Sepsis Learning Collaborative:

Antibiotics and Source Control Essentials in Sepsis

Sepsis Pitfalls and Barriers to Quality Improvement

Presenters

Dr. Jessica Whittle, MD, PhD, FACEP

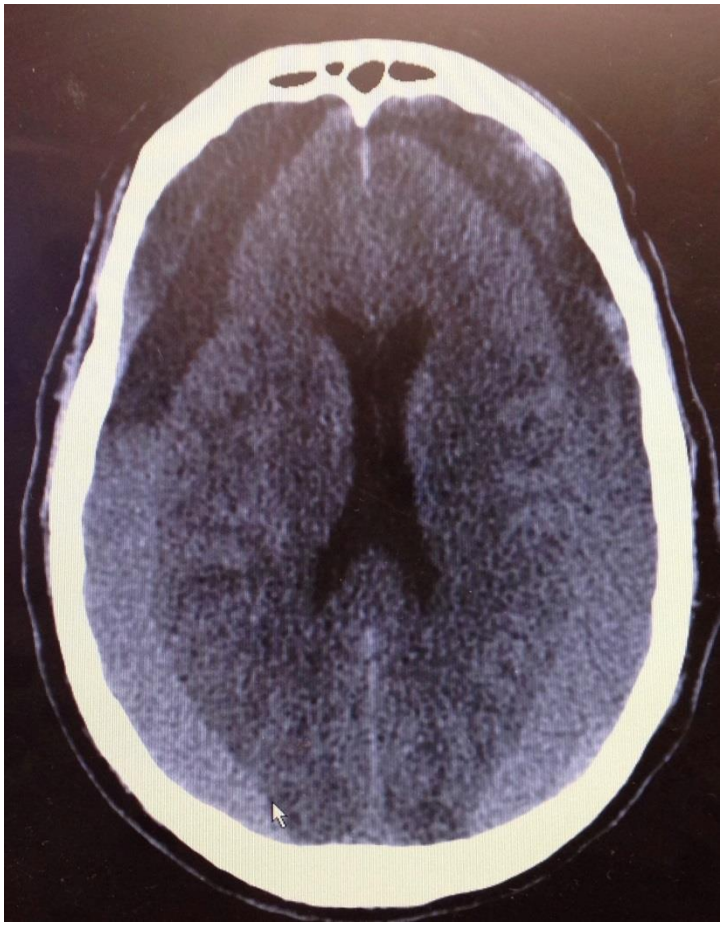
Dr. Don Yealy, MD

Antibiotic Selection in Sepsis

Jessica S. Whittle, MD, PhD, FACEP
Director of Research, Department of Emergency Medicine
UT Chattanooga / Erlanger Hospital
Chattanooga, TN

Balance

Coverage



Stewardship

Sep-1 Guidelines for Antibiotics

Severe Sepsis

Within **3 hours**:

- Measure lactate
- Obtain blood cultures
- **Administer antibiotics**

Septic Shock

Within **3 hours**:

- Measure lactate
- Obtain blood cultures
- **Administer antibiotics**
- 30 cc/kg fluid resuscitation

Delay in Antibiotics is Associated with Increased Mortality

7.6% decrease in survival / hour

Ferrer R, Martin-Loeches I, Phillips G, et al. Empiric antibiotic treatment reduces mortality in severe sepsis and septic shock from a guideline-based performance improvement program. *Crit. Care Med*. 2014;42:1749-55.

Kumar A, Roberts D, Wood KE, et al. Duration of hypotension before initiation of effective antimicrobial therapy is the critical determinant of survival in human septic shock. *Crit Care Med*. 2006;34:1589-1596.

