

Epidemiology of Patients meeting the South Carolina Prehospital Sepsis Care Protocol

Introduction: Early identification of a septic patient can lead to earlier intervention and a potential decrease in mortality. Systemic Inflammatory Response Syndrome (SIRS) criteria has been used in-hospital to aide in sepsis identification. In January 2016, the South Carolina Bureau of EMS & Trauma developed a sepsis treatment protocol that incorporated SIRS criteria as a screening tool for potential septic patients. These criteria, matched with a source of infection, would allow for prehospital sepsis treatment including antibiotics prior to arrival at the emergency department.

Objective: The study objectives were to quantify the number of 2016 emergency 911 patients in South Carolina (SC) that would meet the newly developed prehospital sepsis care protocol. Secondly, this study sought to describe these patients based on patient demographics and incident location community size.

Methods: This retrospective observational study examined all 911 Emergency Medical Service (EMS) patients in SC in 2016 who met the newly developed sepsis prehospital care protocol. Study data were obtained from the SC State EMS Data System located within the EMS Performance Improvement Center. In accordance with the SC prehospital sepsis care protocol, patients were included if they were ≥ 18 years old, had a pulse rate >90 beats per minute (BPM), and met at least two of the following: temperature $>38^{\circ}\text{C}$ or $<36^{\circ}\text{C}$, Systolic Blood Pressure (SBP) <90 mmHg, respiratory rate >20 breaths per minute, had ventilations assisted via bag valve mask (BVM), or had an advanced airway placed. Cardiac arrest and trauma calls were excluded from this analysis. Descriptive statistics were calculated to quantify the number of patients who met the SC sepsis protocol and to evaluate the number of patients who met the SIRS criteria. Additionally, patient's level of consciousness, provider's primary impression, primary symptom, age, gender, race, ethnicity, and community size were described.

Results: In 2016, there were 5,155 patients that met the criteria outlined in the SC sepsis care protocol. Of these patients, 4,831 (93.7%) presented with 2 of the 4 SIRS criteria. There were 317 (6.2%) who met 3 of the 4 SIRS criteria and 7 patients (0.1%) who met all 4 SIRS criteria. The most frequently reported provider's primary impression was respiratory distress (1,257; 36.7%), followed by altered level of consciousness (660; 19.3%), abdominal pain/problems (269; 7.9%), chest pain/discomfort (179; 5.2%), cardiac rhythm disturbance (155; 4.5%), and hypovolemia/shock (140; 4.1%). The most frequently reported primary symptom was breathing problems (1,332; 29.5%), followed by change in responsiveness (1,063; 23.6%), fever (436; 9.7%), pain (424; 9.4%), weakness (396; 8.8%), and "none" (181; 4.0%). The majority of patients were alert (3,536; 74.1%). There were 482 (10.1%) patients that were unresponsive, 459 (9.6%) responded to verbal commands, and 297 (6.2%) responded only to painful stimulus. Patients' age ranged from 18 to 116 years old with an average of 63.1 (± 17.9) and a median of 65. There were 2,596 (50.5%) females and 2,548 (49.5%) males. There were 3,552 (70.3) patients whose race was reported as white, 1,440 (28.5%) black, 64 (1.3%) other, and 4,733 (98.4%) were not Hispanic or Latino. Finally, 4,534 (88.5) patients were located in urban areas of SC and 587 (11.5) were located in rural areas.

Conclusion: Respiratory distress was the primary patient presentation when SIRS criteria was used as a screening tool for septic patients in the prehospital setting. Directed education in the pulmonary source of sepsis could potentially increase the ability of paramedics to identify sepsis in the field. This can also aide in antibiotic selection and future protocol development for this subgroup of patients.