Real-World Healthcare Resource Utilization and Costs of Hospital-Onset Methicillin-Resistant Staphylococcus aureus Bloodstream Infections in U.S. Hospitals: 2023–2025

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Introduction

- Hospital-onset methicillin-resistant Staphylococcus aureus (MRSA) bloodstream infections (BSI) pose a significant clinical and economic burden to both patients and providers.
- Recent evidence on healthcare resource utilization (HCRU) and costs for these infections is limited.
- This study evaluated real-world HCRU, costs, and clinical outcomes associated with hospital-onset MRSA BSI across U.S. hospitals during 2023-2025.

Methods

- **Study design:** A retrospective cohort study
- **Data source:** Premier Healthcare Database (PHD), a large, geographically diverse, all-payor hospital discharge database that accounts for ~25% of all United States inpatient encounters from over 1,320 facilities. The PHD contains time-stamped, billing, clinical, laboratory and microbiology data.
- **Study period**: January 1, 2023 through June 30, 2025 as the index period with a 180-day follow-up post index visit.
- **Study population:**
  - Adult patients (aged ≥18 years)
  - Had any inpatient visit to a PHD hospital with a microbiologically confirmed hospital-onset MRSA BSI diagnosis during the study period
- **Index visit:** the earliest visit meeting the patient selection criteria.
- **Outcomes:**
  - **HCRU:** hospital length of stay (LOS), intensive care unit (ICU) utilization, ICU LOS, risk of 180-day all-cause and MRSA BSA-specific readmission
  - **Costs:** total hospitalization cost, readmission cost, ICU cost. Adjusted to 2024 U.S. dollars based on consumer price index for inpatient services
  - **In-hospital mortality:** during index visit and follow-up
  - **Discharge status:** during index visit
- **Statistical analysis:**
  - Descriptive statistics were used to report the patient characteristics and key outcomes of interest.
  - Analysis was performed using R 4.3.1

Results

- A total of 2,522 patients with diagnosis of hospital-onset MRSA BSI meeting selection criteria were analyzed
- Median age was 65 years, 67.2% White, 24.5% Black, 6.6% Hispanic
- Nearly two thirds had Medicare, 20.6% with Medicaid, and only 8.4% had commercial insurance
- 83.2% were admitted through ED and 73.4% were admitted from non-healthcare settings
- About one third of patients were admitted to hospitals with 500+ beds, 71.3% to teaching hospitals, 90.3% in Urban hospitals, 52.1% from the South
- Median Charlson Comorbidity Index was 5 (3, 7), with 57.5% having 5+ comorbidities.

Figure 1: Prevalence of Most Common Charlson Comorbidities among Patients with hospital-onset MRSA BSI

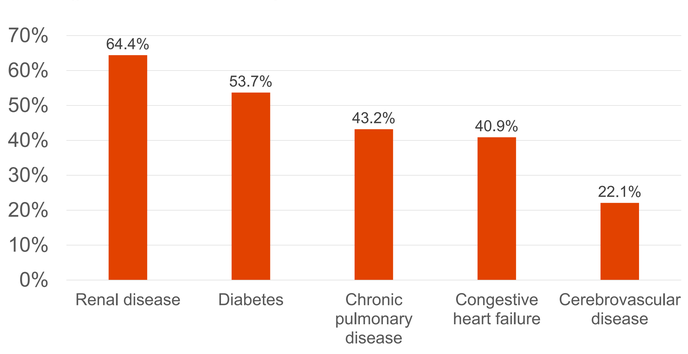
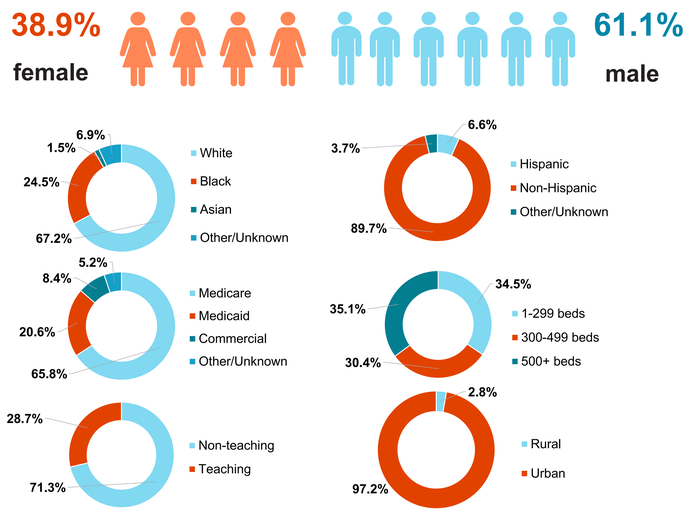


