

Investigating the Dynamic and Static Criteria in the Diagnosis of Sepsis

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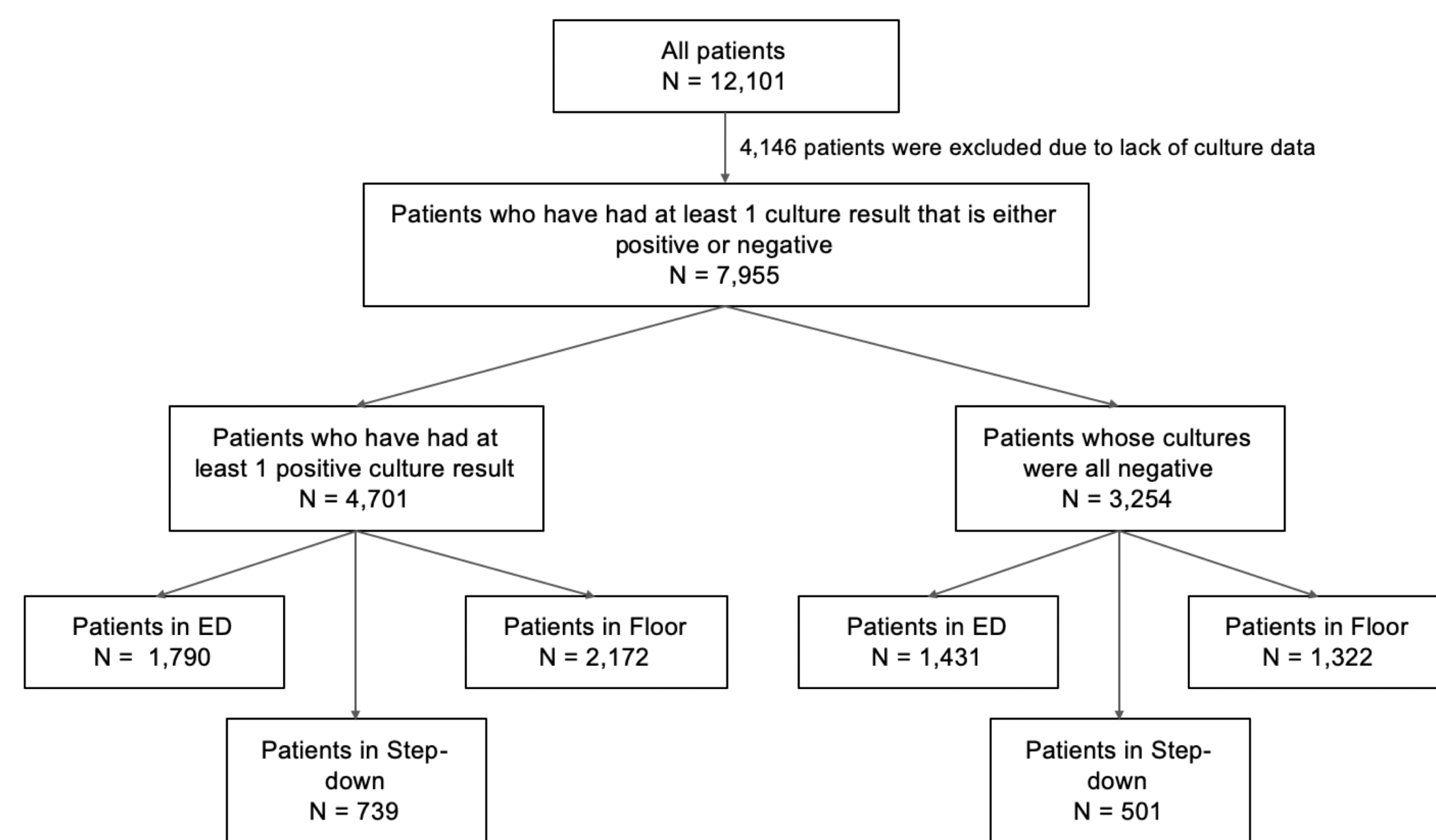
Objective

Perform a retrospective analysis of admitted patients within the DHMC sepsis registry in order to determine the hemodynamic, physiologic, and lab parameters that will best detect sepsis at an earlier stage. Investigate these parameters in a serial and dynamic manner.

