

***Clostridium difficile* Diagnoses During Hospitalizations, Florida, 2008-2013**

Department of Health
Bureau of Epidemiology
Health Care-Associated Infection Prevention Program

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Background

- *Clostridium difficile* infection (CDI) is a diarrheal disease caused by the bacterium *Clostridium difficile*.
- Symptoms include diarrhea, abdominal cramps, fever, and abdominal tenderness.
- CDI is most frequently associated with health care facility exposure and recent antibiotic use.
- *Clostridium difficile* forms spores, causing it to be difficult to disinfect and allows it to survive within the environment for extended periods of time.

Summary

- Objective: Assess overall burden and associated factors with CDI in Florida.
- An analysis of discharge data from Florida hospitals from 2008-2013 was conducted.
- CDI represents a significant source of morbidity, mortality and excess cost.
- CDI prevalence seems to be increasing from 2008-2013.
- Antibiotic use (especially use of third-generation cephalosporins) are associated with CDI.¹

1. APIC Text 4th Edition.

Morbidity/Mortality

- According to a 2011 CDC study, 453,000 people developed CDI and nearly 29,300 died during that year.¹
- Approximately 10%-20% of initial cases later have a recurrent episode of CDI.²
- CDI represents the leading cause of gastrointestinal death and is the leading health care-associated infection (HAI) in the U.S.^{1,3}

1. Lessa FC, Mu Y, Bamberg WM, et al. Burden of Clostridium difficile infection in the United States. *N Engl J Med*. 2015;372:825-834.

2. Kwon JH, Olsen MA, Dubberke ER. The morbidity, mortality, and costs associated with Clostridium difficile infection. *Infect Dis Clin North Am*. 2015;29:123-134

3. Hall AJ, Curns AT, McDonald LC, Parashar UD, Lopman BA. The roles of Clostridium difficile and norovirus among gastroenteritis-associated deaths in the United States, 1999-2007. *Clin Infect Dis* 2012;55:216-223

Associated Costs

- Recent estimates on cost:¹
 - \$3,427-\$9,960 per incident episode (2012 estimate); \$11,631 per recurrent episode
 - Annual estimates: \$1.2 billion in the US.
- These figures do not account for the emotional/familial burden of extended hospitalization, readmissions, lost productivity, and patient recovery.

1. Dubberke ER, Schaefer E, Reske KA, Zilberberg M, Hollenbeak CS, Olsen MA. Attributable inpatient costs of recurrent *Clostridium difficile* infections. *Infect Control Hosp Epidemiol.* 2014;35:1400-1407.

Definitions

CDI Case – any hospitalization in which the admitting diagnosis, principal diagnosis or any secondary diagnosis indicated CDI (ICD-9 Code: 00845)

Principal Diagnosis – the major diagnosis recorded for the hospitalization

Secondary Diagnosis – a concomitant condition coexisting at admission or acquired during the hospitalization

Discharge Prevalence – the number of patients per 1,000 discharges having a diagnosis of CDI within their discharge diagnoses

