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Objectives: In Vietnam, although surveillance and control of multidrug-resistant organisms is a national priority, information on the burden of these pathogens remains scarce. At the University Medical Center in Ho Chi Minh City, we assessed the proportion of carbapanemase-producing carbapenem-resistant organisms (CP-CRO) and evaluated an intervention package to prevent transmission of carbapenemase-producing carbapenem-resistant Enterobacterieacea (CP-CRE) in the intensive care unit (ICU). **Methods:** All gram-negative isolates collected between November 2018 to April 2019 were tested for carbapenem resistance using the disc-diffusion method. Carbapenem-resistant bacteria, defined as meropenem resistant, were tested for phenotypic carbapenemase-production using the Becton Dickinson Phoenix CPO Detect assay. An intervention package, including placement of patients in cohorts, enhanced barrier precautions, enhanced discharge environmental cleaning, and CP-CRE rectal screening, was implemented from July 2019 through December 2020. During this period, all ICU patients were screened on admission, and negative patients were rescreened every 2 days or 7 days until discharge, death, or CRE-positive result. Admission prevalence and incidence of CP-CRE transmission was calculated among CP-CRE infected or colonized patients. **Results:** Among 599 gram-negative isolates collected, 108 were carbapenem-resistant isolates, of which 107 (99%) were CP-CRO by the phenotypic method. Most CP-CRO were *Acinetobacter baumannii* (42%) and *Klebsiella pneumoniae* (36%). Of 1,206 patients, 433 (35.9%) were already colonized or infected with CP-CRE before admission to the ICU. The incidence rate (cases per 100 risk days) of CP-CRE colonization or infection during ICU treatment decreased from 11.5 before the intervention to 2.9 after the implementation of the intervention package. The average number of days to change from a negative to positive screening result in the intervention phase was 7.4, compared with 4.9 days during preintervention phase. **Conclusions:** Nearly all CROs isolated from our ICU are carbapenemase-producing CROs, with high presence on admission as well as new acquisition during an ICU stay. An intervention package containing enhanced infection control measures was effective in reducing CP-CRE transmission.

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Subject Category: Multidrug-Resistant (MDR) Organisms
Abstract Number: SG-APSIC1095

Acquisition rate of carbapenemase-producing organisms (CPOs) among hospital contacts of CPO patients: An interim subgroup analysis of a cohort study

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Objectives: The increase in carbapenemase-producing organism (CPO) transmission among hospitalized patients is a growing concern. Studies investigating the transmission of CPO to epidemiologically linked contacts are scarce. We conducted an interim subgroup analysis of the ongoing multicenter household transmission of CPO in Singapore (CaPES-C) study to identify the acquisition rate of CPO among epidemiologically linked contacts of hospitalized CPO patients. **Methods:** This multicenter prospective cohort study was conducted between January and December 2021. We recruited CPO-positive patients and their epidemiologically linked contacts. Stool samples were collected from the patients at baseline, day 3, day 7, and at weeks 2, 3, 4, 5, 6, 12, 24, 36, and 48. Additionally, a sample was collected at the time of discharge from the hospital. Xpert Carba-R test was used to detect CPO genotypes in the stool samples. In this interim analysis, we calculated the acquisition rate of CPO among the epidemiologically linked hospital contacts of CPO positive patients using Stata version 15 software. **Results:** We recruited 22 (56.4%) CPO-positive index patients [*bla*NDM, n = 7 (31.8%); *bla*IMP, n = 3 (13.6%); *bla*OXA-48, n = 10 (45.5%), others, n = 2 (9.1%)] and 14 (35.9%) epidemiologically linked hospital contacts. The median age of CPO-positive patients was 72.5 years (IQR, 62–82) and 15 (68.2%) were female. The median age for the epidemiologically linked contacts was 82.5 years (IQR, 70–85) and 4 (28.6%) were female. After 1,082 patient days, 2 (14.3%) epidemiologically linked contacts tested positive for CPO giving an acquisition rate of 1.85 per 1,000 patient days (95% CI, 0.46 – 7.39). One of these participants acquired a concordant genotype (*bla*OXA-48) at day 7 and the other acquired a discordant genotype (CPO positive index, *bla*IMP; epidemiologically linked contact, *bla*NDM) at week 12 of follow-up. **Conclusions:** This small interim analysis revealed a high conversion rate among epidemiologically linked hospital contacts. A larger study is needed to understand the influence of genotypes, hospital environment, and human behavior on the transmission of CPO in hospitals.