Background

Sepsis has been rising in the past year with an estimated incidence of 300 per 100,000 in 2013 with an in-hospital mortality rate of 14.4% up to 29.9%.¹ Currently, the diagnostic criteria for sepsis through the Quick Sequential Organ Failure Assessment (qSOFA) entails: systolic BP < 100 mmHg, respiratory rate > 22 breaths per minute, and altered mental status. In addition to qSOFA, the Systemic Inflammatory Response Syndrome (SIRS) have been used to identify signs of sepsis through measurements of temperature, respiratory rate, heart rate, and white blood cell count. However, each scoring system has its limitations and has not been analyzed in a dynamic approach.

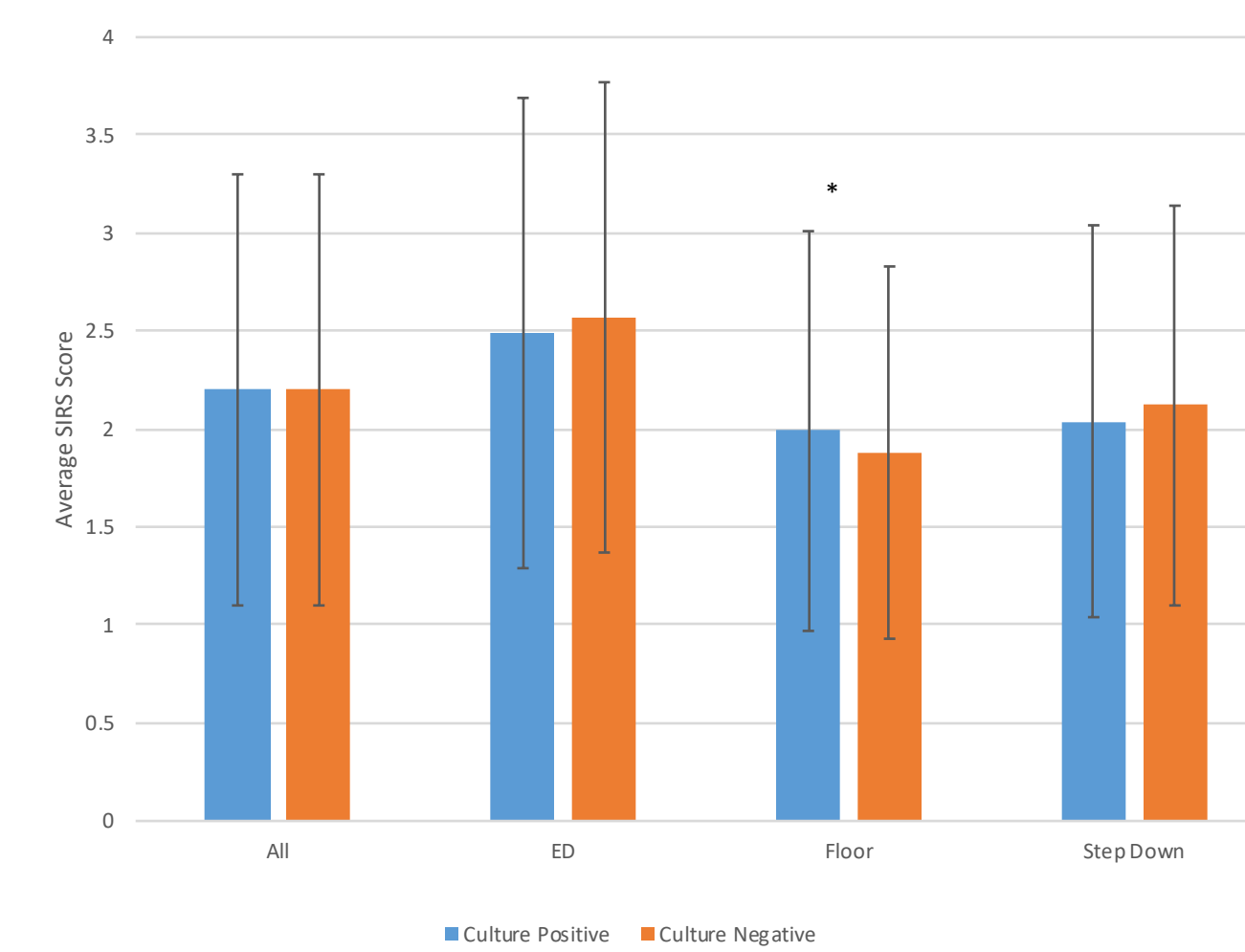
Methods



Each patient's lab and vitals data were all given a SIRS and SEP SCORE and were summed up for a final score. A final score for each patient was given at various time points (T = -3, 0, 3, 6, 12, and 24 hrs)

