

Time to Urine Culture Positivity as Predictor of Pathogen in Critically Ill Patients

Background

- Up to 60% of antibiotics prescribed in the ICU are inappropriate¹
- Unnecessary broad spectrum antibiotics contribute to the increasing problem of multi-drug resistant organisms and can be harmful in critically ill patients
- Previous study at AU Medical Center showed a 99% negative predictive value (NPV) for blood cultures at 72 hours

Objective

- To evaluate urine culture results at 24 hours as a predictor of finalized negative cultures in critically ill patients with suspected urinary tract infection

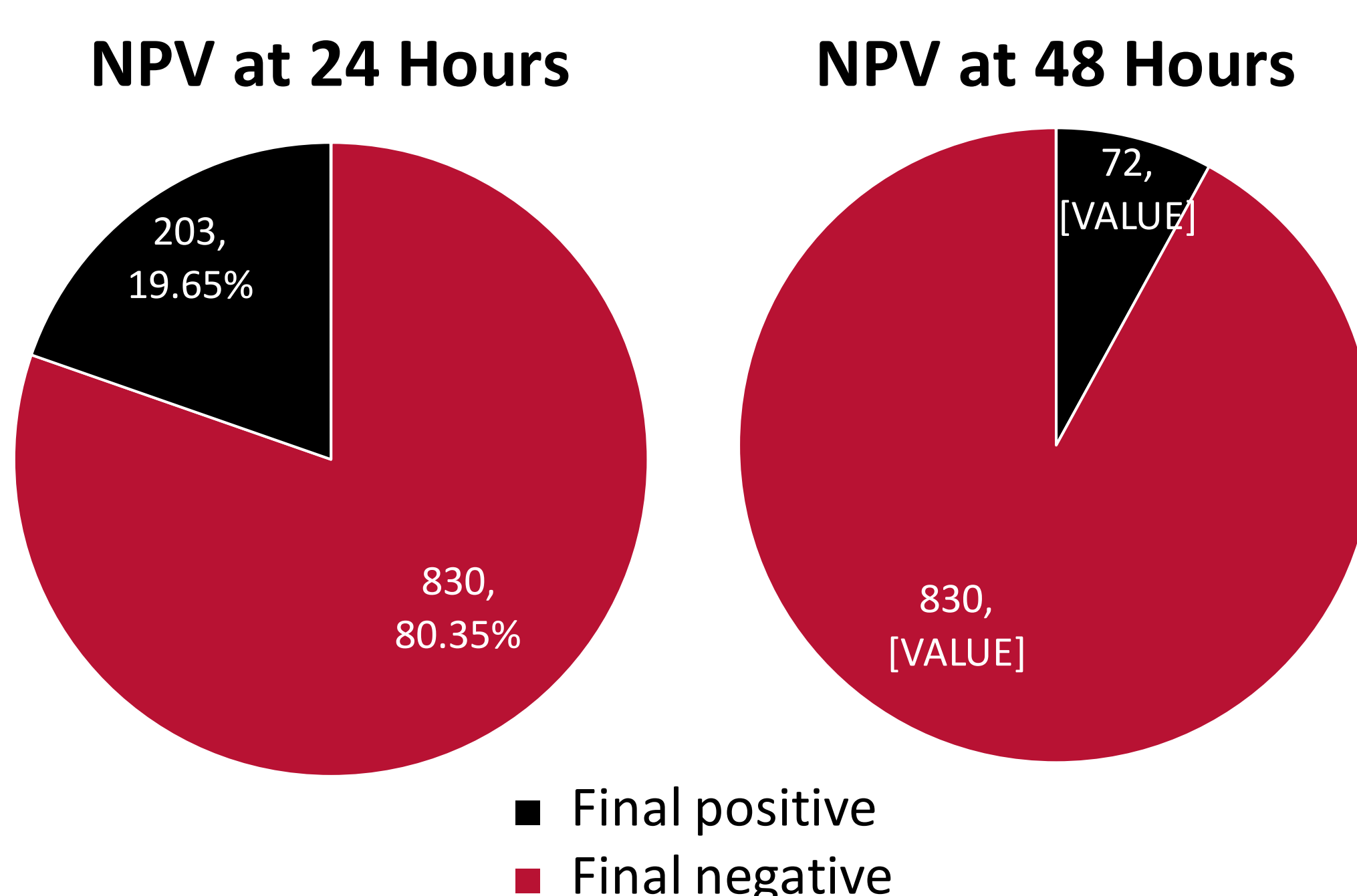
Methods

- **Design:** A single-center, retrospective chart review of patients admitted to the medical ICU with urine cultures collected between June 1, 2010 and July 31, 2018.
- **Inclusion:** Patients were included if they had a urine culture collected during a medical ICU admission
- **Data Collection:** Patient demographics, number of vasopressors at time of culture, antibiotic use prior to culture, culture growth at 24, 48, 72 hours, and final growth, species isolated
- **Statistical Analysis:** Descriptive statistics were utilized to analyze all data
- **Primary outcome:** Negative predictive value of urine cultures at 24 hours

