



# Automated SIRS Alert Systems Are Ineffective at Predicting Sepsis in Burn Patients

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## Background & Significance

- Sepsis is the #1 cause of mortality in burn patients<sup>1</sup>.
- The body's response to burns causes physiological changes difficult to distinguish from sepsis.
- We sought to analyze the effectiveness of the automated SIRS alert system used in our burn unit.

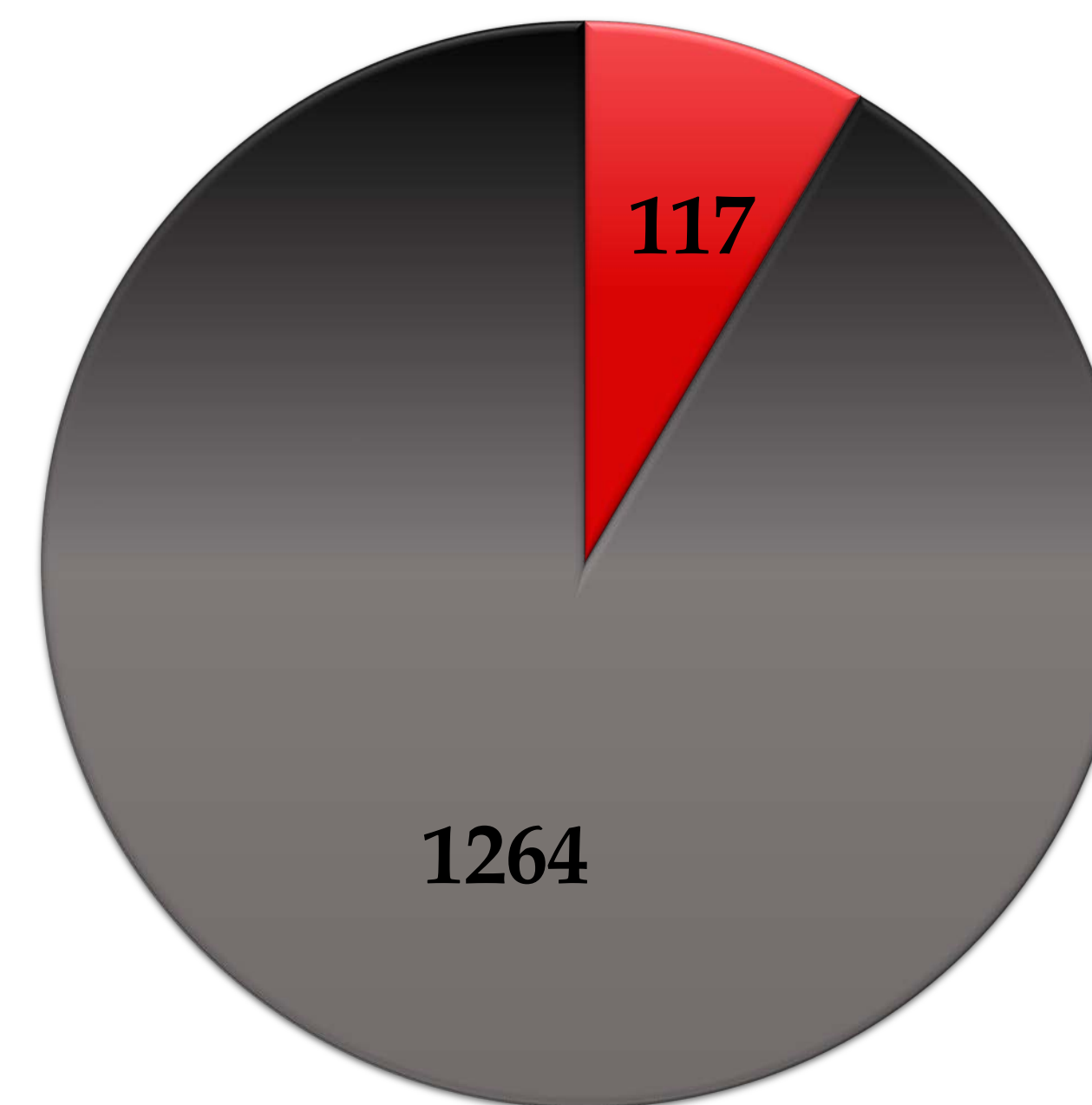
**SIRS Criteria**  
 Temperature: >38°C or <36°C  
 Heart Rate: >90 beats/ min  
 Respiratory: rate >20 breaths/ min or PaCO<sub>2</sub> <32 mmHg  
 WBC: >12,000/ mm<sup>3</sup>, <4,000 mm<sup>3</sup> or >10% bands

## Methods

- The "SIRS alert" dashboard<sup>2</sup> was used to tally SIRS alerts and order set usage.
- Individual patients' charts were reviewed to identify treatment for suspected sepsis and positive cultures.

