Effect of Rapid Sepsis Test Adoption on Mortality, Discharge, Hospital-Free Days and Blood Cultures across Four EDs

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Study Objective

Evaluate the outcomes of mortality, ED discharge rate, and hospital-free days after the introduction of a new sepsis diagnostic in the ED.

This retrospective cohort study was intended to determine if the results observed at an initial site were reproducible.

Endpoints Evaluated:

- Mortality
- Blood Culture Utilization
- ED Discharges and Revisits
- 30-Day Hospital-Free Days (30-day HFD)

Study Design

- Retrospective cohort study of 4 emergency departments in Louisiana and Mississippi
- A new diagnostic test for sepsis was introduced as part of a protocolized triage and screening process
- A Pre-Post comparison was conducted which compared 1-year pre-implementation to 1-year post-implementation*
- Data was collected from the EPIC electronic health record
- Inclusion Criteria:
  - Adult (>=18 years old) patients that presented to the ED
  - Had either of:
    - A triage-based Our Practice Alert (OPA)
    - A rescue alert OPA based on the Epic Predictive Model (>= 44 for Version 2)

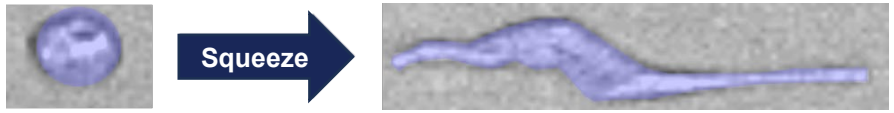
The data in the presentation includes 20,514 more patients than the abstract with a complete set of comparison data including 1y pre and 1y post.

Test Background

- IntelliSep® is an FDA cleared semi quantitative cellular host response test to aid in early detection of sepsis with organ dysfunction manifesting within the first 3 days after testing.
- The rapid sepsis test generates the IntelliSep Index® value that falls within one of three discrete interpretation bands based on the probability of sepsis.
- IntelliSep® utilizes microfluidics, deformability cytometry, and ultra high-speed imaging to quantify biomechanical properties of white blood cells and assess the state of immune activation.

