Background. U.S. regional variation in C. difficile infection (CDI) and specifically community-onset CDI (CO-CDI) is not well understood.

Methods. CO-CDI was defined as a positive C. difficile stool test collected on or before hospital Day 3 (admission was Day 1), reported by acute care hospitals to the Centers for Disease Control and Prevention's National Healthcare Safety Network (NHSN) between January 1 and June 30, 2017. Hospital-onset CDI (HO-CDI) was similarly defined but with stool collection after hospital Day 3. Hospital referral regions (HRR) were previously defined by the Dartmouth Atlas of Health Care, and represent 306 U.S. tertiary healthcare markets. Standardized infection ratios (SIRs) were calculated using separate multivariable models for CO-CDI and HO-CDI, accounting for facility-level factors, and resulted in a ratio of observed to predicted infections, similar to previously established methods. SIRs were aggregated within each facility by summing the observed and predicted events across each testing location (emergency department + observation unit [ED/OBS], inpatient), then aggregated by state or HRR by summing all facility observed and predicted events within the region.

Results. A total of 92,683 CO-CDI events were reported from 4,241 acute care hospitals, C. difficile test type, hospital size, ICU bed size, and ED/OBS reporting were independently and significantly associated with CO-CDI incidence and included in SIR models. 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). An aggregate SIR of CO-CDI and HO-CDI, representing all hospital-identified CDI similarly is shown (Figure 2).

Conclusion. 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 regional resolution of CO-CDI burden compared with state maps and may be a beneficial tool for infection preventionists and public health authorities to further understand regional CDI patterns.

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2170. The National Burden of Pneumonia and Influenza in U.S. Nursing Homes, 2013–2015

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Background. National data on pneumonia and influenza (P&I) morbidity is lacking for the U.S. nursing home (NH) population. Our primary objective was to determine the incidence of hospitalization due to P&I.

Methods. This retrospective cohort used nursing home Minimum Data Set clinical assessments and Medicare claims for U.S. nursing home residents. Any resident who stayed in a nursing home from January 1, 2013 through December 31, 2015 was included and classified as short-stay or long-stay (≥100 days in the home). Residents ≥65 years old or enrolled in an HMO plan were excluded. Hospitalizations due to P&I were identified in the first position on Part A claims (ICD9 diagnoses 480.xx–488.xx). Outcomes were reported for 2013–2014, to allow 1-year forward evaluation.

Results. The study cohort comprised 4.2 million NH residents with 2.9% (69%) million short stays. Mean age (SD) was 80.5 (8.4) for short-stays vs. 83.0 (8.5) years for long-stays. Long-stay residents were more likely to be female (66.3% vs. 60.4%), African-American (10.9% vs. 6.6%) and Hispanic (4.1% vs. 2.8%). For long-stay residents, 23.3% had documented coronary artery disease, 23.2% congestive heart failure, 33.2% diabetes and 47.9% dementia. Incidence proportions are reported in Table 1. Short-stay and long-stay residents have a similar risk of hospitalization due to P&I at 1 year (4.1% vs. 4.5%).

Conclusion. The national incidence of one-year P&I hospitalization was 4.1 and 4.5% among short-stay and long-stay NH residents. Vaccination, prompt diagnosis and treatment, hand-washing and environmental cleaning are all important interventions which can further reduce the morbidity of this disease.

Table 1. Incidence of P&I Hospitalizations in Nursing Homes, 2013–2014

|          | Short-Stay Residents (n = 1,790,388) | Long-Stay Residents (n = 673,254) |
|----------|------------------------------------|----------------------------------|
| 30-day   | 19,122 (1.1%)                       | 4,656 (0.5%)                     |
| 180-day  | 50,433 (2.8%)                       | 22,156 (3.3%)                    |
| 365-day  | 72,948 (4.1%)                       | 39,355 (4.5%)                    |

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2171. Comparing Surveillance Definitions for Noncatherter-Associated Urinary Tract Infections

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Background. Patient sharing between hospitals and long-term care facilities (LTCH) is widespread. However, surveillance criteria for noncatheter associated urinary tract infection (UTI) vary by healthcare setting. Consequently, patients with identical features of UTI may meet criteria in LTCH but not in hospitals. A common definition that spans hospitals and LTCH may inform UTI surveillance efforts across healthcare facilities.

Methods. We performed a cohort analysis of all suspected UTI cases in women ≥65 years from 21 LTCH enrolled in a clinical trial evaluating cranberry capsules to reduce bacteriuria plus pyuria from August 2012 to October 2015. We applied 2017 hospital National Healthcare Safety Network (NHSN), 2012 LTCH NHSN, and proposed criteria (Figure 1) to all suspected UTI cases. Proposed criteria were derived from an electronic medical record which included microbiological criteria. They were used to determine surveillance status and compare results to NHSN criteria for UTI.

