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Poster Presentation - Poster Presentation
Subject Category: Surveillance
Case validation of bloodstream infections with an antibiotic-resistant organism
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Background: Bloodstream infections (BSIs) are an important cause of morbidity and mortality in severely ill patients, contributing to increased length of hospital stay and higher cost of care. Alberta Health Services Infection Prevention and Control (IPC) conducts inpatient surveillance of new episodes of BSIs with methicillin-resistant Staphylococcus aureus (MRSA), vancomycin-resistant enterococci (VRE) or carbapenemase-producing organisms (CPO) in 112 acute care facilities. A case-finding process was undertaken to verify the accuracy of BSI data entry. **Methods:** All positive MRSA, VRE or CPO blood cultures in 2021 were linked to the Inpatient Discharge Abstract Database (DAD) and the National Ambulatory Care Reporting System (NACRS) to identify new cases during acute care admissions. The results were then compared to surveillance records captured by infection control professionals (ICPs). Cases with unmatched culture date and/or encounter date and cases not identified by ICPs were screened by the study team with final decision made by ICPs. Results were analyzed by ARO and by % increase in number of surveillance records. **Results:** The laboratory linkage identified 286 new cases. Comparing to surveillance records (n = 248) captured by ICPs, 137 (57.3%) had matching collection dates and encounter dates, 85 (35.6%) had close matches on collection dates and encounter dates, 17 (7.1%) records had either matching collection dates or encounter dates, and 1 (0.4%) record did not have any matches on dates. There were 46 records identified in the laboratory data that were not in the surveillance system and 8 records that were in the surveillance system but not matched to the laboratory data. After review, 22 Surveillance records had data entry errors (1 CPO BSI, 20 MRSA BSI, and 1 VRE BSI), and there were 14 BSI records found to be missing (13 MRSA BSI, 1 VRE BSI). This represents a 6% increase in MRSA BSI and a 3% increase in VRE BSI identified in 2021 and no increase in CPO BSI. **Conclusions:** A laboratory validation to determine if BSIs with an ARO were missed during routine IPC surveillance identified a small proportion of missed bloodstream infections. The most common reason for the miss was admission through the emergency department with multiple blood cultures collected during a single admission. These results will be shared with the Infection Control program to facilitate correct BSI capture.

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Organism-specific Trends in Carbapenem-resistant Enterobacterales Infections in a Cohort of Hospitalized Patients, 2012–2022
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Background: Carbapenem-resistant Enterobacterales (CRE) infections are an urgent public health threat. An estimated 12,700 CRE (including E. coli, Klebsiella spp., and Enterobacter spp.) infections occurred in the United States in 2020. While the estimated incidence of CRE infections has been relatively stable between 2012 and 2020, organism-specific trends, including those for organisms not typically included in CRE surveillance definitions, have not been described. We estimated the annual rate of carbapenem-resistant Enterobacterales infections, disaggregated by organism, from 2012 to 2022. **Methods:** Data on inpatient hospitalizations from a dynamic cohort of short-term acute care hospitals reporting microbiology data between 2012 and 2022 were obtained from the PINC AI Database and the BD Insights Research Database. We included patients with clinical isolates of E. coli, Enterobacter spp., Klebsiella spp., Citrobacter spp., Serratia marcescens, Proteus mirabilis, and Morganella spp. and sufficient susceptibility results to identify carbapenem resistance. We limited our analysis to incident isolates, defined as a patient's first isolate of a given organism and carbapenem resistance phenotype in a 14-day period. We calculated the annual rate of carbapenem-resistant infections per 10,000 hospitalizations for each organism. **Results:** There were 3,018,792 incident isolates from 55.8 million hospitalizations included in the analysis. Overall, 31,226 incident carbapenem-resistant isolates were identified. The rate of carbapenem-resistant infections varied by organism and over time (Table 1). The rate of carbapenem-resistant Klebsiella spp. infections appeared to decline from 3.94 in 2012 to 2.44 infections per 10,000 hospitalizations in 2022. The rate of carbapenem-resistant Enterobacter spp. infections appeared to increase from 1.05 in 2012 to 1.44 infections per 10,000 hospitalizations in 2022. The rate of carbapenem-resistant E. coli infections also appeared to increase, from 0.61 in 2012 to 0.85 infections per 10,000 hospitalizations in 2022. Rates of carbapenem-resistant Proteus mirabilis, Morganella spp., Citrobacter spp., or Serratia marcescens infections were similar in 2022 compared to 2012. **Conclusions:** Disaggregating data by organism revealed heterogeneous trends, with apparent increases in rates of carbapenem-resistant Enterobacter spp. and E. coli infections and apparent decreases in rates of carbapenem-resistant Klebsiella spp. infections. Organism-specific CRE analyses may provide additional insight into CRE epidemiology.

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Table 1. Annual rate of carbapenem-resistant infections per 10,000 hospitalizations among a U.S. hospital inpatient cohort, by organism, 2012 – 2022

Year	*Klebsiella* spp.	*E.coli*	*Enterobacter* spp.	*Proteus mirabilis*	*Morganella* spp.	*Serratia marcescens*	*Citrobacter* spp.
2012	3.94	0.61	1.05	0.29	0.05	0.19	0.17
2013	3.76	0.59	1.18	0.22	0.03	0.21	0.16
2014	3.81	0.67	1.06	0.13	0.04	0.19	0.18
2015	3.75	0.67	1.22	0.17	0.02	0.20	0.17
2016	3.09	0.73	1.42	0.29	0.05	0.19	0.17
2017	2.48	0.70	1.34	0.18	0.03	0.22	0.17
2018	2.37	0.66	1.37	0.16	0.04	0.24	0.15
2019	2.16	0.68	1.33	0.20	0.03	0.23	0.19
2020	2.47	0.73	1.49	0.21	0.06	0.29	0.21
2021	2.84	0.68	1.50	0.21	0.04	0.23	0.24
2022	2.44	0.85	1.44	0.24	0.05	0.23	0.19