

Figure 1: *Escherichia coli* Antibiotic Non-Susceptibility Rates Among Infants Admitted to Neonatal Intensive Care Units (2009 – 2017)

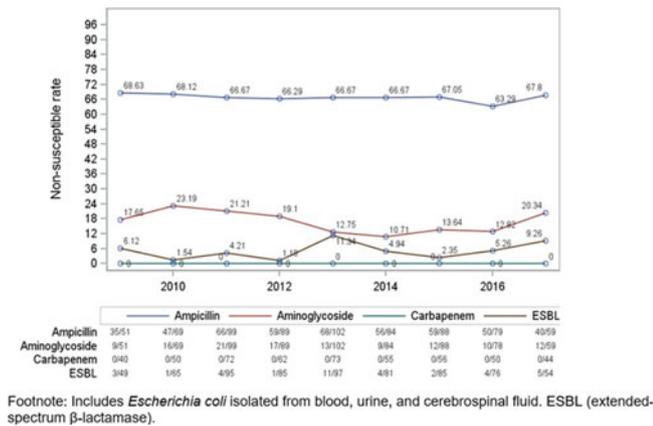


Fig. 1.

Presentation Type:

Oral Presentation

Evaluating Facility Characteristics and Connectivity Metrics as Predictors of *Clostridioides difficile* Rates in Nursing Homes, Atlanta, GA

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Background: Nursing home (NH) residents are at high risk for *Clostridioides difficile* infection (CDI) due to older age, frequent antibiotic exposure, and previous healthcare exposure. Incidence of CDI attributed to NHs is not well established, but it is

hypothesized to be related to the magnitude of transfers. We evaluated the relationship between NH CDI incidence and facility characteristics to explain variability in rates in Atlanta, Georgia. **Methods:** Incident *C. difficile* cases from 2016 to 2018 were identified through the Georgia Emerging Infections Program (funded by the Centers for Disease Control and Prevention), which conducts active population-based surveillance in the 8-county metro Atlanta area. An incident case was defined as an NH resident with a toxin-positive stool specimen (without a positive test within 8 weeks). Sampled (1 to 3 on age and gender) incident cases were attributed to a NH if a patient was an NH resident within 4 days of specimen collection. Facility characteristics (beds, resident days, admissions, and average length of stay [ALOS]) were obtained from NH cost reports, and facility-specific connectivity metrics were calculated (indegree and betweenness) from 2016 Medicare claims data. Case counts were aggregated to estimate yearly incidence and correlated with facility characteristics and location within the healthcare network using the Spearman correlation. A negative binomial model was used to assess residual variability in NH CDI incidence. **Results:** In total, 386 incident CDI cases were attributed to 64 NHs (range, 0–27). Approximately half (54.7%) resided in the NH at the time of specimen collection; however, 33.7% were in inpatient units (≤4 days of admission), and 10.9% were in an emergency room (ER). The frequency of NH CDI cases correlated strongly with admissions ($r = .70$; $P < .01$), inversely with ALOS ($r = -0.53$; $P < .01$), and moderately with resident days ($r = .38$; $P < .01$). After accounting for admissions, incidence (per 1,000 admissions) still varied (Fig. 1) (median 14; range, 0–34). The inverse association with ALOS decreased and incidence no longer correlated with the remaining facility characteristics or location within the healthcare transfer network ($P > .05$, all comparisons). However, there was residual correlation with connectivity metrics (indegree $r = 0.26$; $P = .04$). **Conclusions:** Our data suggest that attributing CDI to NHs requires the inclusion of hospital and ER-based specimen collection. NH CDI incidence appears highest among facilities with a low ALOS and a high number of admissions; incidence rates calculated per 1,000 admissions may best account for infection risk inherent early in a resident's stay. Residual variability attributed to connectivity to the