Definitions

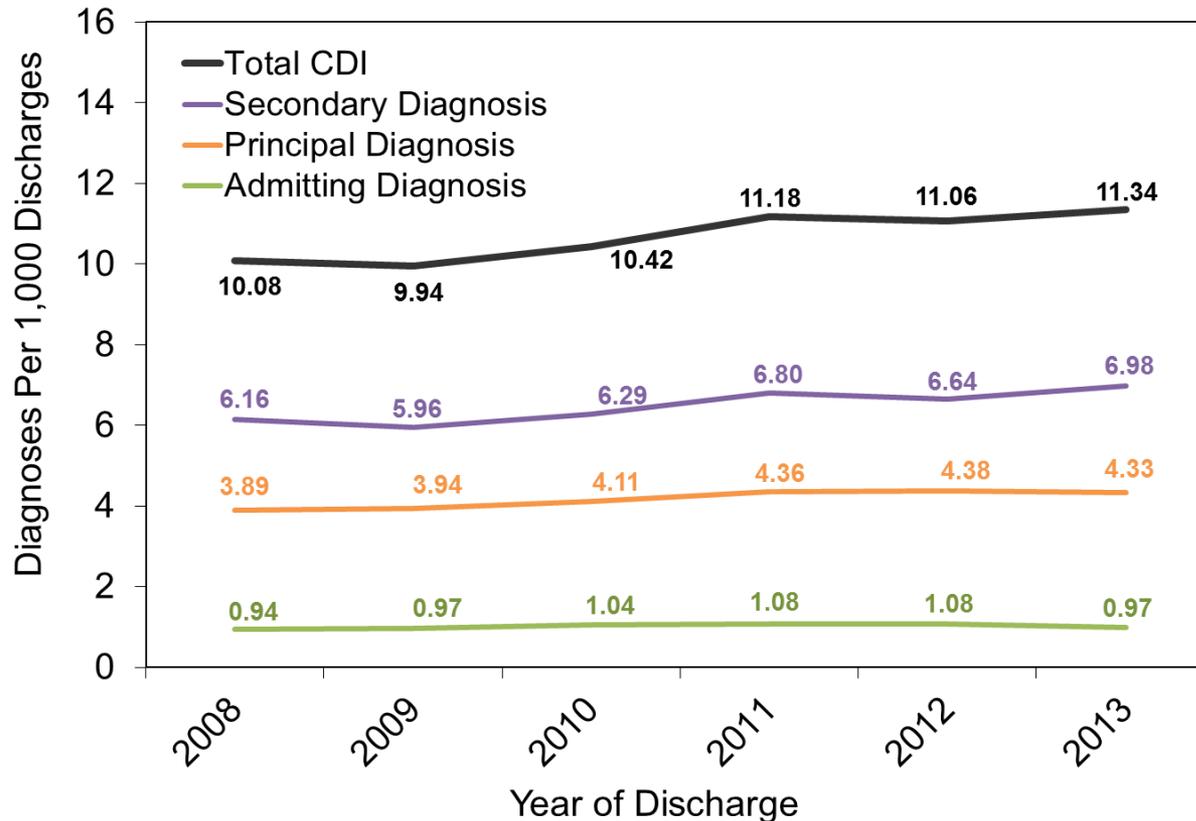
HCFA (health care facility-associated) – CDI diagnosis with previous hospitalization within 4 weeks of diagnosis

CA (community-associated) – CDI diagnosis with no previous hospitalization within 12 weeks of diagnosis

Indeterminate – CDI diagnosis with previous hospitalization between 4-12 weeks of diagnosis

Recurrent CDI – CDI diagnosis with previous CDI hospitalization within 12 weeks of diagnosis

Overall Discharge Prevalence by Year, 2008-2013

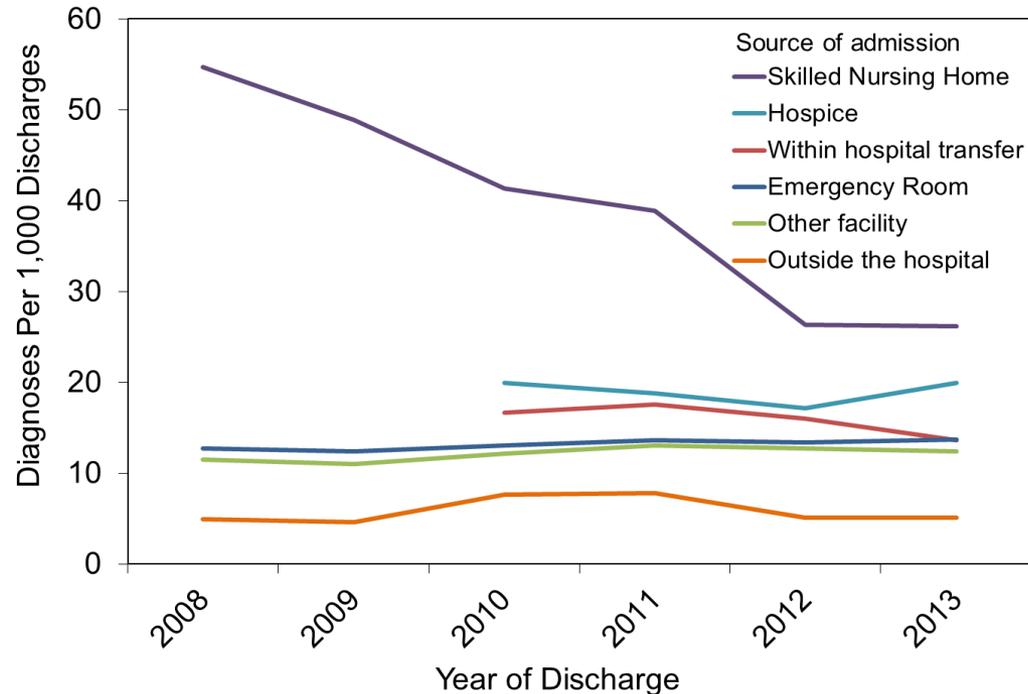


Source: Florida Agency for Health Care Administration (AHCA) Hospital Discharge Database

