

Background

- Sepsis is the leading cause of death in hospitals in the United States with 1 in 3 deaths being from septic shock¹
- Early recognition and administration of antibiotics are the best predictors of improved mortality¹
- Sepsis response teams (SRT) is one method to improve sepsis identification, treatment compliance to guidelines, and reduce hospital mortality²
- To improve sepsis care on general hospital floors, our hospital created a “Sepsis Squashing Squadron” – a combination of SRT and automated scoring tools in EHR targeted at improving:
 - Sensitivity of Sepsis Detection
 - Specificity of Sepsis Detection
 - Efficiency/Response Times
 - Guideline Compliance
- This implementation was our largest to date and included a hospital-wide effort to identify trends and improve identification/response times

Methods

- Through daily chart review, a Sepsis Squashing Squadron (S3) team member screened hospital medicine patients on an assigned floor unit
- Automated scores available in Epic were recorded for performance characterization: qSOFA, an institutional modification of the Modified Early Warning score (jMEWS), sepsis score (SS) and Epic’s “deterioration index” (DI)
- S3 members used Epic automated score thresholds which previously had been shown to have a sensitivity/specificity of >93%/>50%:
 - jMEWS ≥ 2
 - DI ≥ 30 and/or SOFA ≥ 2
- For patients with a likely and/or definitive infection and a SIRS ≥ 2 , adherence to Severe Sepsis/Septic Shock Early Management Bundle (SEP-1) components were assessed

