Background. Daptomycin (dap) has been approved and successfully used for the treatment of methicillin-resistant Staphylococcus aureus (MRSA) infections. However, reports of daptomycin nonsusceptible (DNS) MRSA strains have emerged over the recent years. This study describes the clinical characteristics of patients with DNS MRSA bloodstream infections (BSIs) with the objective of identifying risk factors and outcomes.

Methods. In this retrospective case-control study in a tertiary healthcare system in southeast Michigan, cases included 34 patients with DNS MRSA BSI between September 24, 2005 and March 31, 2018. Cases were matched with controls with MRSA BSI based on age, source of BSI, and time-period of BSI in a 1:1 ratio. Charts were reviewed for clinical and laboratory data. Vancomycin (van) and dap minimum inhibitory concentrations (MICs) were determined by E-test. DNS was defined as an MIC > 10 µg/mL. Chi-square test, Fisher's exact test, and t-test were used to determine statistical significance.

Results. In the case cohort, the source of BSI was endovascular in 11 (32%) patients, central-line associated in 9 (26%), secondary BSI in 13 (38%), and unknown in 7 (21%). Table 1 is a summary of the results.

Table 1. Clinical Characteristics and Outcomes of Cases and Controls

| Characteristic                  | Cases     | Controls   | P-value |
|--------------------------------|-----------|------------|---------|
| Mean age (SD)                  | 63.5 (12.0) | 61.9 (11.2) | 0.572   |
| Mean gender                    | 18 (52.9) | 21 (61.8)  | 0.462   |
| Mean bacteraemia duration (SD) | 4.4 (3.2)  | 5.9 (4.9)  | 0.198   |
| Mean LOS in days (SD)          | 19.5 (13.6) | 18.4 (14.6) | 0.751   |
| Mean van MIC (SD)              | 2.04 (1.19) | 1.39 (0.36) | 0.003   |
| Mean dap MIC (SD)              | 2.69 (1.32) | 0.57 (0.24) | <0.0001 |
| Epidemiologic acquisition      |           |            |         |
| Community-acquired             | 0 (0)     | 9 (26.5)   | 0.002   |
| Healthcare-associated          | 21 (63.6) | 22 (64.7)  | 0.927   |
| Hospital-acquired              | 12 (36.4) | 3 (9.8)    | 0.007   |
| 90-day prior exposure          | 23 (82.1) | 5 (17.9)   | <0.0001 |
| Mean dap exposure in days       | 23.6 (21.0) | 2.68 (10.8) | <0.0001 |
| 90-day prior van exposure       | 25 (83.9) | 9 (32.9)   | <0.0001 |
| Mean van exposure in days       | 13.0 (14.7) | 4.19 (12.7) | 0.020   |
| 30-day mortality               | 10 (32.3) | 6 (18.8)   | 0.218   |
| Mean Charlson Comorbidity Index (SD) | 5.7 (3.07) | 4.4 (2.9) | 0.077   |
| 90-day MRSA BSIs recurrence    | 8 (44.4)  | 2 (10.2)   | 0.125   |

*From date of index BSI.

Conclusion. Prior exposure to vancomycin and daptomycin was associated with significantly higher risk of 90-day MRSA BSIs recurrence.

Disclosures. All authors: No reported disclosures.

1223. Increasing Incidence of Methicillin-Resistant Staphylococcus aureus in Greenland

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Background. The first case of methicillin-resistant Staphylococcus aureus (MRSA) in Greenland was diagnosed in 2000 and led to the first guideline on screening and treatment of methicillin-resistant S. aureus. Up to 2015 there were only 13 patients with MRSA but since then in the recent years. This study describes the clinical characteristics of patients with DNS MRSA infection.

