Gram-Negative Bacteremia: The Comparison of Duration of Antibiotic Treatment at an Academic Medical Center vs. Non-Academic Medical Center

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SCHOOL OF PHARMACY

Background

Longer duration of antibiotic therapy (14 days) is still commonly used, [1] most likely due to the guidelines for the management of catheter-related bloodstream infections recommending a duration of 7-14 days for antibiotic therapy.[2]

- The benefits of shorter duration of antibiotic therapy (7 days) has been shown to reduce the risk of antibiotic resistance, drug-related adverse effects, hospital length of stay, and cost. [3]

Several studies now recommend a 7-day duration of antibiotic therapy over a 14-day duration of antibiotic therapy for uncomplicated gram-negative bacteremia. [1,4,5]

- Uncomplicated bacteremia includes patients who had adequate source control, did not require prolonged antibiotic treatment, and who did not have polymicrobial bacteremia.

Purpose

Compare the duration of antibiotic therapy used for the treatment of gram-negative bacteremia between an academic medical center (UAMS) and a community teaching hospital (SJH)

Methods

Monomicrobial gram-negative bacteremia caused by *Escherichia coli, Klebsiella spp.,* or *Pseudomonas aeruginosa*
January 1, 2023 – May 1, 2024

| Included (n=263)	Excluded (n=246)

• Age 18-99 years old
• Monomicrobial infection
• Source of infection:
  • Urinary tract
  • Abdominal cavity
  • Respiratory tract
  • Skin and soft tissue
• Negative repeat blood cultures
	• Polymicrobial infection
	• Bacteremia not caused by *Escherichia coli, Klebsiella spp.* or *Pseudomonas aeruginosa*
	• Other sources of bacteremia (endocarditis, osteomyelitis, etc.)
	• Uncontrolled infection

Treatment Arms	Primary Outcome
St. John's Hospital (SJH) (n=97)	Duration of antibiotic therapy

	Secondary Outcome
University of Arkansas for Medical Sciences (UAMS) (n=166)	% of patients switched to oral therapy

Results

Baseline Characteristics

	SJH (n=97)	UAMS (n=166)
Age (years) - 18-99 (SD)	60.1 (22.2)	55.4 (17.2)
Sex, n (%)		
- Female	44 (45.4%)	64 (38.6%)
- Male	53 (54.6%)	102 (61.4%)
ID Consult, n (%)	64 (66.0%)	72 (43.4%)
Bacteria Type, n (%)		
Escherichia coli	71 (73.2%)	116 (69.9%)
Klebsiella spp.	23 (23.7%)	39 (23.5%)
Pseudomonas aeruginosa	3 (3.1%)	11 (6.6%)
Source of Bacteremia, n (%)		
Urinary tract	80 (82.5%)	115 (69.3%)
Respiratory	2 (2.1%)	14 (8.4%)
Intra-abdominal	14 (14.4%)	33 (19.9%)
Skin and Soft Tissue	1 (1.0%)	4 (2.4%)

Bacterial Species (%)

