System. Georgia vital records data were used to determine 90-day mortality rates. Prevalence estimates were calculated. Comparisons used a χ² test.

**Results.** Of 1,511 CRE cases, 136 (9%) were on current chronic dialysis, 128 (94%) of which were on hemodialysis (HD) and 3 (4%) were on peritoneal dialysis. Among CRE cases with HD, 94 (73%) had a catheter and 30 (23%) had an arteriovenous fistula or graft. CRE cases with ERSD were more likely to be on dialysis (58% vs. 40%), black (76% vs. 38%), and have diabetes (67% vs. 38%), congestive heart failure (25% vs. 17%), or peripheral arterial disease (12% vs. 4%). CRE cases with ERSD had more hospitalizations within 30 days of the culture date (77% vs. 47%), ICU admissions prior to (29% vs. 7%) or after the culture date (43% vs. 14%) and discharges to LTCFs (35% vs. 15%) after hospitalization. CRE cases with ERSD and bacteremia were more likely to have been hospitalized >3 days before the culture compared with CRE cases with ERSD and positive cultures from other body sites (52% vs. 24%). The 90-day mortality rate per 100,000 population was higher among CRE cases with ERSD (109.9 cases) than without ERSD (1.0 cases).

**Conclusion.** Among a population-based cohort of patients with CRE infections, ERSD comprised ~10% but had markedly mortality, suggesting that future interventions should target ERSD.

**Disclosures.** No reported disclosures.

505. Making of a “Super-Duper Bug”: Plasmid-Mediated Resistance Accumulation in a Carbapenemase-Producing Klebsiella quasipneumoniae from Patients and the Environment

Amy J. Mathers, MD, D(ABMM)1; Anna Sheppard, PhD2; Nicole Stoesser, MBMB, PhD3; Derrick Crook, MBBS4; Katie E. Barry, MS5; David Eyre, MBBS, PhD6; Kasi R. Vegesana, MBBS7 and Hardik Parikh, PhD3

1University of Georgia, Athens, Georgia; 2University of Alabama at Birmingham, Birmingham, Alabama; 3University of Virginia, Charlottesville, Virginia; 4Oxford University, Oxford, UK

**Session:** 54. HAI – MDRO – GNR Epidemiology, CRE

**Thursday, October 3, 2019: 12:15 PM**

**Background.** Carbapenemase-producing Enterobacteriaceae can form a reservoir in hospital wastewater biofilms. Klebsiella quasipneumoniae is increasingly recognized as an emerging nosocomial threat, frequently carrying antimicrobial resistance (AMR) genes on plasmids. The dynamics of AMR gene and plasmid gain/loss over time in this species remain unclear.

**Methods.** Klebsiella quasipneumoniae carbapenemase producing K. quasipneumoniae (KPC-Kq) isolates from patients and wastewater sites from drains and toilets were sequenced (Illumina). Sequence assemblies (SPAdes) were probed in silico for AMR genes and plasmid Incompatibility types (using AMRFinder and PlasmidFinder databases, respectively). For related isolates (<100 SNV) cultured from the same sites longitudinally, we compared the accumulation of AMR genes in patients and environmental reservoirs over time.

**Results.** From 2009 to 2016 there were a total of 15 KPC-Kq isolates from 8 patients and 17 environmental isolates from 11 rooms. The mean number of resistance genes identified in patients and environmental isolates were 15 and 14, respectively (P = NS), with five resistance genes carried by all isolates including blaoXA. There was an average of 4.4 unique incompatible types from patients and 4.0 from the environment (P = NS). For the longitudinal subset, there were 17 related isolates from two patients and two sink drains. One hospitalized patient with repeated antimicrobial exposure had a KPC-Kq initial isolate with 3 plasmid types and 13 AMR genes and died one year later with a KPC-Kq isolated from blood with 11 plasmid types and 25 AMR genes. The other patient was primarily an outpatient with little antimicrobial exposure. His KPC-Kq lost 1 plasmid and 3 AMR genes over 15 months. One KPC-Kq strain in the environment lost 3 plasmid types and 8 AMR genes over 4 months; the other was unchanged over 5 months.

**Conclusion.** K. quasipneumoniae has been seen in both patients and the environment for reservoirs over time. We identified in patients and environmental isolates were 15 and 14, respectively (P = NS). This same accumulation was not witnessed environmental sites over time although the number of patients was small and will require collaborative study work.