The discharge prevalence of CDI increased very slightly across the 6 years from 10.08 (95% CI: 9.95, 10.21) CDI diagnoses per 1,000 discharges in 2008 to 11.34 (95% CI: 11.21, 11.48) diagnoses per 1,000 discharges in 2013.

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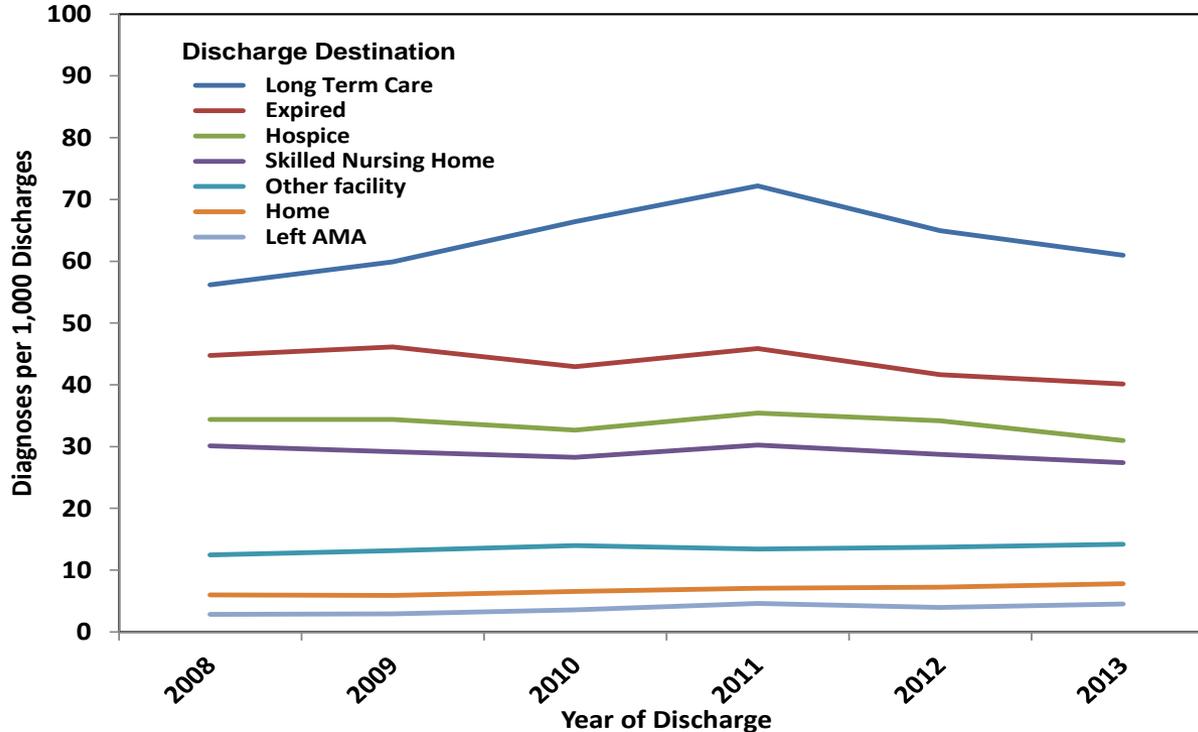
Overall Discharge Prevalence by Admission Source, 2008-2013



Source: Florida Agency for Health Care Administration (AHCA) Hospital Discharge Database

Across the 6-year period, CDI discharge prevalence was highest among patients admitted from skilled nursing facilities, although it declined dramatically from 54.71 (95% CI: 48.03, 61.38) in 2008 to 26.14 (95% CI: 19.78, 32.49) discharges per 1,000 diagnoses in 2013. Other admission sources remained relatively stable across the period.