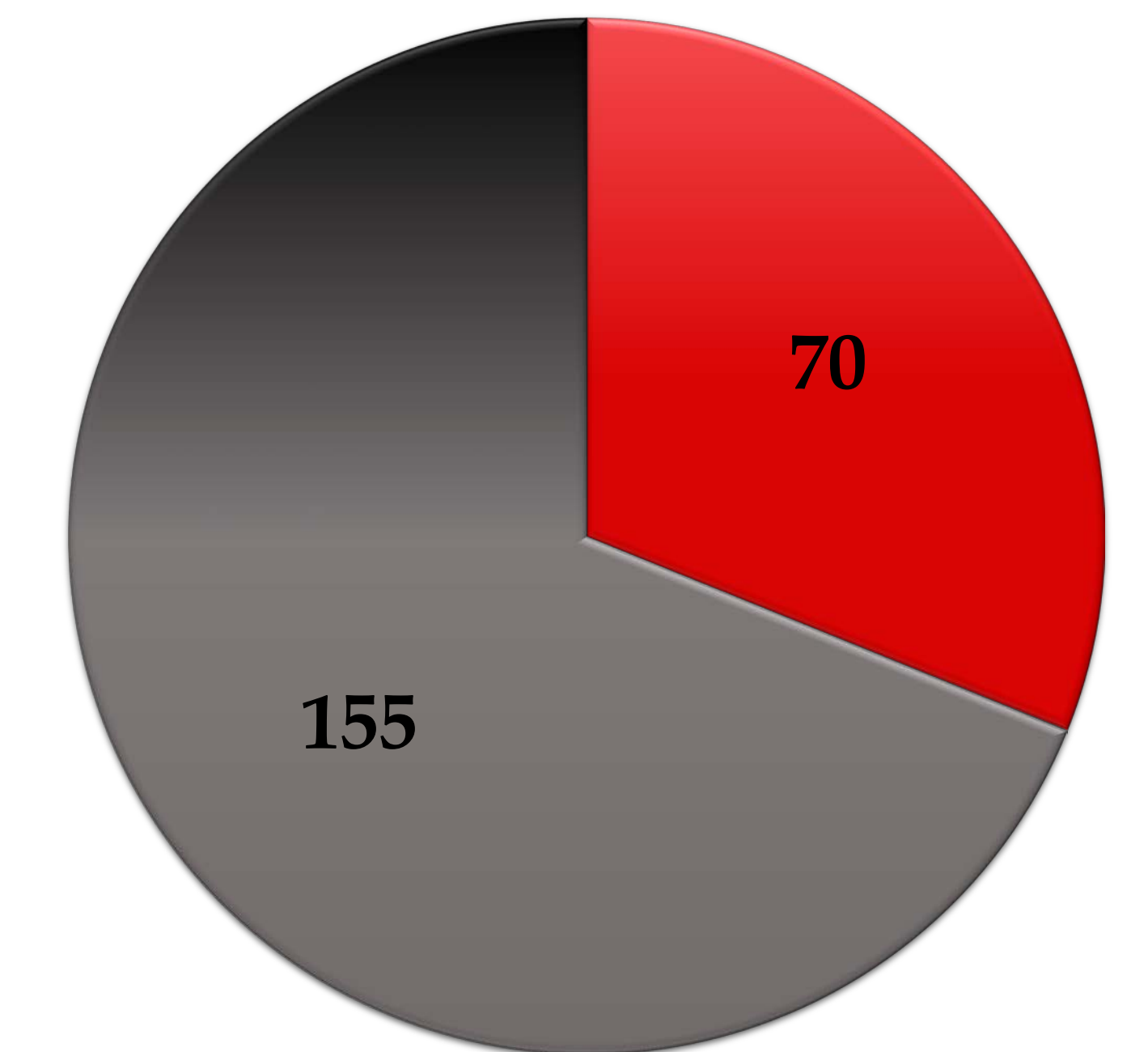
## Results

70 patients out of 225 admitted to the Burn ICU from January 1 to September 14, 2019, triggered a SIRS alert at least once during that time.