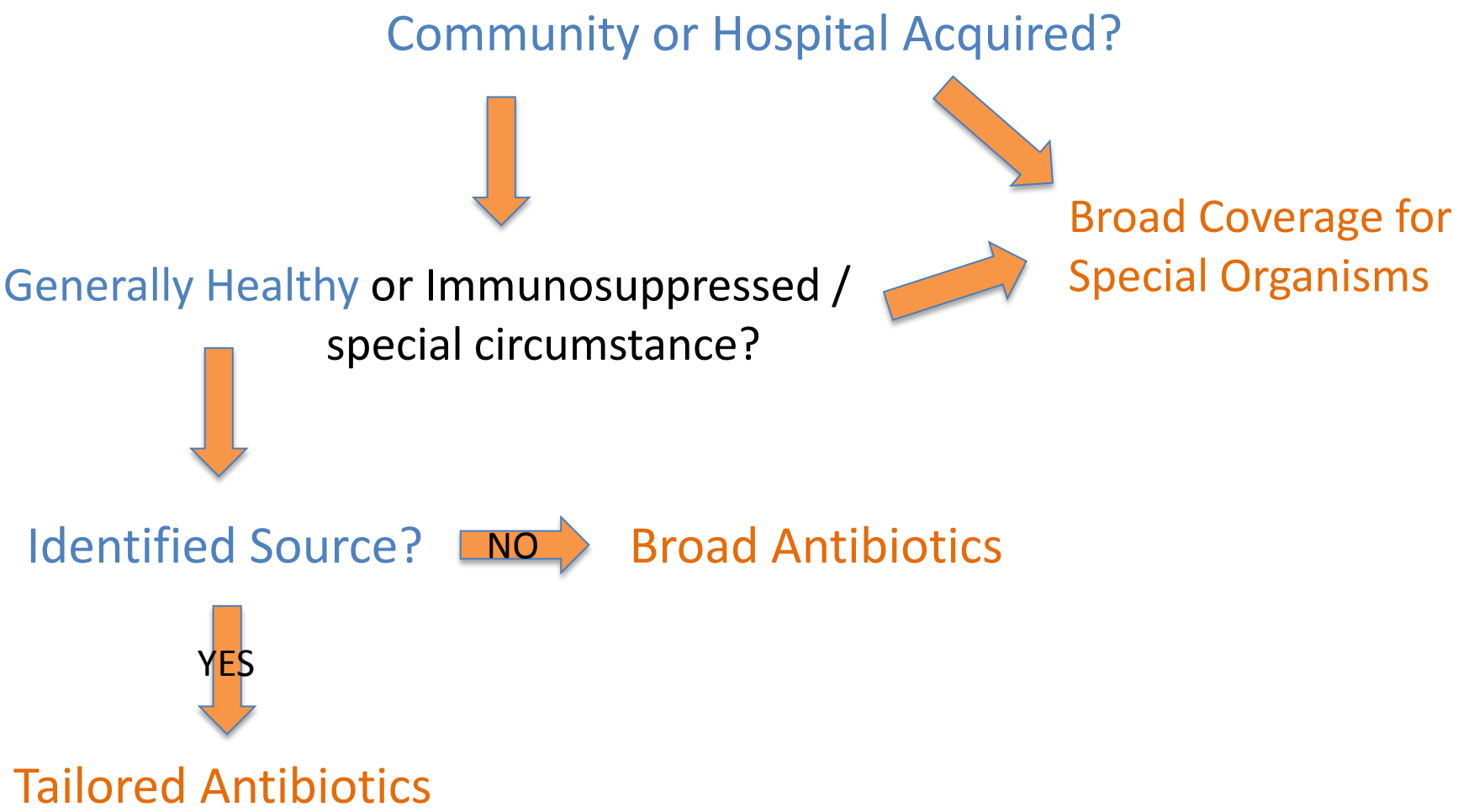
Sterling SA, Miller WR, Pryor J, et al. The impact of timing of antibiotics on outcomes in severe sepsis and septic shock: a systematic review and meta-analysis. *Crit Care Med.* 2015;43(9):1907-1915.

Stewardship Really Does Matter

Not every patient requires
(or benefits from)
vancomycin and zosyn

Limited drug space – I recommend 2 grams Ceftriaxone
To be supplemented as needed by arriving facility
(Example: air ambulance protocol)

How I think about Patients



Has the Patient been Healthcare Exposed?