Source of Bacteremia (%)
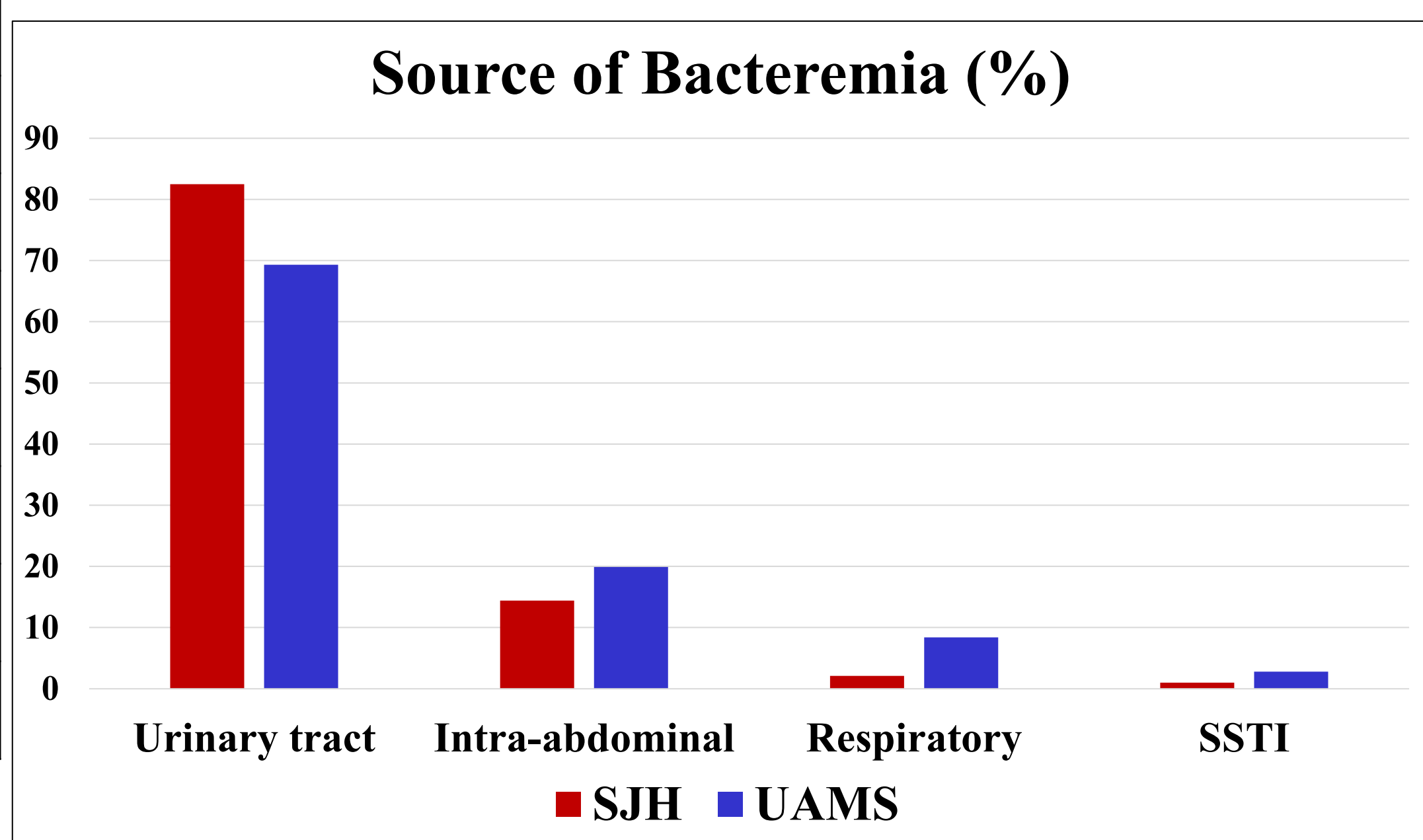