Methods. All data were obtained from the healthcare-associated infection surveillance system. Different strains of S. aureus were identified using the VITEK-2 automated system, the drug susceptibility results of resistance and intermediate were classified into resistance. Chi-square test and variation analyses of S. aureus drug-resistant isolates were performed. Results. From 2013 to 2017, 2,289 strains of S. aureus were isolated, and the specimens were mostly collected from sputum (721, 31.5%), wound secretion (211, 9.2%), and blood (210, 9.1%). The resistance rate of S. aureus was highest for tigecycline (94.43% in 2013, 100% in 2017), teicoplanin (96.49% in 2013, 95.69% in 2017) (P = 0.028). The resistance rates among other drugs such as clindamycin (65.28% in 2013, 71.39% in 2017) and erythromycin (69.62% in 2013, 62.59% in 2017) were more stable (P = 0.056). However, oxacillin (from 73.68% to 34.47%), gentamicin (from 51.51% to 24.13%), and tetracycline (from 46.78% to 30.81%) showed a declining trend (P = 0.017). Meanwhile, there were almost no S. aureus resistance to linezolid, vancomycin, and nitrofurantoin. During the previous 5-year period, MRSA rates decreased sharply and in 2017 rate was 34.47%. In 2017, MRSA was most frequently isolated in orthopaedics, emergency ICU, and respiratory.

Conclusion. The reduction in drug-resistant MRSA may be evidence of effective antibiotic administration practice. Whereas more comprehensive infection control measures are needed to prevent the transmission of S. aureus and MRSA.

Disclosures. All authors: No reported disclosures.

1225. High Rate of Linezolid (LZD) Nonsusceptibility (LNS) Among Enteric Vancomycin-Resistant Enterococci (VRE) Recovered from Hospitalized Patients Actively Screened for VRE Rectal Colonization (VREC)

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Background. Select hospitalized patients are actively screened for VRE but VRE isolates may not undergo antibiotic susceptibility testing. We sought to identify predictors of daptomycin (DAP) nonsusceptible (DNS, MIC > 4) and LNS (MIC > 2) among enteric VRE isolates recovered from patients actively screened for VRE for which antibiotic susceptibility testing was not performed.

Methods. This was a retrospective study of consecutive adults admitted to a surgical intensive care unit (ICU) or associated medical unit between June 1, 2017 and March 1, 2018 who had a VRE isolate from active screening. Only index isolates were included. Antibiotic prescriptions, dating back to January 1, 2016 were included. DAP and LZD MICs were determined by Etest. Patient- and antimicrobial drug-relevant data, including ambulatory prescriptions, were reviewed for clinical and laboratory data. Vancomycin (van) and dap minimum inhibitory concentrations (MICs) were determined by E-test. DNS was defined as an MIC > 10 µg/mL. Chi-square test, Fisher's exact test, and t-test were used to determine statistical significance.

Results. In total, 64 patients' VRE rectal isolates were included. Fifty-nine (92.2%) were female and the mean age ± SD was 60 ± 13 years. Five (7.8%) and 20 (31.3%) patients had previous abdominal transplant and VRE infection, respectively. DAP and LZD MIC distributions are shown in the table below. Forty-one (64.1%) VRE isolates were included. Only one (1.6%) isolate was DNS preformed. Multivariable logistic regression models were used to determine predictors of DNS and LNS VRE.

Conclusion. The increasing number of patients with MRSA in Greenland can be explained by factors such as import from Denmark or abroad due to admission to hospital or traveling, and transmission in Greenland. An ongoing surveillance, compliance to screening procedures (especially patients admitted to hospitals abroad) and guidelines for infection prevention and control are necessary in order to combat MRSA in Greenland in the future.

Disclosures. All authors: No reported disclosures.
3 mg/L - 4 mg/L, respectively and may be stratification. Widely used scoring systems such as the Acute Physiology and Chronic Mortality prediction may have a profound impact on clinical decision making and risk stratification. MRSA BSI is associated with high mortality despite advances in medical care.

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Background. Universal decolonization of patients in intensive care units (ICUs) has been identified to be an effective infection control strategy of methicillin-resistant Staphylococcus aureus (MRSA). However, it remains uncertain whether universal decolonization can obviate the need for active surveillance testing (AST) and contact precautions (CPs) for MRSA carriers.