ESBL

Carbapenems
+/- Pipercillin/tazobactam
Fosfomycin

C. Diff

Flagyl
Vancomycin (oral)

Herpes

acyclovir

Influenza

Tamiflu

MRSA

Vancomycin
Linazolid

VRE

Carbapenems
Ampicillin
Doxycycline
Tigecycline

Pseudomonas

Carbapenems (except Ertapenem)
Cefepime
Pipercillin/ tazobactam

Don’t forget anti-fungals or antivirals if indicated!

Consider Source Control

1. …intervention be undertaken for source control *within the first 12 hr* after the diagnosis is made, if feasible (grade 1C).

2. When infected *peripancreatic necrosis* is identified as a potential source of infection, *definitive intervention is best delayed* until adequate demarcation of viable and nonviable tissues has occurred (grade 2B).

3. …the *least physiologic insult* should be used (eg, percutaneous rather than surgical drainage of an abscess) (UG).

4. If *intravascular access devices are a possible source* of severe sepsis or septic shock, they should be *removed promptly* after other vascular access has been established (UG).

Dellinger RP, Levy MM, Rhodes A, et al: Surviving Sepsis Campaign: International guidelines for management of severe sepsis and septic shock: 2012. *Crit Care Med.* 2013; 41:580-637

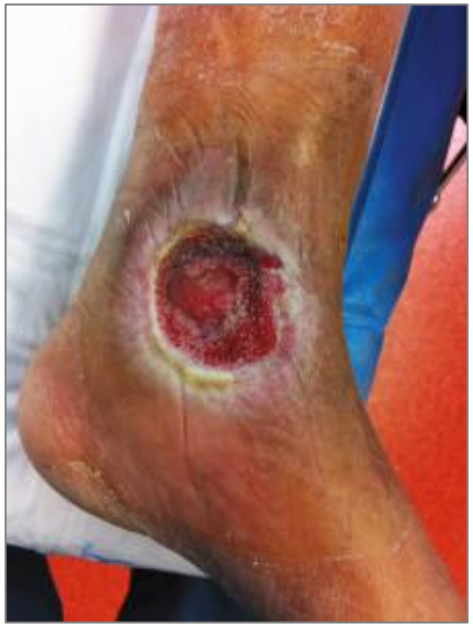
Consider Source Control

Abscesses must be drained.

Infected kidney stones must be IDENTIFIED and drained.

Consider replacing foleys/ G-tubes, etc.

Look under bandages and casts!



Sep-1 Table 5.0

Monotherapy

Doribax/Doripenem
Invanz/Eratepenem
Imipenem/Cilastatin
Meropenem/Merrem
Cefotaxime/Claforan
Ceftazidime/Fortaz
Ceftriaxone/Rocephin
Cefepime/Maxipime
Ceftaroline
Fosamil/Teflaro
Avelox/ Moxifloxacin
Gatifloxacin/Tequin
Levaquin
Augmentin
Ticarcillin/clavulanate/Timentin
Unasyn
Zosyn

Combination Therapy

Column A

Choose one:

Aminoglycosides

OR

Aztreozam

OR

Ciprofloxacin

Column B

Choose one:

Cephlosporins
(1st /2nd Generation)
Clindamycin IV
Daptomycin
Glycopeptides
Linezoid
Macrolides
Penicillins

