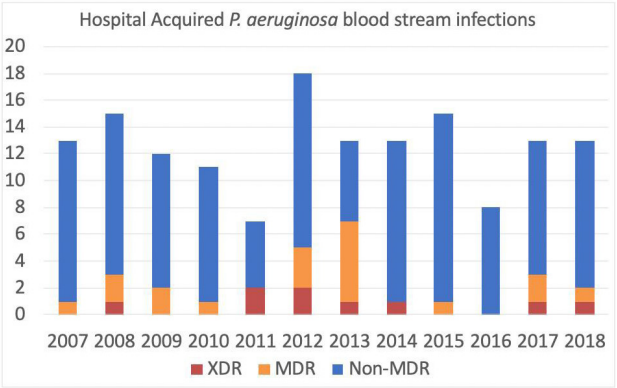
(BSI) with high mortality rates. (1). Multi-drug resistant *P. aeruginosa* (MDRPA) infection rates are reported to be increasing (2) and have been associated with increased mortality (3). This study aims to review the susceptibility pattern and trend of *P. aeruginosa* BSIs and mortality and identify patients at increased risk of BSI with a resistant *P. aeruginosa* isolate. This data has important treatment implications.

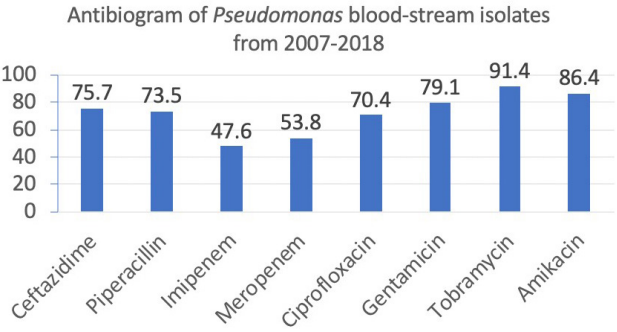
Methods. Cases of nosocomial *P. aeruginosa* bacteremia were prospectively identified at the University of Alberta, Edmonton, Alberta, Canada by the infection prevention and control surveillance program between January 1, 2007 and December 31, 2018. Patient charts were retrospectively reviewed to collect microbiological, clinical, and epidemiological information.

Results. 148 cases of *P. aeruginosa* BSI were identified over a 12-year period between January 2007 and December 2018. There were 19 cases of MDRPA BSI and 9 cases of XDRPA BSI. The incidence of *P. aeruginosa* BSI was 0.47 per 10,000 patient days and remained relatively stable over the study period. 66.9% of cases occurred in men. The mean age was 60 years. The average length of stay prior to bacteremia was 42 days. The overall 30-day mortality following *P. aeruginosa* BSI was 36.4%. Risk factors for increased 30-day mortality included: pulmonary source of infection (OR 4.26, $p < 0.001$), bacteremia with extremely drug resistant *Pseudomonas aeruginosa* (XDRPA) ($p < 0.0001$), and diabetes (OR 2.24, $p < 0.05$). BSI with MDRPA was not an independent risk factor for increased mortality. Significant risk factors for bacteremia with an MDRPA or XDRPA were length of stay > 28 days (OR 4.22, $p < 0.001$) and hemodialysis (OR 8.92, $p < 0.000001$).

Annual hospital acquired P. aeruginosa blood-stream infections from 2007-2018



Antibiogram of P. aeruginosa blood-stream isolates from 2007-2018



Conclusion. The incidence of *P. aeruginosa* BSI as well as the rate of MDRPA and XDRPA BSI have remained stable at our centre between 2007 and 2018. We found that BSI with XDRPA but not MDRPA alone was a significant risk factor for mortality. Risk factors for BSI with a resistant *P. aeruginosa* strain may be considered to guide empiric therapy.

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845. Trends and Regional Differences in Community-Onset Fluoroquinolone-Resistant *E. coli* in Hospitalized Adults in the United States

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Session: P-36. HAI: Gram-negatives (MDR-GNR)

Background. *Escherichia* coli is a common cause of community-onset (CO) infections, including urinary tract and abdominal infections, and CO sepsis. Fluoroquinolones (FQ) are used in the empiric treatment of *E. coli* infections, but FQ-resistance may limit their effectiveness. We examined trends and regional differences in FQ-resistant *E. coli* clinical cultures among hospitalized adult patients in the U.S.