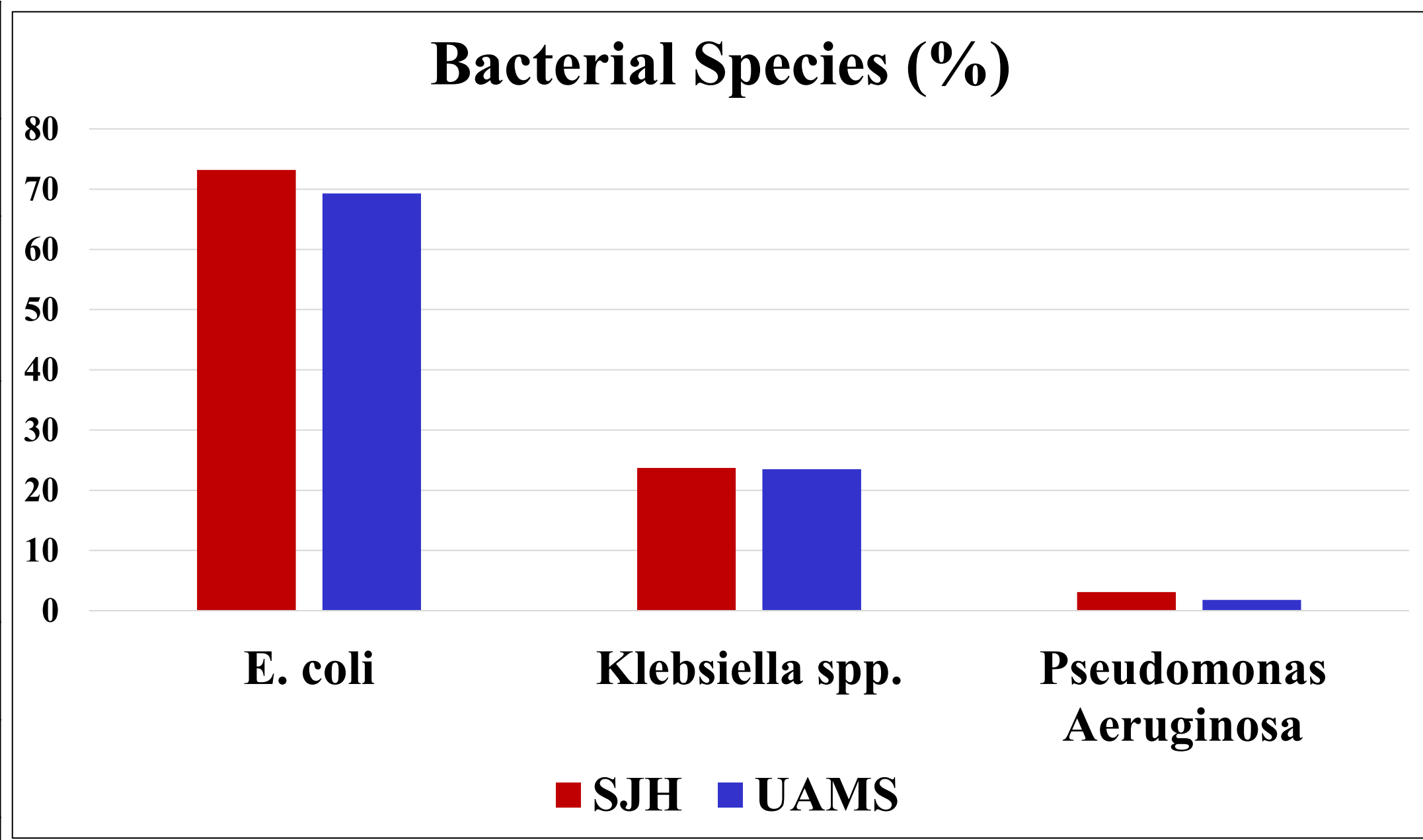
Primary Outcome