Proposed Changes to Sep-1 Table 5.0

Monotherapy

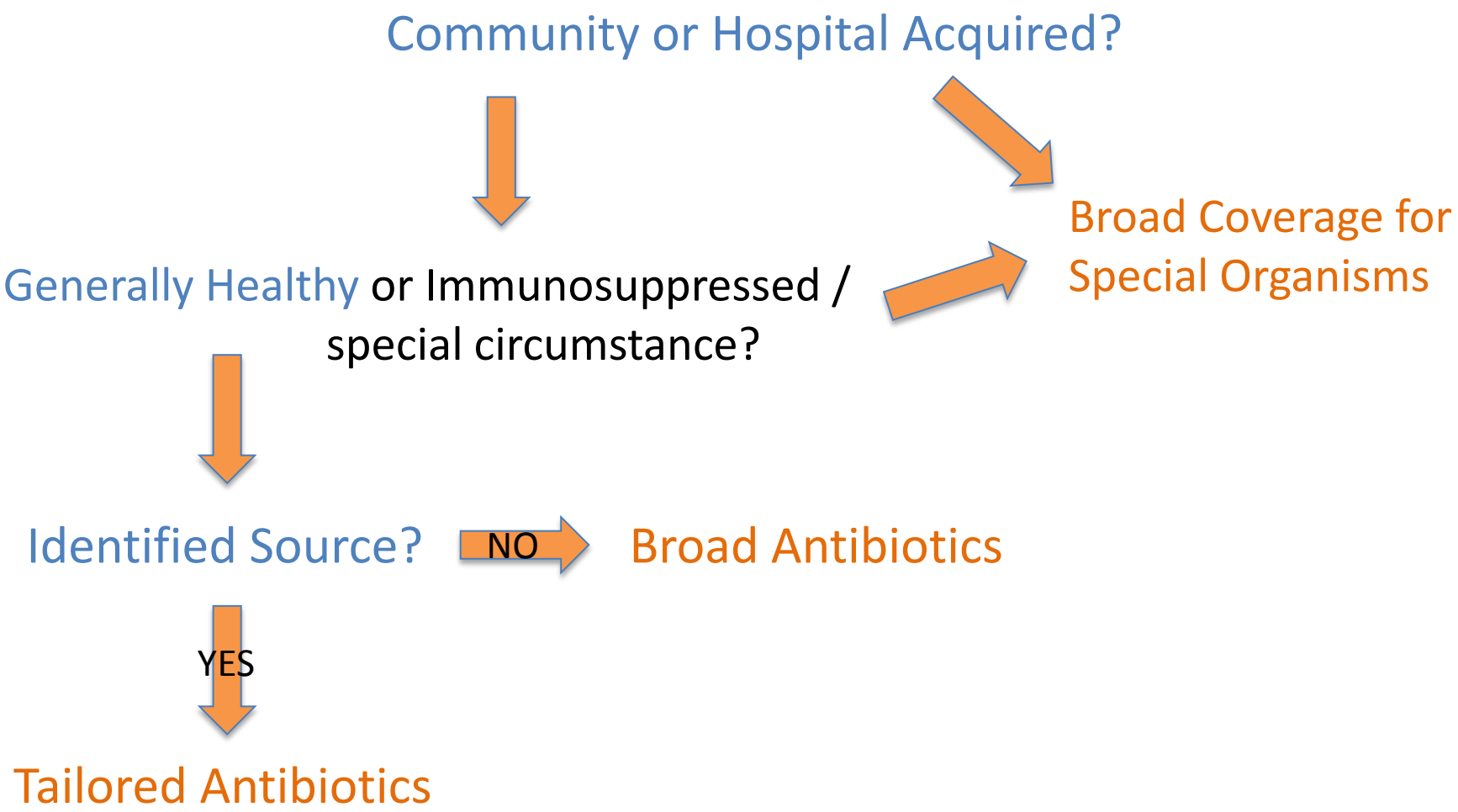
Doribax/Doripenem
Invanz/Eratepenem
Imipenem/Cilastatin
Meropenem/Merrem
Cefotaxime/Claforan
Ceftazidime/Fortaz
Ceftriaxone/Rocephin
Cefepime/Maxipime
Ceftaroline
Fosamil/Teflaro
Avelox
Gatifloxacin/Tequin
Levaquin
Moxifloxacin
Augmentin
Timentin
Unasyn
Zosyn

Combination Therapy

Aminoglycosides	Aztreonam
+	+
Cephalosporins OR	Daptomycin OR
Daptomycin OR	Glycopeptides OR
Glycopeptides OR	Linezolid OR
Linezolid OR	Penicillins OR
Penicillins	Clindamycin IV

Workgroup Members include representatives from :
IDSA, SCCM, SHM, ACEP

How I think about Patients



References

- Ferrer R, Martin-Loeches I, Phillips G, et al. Empiric antibiotic treatment reduces mortality in severe sepsis and septic shock from a guideline-based performance improvement program. *Crit. Care Med*. 2014;42:1749-55.