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506. Urinary Catheters Are Associated with Progression from Bacteriuria to Invasive Infections in Patients with Carbapenem-Resistant Enterobacteriaceae, Metropolitan Atlanta, 2011–2017

Jessica Howard-Anderson, MD1; Chris W. Bower, MHP2; Gillian Smith, MPH3; Mary Elizabeth Sexton, MD, MSc4; Sarah W. Satola, PhD5; Monica M. Farley6 and Jesse T. Jacob, MD, MSc7; Emory University, Decatur, Georgia; 2Georgia Emerging Infections Program, Decatur, Georgia

**Session:** 54: HAI – MDRO – GNR Epidemiology, CRE

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**Background.** Patients with carbapenem-resistant Enterobacteriaceae (CRE) bacteriuria may subsequently develop an invasive infection (“progression”). We sought to evaluate risk factors, particularly urinary catheters, for progression from CRE bacteriuria to an invasive CRE infection within one year.

**Methods.** We used population-based active surveillance data from the Georgia Emerging Infections Program to identify patients in metropolitan Atlanta with CRE in urine but not in a concurrent or previous sterile site between August 1, 2011 and July 31, 2017. CRE was defined as an isolate resistant to third-generation cephalosporins and a minimum inhibitory concentration of 24 µg/mL for meropenem, doripenem, or imipenem. We then assessed if the patients developed an invasive CRE infection (positive sterile site culture) with the same organism between one day and one year later. Demographics, culture site, comorbidities, and risk factors were obtained by chart review. Univariable analyses and multivariable logistic regression with progression as the outcome were performed in SAS 9.4.

**Results.** We identified 551 patients with CRE bacteriuria in 6 years, with an annual incidence of 1.1 cases/100,000 population. Many patients previously resided in long-term care facilities (48%), had a Charlson comorbidity index (CCI) ≥3 (38%), a central venous catheter (CVC) ≥3% or a decubitus ulcer (27%, Table 1). Twenty-five patients (5%) progressed from CRE bacteriuria to an invasive CRE infection within one year (median 34 days).

**Conclusion.** Progression from CRE bacteriuria to an invasive CRE infection is rare but clinically significant. Future interventions should target urinary catheter removal, where possible, in patients with CRE bacteriuria.

**Table 1:** Demographics of patients with CRE bacteriuria in metropolitan Atlanta stratified by the presence of a urinary catheter

| Age (mean years, SD) | 58.1 (17.9) | 65.2 (14.9) |
|----------------------|-------------|-------------|
| Female (n=395) | 270 (57) | 115 (65) |
| Race | White | 166 (35) | 85 (40) |
| | Black | 314 (65) | 121 (68) |
| | Other | 35 (7) | 7 (2) |
| Charlson comorbidity index ≥3 (n=198) | 139 (70) | 48 (24) |
| Dementia subtype | 30 (15) | 12 (6) |
| Central venous catheter | 12 (6) | 12 (6) |
| Other indwelling-device | 26 (13) | 34 (18) |
| Organism | Klebsiella pneumoniae | 255 (66) | 41 (21) |
| | Enterococcus faecalis | 69 (20) | 30 (17) |
| | Pseudomonas aeruginosa | 80 (26) | 35 (17) |
| | Klebsiella oxytoca | 5 (1) | 5 (1) |

**Table 2:** Risk factors for progression to an invasive CRE infection

| Risk Factor | No progression (n=462) | Progression Univariable OR (95% CI) | Multivariable OR (95% CI) |
|-------------|------------------------|-------------------------------------|--------------------------|
| Age (mean years, SD) | 63.1 (17.6) | 62.5 (16.9) | 1.0 (0.8–1.0) |
| Female (n=360) | 276 (74) | 32 (18) | 0.8 (0.4–1.9) |
| Race (n=467) | Black | 280 (63) | 21 (44) | 3.0 (1.0–9.6) |
| | White | 187 (41) | 12 (27) | 0.9 (0.3–2.7) |

**Table 2:** Risk factors for progression to an invasive CRE infection

| Characteristics | No progression (n=462) | Progression Univariable OR (95% CI) | Multivariable OR (95% CI) |
|---------------|------------------------|-------------------------------------|--------------------------|
| Age (mean years, SD) | 63.1 (17.6) | 62.5 (16.9) | 1.0 (0.8–1.0) |
| Female (n=360) | 276 (74) | 32 (18) | 0.8 (0.4–1.9) |
| Race (n=467) | Black | 280 (63) | 21 (44) | 3.0 (1.0–9.6) |
| | White | 187 (41) | 12 (27) | 0.9 (0.3–2.7) |

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