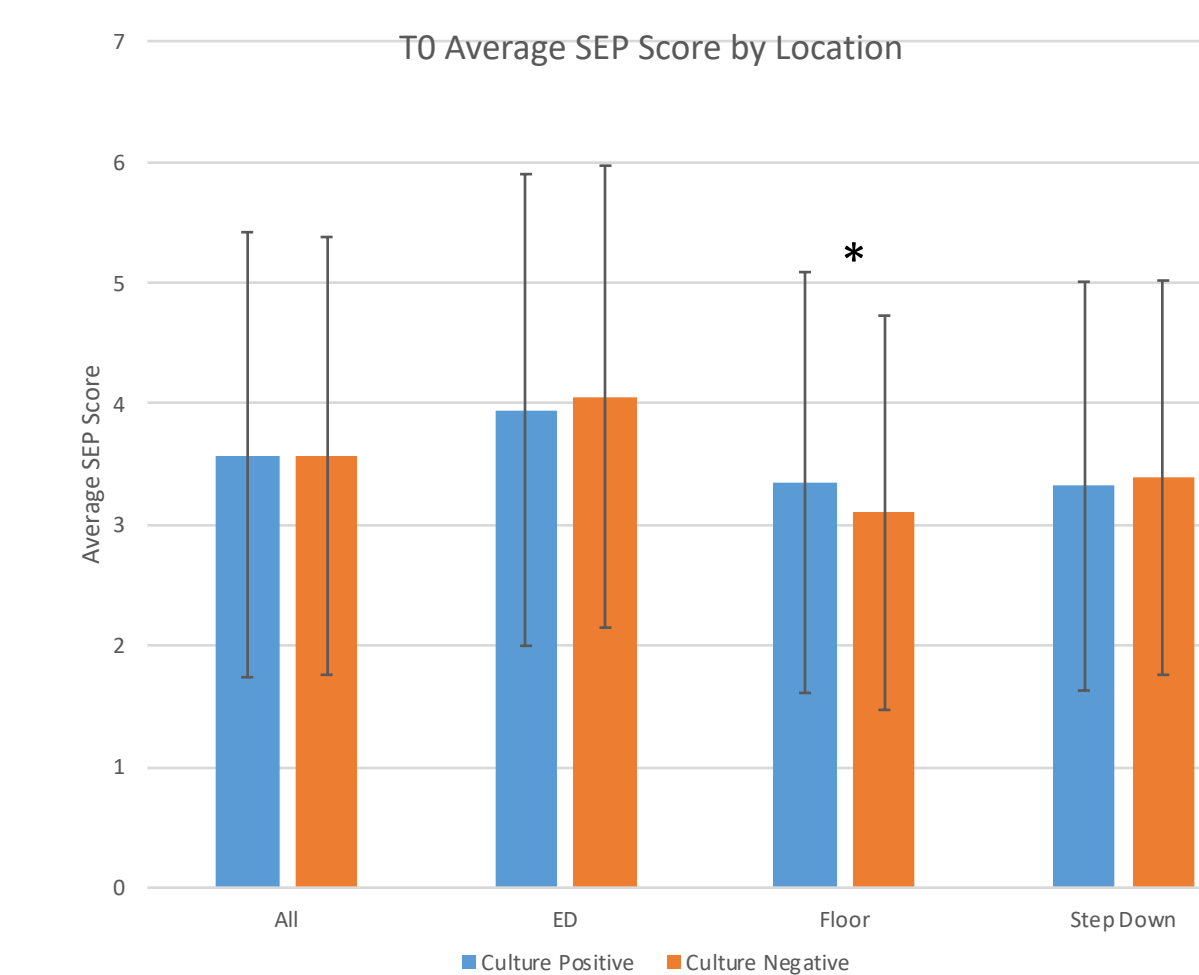
Results

T = 0 hr Average SIRS Score by Location



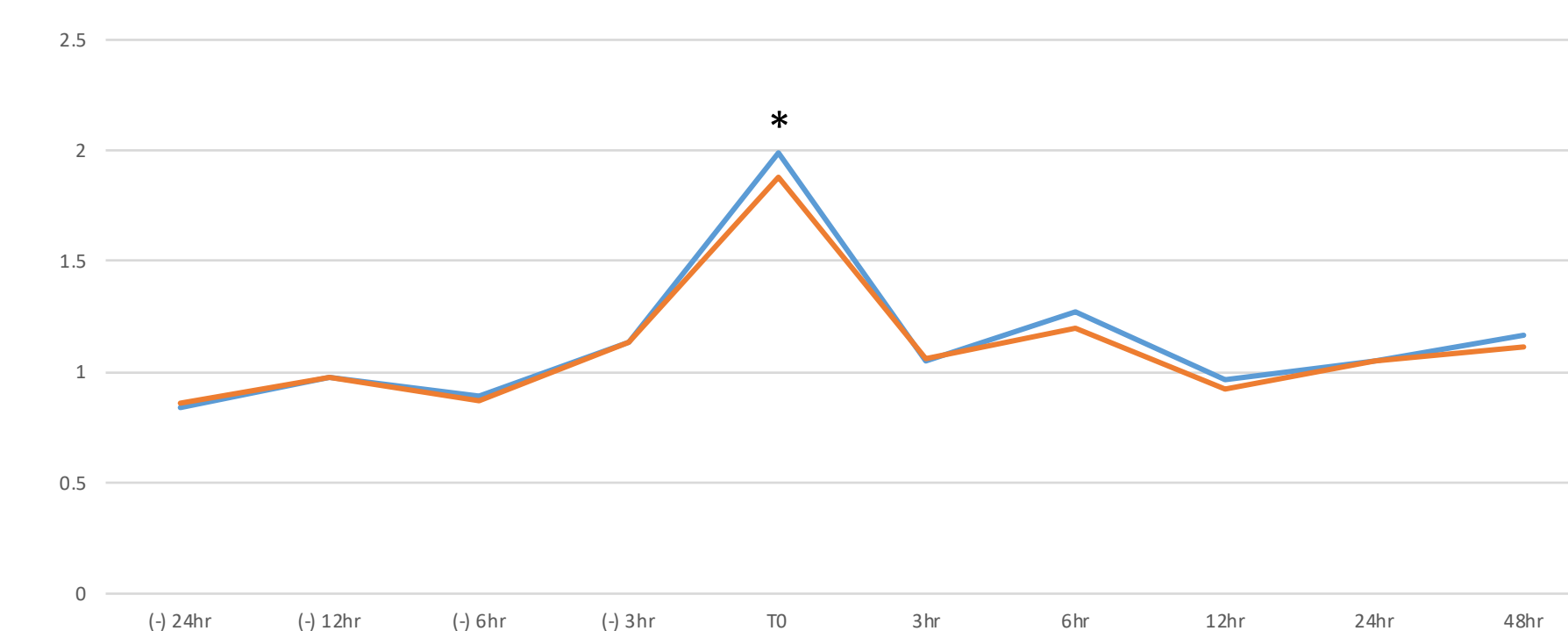
There was a significant difference in average SIRS score between culture positive and negative patients in Floor units.