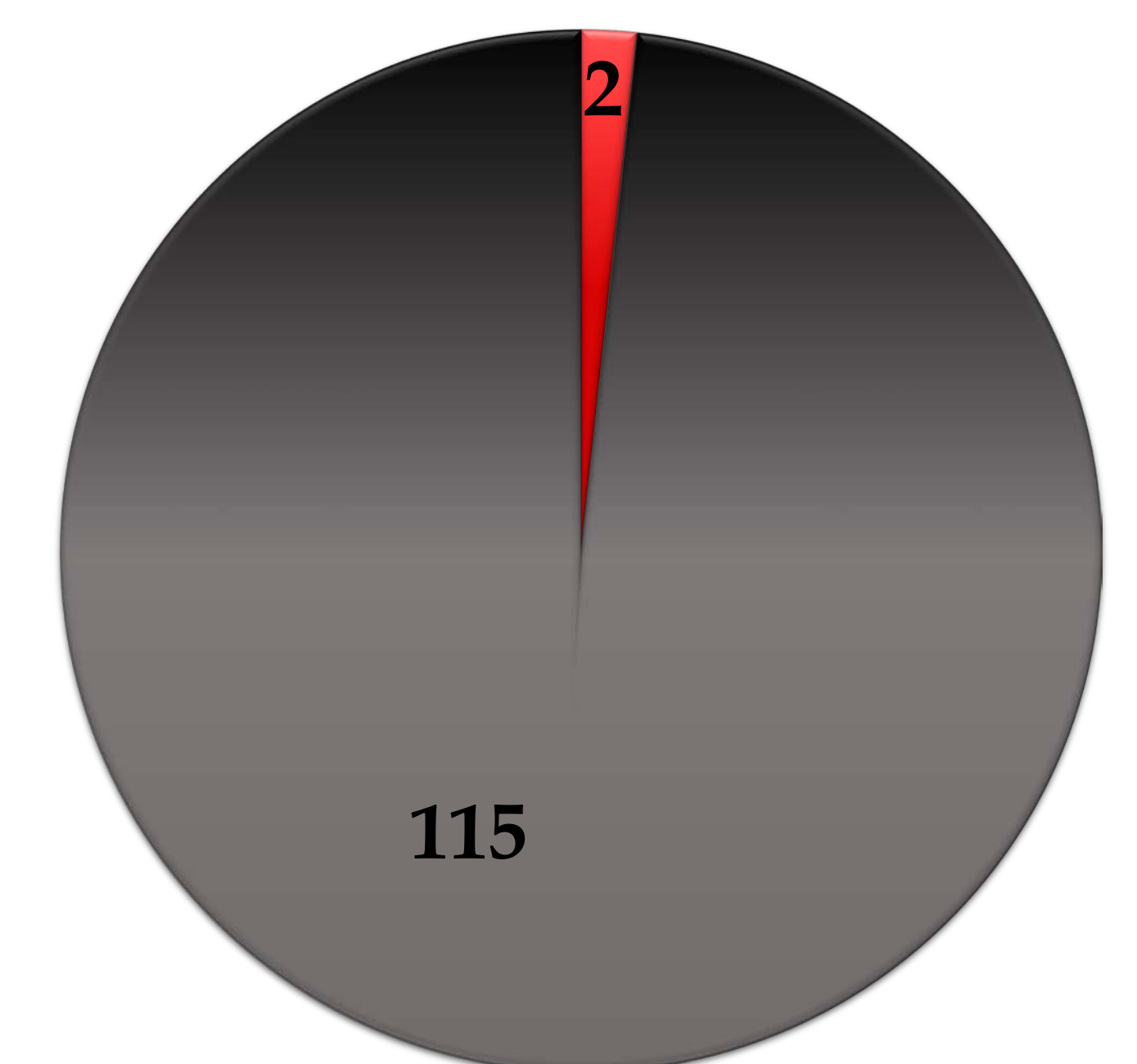


■ Order Set Opened  
 ■ Order Set Not Opened

1,381 total SIRS alerts were triggered, but the SIRS screening order set was subsequently opened just 8.5% of the time.



■ Patients with SIRS Alert  
 ■ Patients without SIRS Alert



■ Sepsis Treatment  
 ■ No Sepsis Treatment

- Only two of those alerts, followed by the opening of the order set, ultimately led to empiric treatment of sepsis.
- The positive predictive value of a SIRS alert for a burn patient following our protocol was 0.04%.

## Discussion

- The automated systems that are initiated by SIRS criteria are ineffective at stimulating the initiation of sepsis treatment in burn patients.
- By using an alert system with a low positive predictive value, the alerts become meaningless. This results in a protocol that does not contribute to patient care.

## Future Directions

- Integrate ABA criteria<sup>3</sup> and other novel predictors<sup>4</sup> into sepsis bundles for burn patients.
- Use artificial intelligence and machine learning to identify more specific early predictors of sepsis.

## References

1. Greenhalgh, D. (2017). *Burns Trauma* 5: 23.
2. UCDCM PCS Quality & Safety Dashboard
3. Greenhalgh, D et al. (2007). *J Burn Care Res* 28(6): 776-90.
4. Mann-Salinas, E et al. (2013). *J Burn Care Res* 34(1): 31-43.

### UC Davis SIRS Alert Workflow

SIRS Alert Triggered if:  
 SBP ≤ 90 OR 2+ SIRS Criteria