White blood cell from **non-septic** patient

White blood cell from **septic** patient



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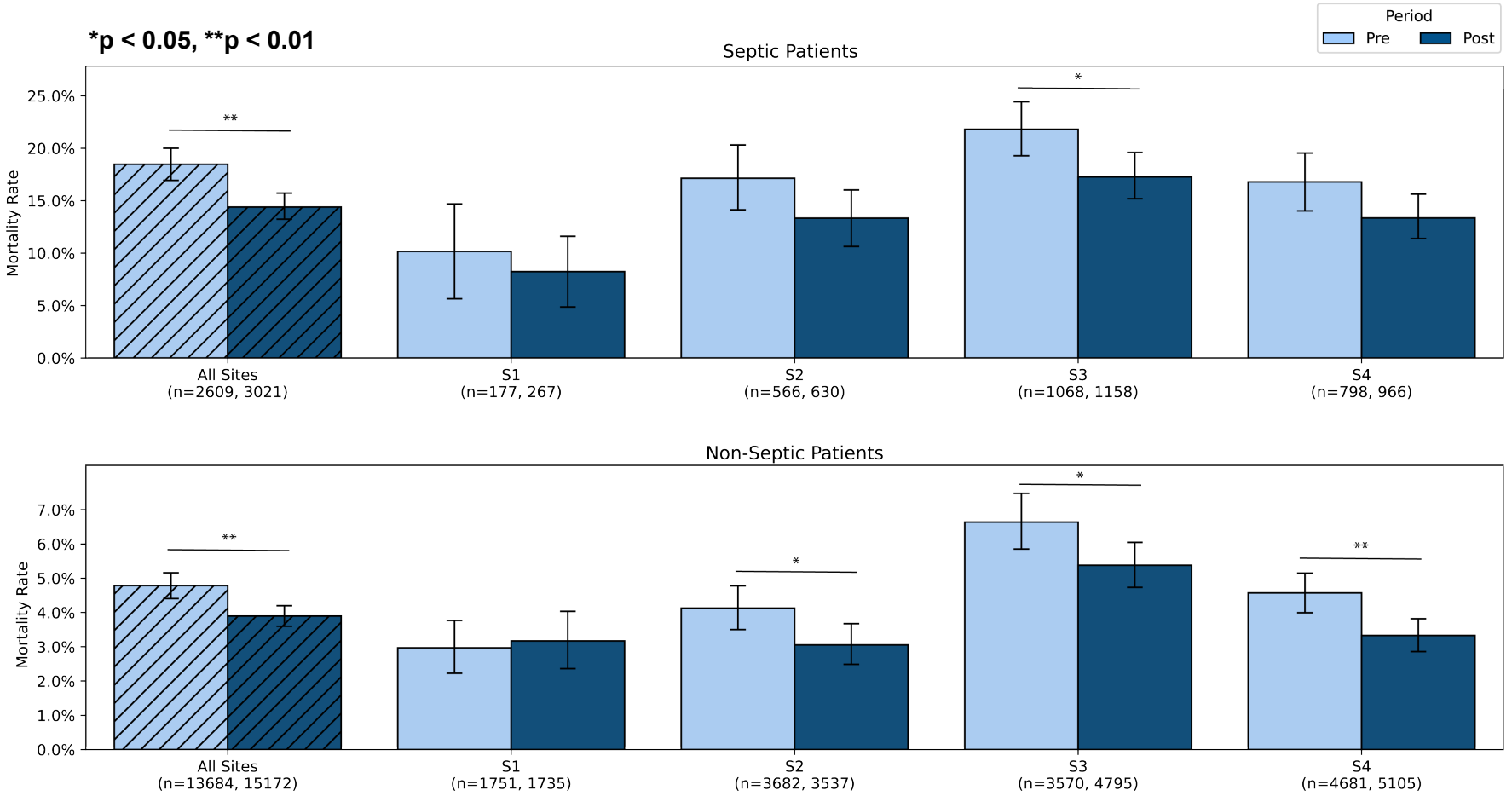
Site Breakdown

- Adult patients that presented to the emergency department and received either a triage or rescue OPA
- 1-year pre-implementation is compared to 1-year post implementation

Site Code	Site Name	Go-Live Date	N (Pre)	N (Post)
S1	FMOL Health: St. Elizabeth	9/24/2024	1928	2002
S2	FMOL Health: Our Lady of Lourdes	9/24/2024	4248	4167
S3	FMOL Health: St. Dominic	8/27/2024	4638	5953
S4	FMOL Health: St. Francis	8/27/2024	5479	6071
	Total		16293	18193

Study Results:
Mortality Reduction Among Septic and Non-Septic Patients



Across all sites there was

- An **18.6%** relative decrease in mortality rate among septic patients (Pre: 4.8%, Post: 3.9%)
- A **22.1%** relative decrease in non-septic patients
- Trends held across sites among sepsis patients