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Subject Category: Multidrug-Resistant (MDR) Organisms
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Incidence and predictors of *Escherichia coli*–producing extended-spectrum beta-lactamase (ESBL-Ec) in Queensland, Australia, from 2010 to 2019: A population-based spatial analysis

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Objectives: The dissemination of *Escherichia coli*–producing extended-spectrum β-lactamase (ESBL-Ec) is evident in the community. In this population-based spatial analysis, we sought to describe the distribution of ESBL-Ec and to identify predictors of incidence in the community. **Methods:** The study population was defined as individuals with the ESBL-Ec isolate in Queensland, Australia, from 2010 to 2019. Annual choropleth maps and a global Moran index were constructed to describe ESBL-Ec distribution. Getis-Ord Gi* was performed to identify "hot spots" of statistical significance. Using demographic factors and incidence per postal area from 2016, multivariable analyses with or without spatially structured random effects were performed. **Results:** In total, 12,786 individuals with ESBL-Ec isolate were identified. The incidence rate increased annually from 9.1 per 100,000 residents in 2010 to 49.8 per 100,000 residents in 2019. The geographical distribution changed from random to clustered in 2014. Hot spots were more frequently identified in the Outback and Far North Queensland, where remote communities and hotter weather are prevalent. Multivariable spatial analysis suggests that communities with higher socioeconomic status (RR, 0.66; 95% CI, 0.55–0.79 per 100 units) and employment in the agricultural industry

(RR, 0.79; 95% CI, 0.67–0.95 per 10%) were protective of lower ESBL-Ec incidence. After accounting for multiple demographic factors, the residual, structured, random-effects model indicated that hot spots were still detected in more remote communities but also in several city regions. **Conclusions:** The change in distribution of ESBL-Ec across Queensland suggests the presence of area-level specific risk factors that enhance spread in the community. Risk factors for spread appear different between remote and city settings, and future research should be tailored to understand the respective area-level risk factors. Factors such as local temperature, antibiotic consumption, and access to services should be validated. Future public health measures to reduce transmission should be focused on the identified hot spots.

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Subject Category: Multidrug-Resistant (MDR) Organisms
Abstract Number: SG-APSIC1097
The impact of COVID-19 on the incidence of carbapenem-resistant Enterobacterales (CRE) in Singapore: An interrupted time-series analysis

