

# Prevalence, Cost, and per-Patient Economic Burden of Hospital-Onset Bacteremia and Fungemia

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ISPOR 2024  
November 17-20, 2024  
Code: EE502

## Background

Healthcare-associated infections (HAIs) are infections that occur during the process of care in a hospital or other health care facility which were not present or incubating at the time of admission.<sup>1</sup> In the United States, a government pay-for-performance program called the Hospital-Acquired Condition (HAC) Reduction Program penalizes hospitals deemed to have excessive rates of five HAIs and one composite measure of patient safety.<sup>2</sup> The most expensive HAI, on a per-case basis, are central-line-associated bloodstream infections (CLABSI).<sup>3</sup>

Hospital-onset bacteremia and fungemia (HOB) is any hospital-onset bloodstream infection from all sources, regardless of procedure or device.<sup>4</sup> HOB is may supplant CLABSI as a quality metric due to its ability to capture multiple disease processes with the potential to have a greater impact on overall patient care.<sup>5,6</sup> As organizations prepare to expand their prevention focus beyond those bloodstream infections associated with central lines to all-cause HOB, they may be assisted by understanding the per-patient burden of both CLABSI and non-CLABSI HOB.

## Objective

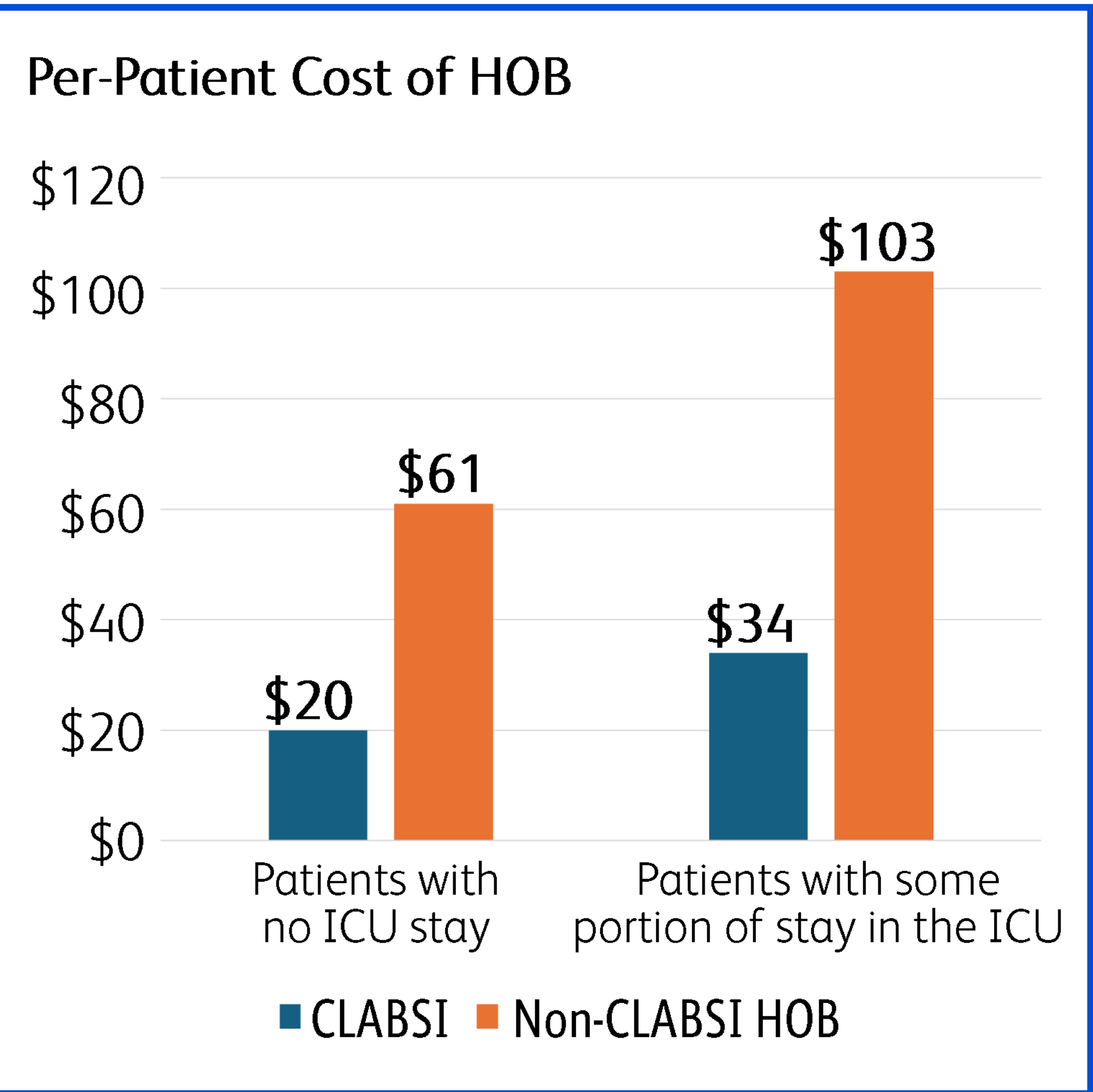
Estimate the relative prevalence, cost, and per-patient economic burden of both CLABSI and non-CLABSI HOB.

