Regional Variation in Community-onset and Hospital-Identified *Clostridium difficile* Infection, 2017

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Background

Reporting of *C. difficile* Infection (CDI) to the Center for Disease Control and Prevention’s (CDC) National Healthcare Safety Network (NHSN) is mandatory under the Hospital-Acquired Conditions Reduction program for the vast majority of U.S. acute care hospitals.

NHSN CDI surveillance from U.S. acute care hospitals could aid in understanding granular geographic variation in CDI incidence, especially community-onset CDI (CO-CDI), which is not well understood.

Methods

Community-onset CDI (CO-CDI) Positive CO-CDI stool test collected on or before hospital day 3 (admission was day 1) reported by acute care hospitals to NHSN between January 1 - June 30, 2017.

Hospital-onset CDI (HO-CDI): Similarly defined but with stool collection after hospital day 3.

Hospital referral regions (HRR): Defined by the Dartmouth Atlas of Health Care, represent U.S. tertiary health care markets that generally require the services of a major referral center, defined by determining where patients were referred for major cardiovascular surgical procedures and neurosurgery.

Standardized infection ratios (SIRs): Calculated using separate multivariable models for CDI-CDI and HO-CDI, accounting for facility level factors, and resulted in a ratio of observed to predicted infections, similar to previously established methods.

## Results

### Reporting Data

92,683 CO-CDI events were reported from 4,241 acute care hospitals.

### Model Parameters

- **C. difficile** test type: hospital size, ICU bed size, and ED/Ob's reporting were independently and significantly associated with CO-CDI incidence and included in SIR models.

### CO-CDI Composite SIRs: State-level CO-CDI SIRs ranged from 0.666 to 1.456 (mean 0.961 Figure 1). Among 306 HRRs, the mean number of CO-CDI reporting facilities was 12 (interquartile range [IQR] 5-14), with a mean of 303 (IQR 101-306) CO-CDI events per HRR. HRR SIRs ranged from 0 to 2.271 (median 0.958, Figure 1).

### Hospital-Identified SIRs: An aggregate SIR of CO-CDI Composite and HO-CDI, representing all hospital-identified CDI similarly is shown (Figure 2).

### Conclusions

CO-CDI and HO-CDI reported by acute care hospitals to NHSN varied across the United States. Although adjustments were limited to only facility-level factors, aggregation of CDI SIR by HRR results in increased geographic resolution of CO-CDI burden compared to state maps and may be a beneficial tool for infection preventionists and public health authorities to further understand granular geographical CDI patterns.

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