Results. Of 350 suspected UTI cases, LTCH NHSN criteria detected more UTI (223/350, 63%) compared with hospital NHSN (15/350, 4.3%; P = 0.04) and proposed criteria (15/350, 4.3%; P = 0.02) criteria (Table 1). Half (11/22) of LTCH NHSN UTI included ≥10^5 CFU/mL of organisms from a catheterized urine as the microbiological criterion. Of the hospital NHSN UTI, criteria included 6.3% for catheterized urine. Women with UTI meeting LTCH NHSN criteria were more likely to have a report of bacteriuria plus pyuria from August 2012 to October 2015.

Conclusion. Current hospital and LTCH NHSN criteria both have limitations. The hospital NHSN criteria exclude UTI among older adults as a clinical criterion. The LTCH NHSN criteria include insensitive microbiological criteria. Our proposed surveillance criteria address these limitations and may be generalizable to both hospitals and LTCH.

Table 1. UTI Detection by Surveillance Criteria.

| Criteria | P value |
|----------|---------|
| Hospital NHSN | LTCH NHSN |
| Present | Present | 0.04 |
| Present | Absent | 0.02 |
| Absent | Absent | 0.04 |

2172. Assessment of Cefepime Neurotoxicity in the FDA Adverse Reporting System

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Background. Cefepime is a fourth-generation cephalosporin antibiotic used for the treatment of neutropenic fever, pneumonia, and urinary tract infections. The safety of cefepime is now being questioned as it has recently been implicated as a possible cause for lesser known adverse effects, including neurotoxicity. The objective of this study was to evaluate the association between cefepime and neurotoxicity.

Methods. Adverse drug reactions (ADRs) reported to the U.S. Food and Drug Administration (FDA) from January 1, 2014 to September 30, 2017 were extracted from the FDA’s Adverse Event Reporting System (FAERS). The Medical Dictionary for Regulatory Activities (MedDRA) was used to identify preferred terms that were subsequently used to create a neurotoxicity composite ADR. Reporting Odds Ratios (ROs) and corresponding 95% confidence intervals (95% CI) were calculated for the neurotoxicity composite ADR and for common preferred terms associated with neurotoxicity. An association was considered to be statistically significant if the 95% CI did not include 1.0.

Results. The neurotoxicity composite ADR (consisting of 40+ MedDRA preferred terms) was reported in 13.9% (n = 209/1504) of cefepime reports. Cefepime was three times more likely to have a report of the neurotoxicity composite ADR as compared with other drugs in the FDA’s FAERS database (OR, 2.90; 95% CI, 2.51–3.36). The most frequent individual MedDRA preferred terms for the neurotoxicity composite ADR included (in descending order): “confusional state” (3.1%, 46/1504), “mental status changes” (2.8%, 42/1504), “encephalopathy” (2.3%, 35/1504), “seizure” (2.3%, 34/1504), “myoclonus” (1.8%, 27/1504), and “neurotoxicity” (1.2%, 18/1504). The highest ROs with cefepime vs. other drugs were (in descending order): “myoclonus” 45.0 (30.6–66.1), “encephalopathy” 29.7 (21.2–41.6), “mental status changes” 27.8 (20.4–37.8), “neurotoxicity” 26.7 (16.7–42.6), “confusional state” 4.3 (3.2–5.7), and “seizure” 3.5 (2.5–4.9).

Conclusion. Cefepime was associated with significantly higher odds of myoclonus, oculogyric chorea, mental status changes, neurotoxicity, confusional state, seizure, and a neurotoxicity composite ADR as compared with other drugs. Practitioners should use caution in initiating cefepime in patients at risk for neurotoxicity and monitor closely for ADRs.

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2173. Surgical Site Infection Determination in Epic ICON: A Utilization Model

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Background. Prior to 2016, our hospital used microbiology results alone to investigate surgical site infections (SSI). Previous studies have shown that this practice can miss as many as half of clinically significant infections. To improve accuracy for fiscal year 2016 SSI surveillance was done by manual chart review of 100% of the surgeries we report to NHSN. While more accurate, this process was time and labor intensive. In May 2016, we began using Epic ICON as our data mining software. ICON can abstract data and determine SSIs, provide a numerator for SSI surveillance, and subsequently use to create a neurotoxicity composite ADR. Reporting Odds Ratios (ROs) and corresponding 95% confidence intervals (95% CI) were calculated for the neurotoxicity composite ADR and for common preferred terms associated with neurotoxicity. An association was considered to be statistically significant if the 95% CI did not include 1.0.

Methods. Algorithm variables within Epic ICON were modified to limit data collection to the following parameters: readmission, chief complaint, surgical log, diagnosis, antibiotic administration post 48 hours, and specific microbiology results. We excluded 31 keywords that were part of the Epic ICON foundation system from our algorithm. For example, we removed the keyword “infection” which flagged whenever “no infection” was charted. The chief complaints grouper was most important as it allowed only meaningful complaints to be considered. Microbiology results were also limited to only include Aerobic, Anaerobic, Fungi, AFB, and wound cultures. To validate the algorithm, it was run retrospectively for fiscal year 2016.

Results. There was 100% concordance of results comparing SSIs identified using chart review to the use of our automated algorithm and Table 1 shows the average number of charts requiring review pre and post implementation.