	2037	24
Underlying conditions - Gastrointestinal disease[a,d]	2327	28
Underlying conditions - Gastrointestinal disease – Diverticular disease[a]	1051	12
Underlying conditions - Gastrointestinal disease – Inflammatory bowel disease[a]	530	6
Underlying conditions - Gastrointestinal disease – Peptic ulcer disease[a]	290	3
Underlying conditions - Gastrointestinal disease – Short gut syndrome[a]	10	<1
Underlying conditions - Gastrointestinal disease – Liver disease[a]	733	9
Underlying conditions - Chronic renal disease[a]	2046	24
Underlying conditions - Neurologic condition, any[a]	2362	28
Underlying conditions - Malignancy (hematologic or solid organ)[a]	1538	18
Underlying conditions - Transplant (hematopoietic stem cell or solid organ)[a]	356	4
Positive test for SARS-CoV-2 during hospitalization and on or before date of incident specimen collection[e]	98	2

[a] Underlying conditions are not mutually exclusive.

[b] Defined as myocardial infarction, congestive heart failure, congenital heart disease, stroke, transient ischemic attack, or peripheral vascular disease.

[c] Defined as cystic fibrosis or any chronic respiratory condition resulting in symptomatic dyspnea.

[d] Defined as diverticular disease, inflammatory bowel disease, peptic ulcer disease, short gut syndrome, or liver disease.

[e] Among patients in the hospital on the date of incident specimen collection (N=4377). Excludes patients who were admitted to the hospital after the date of incident specimen collection. A positive SARS-CoV-2 test was defined as any positive viral test for SARS-CoV-2, including antigen and nucleic acid amplification tests.

Table 7 – Selected Healthcare Exposures and Risk Factors of Incident *Clostridioides difficile* infection Cases in the 12 Weeks Before the Date of Incident Specimen Collection by Epidemiologic Classification, Emerging Infections Program, 2024 (N=8452)[a]

	CA (N=4524)		COHCFA (N=1881)		HCFO (N=2038)	
Healthcare Exposure[a, b]	**N**	**%**	**N**	**%**	**N**	**%**
Acute care hospitalization	0	0	1843	98	1087	53
Long-term care facility residence	0	0	228	12	796	39
Long-term acute care hospitalization	0	0	8	<1	50	2
Surgery	195	4	499	27	575	28
Emergency room	1007	22	691	37	508	25
Observation unit	64	1	61	3	51	3
Chronic dialysis	93	2	166	9	182	9

Abbreviations: CA, community-associated; COHCFA, community-onset, healthcare-facility associated; HCFO, healthcare-facility onset

[a] Excludes 9 cases with unknown epidemiologic classification.

[b] Healthcare exposure categories are not mutually exclusive.

Table 8 – Antibiotic Use in the 12 Weeks Before the Date of Incident Specimen Collection, Emerging Infections Program, 2024 (N=8452)

Antibiotic [a]	N	%
Any antibiotic	5899	70
Aminoglycosides	158	2
Beta-lactam / beta-lactamase inhibitor combinations	2368	28
Carbapenems	391	5
Cephalosporins	3589	42
Clindamycin	410	5
Fluoroquinolones	1055	12
Glycopeptides	1940	23
Macrolides	433	5
Monobactam	15	<1
Penicillins	588	7
Trimethoprim or Trimethoprim/Sulfamethoxazole	567	7
Tetracyclines	592	7
Other antibiotic	1821	22

[a] Antibiotic use categories are not mutually exclusive.

Table 9 – Treatment of Incident *Clostridioides difficile* infection Cases, Emerging Infections Program, 2024 (N=8452)

Treatment[a]	N	%
Any treatment[b]	6676	79
Oral or rectal vancomycin (excluding vancomycin tapers)[c]	5397	64
Vancomycin tapers	286	3
Metronidazole[d]	869	10
Fidaxomicin	1350	16
Bezlotoxumab	53	1
Microbiota-based therapy (excluding stool transplant)	19	<1
Stool transplant	22	<1

[a] Treatment categories are not mutually exclusive.