T = 0 hr Average SEP Score by Location



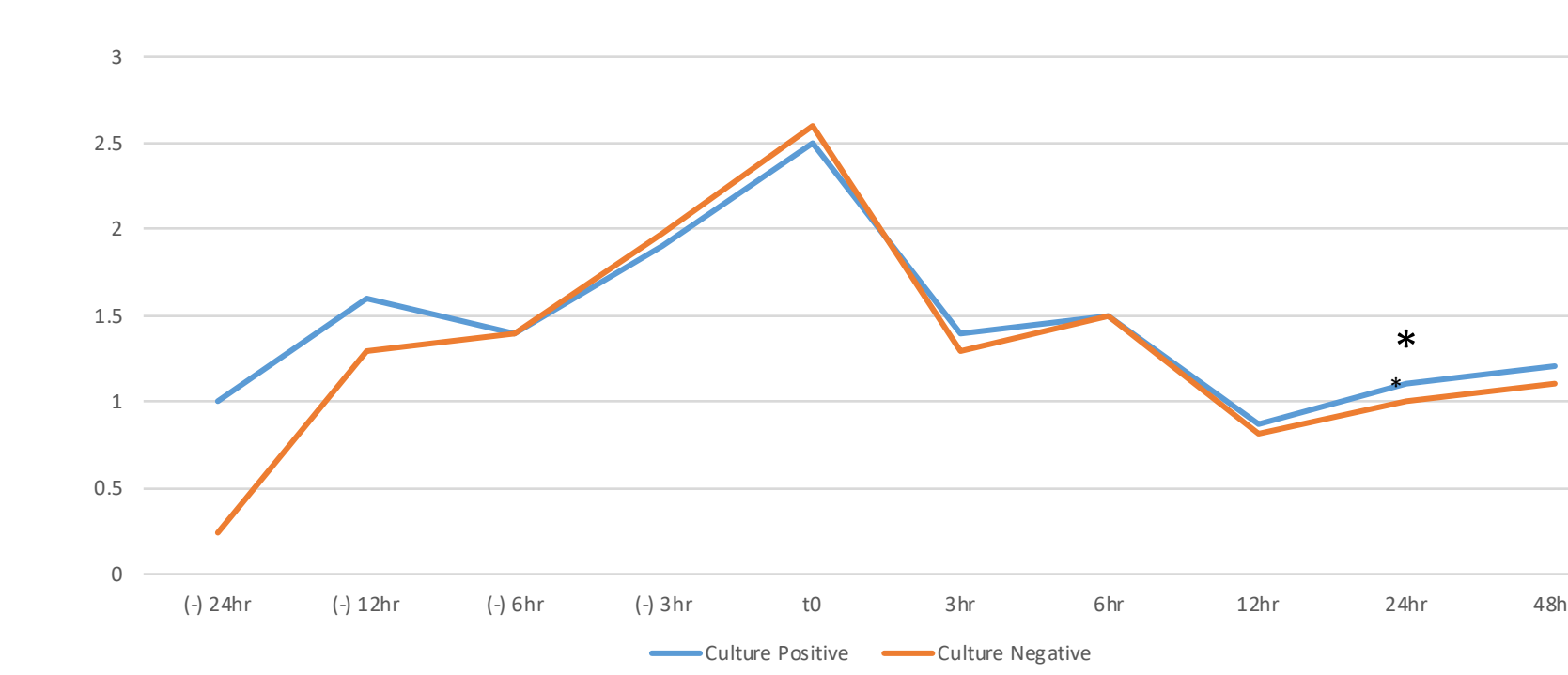
There was a significant difference in average SEP score between culture positive and negative patients in Floor units.

