

# *Clostridium difficile* Sentinel Surveillance Report

2014

***Clostridium difficile* Surveillance Report 2014**

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In 2009 the Minnesota Commissioner of Health designated sentinel surveillance for *Clostridium difficile* in Benton, Morrison, Stearns, and Todd Counties under the authority of the Communicable Disease Rule, Chapter 4605. In 2012, surveillance was expanded to include Olmsted County. This population-based active laboratory surveillance for *Clostridium difficile* infection (CDI) is conducted by the Minnesota Department of Health (MDH) Emerging Infections Program (EIP) in collaboration with the Centers for Disease Control and Prevention (CDC). The surveillance includes all patients at least 1 year of age, with a positive *C. difficile* test, residing in Benton, Morrison, Stearns, Todd, or Olmsted Counties. Patients are categorized into three epidemiologic classifications depending on the location and timing of the *C. difficile* positive sample in relation to their healthcare exposure. The definitions are as follows.

### Epidemiologic classifications:

- **Community-Associated (CA):** a patient who developed CDI while in the community and had no overnight stay in a healthcare facility in the prior 12 weeks; or developed CDI within the first 3 days of admission to a healthcare facility.
- **Community-Onset, Healthcare Facility Associated (CO-HCFA):** a patient who developed CDI while in the community and had an overnight stay in a healthcare facility in the prior 12 weeks.
- **Healthcare Facility-Onset (HCFO):** a patient who developed CDI while in a healthcare facility and had a *C. difficile* specimen collected  $\geq 4$  days after admission to a healthcare facility.

A healthcare facility is defined as an acute care hospital, long-term acute care hospital, or long-term care facility.

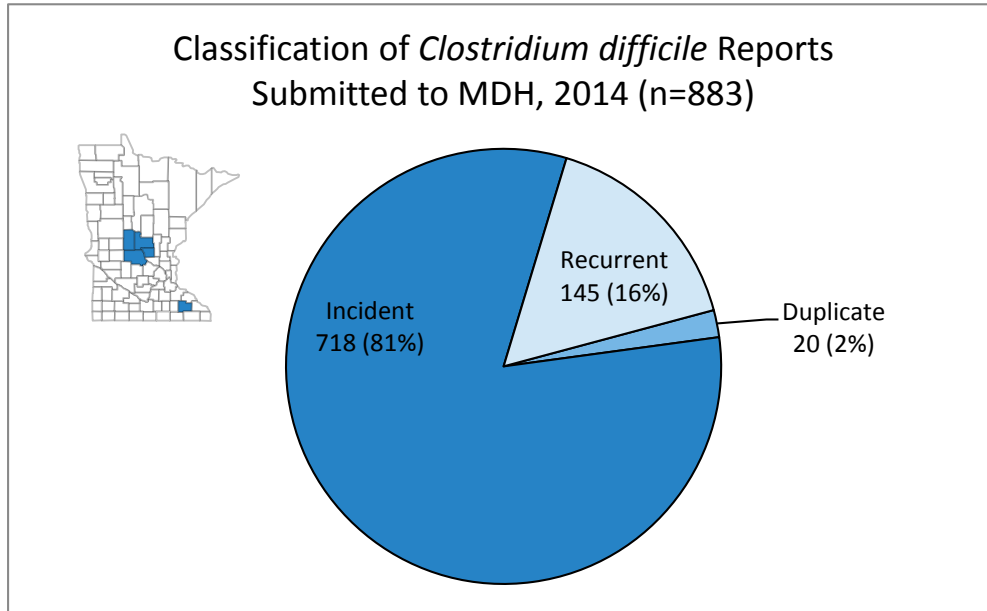
### Specimen classification definitions:

- **Duplicate:** a positive *C. difficile* test collected less than 2 weeks after a previous positive *C. difficile* test.
- **Recurrent:** a positive *C. difficile* test collected between 2 and 8 weeks after a previous positive *C. difficile* test.
- **Incident:** a positive *C. difficile* test collected greater than 8 weeks after any previous positive *C. difficile* test.