Overall Discharge Prevalence by Discharge Destination, 2008-2013



Source: Florida Agency for Health Care Administration (AHCA) Hospital Discharge Database

Most patients who had a CDI diagnosis were discharged to long term care (range: 56.18 - 66.4) facilities and skilled nursing facilities (range 27.4 - 30.27), which is characteristic of observed higher prevalence in the older population. The second highest prevalence was among patients who expired (range: 40.11 – 46.11), however, this analysis did not identify the primary cause of death and CDI is often a secondary diagnosis for many with other more serious co-morbidities and co-infections.

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National Health Care Associated Infection Estimates and Targets

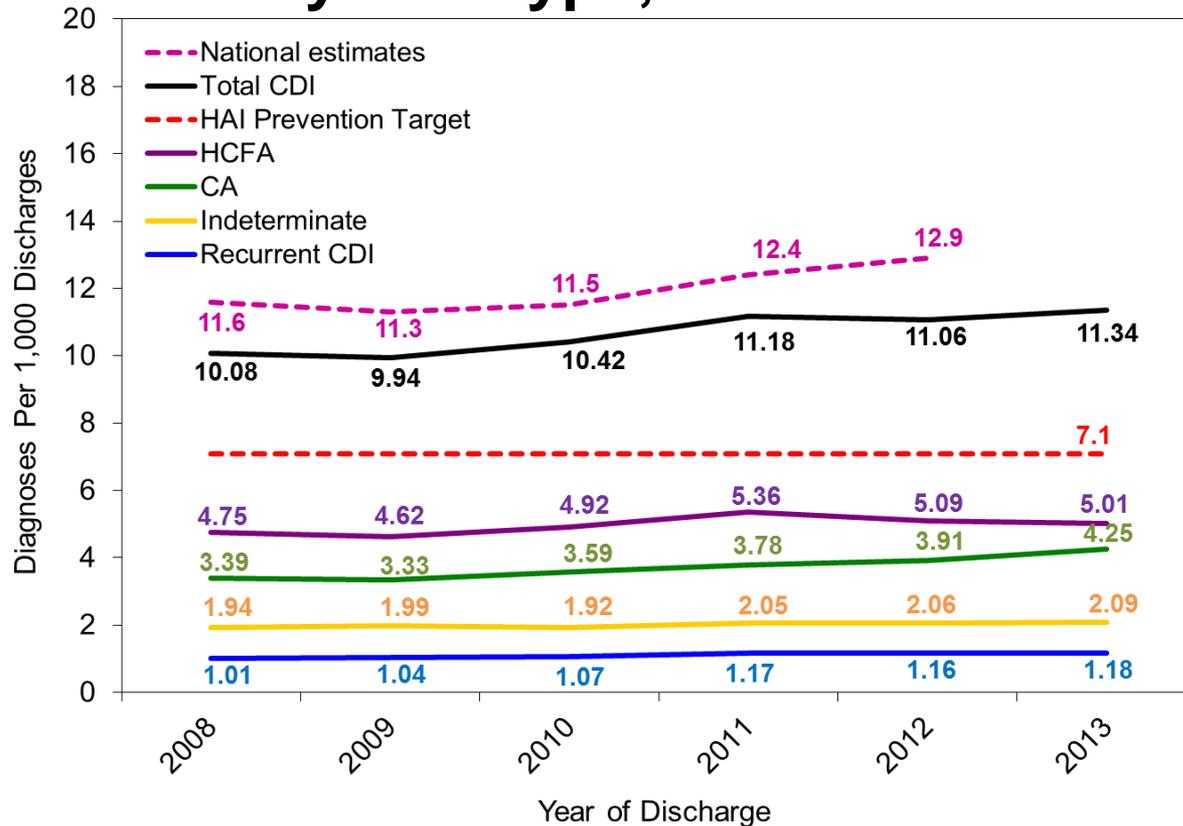
National Estimates

- Derived from Agency for Healthcare Research and Quality (AHRQ) Healthcare Cost and Utilization Project.
- Based on national inpatient discharge data.
- 2012 estimates are the most recent published data available at the time of this report.

HAI Prevention Target

- Part of the Department of Health and Human Services (DHHS) *National Action Plan to Prevent Health Care-Associated Infections: Road Map to Elimination* (HAI Action Plan).
- CDI target set at 30% reduction from baseline (2008)
- Using Florida discharge data, this represents a target of 7.1 infections per 1,000 discharges (2008 baseline, 10.08/1,000 discharges).