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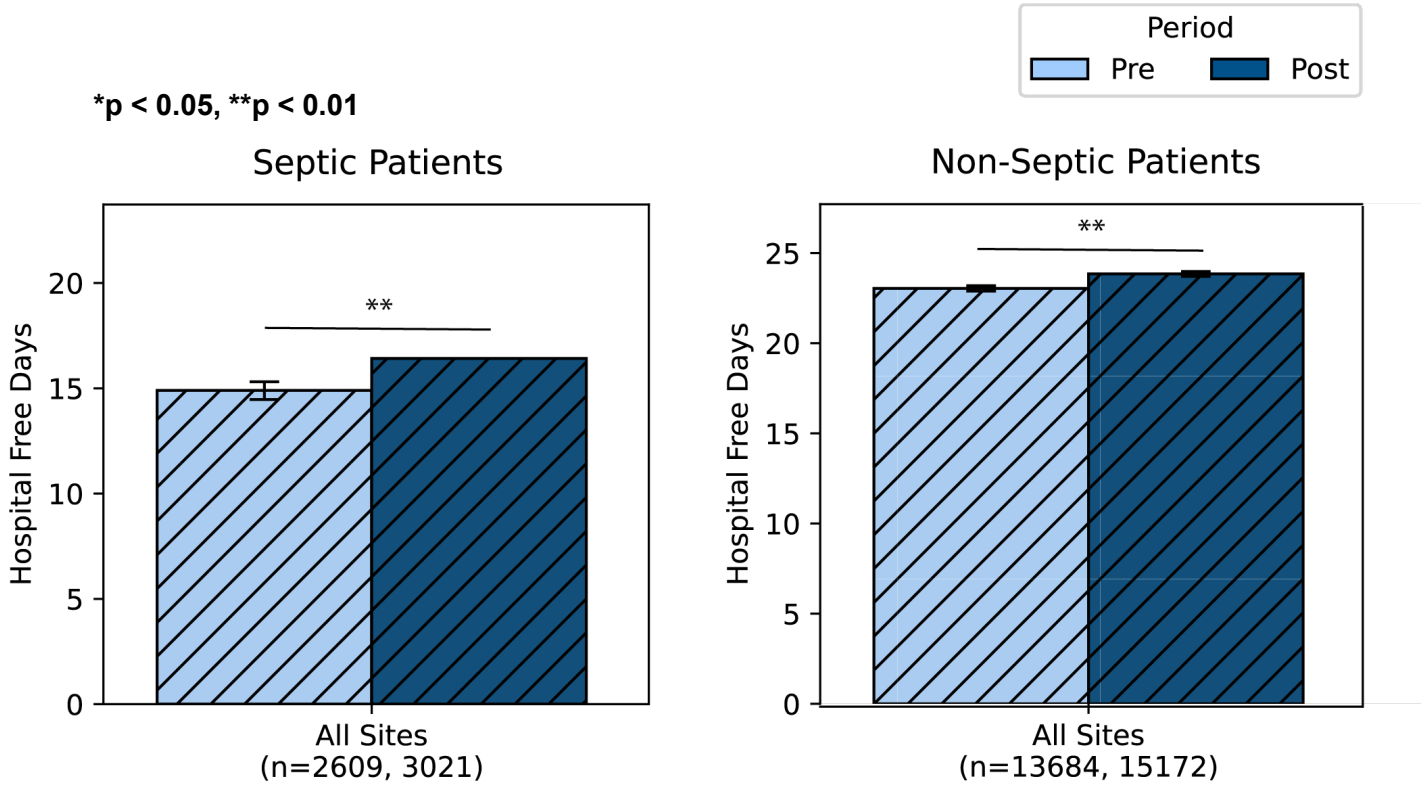