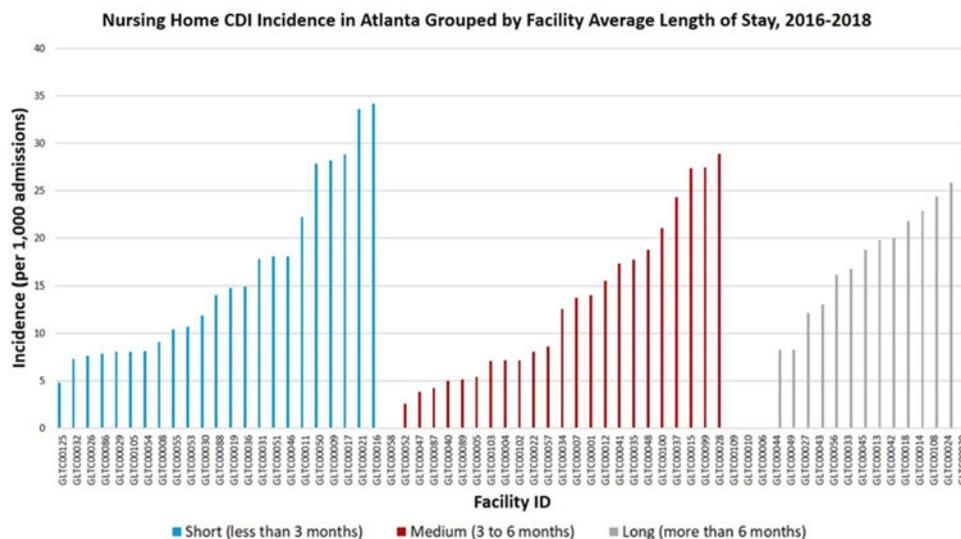


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healthcare network was of borderline significance and should be further explored in the NH setting.

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Evaluation of Care Interactions Between Healthcare Personnel and Residents in Nursing Homes Across the United States

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Figure 1: Distribution of interactions by unit type and HCP role

HCP Role	Long-Term N (%) Facility IQR	Mixed N (%) Facility IQR	Short Stay/Rehab N (%) Facility IQR	Ventilator/Skilled Nursing N (%) Facility IQR	HCP Interviewed per Unit* Mean (IQR)	Interactions per HCP* Mean (IQR)
CNA	1882 (60.1%) 52.0 - 70.1%	345 (55.2%) 41.7 - 57.8%	1061 (50.3%) 40.8 - 55.8%	429 (42.7%) 27.5 - 39.7%	4.5 (3 - 5)	15.5 (9 - 20)
Nurse	856 (27.4%) 26 - 33.8%	250 (40.0%) 37.8 - 47.8%	786 (37.3%) 29.8 - 47.6%	480 (47.8%) 34.4 - 50.8%	2.9 (2 - 3)	16.5 (9 - 22)
PT/OT	33 (1.1%) 1.2 - 3.9%	30 (4.8%) 9.6 - 11.3%	129 (6.1%) 3.4 - 10.7%	31 (3.1%) 4.0 - 8.6%	2.1 (1 - 3)	4.2 (2 - 6)
Other**	358 (11.4%) 1.5% - 40.7%	-	132 (6.3%) 5.1 - 15.4%	55 (5.5%) 13.9 - 22.9%	3 (1 - 5)	10.1 (4 - 15)
Physician	-	-	1 (0.05%) 0.3 - 0.3%	2 (0.2%) 16.8 - 16.8%	1 (1 - 1)	1.5 (1 - 2)
RT	-	-	-	182 (15.3%) 9.2 - 2.1%	2.3 (1 - 3)	13 (4 - 20)
PA/NP	-	-	-	8 (0.8%) 3.3 - 3.3%	1 (1 - 1)	4 (4 - 4)

*Number of HCPs and interactions are from entire shifts
**Other HCP roles included: speech pathologist; restorative nurse aides with PT/OT and CNA care; medication aides; nursing or CNA students

Figure 2: Clustered linear regression of average number of unique tasks types per interaction

	Estimate	Std. Error	p
Baseline			
CNA in Long-term care unit	2.06	0.09	<0.0001
Unit Type			
Mixed	0.12	0.13	0.3472
Short Stay/Rehab	0.00	0.09	0.9600
Ventilator/Skilled Nursing	0.42	0.22	0.0495
HCP Role			
Nurse	-0.74	0.10	<0.0001
Other*	-0.53	0.13	<0.0001
PA/NP	-1.48	0.22	<0.0001
Physician	-1.34	0.25	<0.0001
PT/OT	-0.61	0.20	0.0018
RT	-1.13	0.24	<0.0001

*Other HCP roles included: speech pathologist; restorative nurse aides with PT/OT and CNA responsibilities; medication aides; nursing or CNA students

Fig. 1.