Methods. We measured the incidence of *E. coli* clinical cultures among hospitalized adults in a cohort of hospitals in the Premier Healthcare Database and Cerner Health Facts from 2012 through 2017. FQ resistance was defined as resistance to ciprofloxacin, levofloxacin, or moxifloxacin. Only cultures collected prior to day 4 of hospitalization, defined as CO, were considered. We extrapolated national estimates using a raking procedure to generate weighted adjustments matching the American Hospital Association distribution for U.S. acute care hospitals. Weights were based on U.S. census division, bed size category, teaching status, and urban/rural designation. We used a weighted means survey procedure to calculate national estimates and weighted multivariable logistic regression to examine trends and regional differences.

Results. In 2017, we estimated 949,393 CO *E. coli* infections with FQ susceptibility testing; 312,304 (33%) were due to *E. coli* resistant to FQ. Of FQ-resistant *E. coli* isolates, 76% were isolated from urine. We did not observe a significant trend in FQ-resistant *E. coli* from 2012 to 2017 (p = 0.85). Percent FQ-resistant varied significantly by region (p < 0.0001) with an estimated range of 19% (Mountain) to 42% (Southeast Central) in 2017. We also found variability by hospital (2017 Q1: 26% and Q3: 39%). FQ-resistance rates were higher in urine (36%: 95% CI 34-38%) than blood isolates (27%: 95% CI 26-29%) and higher for males (40%: 95% CI 38-42%) than females (33%: 95% CI 31-35%).

Conclusion. FQ-resistance is common in CO *E. coli* infections with significant variability by region and hospital. Empiric FQ treatment for infectious syndromes commonly caused by *E. coli* may need to be reconsidered. Clinicians should consult with local antibiograms and antibiotic stewardship programs to determine the most appropriate empiric treatment of *E. coli* infections in hospitalized adults.

Disclosures. **All Authors**: No reported disclosures

846. Trends in *Acinetobacter baumanii* Antibiotic Resistance Rates

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Session: P-36. HAI: Gram-negatives (MDR-GNR)

Background. Carbapenem-resistant *Acinetobacter baumannii* is described as an urgent threat by the Centers for Disease Control and Prevention and several older studies have indicated increasing resistance in *Acinetobacter.* We sought to describe these trends in the national Veterans Affairs (VA) Healthcare System.

Methods. We assessed *A. baumannii* positive clinical cultures collected from VA patients (> 18 years) from 2010 to 2018. We categorized cultures based on location at the time of collection: VA medical center (VAMC), community living center (CLC), or outpatient (Outpt). Multidrug resistance (MDR) and extensive drug resistance (XDR) were defined as resistance to > 1 drug in > 3 or all of the following categories, respectively: extended-spectrum cephalosporins (es-CS), fluoroquinolones (FQ), aminoglycosides (AMG), carbapenems (CARB), piperacillin/tazobactam (PIP/TAZ), and ampicillin/sulbactam (AMP/SUL). *Joinpoint* Software was used for regression analyses of trends over time and to estimate annual average percent changes (AAPC) with 95% confidence intervals.

Results. We identified 19,376 *A. baumannii* positive cultures over the study period (53% VAMCs, 4% CLCs, 43% Outpts), which represented 0.5% of all positive cultures in the VA. In VAMCs, the number of *A. baumannii* cultures decreased significantly by 12.5% per year. Of all positive cultures in VAMCs, the proportion that were *A. baumannii* decreased significantly by 5.4% per year. Similar trends were observed in CLCs, while Outpt cultures remained stable. Over the 9-year study period, resistance decreased significantly, with MDR decreasing by 10.2% per year and XDR decreasing by 9.4%. Carbapenem resistance decreased significantly by 4.9% per year in VAMCs (2010, 39%; 2018 28%) and 11.3% in Outpts (2010, 12%; 2018, 6%). Similar annual significant decreases were observed with AMG (9.4%), es-CS (1.4%), and FQ (7.4%) in VAMCs; es-CS (2.7%) and FQ (5.6%) in CLCs; and AMG (9.5%) and FQ (8.2%) in Outpts.

Conclusion. In the national VA Healthcare System, the prevalence of *A. baumannii* is decreasing, as is the resistance previously observed with this organism. MDR *A. baumannii* still made up one-third of cultures in VAMCs and CLCs in 2018, and thus remains a treatment challenge.

