

**Presentation Type:**

Poster Presentation - Poster Presentation

**Subject Category:** MDR GNR**A retrospective longitudinal observational study of natural history of ESBL/MDR gram negative organisms in patients hospitalized in a tertiary hospital**

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**Background:** The IDSA recommends that when determining empiric treatment for a given patient, clinicians should consider previous organisms and associated antibiotic susceptibility data in the prior 6 months when multi-drug-resistant/extended-spectrum  $\beta$ -lactamase gram-negative rods (MDR/ESBL GNR) is suspected. The presence of MDR GN in cultures on previous hospitalization or in surveillance cultures leads to use of broader-spectrum empiric antibiotic in subsequent admissions. We sought to determine whether the presence of an MDRO in 1 hospital admission dictates the need for broader-spectrum antibiotic use in subsequent hospitalizations when a different site is considered the source of infection. **Methods:** The study was conducted at a 700-bed tertiary-care level I trauma center. Infection control records were reviewed for patients aged 21–99 years admitted between July 1, 2013, through January 31, 2014, who had any ESBL or MDR GNR at any site including surveillance culture. The charts were surveyed until January 31, 2016, for ESBL or MDR gram-negative organisms at any site during subsequent hospitalizations. The CDC definition of MDR/ESBL was applied. **Results:** Of the 50 people followed, 34 patients (68%) had ESBL/MDR recovered at a single sentinel site, 6 patients (12%) had ESBL/MDR in multiple sites, and in 10 patients (20%) had ESBL/MDR only in surveillance cultures during their primary hospitalization. In 34 patients with a single sentinel site MDRO/ESBL in their primary hospitalization, 16 (47%) were identified in urine, 13 (38%) were identified by bronchoalveolar lavage (lung), 4 (12%) were identified on skin or MS, and 1 (3%) was identified at another site. When lung and urine were the sole sites of recovery of MDRO/ESBL in primary hospitalization, respectively, 3 patients (23%) and 2 patients (12.5%) subsequently developed MDROs in a secondary site on subsequent admissions. Overall, 10 bacteremia episodes occurred in 8 patients among 189 total admissions. MDRO/ESBL *Klebsiella* spp were identified in the cultures of 5 patients (50%), MDRO *Acinetobacter* spp were identified in the cultures of 3 patients (30%), and ESBL *E. coli* was identified in the cultures of 2 patients (20%). The organism causing bacteremia was present at a different sites during the same admission in only 3 (30%) of these cases: 2 were cultured from urine and 1 was cultured from a pulmonary source. **Conclusions:** The presence of MDRO at 1 site in a previous hospitalization may not be sufficient evidence to justify very broad antibiotics for patients during subsequent admissions, especially when another site is considered the source of infection. More studies are needed on natural history of MDRO in different patient populations with different risk factors.

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**Presentation Type:**

Poster Presentation - Poster Presentation

**Subject Category:** MDR GNR**Low function and frequent readmission in nursing home patients with persistent resistant gram-negative bacterial colonization**

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**Background:** Persistent colonization with resistant gram-negative bacteria (R-GNB) increases risk of clinical infection and intra-facility transmission among nursing home (NH) patients. Limited data exist on the roles of age and function on duration of R-GNB colonization. **Methods:** Secondary data analysis was performed from a cohort study of patients admitted to 6 Michigan NHs between November 2013 and May 2018. Swabs obtained upon enrollment, day 14, day 30, then monthly until NH discharge from 6 anatomical sites were cultured for GNB. R-GNB were defined as resistant to ciprofloxacin, ceftazidime, or imipenem. Positive R-GNB culture from a

single visit followed by negative cultures for the same organism from  $\geq 2$  subsequent visits were defined as transient R-GNB colonization. All other patients with positive R-GNB cultures from multiple visits were considered persistently colonized. Demographic data, antibiotic use, device use, and physical self-maintenance scales (PSMSs) were obtained upon enrollment. Characteristics were compared between patients with transient versus persistent R-GNB and uncolonized patients using multinomial logistic regression. **Results:** We recruited 896 patients (median age, 75 years; 41% male; 46% nonwhite) and followed them for 2,437 total visits. Of 896 patients, 407 (45.4%) were colonized with  $\geq 1$  R-GNB during their stay. Of 171 patients with  $\geq 2$  follow-up visits after R-GNB detection, 94 (55%) remained persistently colonized with the same R-GNB (Table 1). *Escherichia coli* (30%) and *Proteus mirabilis* (22%) were the most frequently identified R-GNB. The most common anatomical colonization sites were perirectal (368 [24.3%] of 1,147) groin (340 [14.3%] of 2,046), and hands (115 [4.8%] of 2283). Compared to uncolonized patients, patients with persistent (1.09; 95% CI, 1.00–1.19,  $P = .048$ ) and transient R-GNB colonization (1.13; 95% CI, 1.04–1.23;  $P = .003$ ) had lower PSMS (Tables 2 and 3). Compared to uncolonized and transiently colonized patients, patients with persistent R-GNB colonization had prolonged