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Objectives: Over the past 2 years, many infection prevention and control (IPC) resources have been diverted to manage the COVID-19 pandemic. Its impact on the incidence of antimicrobial-resistant organisms has not been adequately studied. We investigated the impact of the pandemic on the incidence of carbapenem-resistant Enterobacterales (CRE) in Singapore. **Methods:** We extracted data on unique CRE isolates (clinical and/or surveillance cultures) and patient days for 6 public hospitals in Singapore from the carbapenemase-producing Enterobacteriaceae (CaPES) study group database, and we calculated the monthly incidence of CRE (per 10,000 patient days). Interrupted time-series (ITS) analysis was conducted with the pre–COVID-19 period defined as before February 2020, and the COVID-19 period defined as after February 2020. Statistical analyses were performed using Stata version 15 software. **Results:** From January 2017 to March 2021, 6,770 CRE isolates and 9,126,704 patient days were documented. The trend in CRE monthly incidence increased significantly during the pre–COVID-19 period (0.060; 95% CI, 0.033–0.094; $P < .001$) but decreased during the COVID-19 period (−0.183; 95% CI, −0.390 to 0.023; $P = .080$) without stepwise change in the incidence (−1.496; 95% CI, −3.477 to 0.485; $P = .135$). The trend in monthly incidence rate of CRE clinical cultures increased significantly during the pre–COVID-19 period (0.046; 95% CI, 0.028–0.064; $P < .001$) and decreased significantly during COVID-19 period (−0.148; 95% CI, −0.249 to −0.048; $P = .048$) with no stepwise change in the incidence (−0.063; 95% CI, −0.803 to 0.677; $P = .864$). The trend in monthly incidence rate of CRE surveillance cultures decreased during the pre–COVID-19 period (−0.020; 95% CI, −0.062 to 0.022; $P = .341$) and the COVID-19 period (−0.067; 95% CI, −0.291to 0.158; $P = .552$) without stepwise change in the incidence (−1.327; 95% CI, −3.535 to 0.881; $P = .233$). **Conclusions:** The rate of CRE in clinical cultures decreased during COVID-19 but not the rate in surveillance cultures. Further studies are warranted to study the impact of COVID-19 on CREs.
(DUPLICATE DELETED)

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Subject Category: Multidrug-Resistant (MDR) Organisms
Abstract Number: SG-APSIC1157
The attributable mortality and excess length of stay associated with third-generation cephalosporin-resistant Enterobacterales bloodstream infections—A prospective cohort study in Suva, Fiji

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Objectives: Although antimicrobial resistance (AMR) disproportionately affects low- and middle-income countries (LMICs), primary clinical data on AMR burden from LMICs are lacking, particularly from the Pacific Islands. We adapted recent World Health Organization methodology to measure the impact of third-generation cephalosporin (3GC) resistance on mortality and excess length of hospital stay among inpatients with Enterobacterales bloodstream infection (BSI) in Fiji. **Methods:** We conducted a prospective cohort study of inpatients with Enterobacterales BSIs at Colonial War Memorial Hospital in Suva. We collected demographic, clinical, and microbiological data, and we stored bacterial isolates for confirmatory testing and molecular genomics in Melbourne, Australia. We employed cause-specific Cox proportional hazards models to estimate the effect of 3GC-resistance on hazard of in-hospital mortality and discharge alive (competing outcomes), and we used multistate modelling to estimate the excess length of hospital stay associated with 3GCR. **Results:** From July 2020 to February 2021, we identified 162 consecutive Enterobacterales BSIs, and 66 (40.7%) were 3GC resistant. The crude mortality rates for patients with 3GC-susecptible and 3GC-resistant BSIs were 16.7% (16 of 96) and 30.3% (20 of 66), respectively. Also, 3GC resistance was not associated with either in-hospital mortality (aHR, 1.67; 95% CI, 0.80–3.49) or discharge alive (aHR, 0.75; 95% CI, 0.50–1.12). However, patient comorbidities and acuity of illness were associated with in-hospital mortality. Furthermore, 3GC-resistance was associated with an increased length of stay of 2.6 days (95% CI, 2.5–2.8). Overall, 3GC-resistance was more common among patients with hospital-associated than community-acquired infection, but genomics did not identify clonal transmission. **Conclusions:** Among patients with Enterobacterales BSIs, mortality was relatively high, and 3GC resistance was common. Also, 3GC resistance was associated with increased hospital length of stay but not with in-hospital mortality after adjusting for potential confounders. Accurate estimates of the burden of AMR are important, especially from LMICs. Such knowledge can inform policy decisions, guide allocation of limited resources, and assist the evaluation of future interventions to address AMR.

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Subject Category: Multidrug-Resistant (MDR) Organisms
Abstract Number: SG-APSIC1069
Implementing infection prevention bundle significantly reduced multi-drug-resistant organisms infection and healthcare-associated infections in intensive care unit at a national hospital in Vietnam