- Jimenez MF, Marshall JC; International Sepsis Forum. Source control in the management of sepsis. *Intensive Care Med.* 2001;27 Suppl 1:S49-S62.

- Kumar A, Roberts D, Wood KE, et al. Duration of hypotension before initiation of effective antimicrobial therapy is the critical determinant of survival in human septic shock. *Crit Care Med*. 2006;34:1589-1596.

- Kumar A, Ellis P, Arabi Y, et al. Initiation of inappropriate antimicrobial therapy results in a fivefold reduction of survival in human septic shock. *Chest.* 2009;136:1237-1248.

- Sterling SA, Miller WR, Pryor J, et al. The impact of timing of antibiotics on outcomes in severe sepsis and septic shock: a systematic review and meta-analysis. *Crit Care Med.* 2015;43(9):1907-1915.

- Weinstein MP, Reller LB, Murphy JR, et al. The clinical significance of positive blood cultures: a comprehensive analysis of 500 episodes of bacteremia and fungemia in adults. I. Laboratory and epidemiologic observations. *Rev Infect Dis.* 1983;5:35-53.

University of Pittsburgh Emergency Medicine

www.emergencymedicine.pitt.edu

Common Sepsis Pitfalls and Barriers to Quality Improvement

Donald M. Yealy, MD

Chair, Department of Emergency Medicine;

Professor of Emergency Medicine, Medicine, and

Clinical and Translational Sciences,

School of Medicine, University of Pittsburgh

Financial disclosures

- My external funding past 36 months
  - NHLBI – **Emergency Care Research K12 (PI); PETAL Network (PI)**
  - NIGMS - **RO1 ProACT (procalcitonin in LRTI)**
  - Royalties from:
    - Three texts
      - *Tintinalli's Study Guide (editor; chapters including pneumonia)*
      - *The Trauma Manual and Acute Care Surgery (editor)*
      - *ED Critical Care (editor*)
    - and *UpToDate* (pneumonia decision making author)
- **Expert opinions - civil**


FINAL FO
00.4
SPALDING
FINAL FOUR

Barrier – “Another regulation!!?”

- **Sepsis not seen as highest emergency**
  - Under-recognized
  - Insidious and bad things happen, albeit elsewhere
  - Fatalism
  - Mortality – short term 15-30% - worse than STEMI, CVA, trauma
- **“I don’t miss it”**
  - Self-reflection limits
  - Limited feedback, asymmetric
- **Real goal of efforts**
  - “Hassling us”
  - Want “university look” (sic)
  - Take $$ away

Barrier – Early recognition

- **Outside of extremes (overt infection and shock), no "one test" – SIRS vs qSOFA, sensitivity vs specificity**
  - Partially compensated
  - Lactate value and noise
  - Many have features, but not at same time or recognized
- **Signal : noise unfavorable**
  - Many infected or inflamed, few "septic"
  - False positives (see sensitivity); late positives
  - Collecting info to judge hard – even VS
  - NY Times 2 days ago – "Could it be sepsis?"
- **Fallibility**
  - Extremes of age
  - Confounders (trauma, inflammation, meds)

Barrier – Changing Behavior

- **Looking early**
  - Starts prehospital and triage
  - Use a tool – NYHA, SIRS, whatever; liberal lactate ordering
  - Think sensitive, deploy **prompts** (checklist; e-record; labs)
- **Looking often**
  - Repeat exam and VS if unsure
  - Then comes 3-6 hour reassessment – **use exam or tool, > one**
- **Acting early**
  - Bolus fluid – **isotonic, 1-2 L** unless issue (target 30 cc/kg)
  - Antibiotics – **broad, prompt** – don't hold for cultures
- **Acting often**
  - Titrate – volume (500-1000cc boluses plus maintenance), pressors, lactate repeat if elevated

Barriers – Nonsensical requests

- ? Time zero
- Set fluid boluses (CHF/CRF; ecologic fallacy)
- Blood cultures
- Antibiotics (what if you know source?)
- Reassessment
- Vasopressors and CVC vs peripheral