Discharge Prevalence by CDI Type, 2008-2013



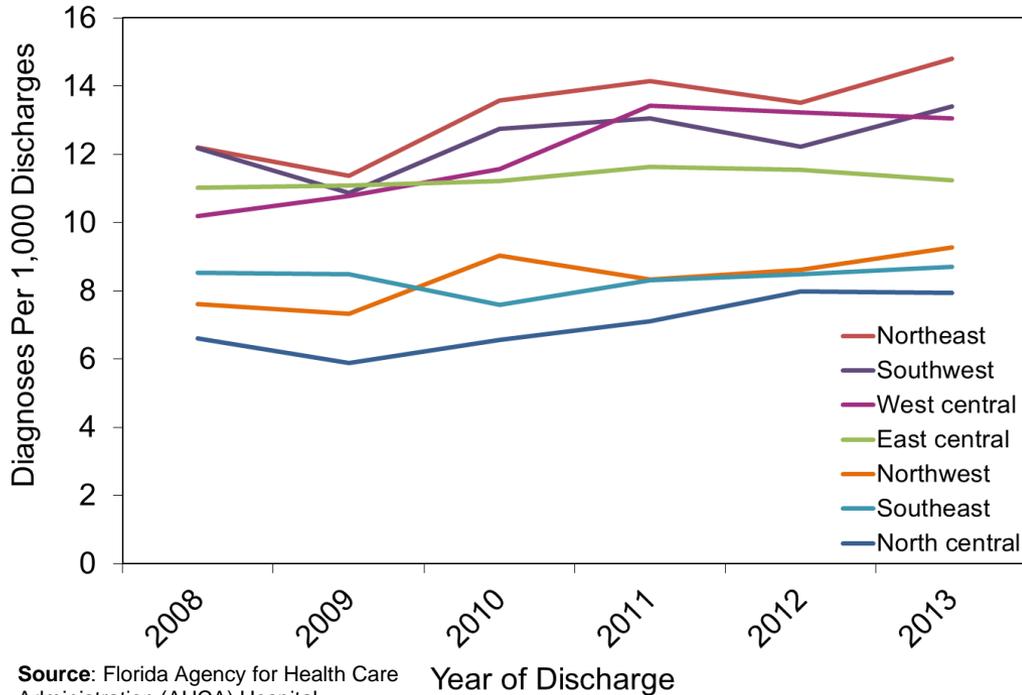
Source: Florida Agency for Health Care Administration (AHCA) Hospital Discharge Database

While total CDI prevalence in Florida remained below national estimates, it also remained above the HAI Prevention Target for the entire period. Health care-facility associated CDI did see a slight decrease from a high of 5.36 per 1000 discharges (95% CI: 5.26, 5.45) in 2011 to 5.01 (95% CI: 4.92, 5.10) in 2013, although this was not statistically significant.

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Overall Discharge Prevalence by Region of Florida, 2008-2013



Source: Florida Agency for Health Care Administration (AHCA) Hospital Discharge Database

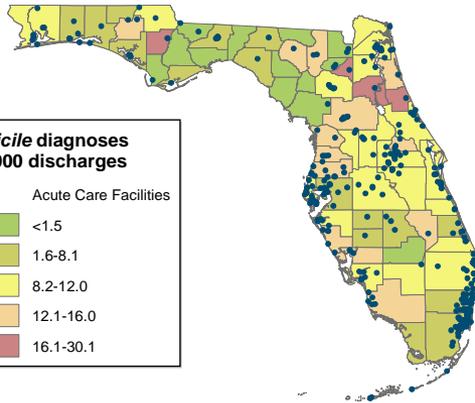
Four of the seven regions (Northeast, Northwest, and Southwest and West Central) saw overall statistically significant increases in CDI discharge prevalence across the 6-year period. The other three regions (Southeast, East Central and North Central) also experienced overall increases, but were not statistically significant.