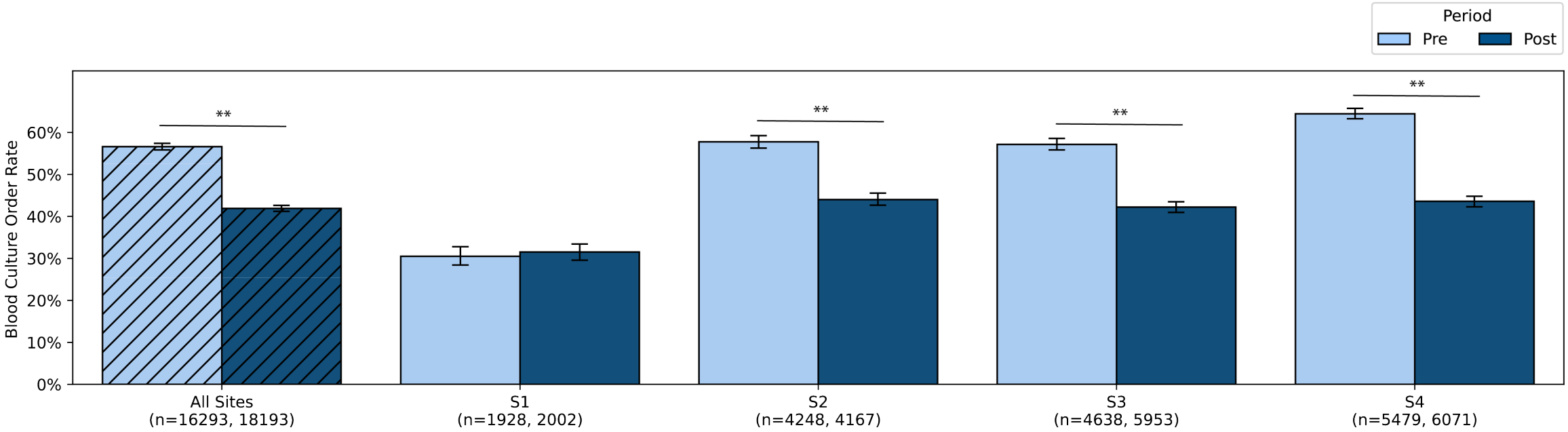
Study Results:
30-day Hospital Free Days (HFDs)