[b] Includes any course of *C. difficile infection* (CDI) antibiotic therapy, bezlotoxumab, or microbiota-based therapy (REBYOTA, VOWST, or stool transplant).

[c] Includes 94 patients receiving vancomycin prophylaxis after treatment of incident CDI.

[d] Includes 2 patients receiving metronidazole prophylaxis after treatment of incident CDI.

Table 10 – Clinical Course and Outcomes of Incident *Clostridioides difficile* infection Cases, Emerging Infections Program, 2024 (N=8452, except where indicated)

Clinical course and outcome	N	%
Toxic megacolon[a]	28	<1
Ileus[a]	287	3
Pseudomembranous colitis[a]	17	<1
White blood cell count >= 15,000/µl[a]	1793	21
Recurrent infection[a]	909	11
Hospitalization on the day of or within 6 days after the date of incident specimen collection[a, b]	4510	53
ICU admission one day before, the day of, or within 6 days after the date of incident specimen collection [a]	838	10
In-hospital death[a]	315	4
Discharge location after acute-care hospitalization among patients who survived[c] - Private Residence	2999	72
Discharge location after acute-care hospitalization among patients who survived[c] - Long-term care facility	1008	24
Discharge location after acute-care hospitalization among patients who survived[c] - Long-term acute care hospital	59	1
Discharge location after acute-care hospitalization among patients who survived[c] - Other	106	3
Discharge location after acute-care hospitalization among patients who survived[c] - Unknown	21	1

Abbreviations: ICU, intensive care unit

[a] Clinical course and outcomes, except for location of discharge from acute care hospitalization, are not mutually exclusive.

[b] Data include 1432 cases considered to be hospital-onset.

[c] N=4193

Laboratory Characterization

This section will be updated once the data are available.

Summary

Surveillance data from 2024 represent the fourteenth year of population-based surveillance for CDI conducted in 10 Emerging Infections Program sites. The crude overall incidence rate of CDI in 2024 was 124.4 cases per 100,000 persons, which is higher than the overall incidence rate of 117.2 cases per 100,000 persons in 2023. These estimates do not account for potential changes in diagnostic testing practices over time. The incidence of community-associated CDI cases (67.4 cases per 100,000 persons) was higher compared with healthcare-associated cases (57.0 cases per 100,000 persons). The incidence rate of CDI increased with age and was higher in women than in men and highest in persons who were White, compared to persons of other racial/ethnic groups.

Underlying conditions were commonly reported among CDI cases, with 49 percent having a Charlson comorbidity index of ≥2. Antibiotic use in the prior 12 weeks was reported for 70 percent of CDI cases. Seventy-nine percent of CDI cases were treated, with vancomycin being the most common treatment given. CDI-related complications, such as toxic megacolon and ileus, were rare.

References

1. Elliott MN, Morrison PA, Fremont A, McCaffrey DF, Pantoja P, Lurie N. Using the Census Bureau's Surname List to Improve Estimates of Race/Ethnicity and Associated Disparities. RAND website. Available at: Using the Census Bureau's Surname List to Improve Estimates of Race/Ethnicity and Associated Disparities | RAND (https://www.rand.org/pubs/external_publications/EP20090611.html#document-details) Accessed September 19, 2025.
2. Buuren SV, Brand JPL, Groothuis-Oudshoorn CGM, Rubin DB. Fully conditional specification in multivariate imputation. Stat Comput Sim 2006;76:1049–1064.

Citation

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For more information, visit our web sites:

- *Clostridioides difficile* Infection (CDI) Tracking [Clostridioides difficile Infection (CDI) Surveillance | HAIs | CDC] (https://www.cdc.gov/healthcare-associated-infections/php/haic-eip/cdiff.html)
- Emerging Infections Program A.R. & Patient Safety Portal Data [Emerging Infections Program | A.R. & Patient Safety Portal] (https://arpsp.cdc.gov/profile/eip?tab=eip)
- *Clostridioides difficile* Infection [About C. diff | C. diff | CDC] (https://www.cdc.gov/c-diff/about/?CDC_AAref_Val=https://www.cdc.gov/hai/organisms/cdiff/cdiff_infect.html)