This document summarizes the surveillance data collected during 2014. Because *C. difficile* is reportable in only 5 counties, the data may not be generalizable to the entire state of Minnesota

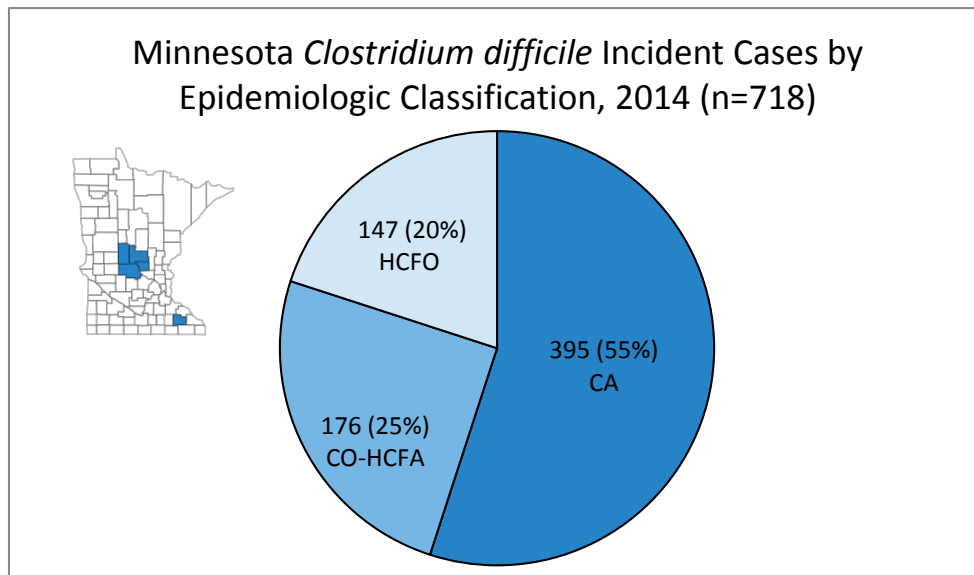
In 2014, 883 case reports from residents within the catchment area who were at least 1 year of age were submitted to MDH; Figure 1 below shows the proportion of incident, recurrent, and duplicate specimens.

**Figure 1**



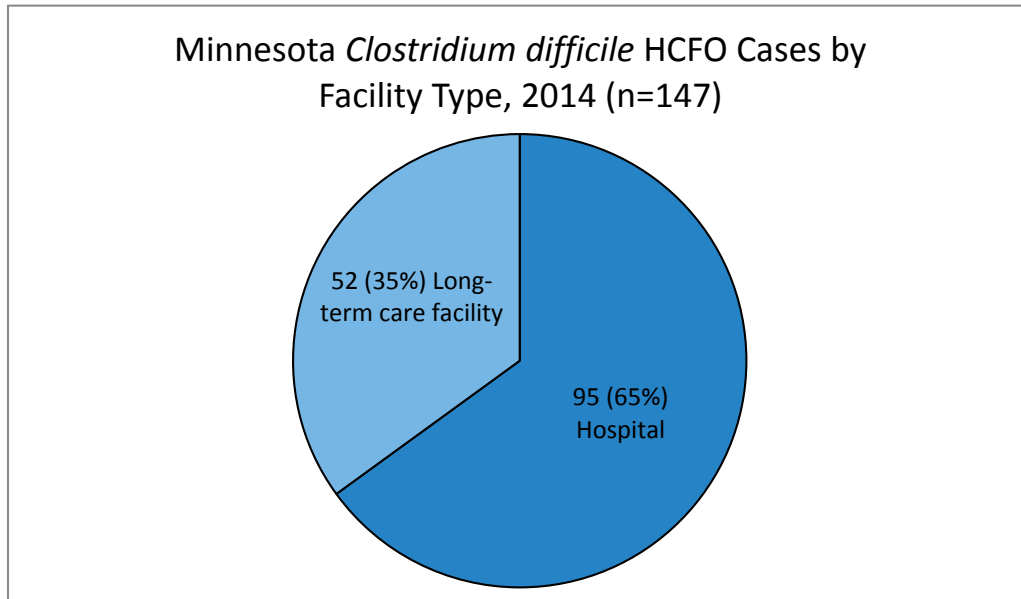
Of the 718 incident reports with medical records available, 395 (55%) were classified as community-associated. Figure 2 below shows the proportion of the epidemiologic classifications.

**Figure 2**



Of the 147 HCFO, 95 (65%) were likely acquired in a hospital setting and 52 (35%) were likely acquired in a long-term care facility.