Figure 2: Discharge Status of the Index Visit



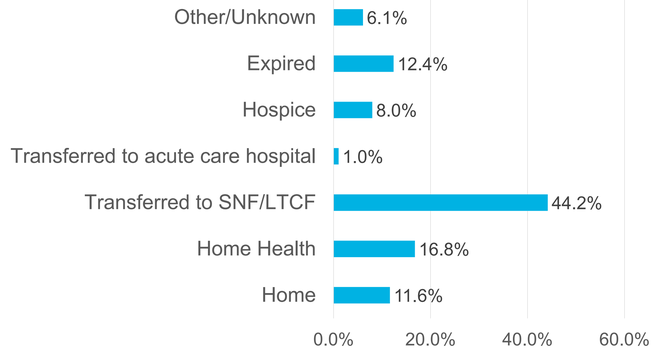


Table 1: Healthcare Resource Utilization for Hospital-Onset MRSA BSI-Related Hospitalizations

Variables	Results*
Index visit	
Total Hospital LOS, days*	11 (7, 23)
ICU admission during index visit	46.6%
ICU LOS, days*	5 (2, 12)
In-hospital mortality	12.4%
180-day follow-up period	
Risk of all-cause readmission	57.5%
Risk of BSI-associated readmission	42.5%
Risk of 180-day all-cause ED visit	65.9%
In-hospital mortality	10.1%
Minimum days to readmission	32 (13, 66)

*Continuous variables were reported as median (Q1, Q3).

Table 2: Costs for Hospital-Onset MRSA BSI-Related Hospitalizations (in 2024 U.S. dollars)

Variables	Results*
Index visit	
Total Hospitalization cost*	$32,980 ($18,321, $69,792)
ICU cost*	$31,561 ($13,884, $83,491)
Total cost of antibiotics*	$816 ($367, $1,952)
180-day follow-up period	
Total cost of all-cause readmission*	$41,291 ($19,709, $81,311)
Total cost of BSI-associated readmission*	$39,224 ($18,603, $75,311)
Total cost for all-cause outpatient visits*	$1,924 ($752, $5,487)

Conclusions

- Using up to date, large, nationally representative PHD data, we demonstrated that microbiologically confirmed hospital-onset MRSA BSI mainly affects patients with multiple comorbid conditions.
- It is associated with high mortality, high readmission risks, long hospital and ICU length of stay, and high hospitalization and ICU, and readmission costs.
- The HCRU and costs associated with hospital-onset MRSA BSI are substantial.
- Frequent and costly readmissions highlight the need for targeted strategies, including better infection prevention and optimized discharge planning, to reduce readmission risks and improve patient outcomes.

Limitations

- The PHD includes a slightly higher proportion of community-based hospitals compared with the American Hospital Association survey data; therefore, findings may not be generalizable to all hospitalized patients in the United States.
- Follow-up outcomes were captured only for events occurring within hospitals participating in the PHD, which may result in underestimation of outcomes occurring outside these facilities.
- As with all studies using administrative data, results may be subject to misclassification due to coding errors or incomplete clinical detail.

Reference

Ham DC, See I, Novosad S, Crist M, Mahon G, Fike L, Spicer K, Talley P, Flinchum A, Kainer M, Kallen AJ, Walters MS. Investigation of Hospital-Onset Methicillin-Resistant Staphylococcus aureus Bloodstream Infections at Eight High Burden Acute Care Facilities in the United States, 2016. J Hosp Infect. 2020 Apr 10:S0195-6701(20)30182-1. doi: 10.1016/j.jhin.2020.04.007. Epub ahead of print. PMID: 32283173; PMCID: PMC7857529.

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Disclosures

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