## Methods

The subjects from a 41-hospital (756,637-patient) real-world data analysis<sup>7</sup> were first refined to exclude patients with a length of stay (LOS) greater than 365 days. The resultant cohort of 645,315 was employed to calculate the per-patient burden of CLABSI and non-CLABSI HOB.

## Results

The rate of HOB per 1,000 adult hospital patients with a LOS of 2 days or longer, but less than 365 days, was found to be 3.06; with CLABSI and non-CLABSI HOB being 0.62 and 2.44, respectively (see Model). The cost to the hospital for a CLABSI infection was \$32,759 for patients who did not spend any part of their stay in an intensive care unit (ICU) and \$55,001 for patients who spent some portion of their stay in the ICU. Those values translated to a per-patient CLABSI burden of \$20 and \$34 for those two groups of patients respectively. The cost of a non-CLABSI HOB infection was \$25,207 for patients with no ICU stay and \$42,095 for patients with an ICU stay. Those values translated to per-patient non-CLABSI HOB burden of \$61 and \$103 for those two groups of patients respectively (see below).



## KEY FINDINGS

- HOB occurs at a rate of 3.06 cases per 1,000 patients\* with non-CLABSI HOB comprising 80% of the cases (2.44 per 1,000 patients\*).
- Due to its greater prevalence, the per-patient\* cost of non-CLABSI HOB is \$61 in patients who spent no time in the ICU, increasing to \$103 in patients who spent some portion of their stay in the ICU.

\*Rates and costs for adult inpatients with a length of stay of at least 2 days, but less than 365 days

## Model

### Per-Patient Economic Burden of HOB

	CLABSI	Non-CLABSI HOB
<b>Prevalence per 1,000 patients</b>		
Total number of patients (N = 645,315) <sup>7</sup>		
Number of HOB cases <sup>7</sup>	403 (20.4%)	1,574 (79.6%)
Rate of HOB cases (cases per 1,000 patients)	0.62	2.44
<b>Per-patient burden (no ICU stay)</b>		
Incremental cost of a single infection to the organization <sup>7</sup>	\$32,759	\$25,207
Per-patient burden of infection	\$20	\$61
<b>Per-patient burden (with some portion of stay in ICU)</b>		
Incremental cost of a single infection to the organization <sup>7</sup>	\$55,001	\$42,095
Per-patient burden of infection	\$34	\$103

## Limitations

Length of stay for individual patients was not known, nor was the duration of any stay in the ICU – only that the patient had or had not spent some portion of their stay in the ICU. Thus, analyses were performed on a per-patient and not on a per-day basis.

## Discussion

As a benchmark, the cost of CLABSI employed in this analysis – \$55,001 for patients with an ICU stay and \$32,759 for patients without an ICU stay – is consistent with the cost of CLABSI derived by others – \$55,154 (Zhang, 2024)<sup>8</sup> and \$48,108 in 2015 dollars (Bysshe, 2017).<sup>9</sup>

The per patient burden of non-CLABSI HOB – \$61 to \$103 (depending on ICU status) – may be viewed as a potentially preventable expense by organizations. Dantes et al. estimated that two-thirds of all HOB events are preventable.<sup>10</sup> Other studies have estimated that between 36% and 74% of HOB events are preventable depending on whether they result from non-commensal or commensal organisms, respectively.<sup>11</sup>

Urine is the most common identifiable site of likely secondary non-CLABSI HOB.<sup>7</sup> 48% of the HOB events attributable to urine as a source are estimated to be potentially preventable and 70% of those events that are specifically associated with a urinary catheter are estimated to be potentially preventable.<sup>11</sup>

## Conclusions

The per-patient economic burden of non-CLABSI HOB is three times the per-patient burden of CLABSI HOB – the subset of reportable infections that receive scrutiny today. Organizations may find that the cost of infection prevention interventions can be offset to an extent by the economic benefit of infection avoidance while they simultaneously work to navigate a potential, future HAC penalty that may be based on reducing all forms of HOB.

## References

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<sup>6</sup>Leaptrot DE, Godfrey D. NHSN on FHIR: Comparing the Legacy Measures and Digital FHIR Measures. San Antonio: APIC Annual Conference. Jun 3-5, 2024.

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<sup>11</sup>Leekha S, Robinson GL, Jacob JT, Fridkin S, Shane A, et al.; CDC Prevention Epicenters Program. Evaluation of hospital-onset bacteraemia and fungaemia in the USA as a potential healthcare quality measure: a cross-sectional study. *BMJ Qual Saf.* 2024 Jul 22;33(8):487-498.

## Disclosures and Funding

Timothy Kelly is an employee of Becton Dickinson and Company. Reference reprints and poster printing costs were funded by Becton Dickinson and Company. BD-138582