**Figure 3**



Of the 176 CO-HCFA cases, 161 (91%) were associated with a prior overnight hospital stay, 5 (3%) were associated with a prior long-term care facility stay, and 10 (6%) had both a prior overnight hospital stay and prior long-term care facility stay.

**Figure 4**

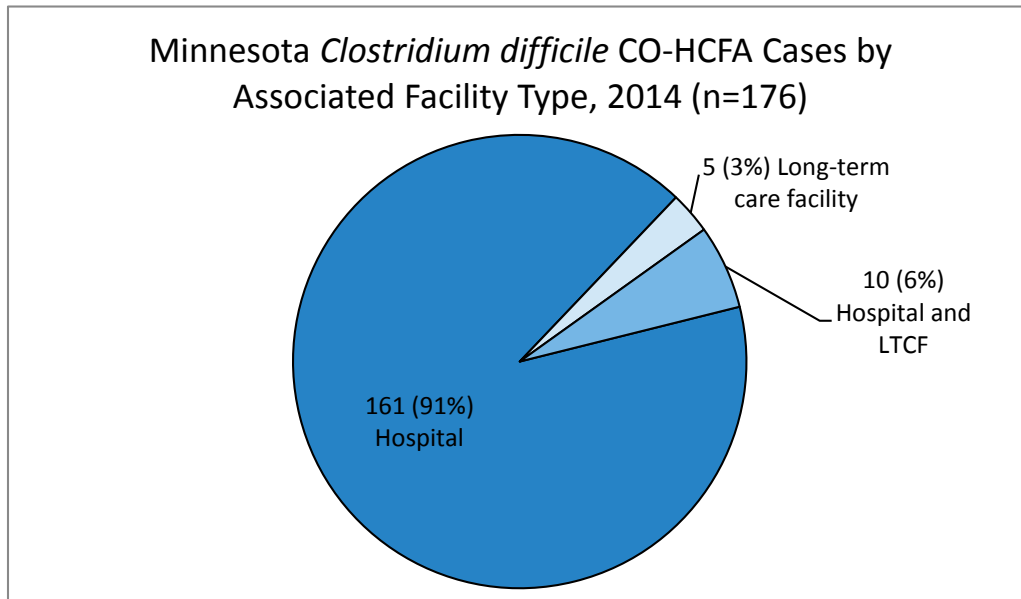
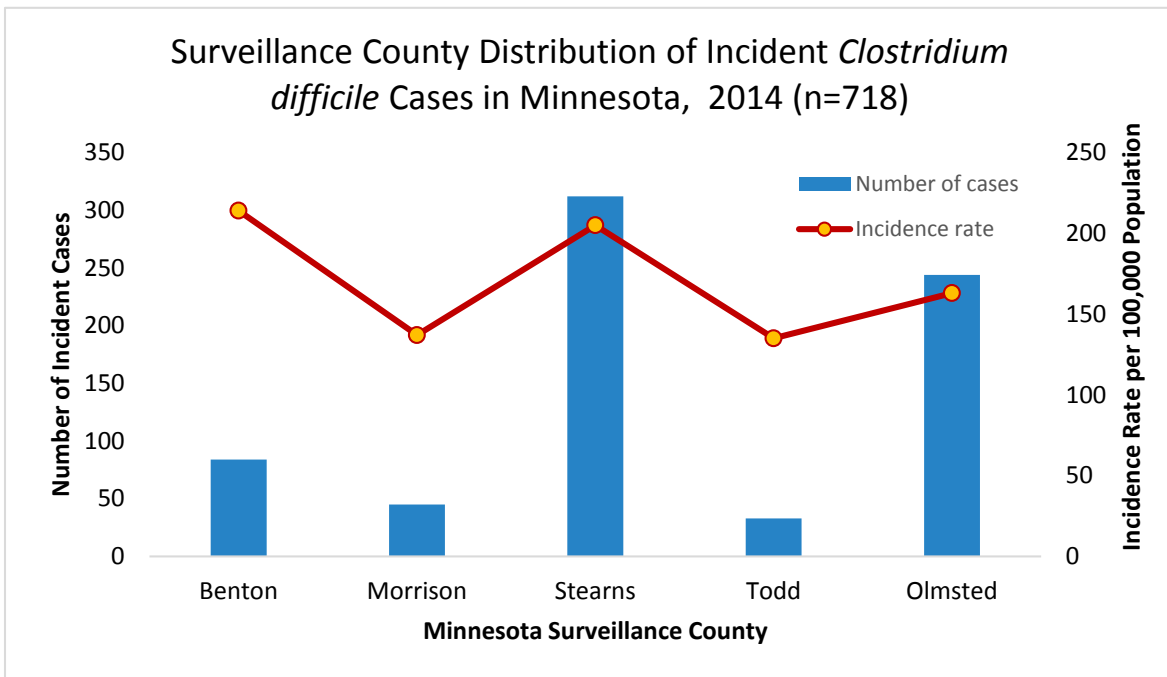