Results

- Of 1059 cultures, 272 (25.7%) were positive for growth
- Of 272 positive cultures, 43 (15.9%) were considered contaminants

Figure 1. Urine Culture NPV at 24 and 48 Hours



Implications

- Urine cultures at 24 hours should not be used to guide de-escalation of antimicrobial therapy for suspected urinary tract infection

INVESTIGATOR TEAM

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Negative urine culture results at 24 hours are ***not predictive*** of finalized negative cultures and ***should not guide*** antimicrobial de-escalation for critically ill patients with suspected urinary tract infection.



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TABLES AND FIGURES

Table 1. Patient Demographics

Patients with Urine Cultures (N = 1059)	
Age (years), mean (SD)	57.7 (17.2)
ICU length of stay (days), mean (SD)	5.6 (6.9)
SOFA score, mean (SD)	6.8 (4.2)
Mortality during hospital stay	197 (18.6%)
Immunocompromised	164 (15.5%)
Systemic steroid use while in the hospital	88 (8.3%)
≥1 vasopressor at time of culture	191 (18.0%)
Antibiotics prior to culture drawn	412 (38.9%)
Nursing home resident	145 (13.7%)

Figure 2. Average Time to Positivity (TTP) (mean ± SD)

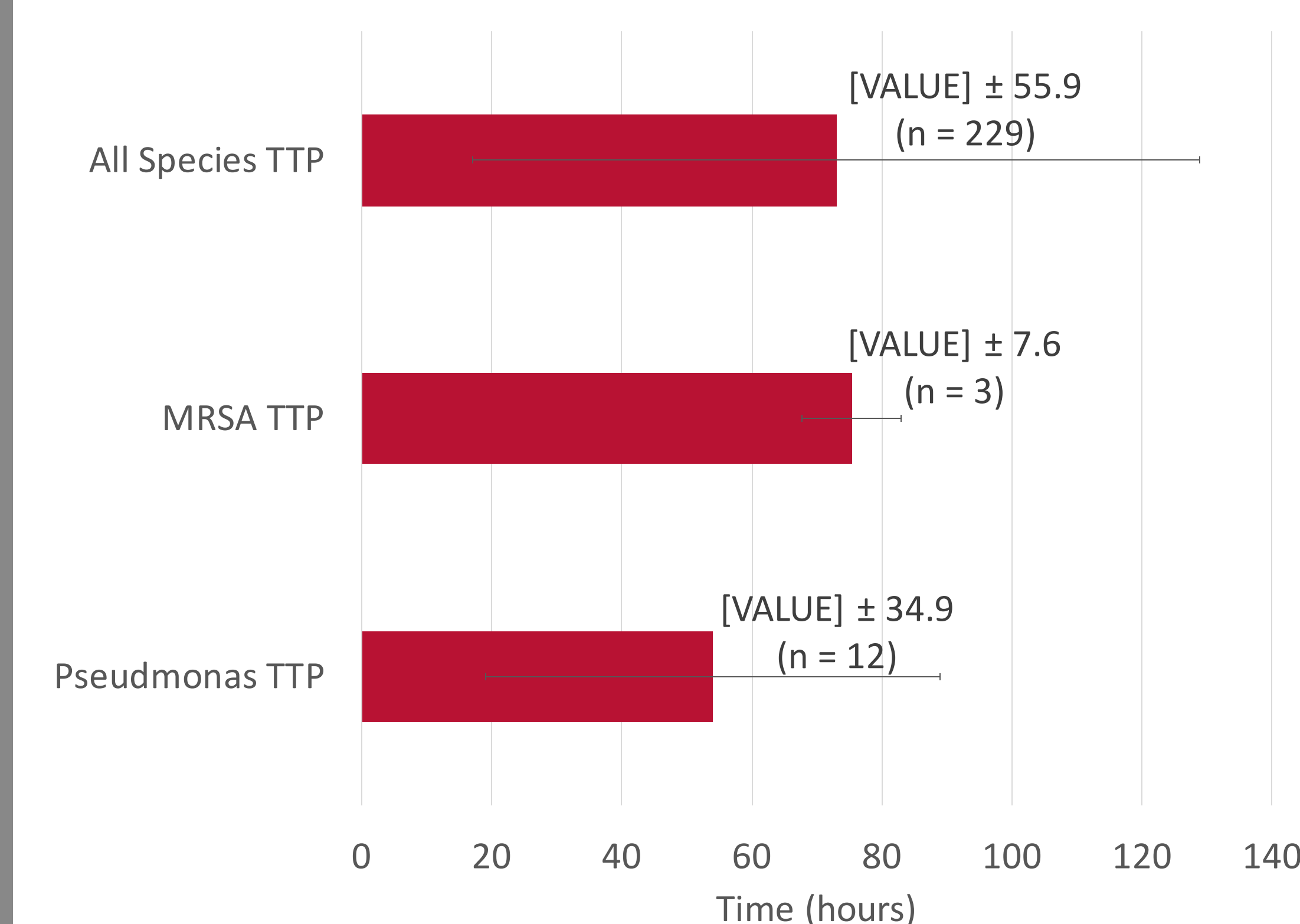
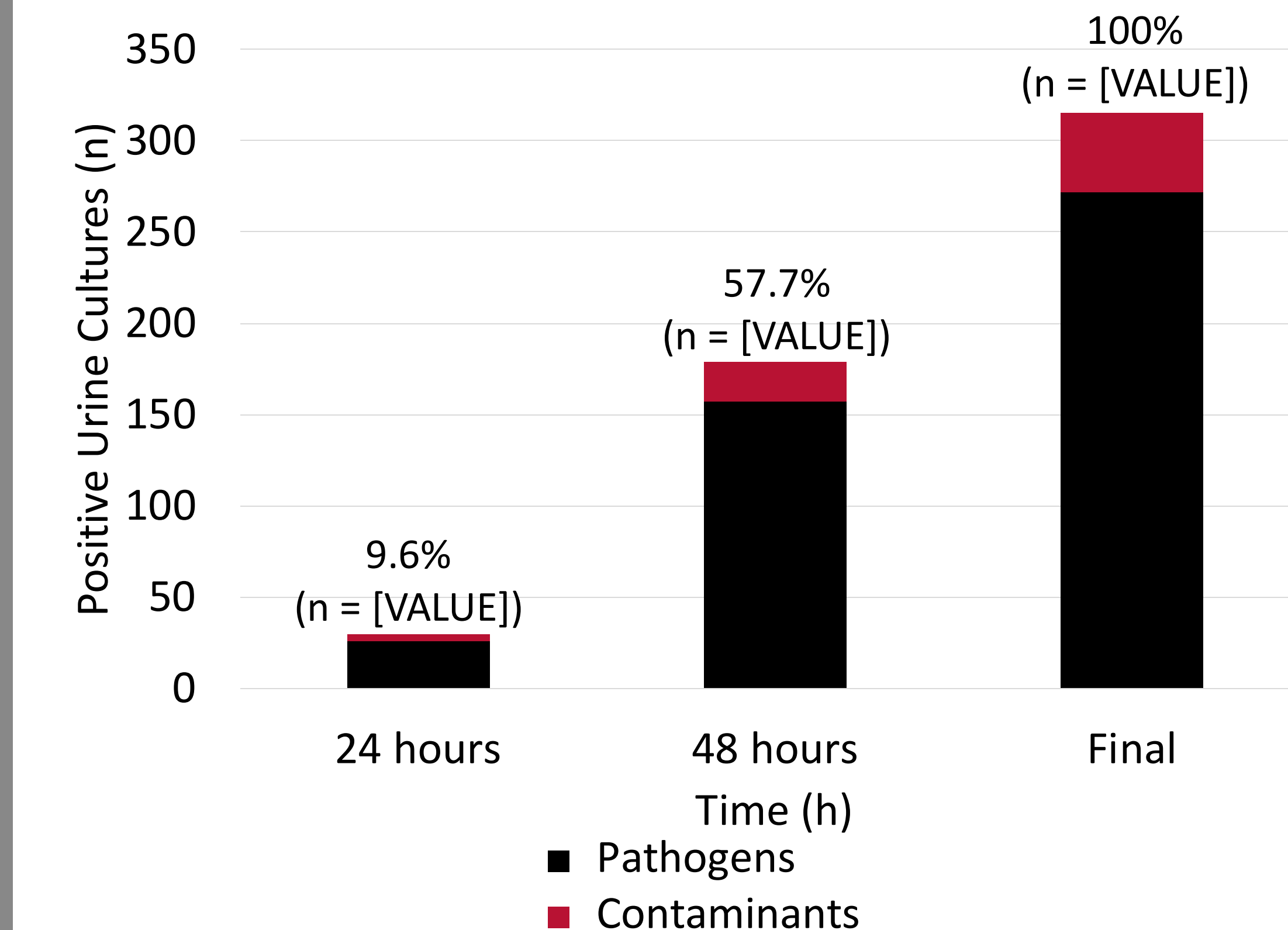


Figure 3. Urine Culture Growth at 24, 48 Hours (% of final pathogens and contaminants at each time point)



REFERENCES

1. Luyt C-E, Bréchet N, Trouillet J-L, Chastre J. Antibiotic stewardship in the intensive care unit. *Critical Care*. 2014;18(5). doi:10.1186/s13054-014-0480-6.

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