Floor Averaged SIRS Score Over Time



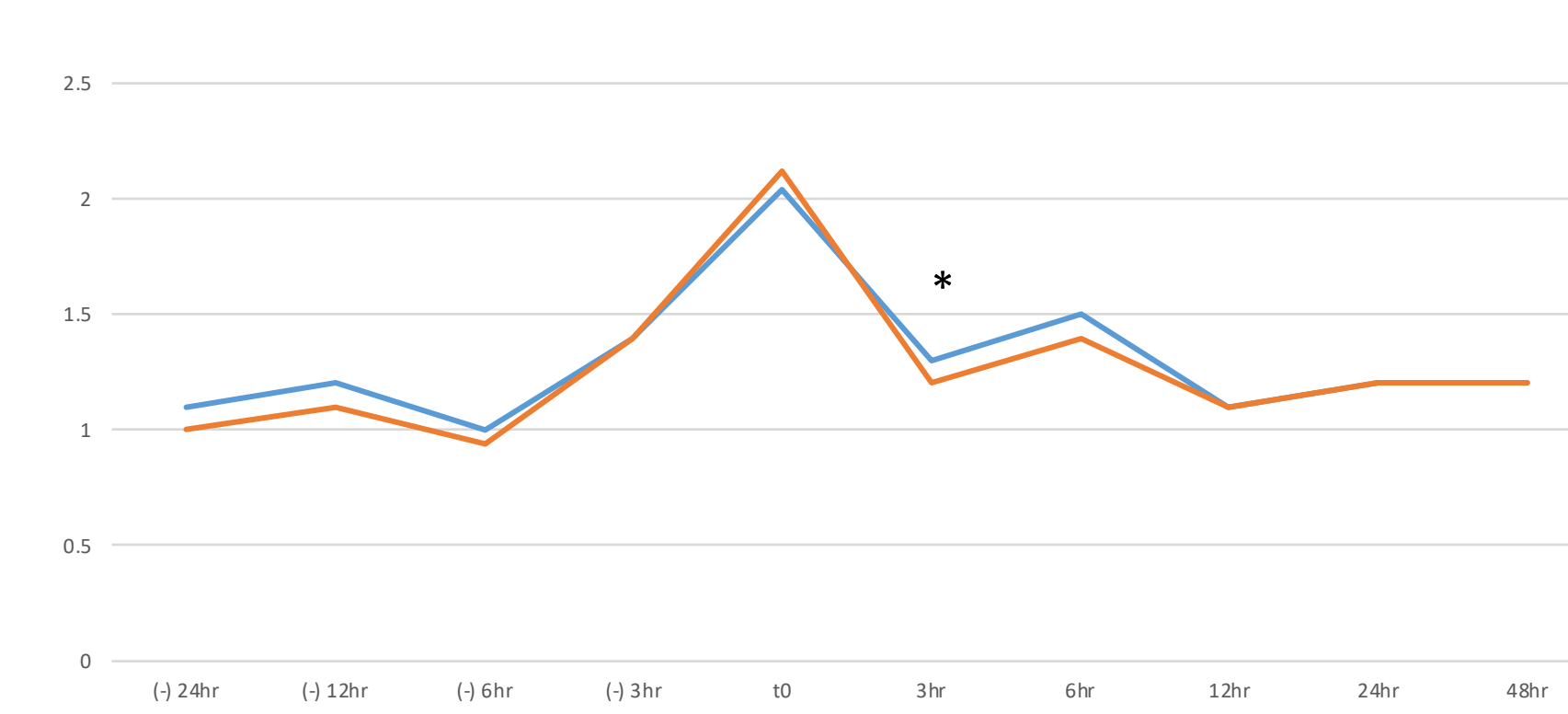
There was a significant difference in averaged SIRS score between culture positive and negative patients in Floor at T = 0 hr.