Figure 5



\*Rates are based upon estimated 2013 population (ages ≥1 yr.) data for Benton, Morrison, Stearns, Todd, and Olmsted Counties

Table 1: Number of Cases and Rates of Incident *Clostridium difficile* by Gender and Age Group in Minnesota, 2014

	Incident Cases n (%)	Incidence Rate per 100,000 population*
Gender		
Male	294 (41)	148
Female	424 (59)	213
Age		
1-17 years	48 (7)	53
18-44 years	178 (25)	124
45-64 years	199 (28)	193
65+ years	293 (41)	526
Totals	718	183

\*Rates are based upon estimated 2013 population (ages ≥1 yr.) data for Benton, Morrison, Stearns, Todd, and Olmsted Counties

Figure 6

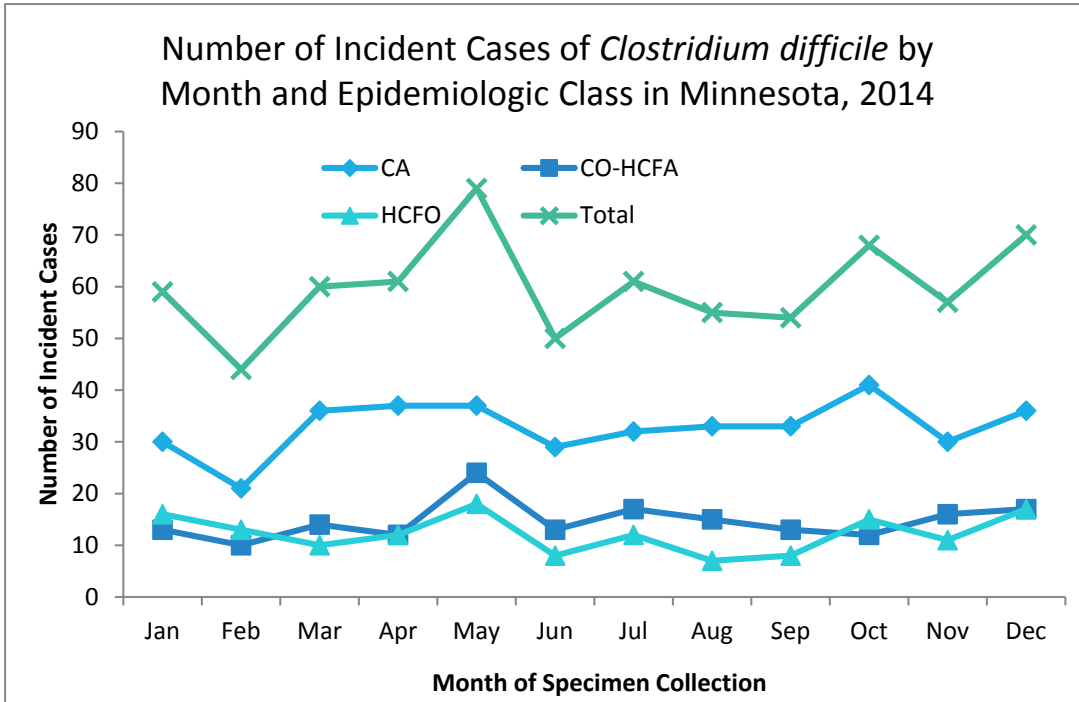
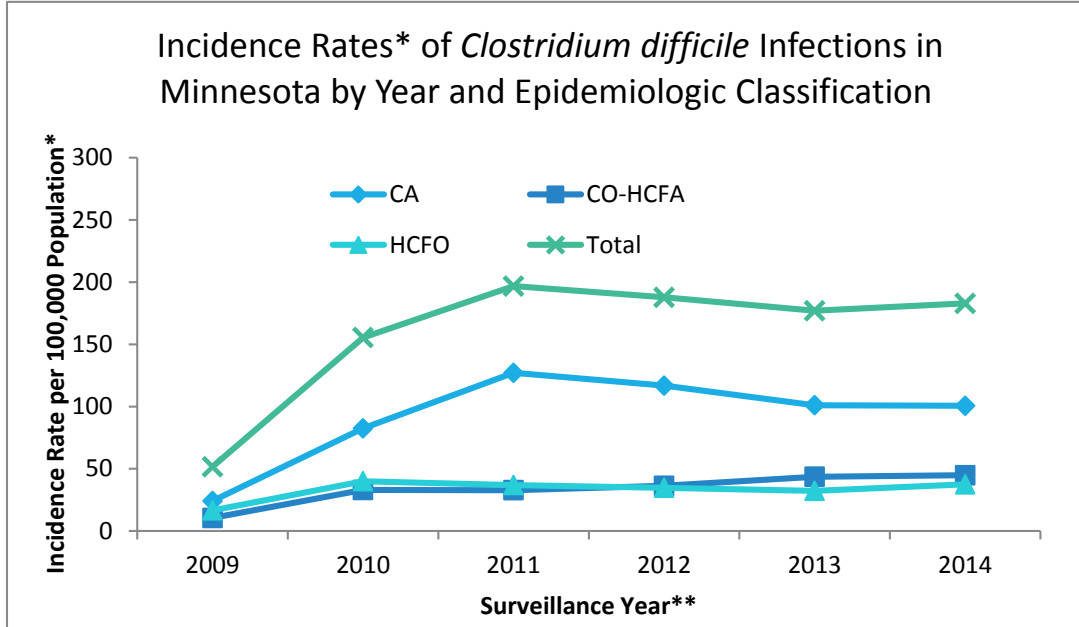


