

Can Paramedics Draw Uncontaminated Blood Cultures Prior to Prehospital Antibiotic Administration?

Jason Walchok NRP, FPC¹; Martin Lutz MD, FACEP²; Colt Shope BSN, RN²; Greta Gue' MSN, RN³; Ronald Pirrallo MD, MHSA FACEP²; Douglas Furmanek PharmD BCPS²; Aaron Dix MBA, NRP²
Greenville County EMS¹, Department of Emergency Medicine, Greenville Health System², Bon Secours St. Francis Health System³

Introduction

- Early antibiotic administration in the presence of sepsis can significantly decrease morbidity and mortality.
- CMS core measures require blood culture collections prior to administration of antibiotics.
- If uncontaminated blood cultures can be obtained by EMS providers prior to ED arrival, a reduction in time to antibiotic administration for patients with a diagnosis of sepsis can be realized.

Study Objective

- To best facilitate meeting Core Measures and decrease time to antibiotic administration, we sought to determine the ability of Paramedics to identify sepsis and draw blood cultures in the field.
- Outcome variables:
 - Percent contaminated blood cultures.
 - ICD-9 ED admitting diagnosis.

Background

Greenville County EMS (GCEMS) is the primary 911 Paramedic responding and transport service for the Greenville, South Carolina metropolitan area encompassing 795 square miles with a 2010 census of 451,225 people and a mean transport time of 16 minutes.

GCEMS is a 3rd service county-based program with NREMT certified providers.

Acknowledgments

This study would not have been possible without the support of the Bon Secours St. Francis Health System & Greenville Health System Critical Care, ED, Pharmacy and Laboratory faculty and staff and the dedicated Greenville County EMS System providers.

Method

- 170 Paramedics received 12 hours of training on the Sepsis Alert protocol including:
 - Sepsis identification and treatment.
 - Aseptic technique for venous blood collection of blood cultures and lactate levels.
 - IV Antibiotic administration.
- Retrospective case review of all Paramedic Sepsis Alerts between 14 November 2014 and 30 April 2015.
- Blood collected in the field was sent to the receiving hospital laboratory for serum lactate level determination and processing of the initial set of blood cultures.
- Patient demographic and laboratory information was gathered for descriptive analysis with Greenville Health System IRB approval.
- This analysis is part of a larger "Sepsis Alert" prehospital protocol that calls for Paramedic administered antibiotics.

Greenville County EMS
301 University Ridge Suite 1100 Greenville SC 29681
EMS Evaluation and treatment of Sepsis tool

Date: _____ EMS Arrival Time: _____ Truck Number: _____

Lead Medic: _____ Culture Drawn by: _____

Evaluation for Sepsis

1. **Are any two of the following symptoms present AND new to the patient?**

- ☐ Hyperthermia ($> 101^{\circ}\text{F}$ or 38°C) or hypothermia ($< 96.8^{\circ}\text{F}$ or 36°C)
- ☐ Heart rate > 90 beats per minute
- ☐ Respiratory rate > 20 breaths per minute or mechanical ventilation
- ☐ Signs of poor perfusion (such as SBP < 90 mmHg)

2. **Is the patient's presentation suggestive of any of the following infections?**

- ☐ Pneumonia (cough/thick sputum)
- ☐ Abdominal pain and/or diarrhea
- ☐ Urinary tract infection
- ☐ Wound infection
- ☐ Acutely AMS change
- ☐ Skin/soft tissue infection
- ☐ Blood stream/Catheter related

If positive for sepsis, call a sepsis alert and follow the directions on the back

Green Sepsis patient sticker

Temperature
Result: _____

Glucose
Result: _____ mg/dl
Normal Range 88-128 mg/dl

GCEMS – both sides of this sheet must be copied and turned in or emailed to Jason Walchok