ED Averaged SIRS Score Over Time



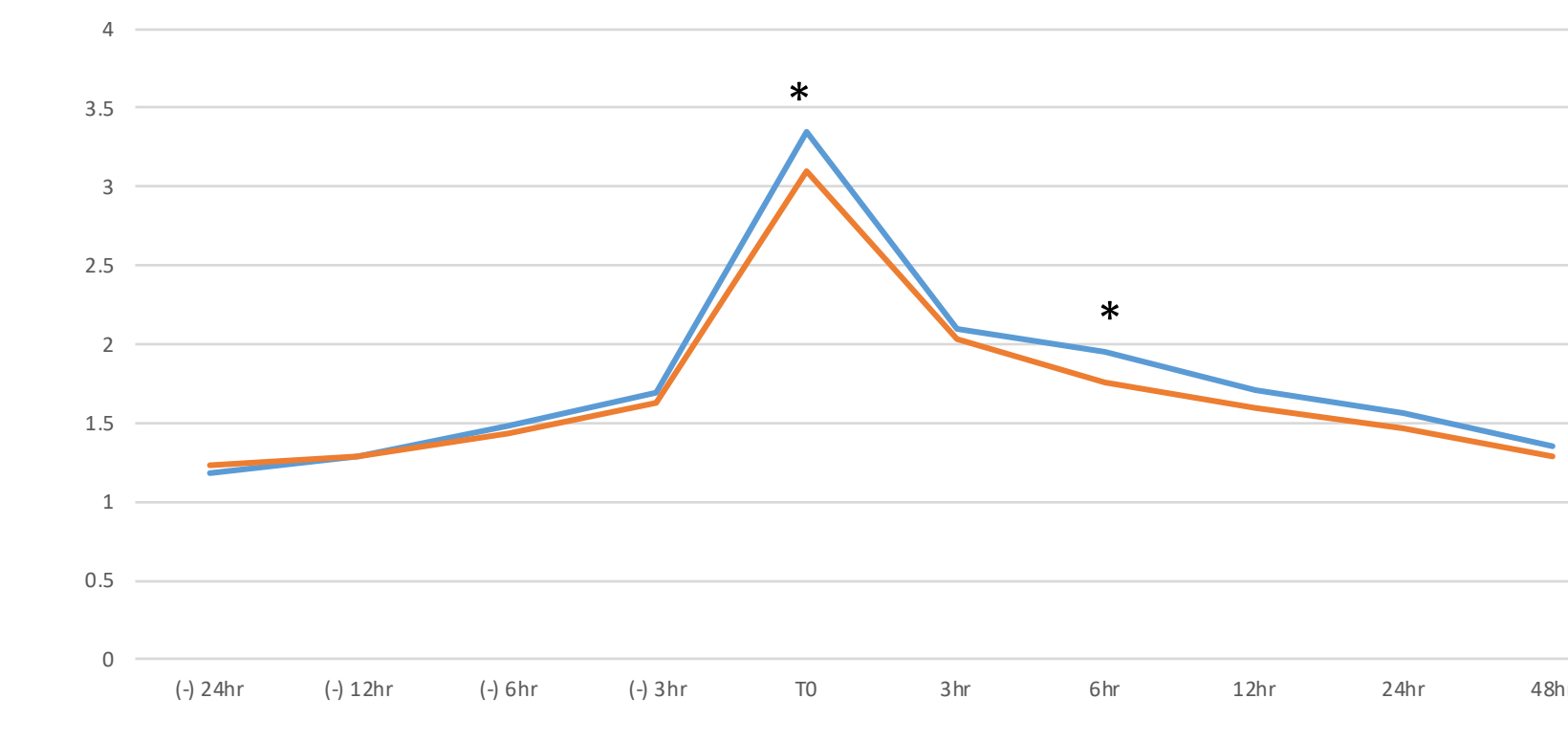
There was a significant difference in averaged SIRS score between culture positive and negative patients in Floor at T = 24 hrs.