- Significant increase of 1.5 days in 30-day HFDs among sepsis patients
- Significant increase of 0.8 30-day HFDs among Non-sepsis patients

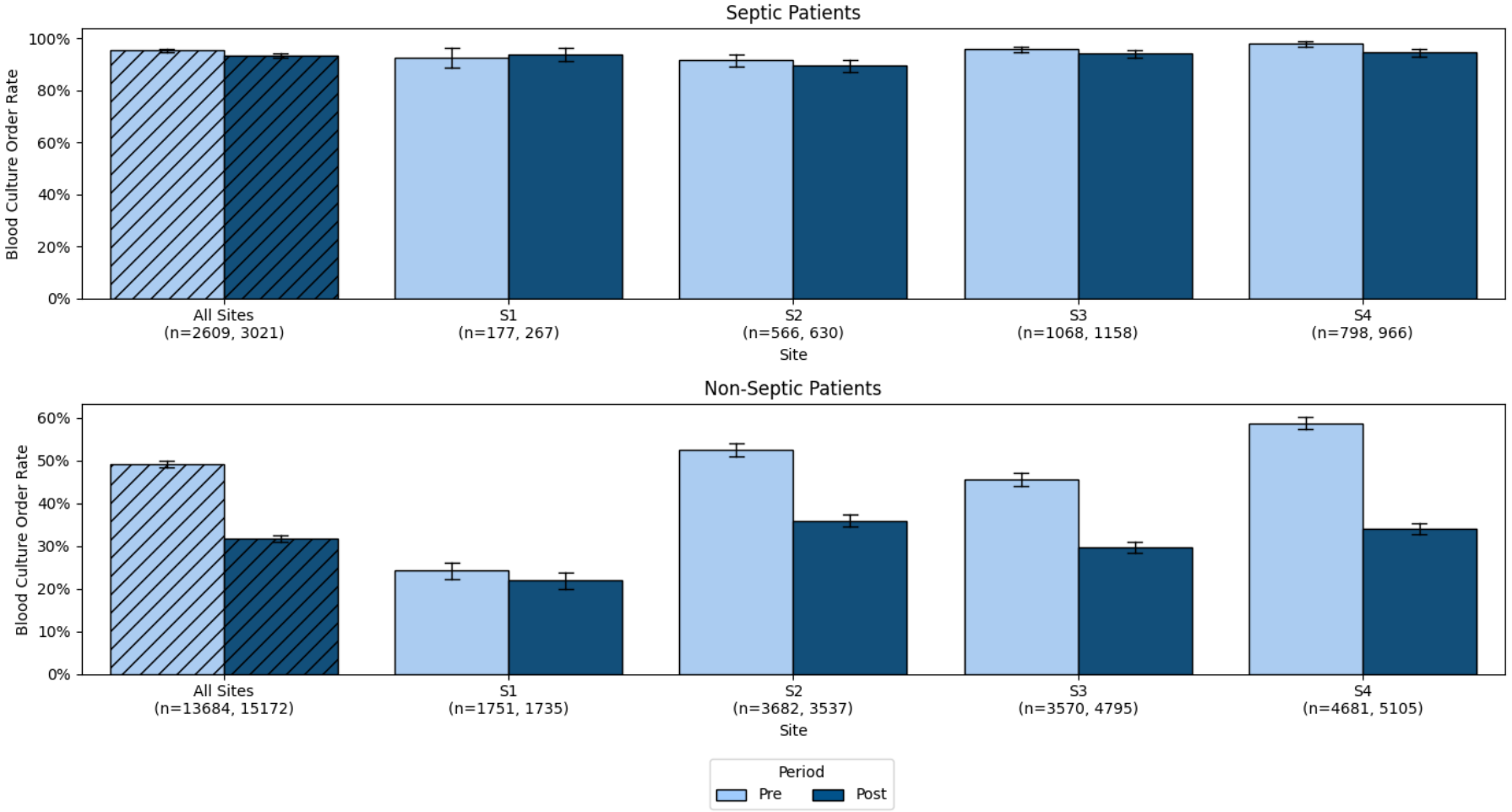
	Pre	Post	Difference (%)	p-value
Sepsis	14.9 days	16.4 days	1.5 days (10.2%)	p < 0.01
Non-Sepsis	23.0 days	23.8 days	0.8 days (3.5%)	p < 0.01