Figure 7



\* Rates are based upon estimated 2013 population (ages ≥1 yr.) data for Benton, Morrison, Stearns, Todd, and Olmsted Counties

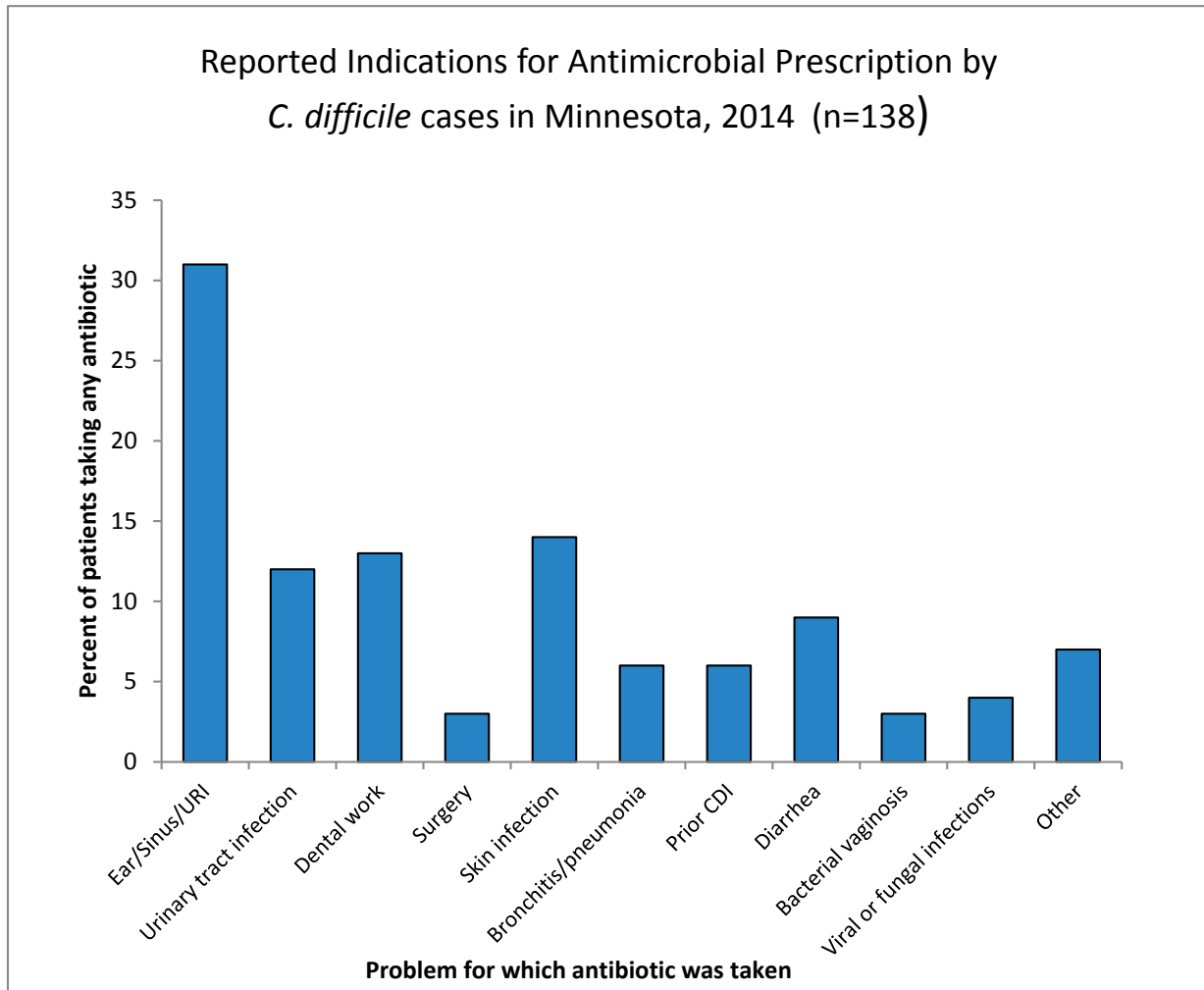
\*\* One major clinical laboratory switched laboratory testing methods from EIA to PCR in 2010