Step Down Averaged SIRS Score Over Time



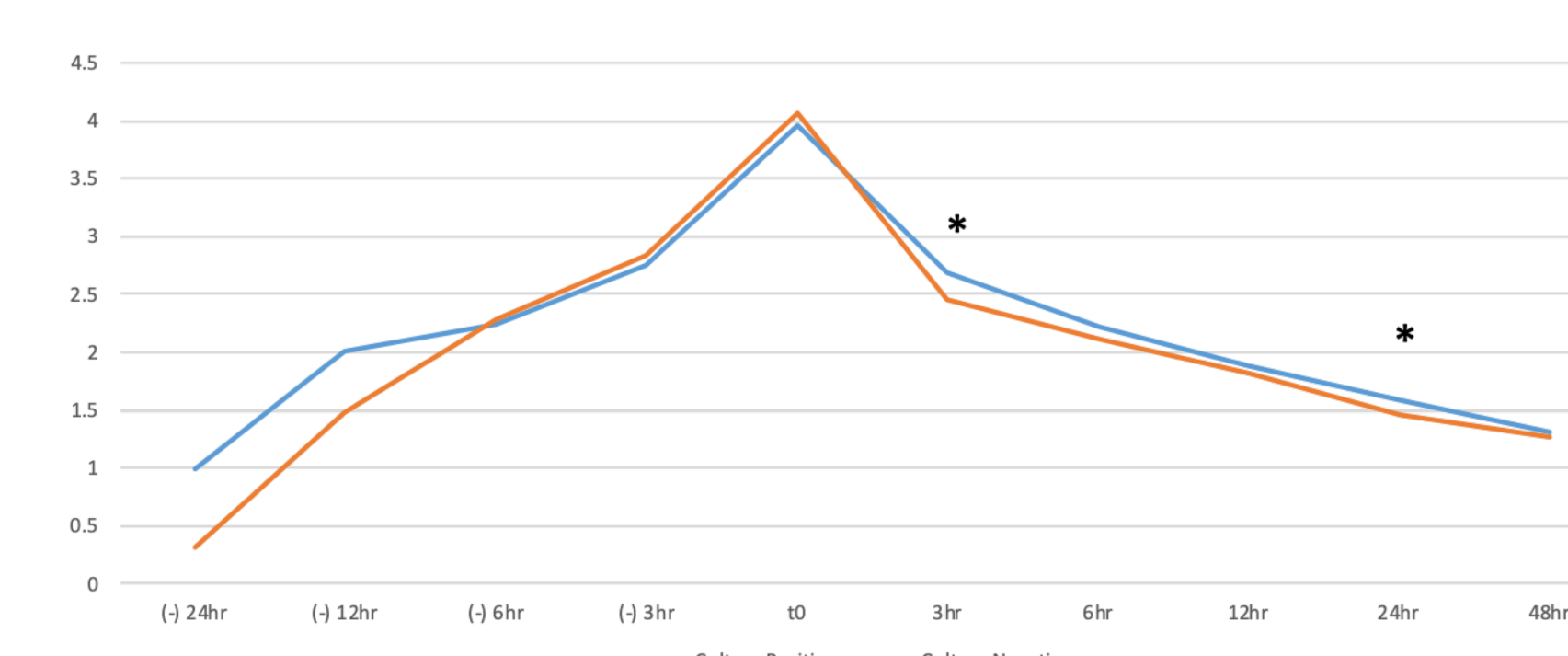
There was a significant difference in averaged SIRS score between culture positive and negative patients in Floor at T = 3 hrs.