Study Results:
Decrease in Blood Culture Order Rate



	Pre	Post	Absolute Diff	Relative Diff	p-value
All Sites	61.1%	42.9%	-18.2%	-29.8%	$p < 0.01$
S1	30.5%	31.5%	1.0%	3.3%	ns
S2	57.8%	44.0%	-13.8%	-23.8%	$p < 0.01$
S3	57.2%	42.2%	-14.9%	-26.1%	$p < 0.01$
S4	64.4%	43.6%	-20.8%	-32.3%	$p < 0.01$

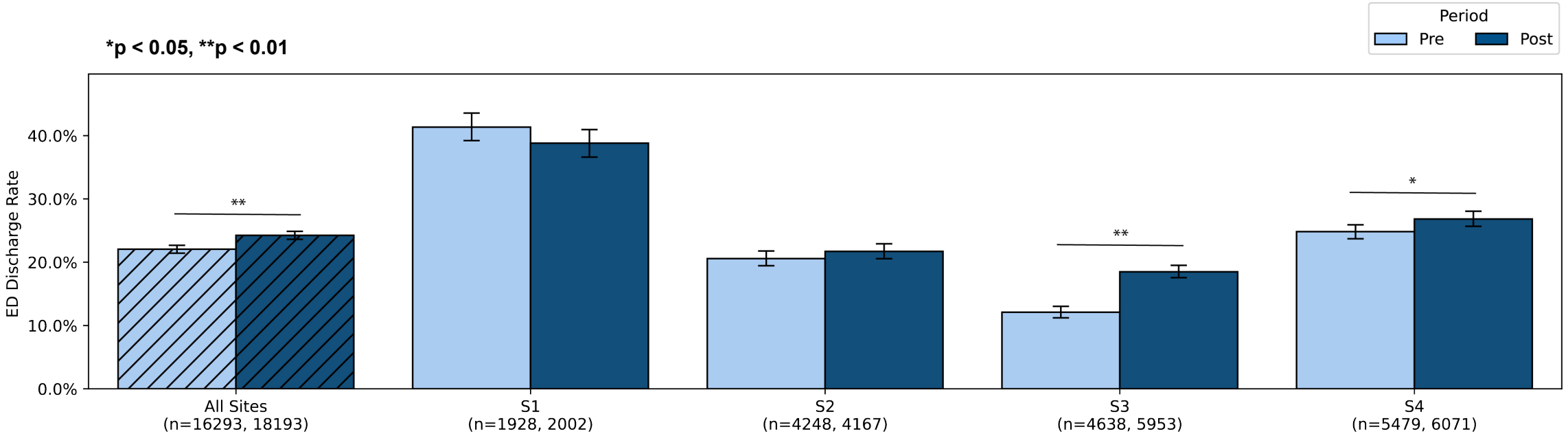
Study Results:
Blood Culture Reduction



- Rate of blood cultures orders amongst patients who ultimately are diagnosed as septic remain largely unchanged

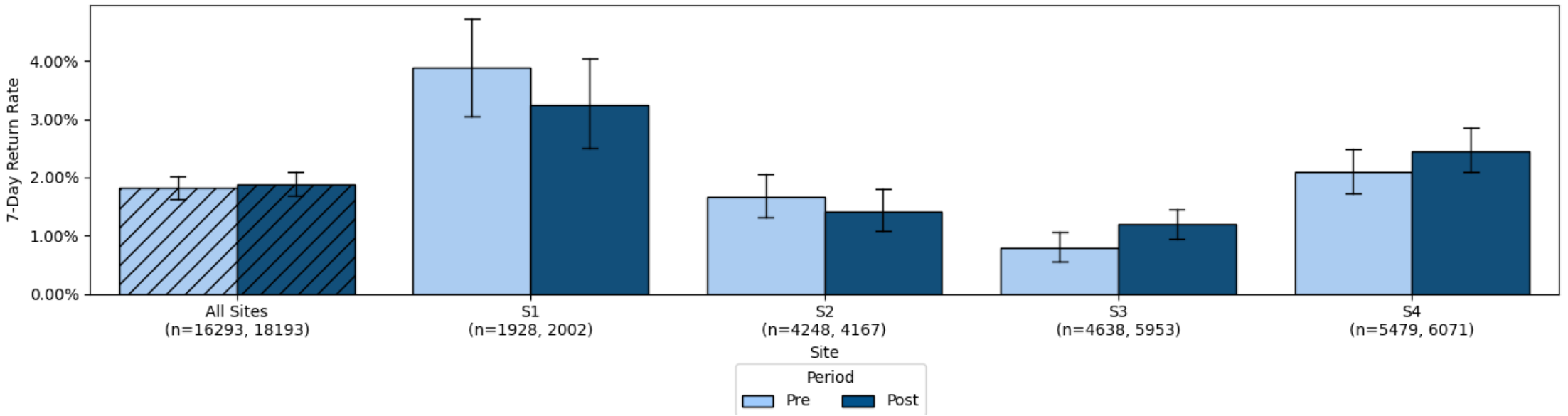
- Overall decrease in blood cultures is driven by a 35.6% relative decrease in blood culture order rate in non-septic patients

Study Results:
Increase in ED Discharge Rate



19.5% relative increase in discharge rates across suspected infection population

Study Results:
ED Revisit Rate is Unchanged



No statistically significant change in ED revisit rate across suspected infection population

Conclusions

After the implementation of a novel diagnostic test for sepsis across 4 FMOL Health EDs there was:

- A significant reduction of mortality in septic patients and non-septic patients (relative reduction of 18.6% and 22.1% respectively)
- A significant decrease in blood culture utilization (29.8% relative reduction)
- A significant increase in ED discharges (19.5% relative increase) while the rate of ED revisits remained the same
- A significant increase in 30-day Hospital-Free Days among septic and non-septic patients (1.5 and 0.8 days respectively)