Treatment for sepsis

Confirm no PCN allergy – **IF PCN ALLERGY DO NOT ADMINISTER ANTIBIOTICS**

Draw Blood Culture (8cc-10cc of blood in each vial) Time drawn: _____

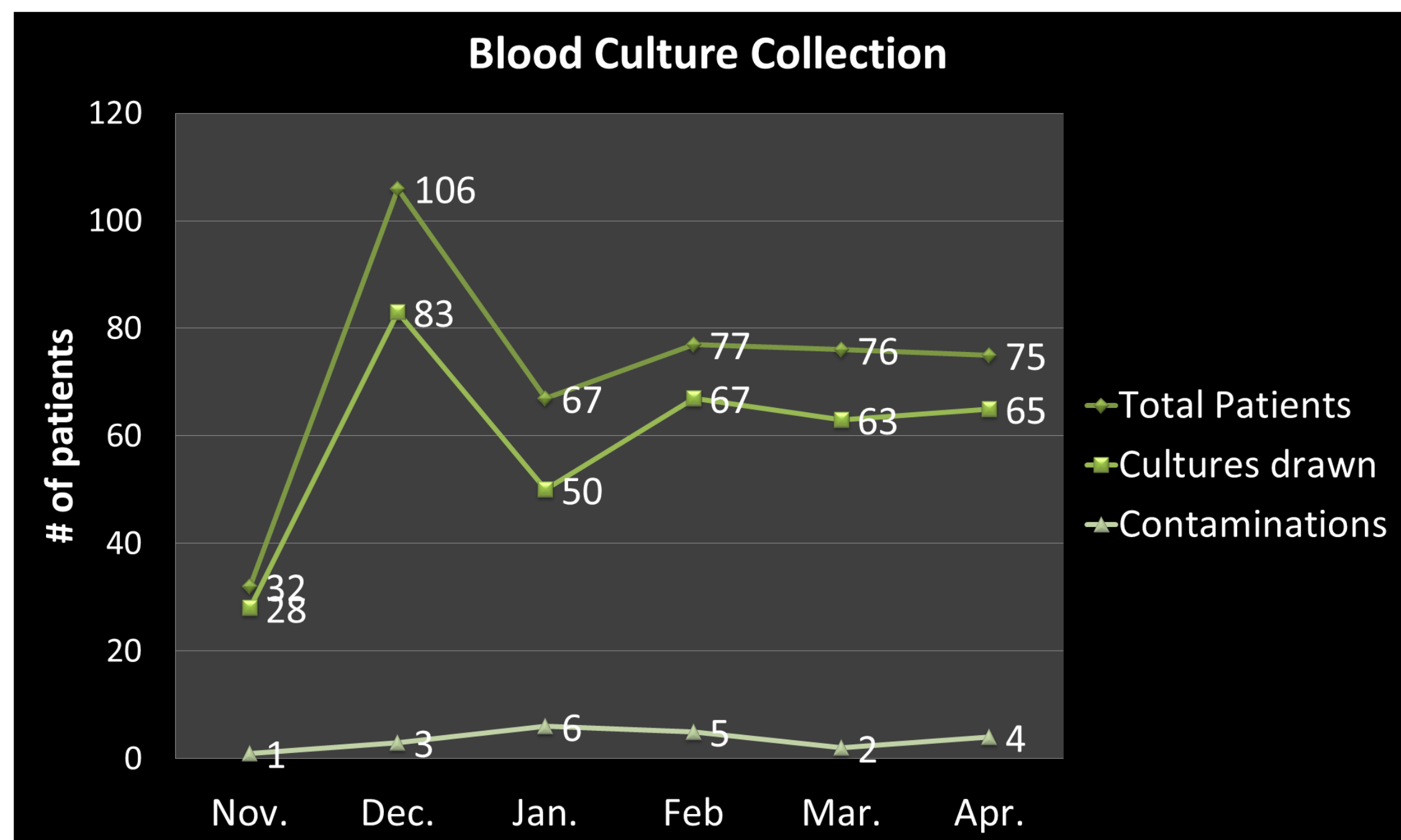
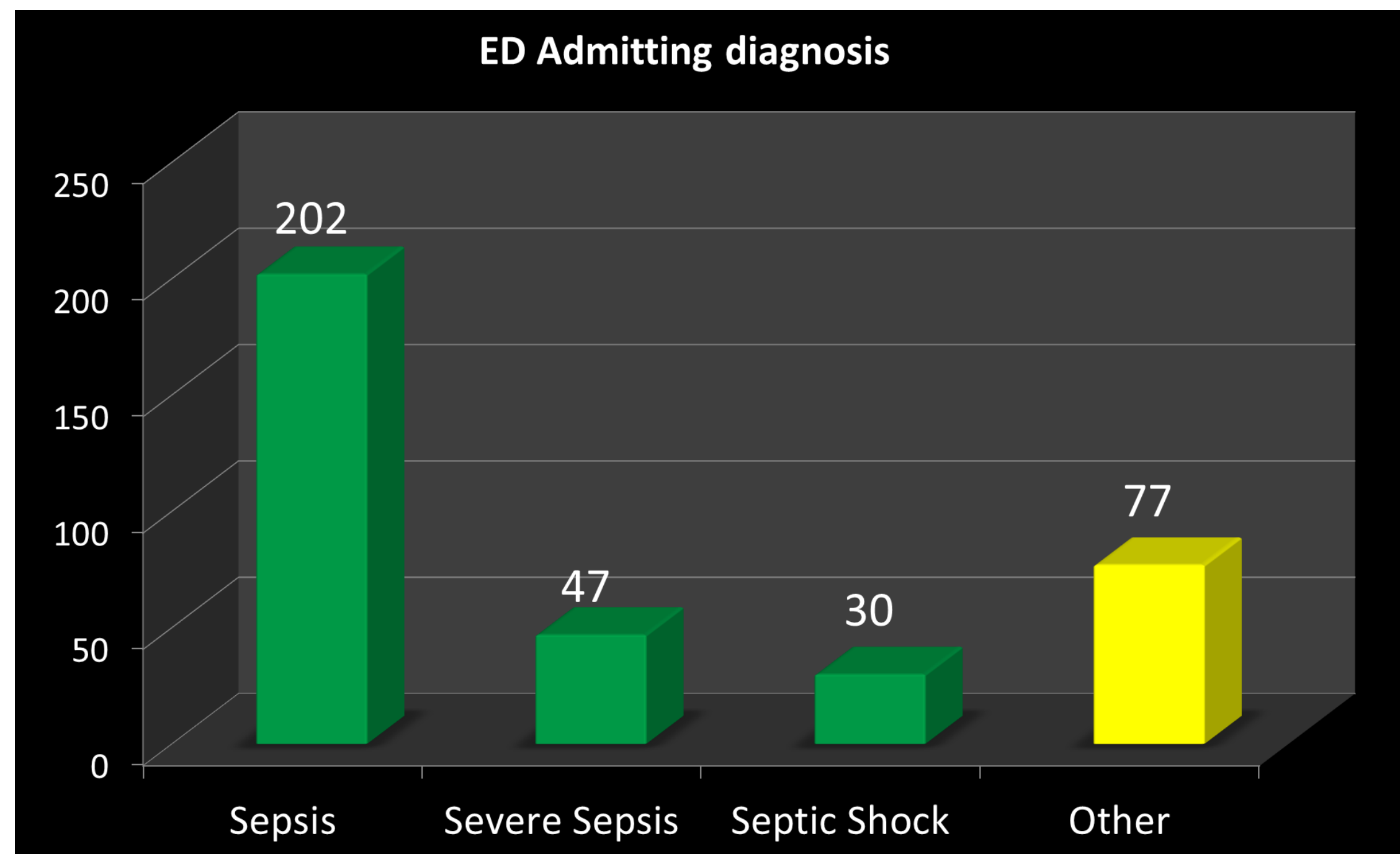