Methods. We conducted an interrupted time series study to evaluate whether universal decolonization (daily chlorhexidine bathing plus twice-daily intranasal mupirocin ointment for 5 days) without AST and CPs did affect the incidence of MRSA acquisition on clinical specimen and MRSA bacteremia (the first positive blood culture obtained more than 48 hours after ICU admission) in a medical ICU. There was a 12-month control period of universal decolonization combined with AST and CPs, followed by a 12-month intervention period of universal decolonization without AST and CPs for MRSA carriers. Changes in incidence density (new cases of MRSA acquisition on clinical specimen per 1,000 eligible patient-days) of MRSA were evaluated by segmented Poisson regression, and the corresponding hazards regression model was used to compare the differences in incidence of MRSA bacteremia between the two periods.

Results. The median overall prevalence of MRSA did not differ between the two periods (25.3% vs. 23.4%, P = 0.55), and the segmented Poisson regression analysis revealed that there were no significant differences in both level and trend of MRSA prevalence (P = 0.43 and P = 0.27, respectively). The incidence density of MRSA acquisition on clinical specimen was lower during the intervention period (5.7 vs. 4.5, P = 0.039). However, both level and trend of MRSA incidence density did not differ significantly whether to perform active surveillance and contact precaution or not (P = 0.94 and P = 0.81, respectively). No patient developed MRSA bacteremia during the control period and there were only two patients of MRSA bacteremia during the intervention period, which showed no significant difference (Log rank test, P = 0.21).

Conclusion. Universal decolonization without AST and CPs for MRSA carriers do not increase the incidence of MRSA acquisition on clinical specimen and ICU attributable MRSA bacteremia in ICU with high prevalence rate of MRSA.

Disclosures. All authors: No reported disclosures.

1227. Development of a Clinical Prediction Model for Mortality in Methicillin-Resistant Staphylococcus aureus Bacteremia

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Background. Methicillin-resistant Staphylococcus aureus bloodstream infection (MSSA BSI) is associated with high mortality despite advances in medical care. Mortality prediction may have a profound impact on clinical decision making and risk stratification. Widely used scoring systems such as the Acute Physiology and Chronic Health Evaluation (APACHE) II Score and the Pitt Bacteremia Score were derived in the general critical care and Gram-negative BSI populations, respectively and may be less precise in MSSA BSI. We sought to develop a predictive model (PM) for 30-day mortality in patients with MRSA BSI based on characteristics readily assessable at initial evaluation.

Methods. Retrospective, single-center, cohort study in adults with MRSA BSI 2008 to 2018. Patients who did not receive active therapy within 72 hours of index culture were identified. Independent baseline demographic, clinical, and laboratory predictors of 30-day mortality were identified through multivariable logistic regression analysis with bootstrap resampling and coefficient shrinkage. The PM was derived using a regression coefficient-based scoring method. PM discriminatory ability was assessed using the c-statistic. The optimal threshold score was identified using the Youden Index (J).

Results. A total of 455 patients were included and 30-day mortality was 16.3%. The PM consisted of five variables and a potential total score of 33. Points were assigned as follows: age (9 points 290 years, 6 points 80–89 years, 5 points 70–79 years, 4 points ≥80 years); Glasgow Coma Scale (4 points 9–5 points ≤6); 7 points infective endocarditis or pneumonia; 5 points serum creatinine ≥ 3.5 mg/dL; and four points respiratory rate < 10 or > 24. The PM c-statistic was 0.860 (95% CI 0.818, 0.902). The PM score with the maximum J value was 13. Thirty-day mortality was 5.2% vs. 44.5% for PM score < 13 vs. ≥13, respectively (P < 0.001). The sensitivity, specificity, positive predictive value (PV), negative PV, and accuracy using a threshold of 13 points were 77.0%, 81.4%, 44.5%, 98.4%, and 80.7%, respectively.

Conclusion. Our findings demonstrate a weighted combination of five independent variables readily assessable at initial evaluation, with high discrimination, 30-d mortality in MRSA BSI. External validation is required before wide-spread clinical use.