**Table 2: Percent of Cases Prescribed Antibiotics in Previous 12 weeks, According to Medical Record, 2014 (n=718)**

Total	71%
CA	58%
CO-HCFA	86%
HCFO	84%

Attempts to contact all CA cases were made to administer a health interview inquiring about risk factors in the previous 12 weeks, including antibiotic use. 280 health interviews were completed in 2014, 138 (49%) cases reported taking antibiotics in the 12 weeks prior to symptom onset or stool collection.

**Figure 8**



Of the 280 interviewed CA cases, 30 (11%) had no outpatient healthcare and no antibiotic exposure documented in their medical record or reported on interview.



# Discussion

*Clostridium difficile* infections are an important public health concern in Minnesota; the incidence is highest in people age 65 years and older, and women are more often affected than men. A majority of Minnesota's CDI cases have no inpatient or overnight healthcare exposure, and at least 11% of interviewed CA patients had no documented healthcare or antibiotic exposure, the main modifiable risk factors for *C. difficile* infection. This signifies further investigation of community-associated CDI is needed to identify risk factors for acquiring *C. difficile*. In 2014 and 2015 Minnesota participated in a larger case-control study to identify risk factors for community-acquired CDI; results are pending.

Antibiotic use is a known risk factor for CDI; overall, 71% of Minnesota cases in 2014 were prescribed an antibiotic prior to their *C. difficile* infection. Attention to appropriate antibiotic prescribing practices, especially in the case of asymptomatic bacteriuria, upper respiratory illnesses, and dental cleaning prophylaxis, could be an important avenue for CDI prevention.

# Publications Utilizing Minnesota *Clostridium difficile* Surveillance Data

## 1. **DEATH DUE TO COMMUNITY-ASSOCIATED *CLOSTRIDIUM DIFFICILE* IN A WOMAN RECEIVING PROLONGED ANTIBIOTIC THERAPY FOR SUSPECTED LYME DISEASE**

Holzbauer S, Kemperman M, Lynfield R. Death due to community-associated *Clostridium difficile* in a woman receiving prolonged antibiotic therapy for suspected Lyme disease. Clin Infect Dis. August 1, 2010;51(1):369-70. Available at: <http://cid.oxfordjournals.org/content/51/3/369.long>

## 2. **EPIDEMIOLOGY OF COMMUNITY-ASSOCIATED *CLOSTRIDIUM DIFFICILE* INFECTION, 2009 THROUGH 2011**

Chitnis AS, Holzbauer SM, Belflower RM, Winston LG, Bamberg WM, Lyons C, Farley MM, Dumyati GK, Wilson LE, Beldavs ZG, Dunn JR, Gould LH, Maccannell DR, Gerding DN, McDonald LC, Lessa FC. Epidemiology of community-associated *Clostridium difficile* infection, 2009 through 2011. JAMA Intern Med. 2013 Jul; 173(14): 1359-67. Available at: <http://archinte.jamanetwork.com/article.aspx?articleid=1697791>