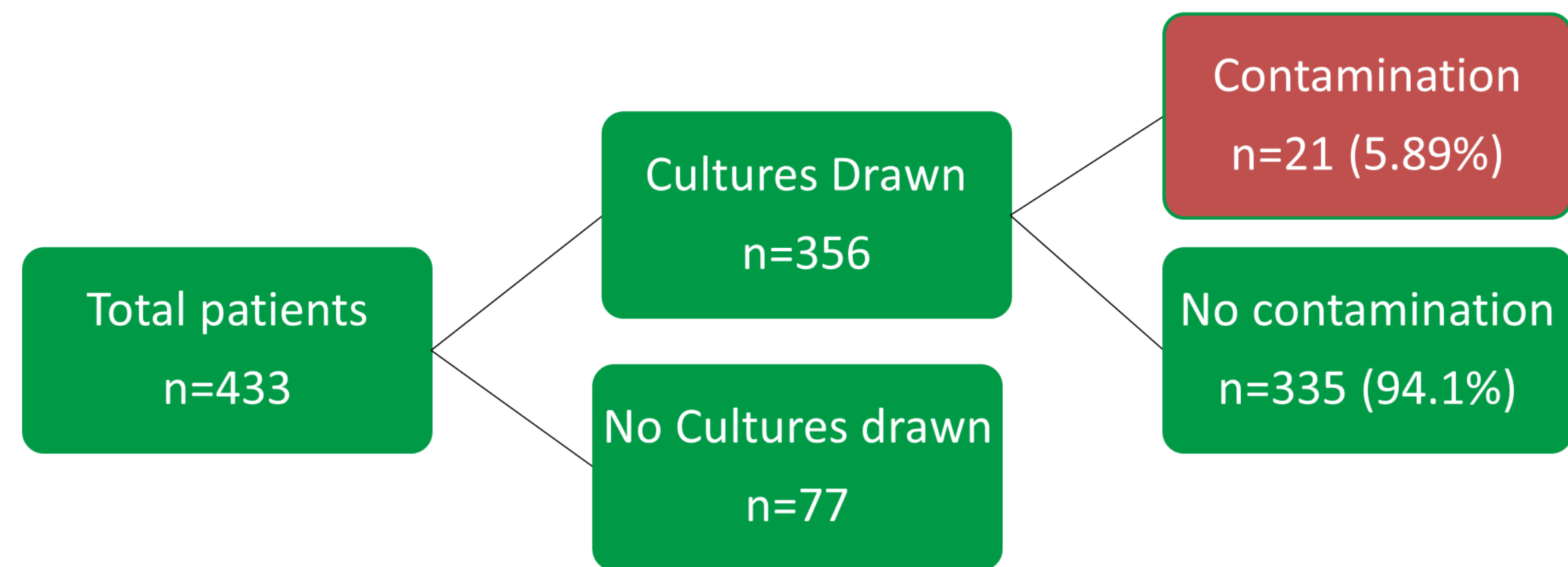
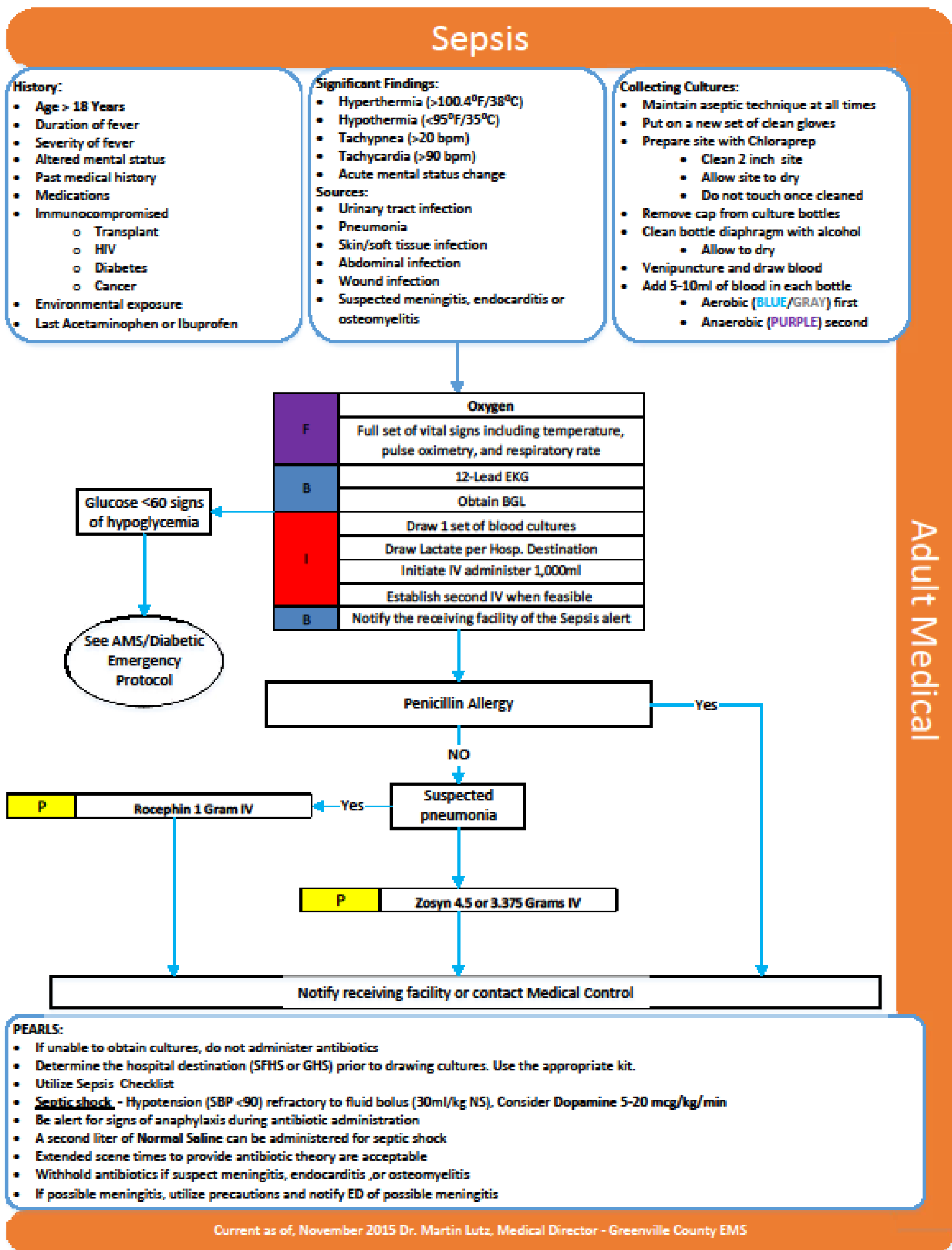
- Prepare a 2 inch site area with chloraprep and allow to dry
- Disinfect the top of each culture bottle with alcohol and allow to dry
- Inoculate the aerobic (blue cap) bottle first and then the anaerobic (purple cap) bottle.
- Minimum of 3cc of blood in aerobic bottle is required to proceed with antibiotic therapy
- If unable to draw cultures **DO NOT ADMINISTER ANTIBIOTICS**