Figure 1: SEP-1 Component Adherence for New Sepsis

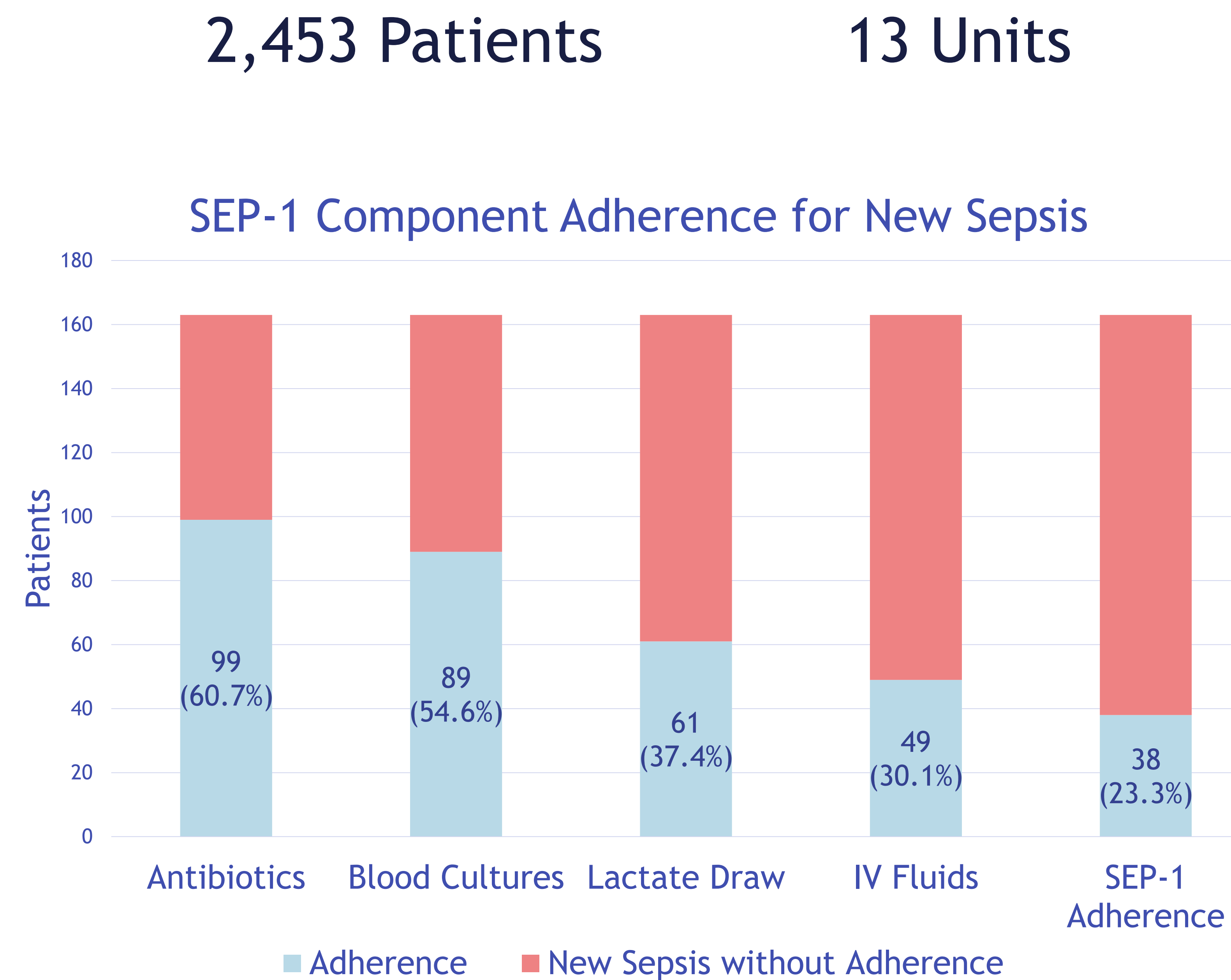


Table 1: SEP-1 Component Mean Order to Action Time

SEP-1 Component	Mean Order to Administration/Draw Time
Antibiotics	102 min
Blood Cultures	126 min
Lactate Draw	47 min
IV Fluid Administration	32 min

Results

- From 4/19/23 - 5/31/23, 2453 patients screened across 13 units
- Daily Sepsis Prevalence was 274/2,453
- New Episode of Sepsis 163/274
- Of 163 with new sepsis, SEP-1 Bundle Adherence:
 - Antibiotics 99/163 (60.7%)
 - Blood Cultures 89/163 (54.6%)
 - Lactate Draw 61/163 (37.4%)
 - IV Fluids 49/163 (30.1%)
 - SEP-1 All Components 38/163 (23.3%)
- Of the 163 new sepsis patients, 107 were adjudicated for appropriate recognition and treatment
- Appropriate Recognition & Treatment: 37/107 (34.5%)
- Updated Automated Epic Score Thresholds, AUC, and Sensitivity | Specificity with Lower Limit Specificity ≥ 0.2 :

Score	Threshold, Sensitivity Specificity ≥ 0.2	AUC
jMEWS	≥ 6 ; Sen/Spec 0.53 0.25	(AUC – 0.79)
SS	≥ 4 ; Sen/Spec 0.67 0.21	(AUC – 0.78)
DI	≥ 46 ; Sen/Spec 0.42 0.20	(AUC – 0.69)
mSOFA	≥ 8 ; Sen/Spec 0.04 0.4	(AUC – 0.60)

Conclusion

- Complete SEP-1 bundle adherence and appropriate recognition/treatment was low
- Low adherence and lengthy time from order to action provides room for improvement
- Sepsis scores for recognition are wanting with AUCs ranging from 0.6-0.79 and poor sensitivities, even with specificity minimums of 0.2

References

- Ju, Tammy, et al. “Sepsis Rapid Response Teams.” *Critical Care Clinics*, vol. 34, no. 2, 2018, pp. 253–258., <https://doi.org/10.1016/j.ccc.2017.12.004>.
- Bloos, Frank. “The Importance of a Hospital-Dedicated Sepsis Response Team.” *Expert Review of Anti-Infective Therapy*, vol. 18, no. 12, 2020, pp. 1235–1243., <https://doi.org/10.1080/14787210.2020.1794813>.