## 3. **EFFECT OF NUCLEIC ACID AMPLIFICATION TESTING ON POPULATION-BASED INCIDENCE RATES OF *CLOSTRIDIUM DIFFICILE* INFECTION**

Gould CV, Edwards JR, Cohen J, Bamberg WM, Blark LA, Farley MM, Johnson H, Nadle J, Windston L, Gerding DN, McDonald LC, Lessa FC. Effect of nucleic acid amplification testing on population-based incidence rates of *Clostridium difficile* infection. Clin Infect Dis. 2013 November; 57(9):1304-1307. Available at: <http://cid.oxfordjournals.org/content/57/9/1304.long>

## 4. **IMPACT OF CHANGES IN *CLOSTRIDIUM DIFFICILE* TESTING PRACTICES ON STOOL REJECTION POLICIES AND *C. DIFFICILE* POSITIVITY RATES ACROSS MULTIPLE LABORATORIES IN THE UNITED STATES**

Cohen J, Limbago B, Dumyati G, Holzbauer S, Johnston H, Perlmutter R, Dunn J, Nadle J, Lyons C, Phipps E, Beldavs Z, Clark LA, Lessa FC and Investigators CDC's *Clostridium difficile* Infection Surveillance. Impact of changes in *Clostridium difficile* testing practices on stool rejection policies and *C. difficile* positivity rates across multiple laboratories in the United States. J Clin Microbiol. 2014 Feb; 52(2): 632-4. Available at: <http://jcm.asm.org/content/52/2/632.short>

## 5. ***CLOSTRIDIUM DIFFICILE* INFECTION AMONG CHILDREN ACROSS DIVERSE U.S. GEOGRAPHIC LOCATIONS**

Wendt JM, Cohen JA, Mu Y, Dumyati GK, Dunn JR, Holzbauer SM, Winston LG, Johnston HL, Mek JI, Farley MM, Wilson LE, Phipps EC, Beldavs ZG, Gerding DN, McDonald LC, Gould CV, Lessa FC. *Clostridium difficile* infection among children across diverse U.S. geographic locations.

Pediatrics. 2014 April; 133(4): 1-8. Available at:  
<http://pediatrics.aappublications.org/content/early/2014/02/25/peds.2013-3049>

6. **NAP1 STRAIN TYPE PREDICTS OUTCOMES FROM CLOSTRIDIUM DIFFICILE INFECTION**

See I, Mu Y, Cohen J, Beldav ZG, Winston LG, Dumyati G, Holzbauer S, Dunn J, Farley MM, Lyons C, Johnston H, Phipps E, Perlmutter R, Anderson L, Gerding DN, Lessa FC. NAP1 strain type predicts outcomes from *Clostridium difficile* infection. Clin Infect Dis. 2014 May 15; 58(10): 1394-1400. Available at: <http://cid.oxfordjournals.org/content/58/10/1394.long>

7. **DETERMINANTS OF CLOSTRIDIUM DIFFICILE INFECTIONS ACROSS DIVERSE U.S. GEOGRAPHIC LOCATIONS**

Lessa FC, Mu Y, Winston LG, Dumyati GK, Farley MM, Beldavs ZG, Kast K, Holzbauer SM, Meek JI, Cohen J, McDonald LC, Fridkin SK. Determinants of *Clostridium difficile* infections across diverse U.S. geographic locations. Open Forum Infect Dis (Summer 2014) 1 (2): doi:10.1093/ofid/ofu047. Available at: <http://ofid.oxfordjournals.org/content/1/2/ofu048.full>

8. **BURDEN OF CLOSTRIDIUM DIFFICILE INFECTION IN THE UNITED STATES**

Lessa FC, Mu Y, Bamberg WM, Beldavs ZG, Dumyati GK, Dunn JR, Farley MM, Holzbauer SM, Meek JI, Phipps EC, Wilson LE, Winston LG, Cohen JA, Limbago BM, Firdkin SK, Gerding DN, McDonald LC. Burden of *Clostridium difficile* infections in the United States. N Engl J Med. 2015 Feb 26; 372(9): 825-834. Available at: <http://www.nejm.org/doi/full/10.1056/NEJMoa1408913>