Draw point of care lactate (only good for 30 min) Time Drawn: _____

Begin fluid resuscitation: **Normal Saline 1,000cc** Total given: _____

Presumed sepsis from pneumonia: **Rocephin 1 Gram IV** Time hung: _____

Presumed sepsis **not** from pneumonia: **Zosyn (3.375) 4.5 Grams IV** Time hung: _____



Primary Infection		
Total Cultures	n=356	
Pulmonary	162	46%
GU	84	24%
Unknown	58	16%
Skin	22	6%
GI	16	4%
Other	10	3%
Implanted device	4	1%

Results

- 356 Blood cultures collected from 433 patients
- Patient demographics included 55.3% male and mean age of 65
- Most common admitting diagnosis was Sepsis 202/356 (56.7%)
- Contamination was found in 5.89% (21/356) with 14/21 (66.7%) of these identified as skin flora (coagulase negative Staphylococci)

Limitations

- A single EMS system was used in this study. It is unknown if these findings can be replicated elsewhere.
- Missed activations of the Sepsis Alert were not examined.
- Outcome comparison used was admitting diagnosis.

Conclusion

This study demonstrates the potential for Paramedics to facilitate completing 1 component of the Core Measure Bundle for sepsis treatment in the field by acquiring prehospital blood cultures with a low contamination rate prior to antibiotic administration. It is yet to be determined if a 6% contamination rate is clinically acceptable and if these findings are stable.