Median Duration of Treatment

SJH	UAMS	P-value
10.0 days	14.0 days	0.001

Median Duration of Treatment
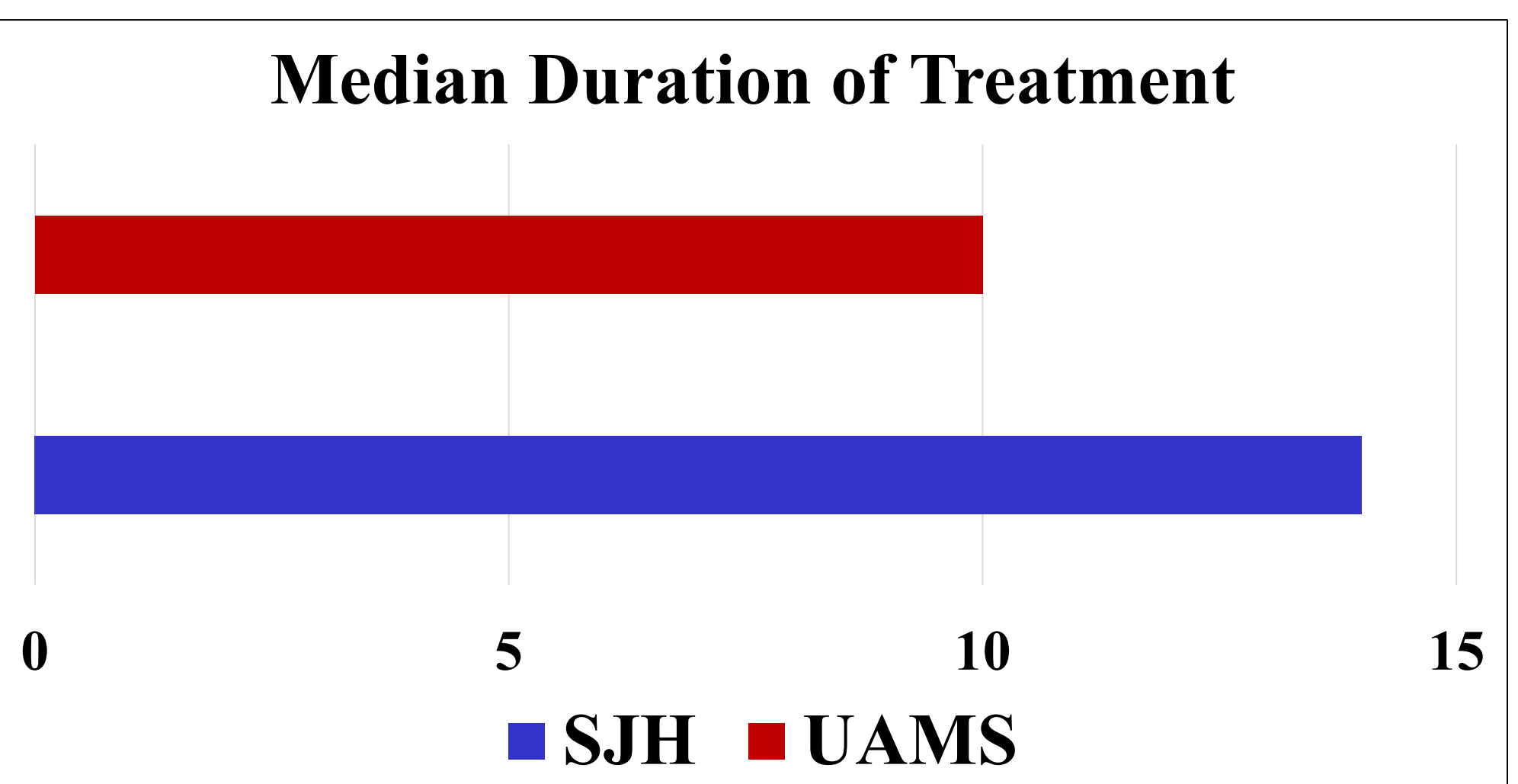
Secondary Outcome