Barrier – Changing behavior

- **Axioms**
  - Easy
  - Aligned with daily work
  - Prompts
  - Focused (simple, works 85%++)
  - Automated (order sets, triage)
  - Clear information
    - Start/stop of fluid/ATB
    - Timing of lab return

Barrier – Measuring What We Do

- **EMS data**
  - Diagnostic features
  - Intervention – fluids (When/what/how? Where noted?)
- **ED data**
  - Key diagnostics – need method to track esp. if asynchronous
  - Same fluid/ATB issues – what/when?
    - Bolus – body mass based for “30 cc kg” vs set but adequate volumes; timing
- **Labs**
  - Order sets
- **Follow-up info**
  - Automated re-checks of VS, labs, fluids

Barriers – Getting improvement

- **Measure, measure, measure**
  - It will be bad to start
  - It wont budge a lot at first
  - No magic bullett
- **Feedback**
  - To key ED clinicians
  - To assessors
  - To next level clinicians
  - To coders
- **Targeted actions**
  - **P**lan, **D**o, **S**tudy, **A**ct
    - Ours – Fluid data
    - Rapid cycle

Barrier

- **Resources**
  - Training of clinicians
  - Training of assessors
  - Equipment
  - IT solutions
  - Time to measure and analyze
  - Time to do PDSA

CMS not linked yet; when linked, wont add $$ - your job is to show value by noting savings (from no/less penalties; lowered cost of care; better outcomes that may attract more acre opportunities)

Barriers – Can you get a change of “asks”?

- **Get involved**
- **CMS accepts feedback, needs data**
- **Focus on things that run counter to improving health / outcomes**
  - Avoid “hassle” arguments
  - Show challenge
  - Offer alternatives
  - Recognize need

Sepsis Initiative- SEP-1 Challenge

Sepsis Initiative- Wave II

SEP-1 Challenge

What is the SEP-1 Challenge?

E-QUAL is collecting self-reported, confidential and de-identified data from EDs across the country on the CMS SEP-1 measure.

No Data Collection Required! Just submit the preliminary data that your hospital has provided you already! This data submission ***only takes 10 minutes*** and a benchmarking summary report will be published in 30 days!