Floor Averaged SEP Score Over Time



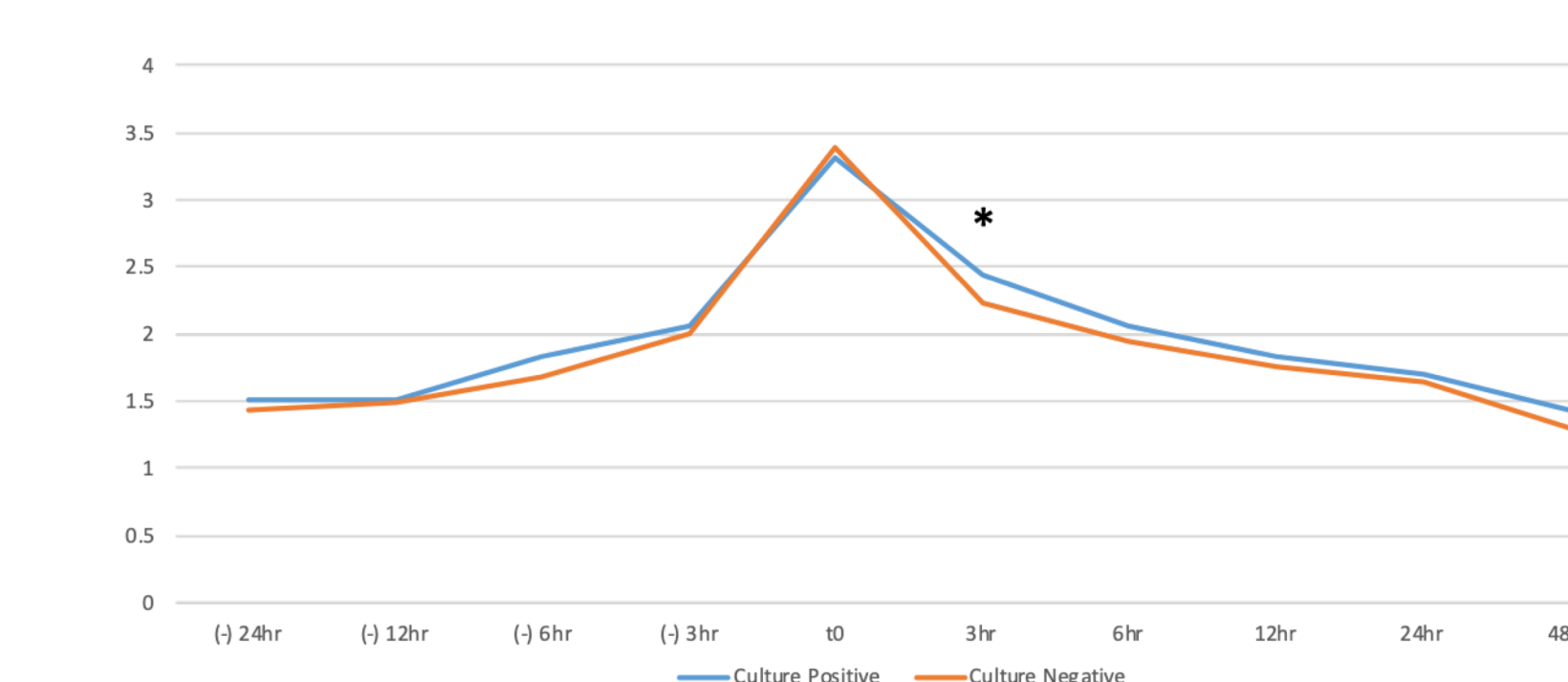
There was a significant difference in averaged SEP score between culture positive and negative patients in Floor at T = 0 and 6 hrs.

ED Averaged SEP Score Over Time



There was a significant difference in averaged SEP score between culture positive and negative patients in ED at T = 3 and 24 hrs.

Step Down Averaged SEP Score Over Time



There was a significant difference in averaged SEP score between culture positive and negative patients in Step Down at T = 3 hr.

Conclusions

Amending the current SIRS criteria to a more dynamic SEP criteria leads to statistically significant differences in culture results and location of sepsis patients within the hospital. Changing the SIRS criteria to broaden the definition of what it means to have sepsis has indications for a patients clinical course. Adding the parameters of systolic blood pressure, diastolic blood pressure, lactate levels impacts the clinical course of a patient with or without sepsis.

Future Research

Next steps for this research involves performing time analysis and location analysis for each culture collected from the patients. This will allow us to evaluate for differences in sepsis diagnosis within different lab cultures including blood, urine, and CSF. This analysis will also extend to the locations of BPA firing among patients in different locations in the hospital including the emergency department, the floor and step down.

Reference

1. Mayr FB, Yende S, Angus DC. Epidemiology of severe sepsis. *Virulence*. 2014 Jan 1;5(1):4-11. doi: 10.4161/viru.27372. Epub 2013 Dec 11. PMID: 24335434; PMCID: PMC3916382.

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