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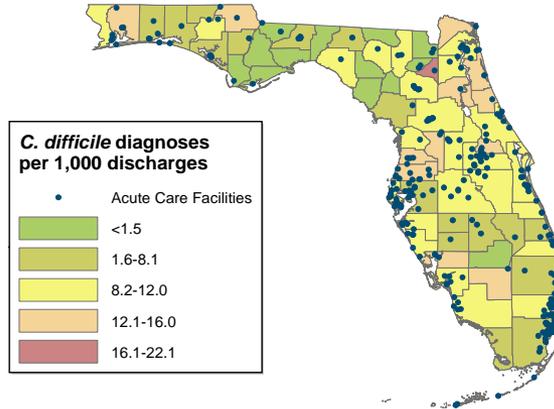


Discharge CDI Prevalence Distribution by Year

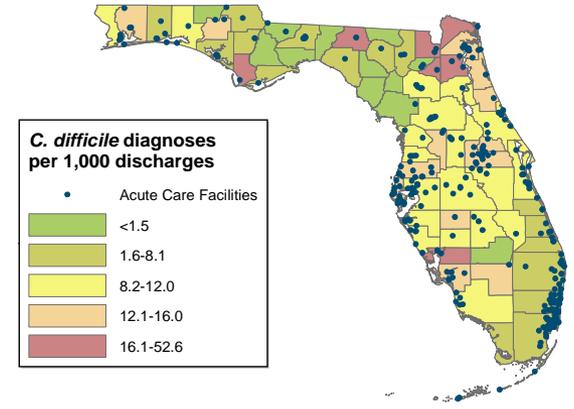
2008



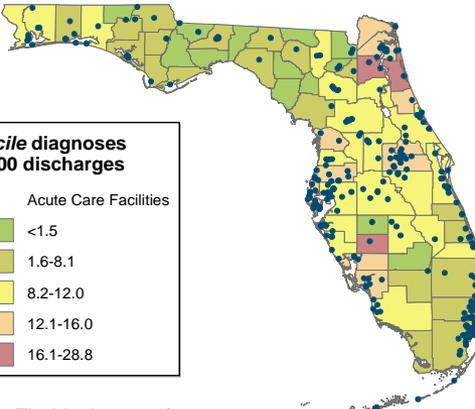
2009



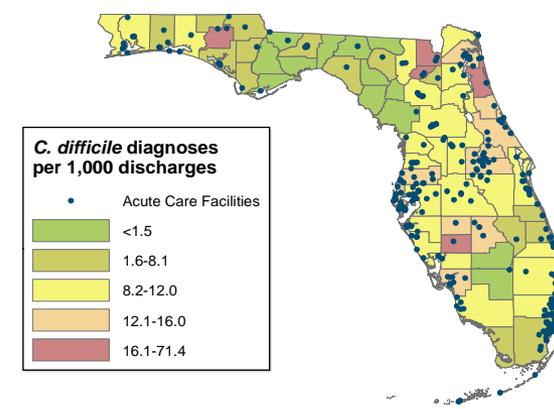
2010



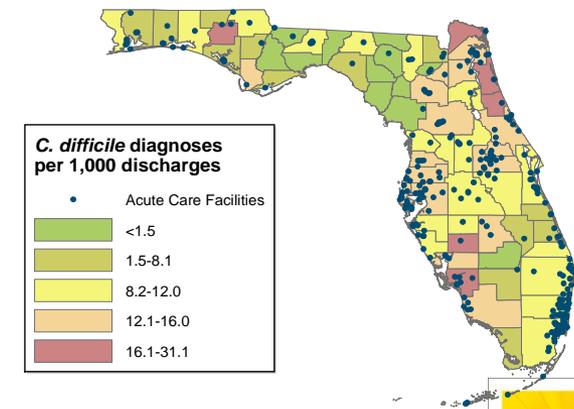
2011



2012



2013



Source: Florida Agency for Health Care Administration (AHCA) Hospital Discharge Database

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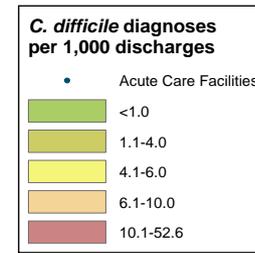
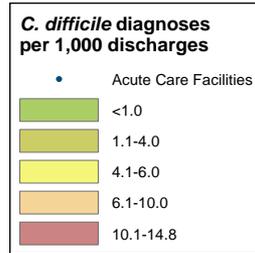
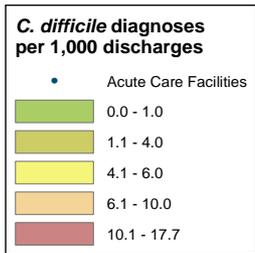