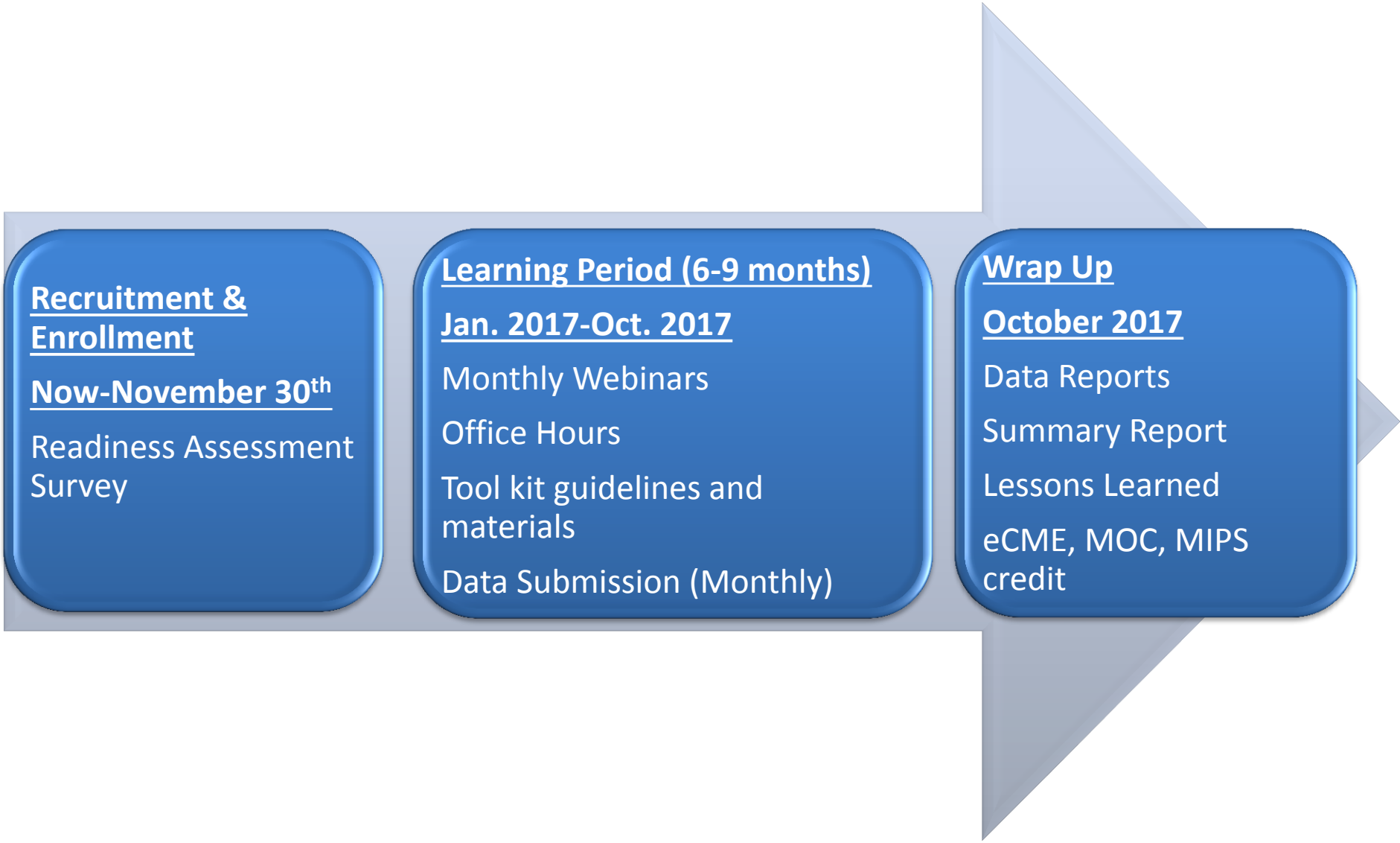
Why join the SEP-1 Challenge?

- Get exclusive access to early benchmarking data on the new CMS SEP-1 sepsis measure (only sites participating in the SEP-1 challenge will receive the confidential, de-identified summary report initially)
- Prepare hospital leadership for national expectations on SEP-1
- Help the EM community identify improvements in the measure for CMS

Participating in the E-QUAL SEP-1 Challenge does not meet your PQRS reporting requirements; however, ***participation in the SEP-1 survey alongside participation in the E-QUAL Sepsis Learning Initiative can earn MOC Part IV Credit for you and your group!***

Deadline to submit data for the SEP-1 Challenge November 11th , 2016.

Sepsis Initiative- Wave II



Why Participate in Wave II?

- Address Modifications of SEP-1 Definitions
- New Webinar Topics
- Additional Quality Improvement Activities
- Get access to high-quality eCME for FREE
- Earn ABEM MOC credit (LLSA and Part IV Activities)
- Meet new CMS MIPS requirements for Clinical Practice Improvement Activities
- Meet CMS quality reporting requirements by joining the CEDR
- Submit and receive benchmarking data to guide local quality improvement efforts
- Feature your ED's commitment to quality improvement to hospital leaders and payers
- Learn from expert national faculty
- Gain access to toolkits including best practices, sample guidelines, and key talking points

SIGN UP TODAY!

Step 1: Contact Nalani Tarrant

Contact Nalani Tarrant at ntarrant@acep.org for more information on how to participate in the E-QUAL Sepsis Wave II and SEP-1 Challenge.

Step 2: Take the E-QUAL Readiness Assessment

Directors or an assigned leader in the clinician group will need to complete an online survey to assess the group's quality improvement resources, needs and feature your existing work that you seek to highlight to other E-QUAL and TCPI members.

Deadline to sign up for Sepsis Wave II is November 30th

Step 3: Visit the E-QUAL Homepage

Visit the E-QUAL homage (www.acep.org/equal) for more information on the Sepsis Wave II, resources and upcoming webinars.