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847. Trends in *Stenotrophomonas maltophilia* Antibiotic Resistance Rates

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Session: P-36. HAI: Gram-negatives (MDR-GNR)

Background. Studies from the 1990's and 2000's identified increasing rates of *Stenotrophomonas maltophilia*, particularly among respiratory isolates and in intensive care populations. Additionally, resistance in *S. maltophilia* was found to be worsening. We aimed to quantify recent trends in prevalence and resistance of *S. maltophilia* in the national Veterans Affairs (VA) Healthcare system.

Methods. We identified positive *S. maltophilia* clinical cultures among VA adult patients from 2010 to 2018, collected in either VA medical centers (VAMCs), community living centers (CLCs), or the outpatient (Outpt) setting. Multidrug resistance (MDR) was defined as resistance to sulfamethoxazole/trimethoprim (SMX/TMP) and minocycline or levofloxacin. Time trends were assessed with regression analyses to estimate annual average percent changes (AAPC) with 95% confidence intervals using *Joinpoint* Software.

Results. Over the 9-year study period, we identified 18,285 *S. maltophilia* cultures (57% VAMCs, 3% CLCs, 40% Outpt). *S. maltophilia* cultures made up 0.4% of all positive cultures in the VA. In VAMCs and CLCs, the number of *S. maltophilia* cultures decreased 5.1% and 8.5% per year, respectively. Alternatively, of all positive cultures in VAMCs, the proportion that were *S. maltophilia* increased significantly by 2.6% per year.

SMX/TMP resistance decreased significantly by 8.5% (2010, 15%; 2018, 6%) per year in VAMCs, and decreased non-significantly by 8.7% (2010, 13%, 2018, 6%) per year in CLCs and 6.0% (2010, 12%; 2018, 7%) in the outpatient setting. No other significant changes in resistance were observed over the study period. MDR increased non-significantly by 1.2% per year.

Conclusion. While previous studies found increasing rates of *S. maltophilia*, the number of positive *S. maltophilia* cultures decreased in the national VA Healthcare System between 2010 and 2018. However, *S. maltophilia* is making up a greater proportion of positive culture over time. During the study period, resistance to SMX/TMP decreased and now more closely reflects previously reported resistance rates worldwide (0-10%).

Disclosures. **Aisling Caffrey, PhD**, **Merck** (Research Grant or Support)**Pfizer** (Research Grant or Support)**Shionogi** (Research Grant or Support) **Haley J. Appaneal, Pharm.D**, **Shionogi, Inc.** (Research Grant or Support) **Kerry LaPlante, PharmD**, **Merck** (Advisor or Review Panel member, Research Grant or Support)**Ocean Spray Cranberries, Inc.** (Research Grant or Support)**Pfizer Pharmaceuticals** (Research Grant or Support)**Shionogi, Inc.** (Research Grant or Support)

848. Trends of Carbapenem Resistance in Enterobacterales in the US Between 2015 and 2019

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Session: P-36. HAI: Gram-negatives (MDR-GNR)

Background. Carbapenem-resistant Enterobacterales (CRE) are considered an urgent threat to human health by the CDC. Tracking resistance over time is of importance to understand trends and patterns. Tracking carbapenem resistance is complicated by definitions which include resistance to ertapenem only which can differ in epidemiology, mechanism, and treatment options. This study examines trends of CRE from 2015 to 2019 and the impact of carbapenem resistance on outcomes.

Methods. Enterobacterales infections identified in the Premiere HealthCare database from 2015 to 2019 were categorized into 3 groups: ertapenem only resistant (Erta-R); isolates resistant to ertapenem and class 2 carbapenems (CR-1/2); and carbapenem susceptible (CS). Trends in resistance over the study period were assessed. Furthermore, patient characteristics and outcomes were compared between groups.

Results. Among 225,457 unique cultures 692 were Erta-R, 2,397 were CRE-1/2, and 222,368 were CS. Overall rates of CRE-1/2 slightly increased from 0.9% to 1.2% over the study period (P for trend of < 0.0001) while there was a slight negative trend for Erta-R rates (P for trend =0.006). Rates of CR by pathogen (Figures 1 and 2) were relatively stable over the study period. *Enterobacter cloacae* was the most common organism in the Erta-R group and *K. pneumoniae* was the most common CRE-1/2 pathogen. Differences in patient characteristics were seen between the three groups for race, gender, and comorbidities (Table). Both mortality (Erta-R: 10%, CRE-1/2: 9% vs CS: 4%, respectively) and infection-associated length of stay (Erta-R: 8 days; CRE-1/2: 8 days vs CS: 6 days, respectively) were higher in both Erta-R and CRE 1/2 when compared to CS (P< 0.001). There were no differences in outcomes between patients with Erta-R and CRE 1/2.