Patients Switched From IV to PO

SJH	UAMS	P-value
41 patients (42.3%)	107 patients (64.5%)	0.001

Patients Switched From IV to PO (%)
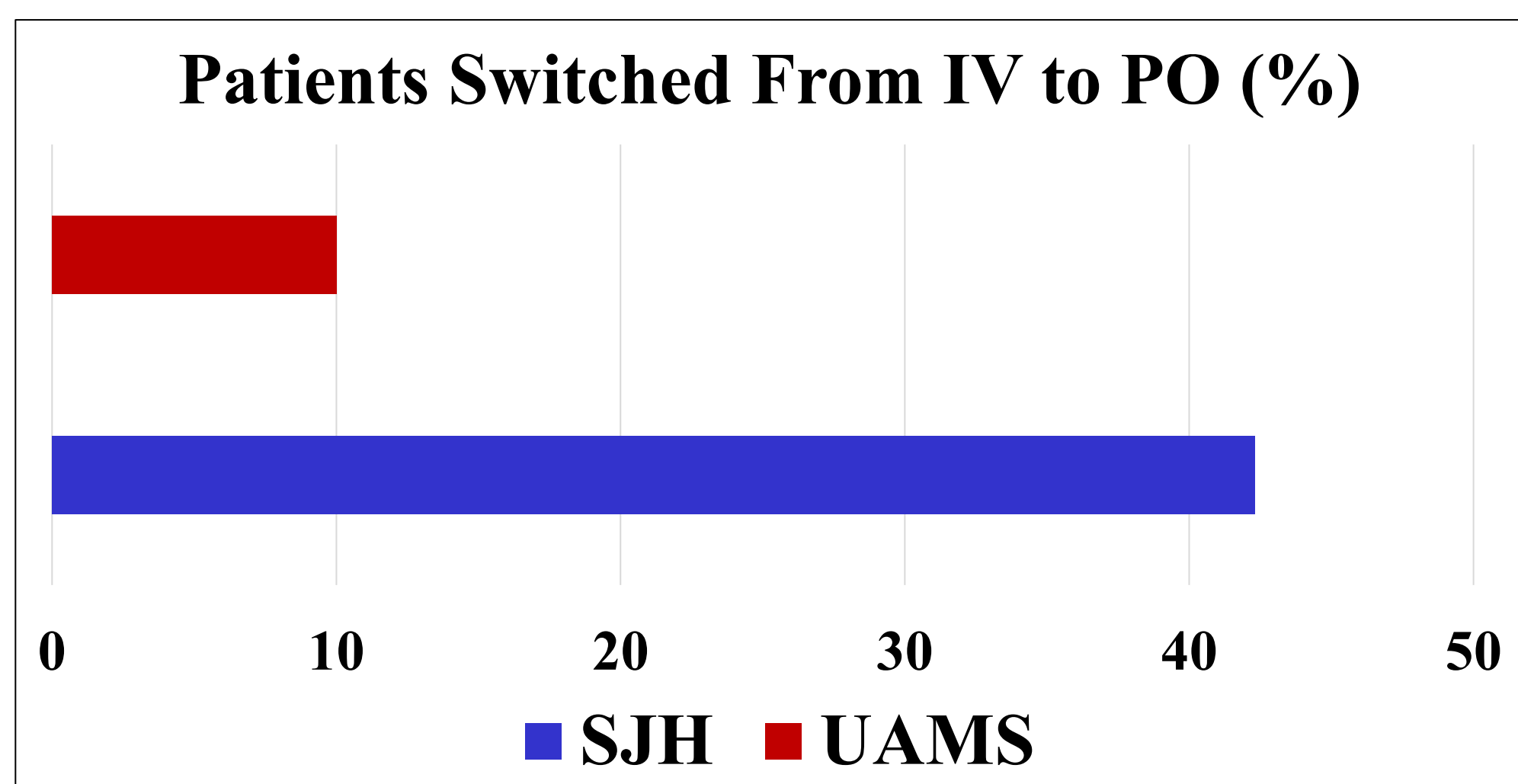
Conclusion

- Although previous studies have shown that 7 days of antibiotic treatment is noninferior to 14 days of antibiotic treatment for the treatment of gram-negative bacteremia, the average duration of antibiotic therapy in both institutions was greater than 7 days.
- The most common pathogen isolated was *Escherichia coli* and the most common source of infection was the urinary tract, which are both consistent with previous studies.
- Patients treated at UAMS were treated with a shorter course of antibiotic therapy and were more likely to be transitioned from IV to PO antibiotic therapy compared to patients treated at SJH.
  - These outcomes may be indicative of academic medical centers having more established antimicrobial stewardship programs who may be more comfortable with earlier de-escalation of therapy compared to community hospitals.
- Future research opportunities:
  - Larger patient population and multi-center study
  - Analyzing outcomes such as mortality, clinical success, and resistance rates
  - Evaluation of which IV antibiotics were used
  - ID consult vs. non-ID consult

References

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