**Table 1: Patient Demographics by R-GNB Colonization Status**

	Total Cohort (n=318)	Newer R-GNB Colonization (n=147)	Transient R-GNB Colonization (n=77)	Persistent R-GNB Colonization (n=94)	P value
Age, median (IQR)	75 (65-85)	77 (66-86)	75 (64-85)	74 (65-82)	0.396
Male gender	130 (40.9%)	65 (44.2%)	29 (37.7%)	36 (38.3%)	0.531
Non-white race	145 (45.6%)	59 (40.1%)	38 (49.4%)	48 (51.1%)	0.189
Charlson Score, median (IQR)	2 (1-4)	2 (1-4)	2 (1-4)	2 (1-4)	0.9057
Dementia	69/317 (21.8%)	23/146 (15.8%)	20/77 (26.0%)	26/94 (28.0%)	0.055
PSMS score, median (IQR)	14 (11-19)	13 (11-17)	16 (12-19)	17 (14-21)	<0.001
Indwelling Device Upon Admission	58 (18.2%)	17 (11.6%)	18 (23.4%)	23 (24.5%)	0.017
Open Wounds	61/317 (19.2%)	19/146 (13.0%)	14/77 (18.2%)	28 (29.8%)	0.005
Hospital LOS Prior to NH admission, median (IQR)	6 (3-10)	6 (4-10)	5 (3-11)	6 (3-10)	0.3912
Duration of study follow-up, median (IQR)	28.5 (27-62)	28 (22-33)	29 (27-61)	61 (28-175)	<0.001
Duration prior to first colonization/study exit, median (IQR)	14 (0-28)	28 (22-33)	0 (0-9)	0 (0-6)	<0.001
Antibiotics upon enrollment (any)	175/303 (57.8%)	78/142 (54.9%)	44/72 (61.1%)	53/89 (59.6%)	0.633
<b>Outcomes</b>					
Re-hospitalization	86 (27.0%)	28 (19.1%)	20 (26.0%)	38 (40.4%)	0.001
Clinical Infection (after first colonization), any	100 (31.5%)	37 (25.2%)	27 (35.1%)	36 (38.3%)	0.074
UTI	54 (17.0%)	21 (14.3%)	12 (15.6%)	21 (22.3%)	0.249
Pneumonia	16 (5.0%)	6 (4.1%)	4 (5.2%)	6 (6.4%)	0.726
SSTI	20 (6.3%)	7 (4.8%)	4 (5.2%)	9 (9.6%)	0.292
<i>C. difficile</i>	5 (1.6%)	2 (1.4%)	1 (1.3%)	2 (2.1%)	0.875

**Table 2: Unadjusted Multinomial Analysis of Patient Characteristics Associated with Colonization Status**

	Transient vs Uncolonized RRR (95% CI)	P value	Persistent vs Uncolonized RRR (95% CI)	P value	Persist vs Transient RRR (95% CI)	P value
Age	0.99 (0.98-1.01)	0.452	0.99 (0.97-1.00)	0.127	0.99 (0.97-1.01)	0.334
Male gender	0.76 (0.40-1.44)	0.401	0.78 (0.52-1.18)	0.239	1.03 (0.57-1.84)	0.928
Nonwhite race	1.45 (0.77-2.76)	0.253	1.56 (0.76-3.21)	0.230	1.07 (0.71-1.62)	0.745
Charlson	1.00 (0.94-1.07)	0.941	1.02 (0.98-1.07)	0.361	1.02 (0.96-1.08)	0.530
Dementia	0.175 (0.76-4.66)	0.175	2.04 (0.96-4.37)	0.065	1.09 (0.52-2.28)	0.819
PSMS score	1.09 (1.03-1.16)	0.004	1.16 (1.09-1.22)	<0.001	1.06 (0.99-1.13)	0.081
Indwelling Device on admission	2.33 (1.27-4.30)	0.007	2.48 (1.37-4.48)	0.003	1.06 (0.64-1.75)	0.815
Open Wounds	1.49 (0.68-3.24)	0.319	2.84 (1.27-6.36)	0.011	1.91 (0.66-5.53)	0.234
Hospital LOS Prior to NH	1.01 (0.97-1.05)	0.705	1.01 (0.98-1.04)	0.547	1.00 (0.97-1.03)	0.942
Duration of study follow-up	1.01 (1.00-1.02)	0.003	1.02 (1.01-1.03)	<0.001	1.01 (1.00-1.01)	<0.001
Days to 1st Positive Cx or DC	0.91 (0.87-0.97)	0.002	0.91 (0.86-0.96)	0.001	0.99 (0.95-1.04)	0.805
Antibiotics Upon Enrollment (any)	1.29 (0.72-2.32)	0.398	1.21 (0.56-2.59)	0.627	0.94 (0.68-1.30)	0.694
<b>Outcomes</b>						
Re-hospitalization	1.49 (0.81-2.74)	0.198	2.88 (1.78-4.68)	<0.001	1.93 (1.01-3.72)	0.048
Clinical Infection (after first colonization), dichot	1.61 (0.82-3.15)	0.169	1.85 (0.89-3.82)	0.099	1.15 (0.53-2.50)	0.725
UTI	1.11 (0.62-1.99)	0.731	1.73 (1.08-2.76)	0.023	1.56 (0.89-2.73)	0.121
Pneumonia	1.29 (0.72-2.30)	0.391	1.60 (0.38-6.68)	0.517	1.24 (0.36-4.25)	0.727
SSTI	1.10 (0.38-2.17)	0.866	2.12 (0.66-6.85)	0.210	1.93 (0.72-5.18)	0.191
<i>C. difficile</i>	0.95 (0.08-11.19)	0.970	1.58 (0.42-5.92)	0.500	1.65 (0.32-8.64)	0.552