Discharge Health Care-Associated CDI Prevalence by Year

2008

2009

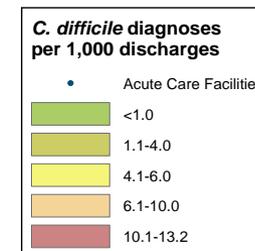
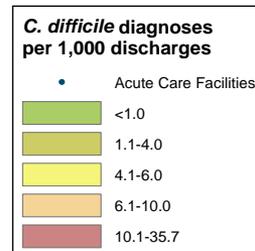
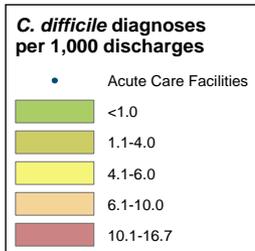
2010



2011

2012

2013

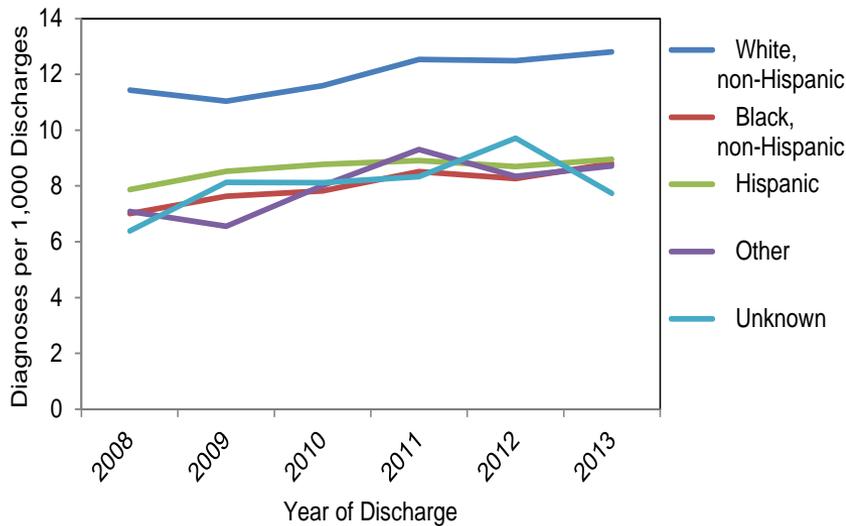


Source: Florida Agency for Health Care Administration (AHCA) Hospital Discharge Database

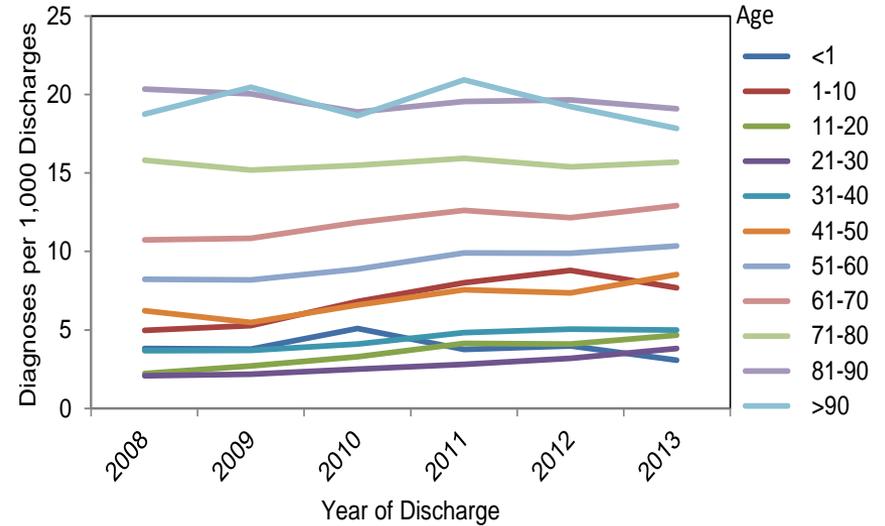
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Overall Discharge Prevalence by Race and Age, Florida, 2008-2013

Race



Age



Across all years, white, non-Hispanics had a statistically significant elevation in discharge prevalence compared to all other groups. Older age groups (51 and over) had significantly higher rates of CDI compared to younger adults, children, and infants (range: 8.22-20.93 per 1,000 discharges).