Disclosures. M. J. Rybak: Allergan: Consultant, Grant Investigator and Speaker's Bureau, Research grant and Research support. Achaogen: Consultant, Grant Investigator and Speaker's Bureau, Consulting fee, Research grant and Research support. Bayer: Consultant, Grant Investigator and Speaker's Bureau, Consulting fee, Research grant and Research support. Melinta: Consultant, Grant Investigator and Speaker's Bureau, Consulting fee, Research grant and Research support. Merck: Consultant, Grant Investigator and Speaker's Bureau, Consulting fee, Research grant and Research support. Theravance: Consultant, Grant Investigator and Speaker's Bureau, Consulting fee, Research grant and Research support. Sunovian: Consultant, Grant Investigator and Speaker's Bureau, Consulting fee, Research grant and Research support. Zavante: Consultant, Grant Investigator and Speaker's Bureau, Consulting fee, Research grant and Research support. NIH: Consultant, Grant Investigator and Speaker's Bureau, Consulting fee, Research grant and Research support.

1228. Incidence of Staphylococcus aureus Infection after Elective Surgeries Among Adults in US Hospitals

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Background. Staphylococcus aureus is a leading cause of postsurgical infections. National estimates of these infections after elective surgeries based on microbiology data are limited. This study assessed 180-day postsurgical S. aureus incidence in real-world hospital settings.

Methods. Adults (≥18 years) who underwent elective surgery during a hospital-based outpatient or inpatient encounter from July 1, 2010–June 30, 2015 at one of 181 hospitals reporting microbiology codes according to National Hospital Surveillance Network groupings plus additional codes were included. Eighty-seven surgical categories were deﬁned using ICD-9-CM and CPT procedure codes according to National Hospital Surveillance Network groupings plus additional categories. Microbiology results and ICD-9-CM diagnosis codes were used to identify invasive (e.g., deep incisional and organ-space S. aureus bloodstream) and overall (i.e., invasive, superficial incisional, urinary tract, respiratory) S. aureus infections. Cumulative 180-day S. aureus infection rates were calculated as number of infections divided by number of discharges with elective surgeries. National infection volumes were calculated by multiplying infection rates by national inpatient elective surgery estimates using surgery counts from the entire PHD (665 hospitals) and weights based on hospital characteristics.

Results. Following 1,116,994 hospital-based outpatient elective surgeries, 180-day S. aureus incidence was 1.79% overall, with 0.38% complicated by invasive S. aureus infections. Among 884,803 inpatient surgical enrollments, overall and invasive 180-day S. aureus infection incidence was 3.5% and 0.53%, respectively. Based on an estimated 57,200 S. aureus infections (22,400 invasive) among an estimated 4.2 million elective inpatient surgeries annually in the US methicillin-resistant (MRSA) was observed in 45% and 46% of S. aureus infections after inpatient and outpatient surgeon-specific incidence. Figure 1 shows that invasive S. aureus incidence rate at 6 points after outpatient and inpatient elective surgeries. Figure 2 delineates the incidence rates for each type of S. aureus infection.

Conclusion. Our study indicated similar S. aureus infection rates after inpatient and outpatient elective surgeries. The results highlight the much larger burden of disease of S. aureus infection in the United States beyond inpatient surgeries.

Disclosures. M. J. Rybak: Allergan: Consultant, Grant Investigator and Speaker's Bureau, Research grant and Research support. Achaogen: Consultant, Grant Investigator and Speaker's Bureau, Consulting fee, Research grant and Research support. Bayer: Consultant, Grant Investigator and Speaker's Bureau, Consulting fee, Research grant and Research support. Melinta: Consultant, Grant Investigator and Speaker's Bureau, Consulting fee, Research grant and Research support. Merck: Consultant, Grant Investigator and Speaker's Bureau, Consulting fee, Research grant and Research support. Theravance: Consultant, Grant Investigator and Speaker's Bureau, Consulting fee, Research grant and Research support. Sunovian: Consultant, Grant Investigator and Speaker's Bureau, Consulting fee, Research grant and Research support. Zavante: Consultant, Grant Investigator and Speaker's Bureau, Consulting fee, Research grant and Research support. NIH: Consultant, Grant Investigator and Speaker's Bureau, Consulting fee, Research grant and Research support.