Figure 1. Annual rates of CRE (resistance to both classes) by pathogen over the study period

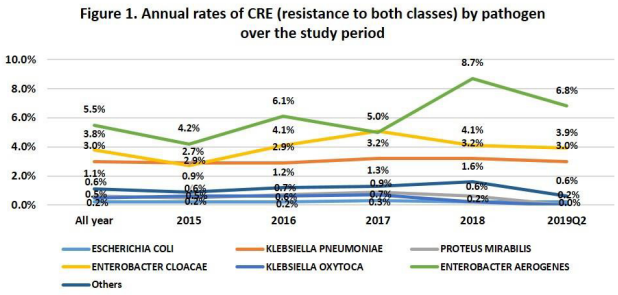

Figure 2. Annual rates of CRE (ertapenem R only) by pathogen over the study period

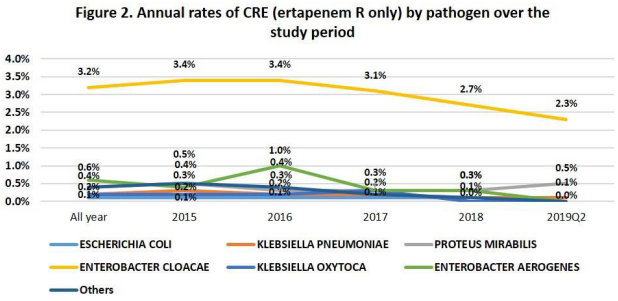

Table. Patient demographics and outcomes

Characteristic	CRE – ertapenem-resistant only (N =692) N (%)	CRE – both classes (N =2,397) N (%)	CS – both classes (N =222,368) N (%)	*P* value
Patient Demographics				
Race				<0.01
White	557 (81)	1,729 (72)	166,231 (75)	
Black	88 (13)	463 (19)	30,106 (14)	
Age, median (IQR)	68 (57–79)	68 (57–78)	70 (57–82)	<0.01
Female	354 (51)	1,236 (52)	148,489 (67)	<0.01
Baseline CCI Score, median (IQR)	4 (2–5)	3 (2–5)	2 (1–4)	<0.01
Admission source				
Non-healthcare facility	505 (73)	1,672 (70)	167,182 (75)	<0.01
Transfer (any facility)	170 (25)	633 (26)	49,584 (22)	
Infection Type				
BSI	59 (9)	162 (7)	15,537 (7)	<0.01
Respiratory	118 (17)	455 (19)	14,903 (7)	
UTI	343 (50)	1,293 (54)	160,338 (72)	
Other	172 (25)	487 (20)	31,590 (14)	
Outcomes				
In hospital mortality	61 (9)	237 (10)	8,986 (4)	<0.01
Infection Associated Length of Stay (days, median [IQR])	8 (5–14)	8 (5–13)	6 (4–9)	<0.01
30-day readmission rate	46 (7)	181 (8)	7,206 (3)	<0.01

BSI, bloodstream infection; CCI, Charlson Comorbidity Index; CRE, Carbapenem-resistant Enterobacterales; CS, carbapenem susceptible; IQR, interquartile range; UTI, urinary tract infection.

Conclusion. CRE rates were relatively stable over the study period. Despite low incidence, CRE continue to have significant associations with morbidity and mortality. Interestingly, outcomes were similar in patients with isolates resistant to ertapenem only when compared to isolates resistant to both classes of carbapenems. This might be reflective of novel treatment options available over the study period.

Disclosures. Stephen Marcella, MD, Shionogi Inc. (Employee) Hemanth Kanakamedala, BS, Shionogi Inc. (Independent Contractor) Yun Zhou, MS, Shionogi Inc. (Independent Contractor) Bin Cai, MD, PhD, Shionogi Inc. (Employee) Jason M Pogue, PharmD, BCPS, BCIDP, Shionogi Inc. (Advisor or Review Panel member)

849. Whole Genome Sequencing Analysis of *Klebsiella pneumoniae* Isolates Reveals Diversity in Genetic Antibiotic Resistance Patterns.

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