Source: Florida Agency for Health Care Administration (AHCA) Hospital Discharge Database

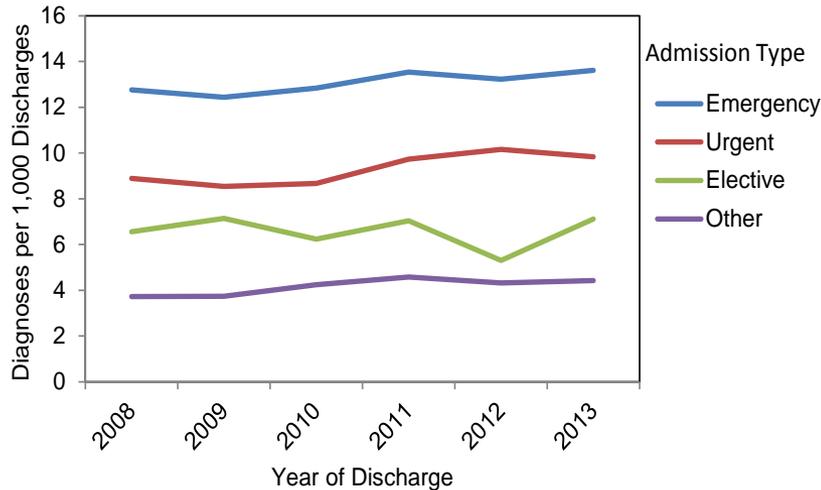
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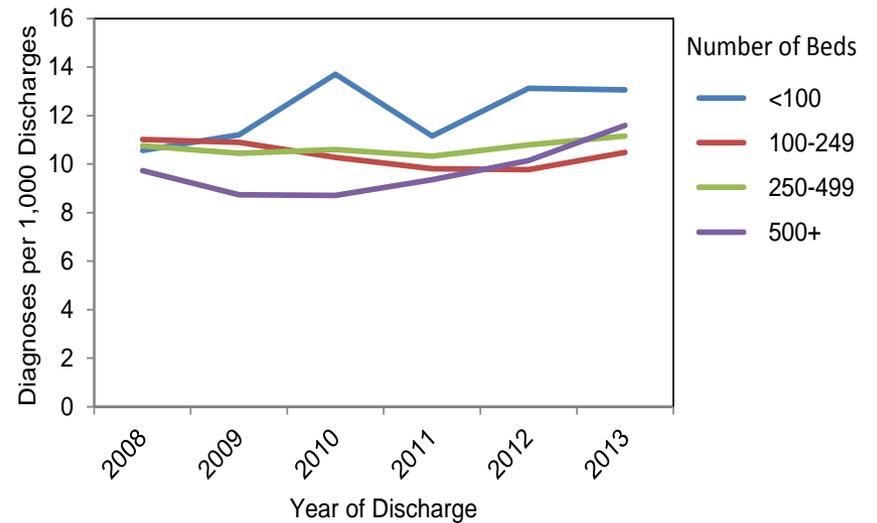
Overall Discharge Prevalence

by Admission Type and Hospital Size, Florida, 2008-2013

Admission Type



Hospital Size



Emergency admissions had a significantly higher prevalence (range: 12.43-13.61 per 1,000 discharges) than urgent or elective admission types across the six year period. Hospitals with less than 100 licensed beds also had elevated discharge prevalence, significant in three of four years (2010, 2012, 2013).

Source: Florida Agency for Health Care Administration (AHCA) Hospital Discharge Database

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Conclusions

- The 6-year CDI discharge prevalence in Florida from 2008-2013 remained below national estimates, however it remained above the DHHS HAI Prevention Target of a 30% reduction in the CDI discharge prevalence (based on 2008 baseline).
- Regions in Northeast, Southwest and West Central and Northwest Florida had higher prevalence of overall CDI as well as pockets of high prevalence of health care-associated CDI.

Conclusions

- Older patients, non-Hispanic white patients, patients admitted emergently and patients admitted from other medical facilities had higher discharge prevalence of CDI.
- Health care facility-associated CDI was a particular problem for facilities with fewer than 100 licensed beds.
- DOH will continue to trend CDI discharge prevalence annually and will identify areas to promote antimicrobial stewardship programs and prevention strategies to reduce incidence and transmission of CDI in health care facilities.

Contact

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