Welcome and Instructions

- For audio, join by telephone at 877-594-8353, participant code 56350822#

- Your line is OPEN. Please do not use the hold feature on your phone but do *mute your line by dialing *6.

- If you are having technical difficulties, email mmoch@kyha.com

- You may ask questions through the chat box or anytime through the call today
Process Measures Series #10
Sepsis

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Objectives

Discuss elements of sepsis morbidity and mortality reduction efforts
  ◦ Cross-cutting measures for prevention
    • Hand hygiene
    • Environmental hygiene
    • Bundles

Discuss recognition and treatment

Explore possible process measures

*Remember, the goal is not to discuss specific interventions in detail, but rather monitoring and feedback as prevention mechanisms!!
Becker’s recently published a list of how each of the 50 states rank in terms of percentage of patients who received appropriate care for severe sepsis and septic shock in 2017.

- We were #46! 😞
- Have we made progress?? Yes, BUT…
Sepsis 3 definitions

- Sepsis is life threatening organ dysfunction due to a dysregulated host response to infection
- Septic shock is a subset of sepsis in which particularly profound circulatory, cellular and metabolic abnormalities substantially increase mortality
What changed in SEP–3? Removed SIRS,** BUT

- The recommendation is still to use SIRS criteria for screening if an infection is suspected.
  - T=\(<36^\circ C\) or \(>38^\circ C\)
  - HR \(> 90\)
  - RR \(> 20\)
  - PaCO2 \(<32\)
  - WBC \(<4,000\) or \(>12,000\) and/or \(>10\%\) bands
SEP–3 Screening process

- 2 or more of the criteria PLUS suspected infection = diagnosis of **sepsis**
- Assess end organ function, e.g., lactate level
  - Lactate > 2 mmol/L = **sepsis with organ dysfunction** (the old severe sepsis)
  - Persistent hypotension less than 90 mmHg, signs of end organ dysfunction and/or lactate level > 4 mmol/L = **septic shock**
- Early goal directed therapy for volume replacement via formal algorithms *de-emphasized*, some studies showed no clinical advantage*

The controversies continue!
What about qSOFA?

- Quick Sequential Organ Failure Assessment
  - RR $\geq 22$
  - Systolic BP $\leq 100$
  - Altered mental status

- If 2 of above are present – perform SOFA

- Data has shown that this assessment is better for predicting risk of mortality than for screening.
  (not sensitive enough)
3 hour bundle*

- Received within 3 hours of presentation of Severe Sepsis:
  - Initial lactate level measurement
  - Broad spectrum antibiotics administered intravenously
  - Blood cultures drawn prior to antibiotics
  - If hypotension present (MAP<65) or lactate >4, resuscitation w/ 30ml/kg crystalloid fluids

*Pruinelli, et al, CCM Journal, January 2018
“No delays are safe”
6 hour bundle– simplified

- Repeat lactate level measurement only if initial lactate level is elevated (>2 mmol/L)
- If Septic Shock present– (Hypotension persists after fluid administration or initial lactate >/= 4mmol/L): Vasopressors
- Repeat volume status and tissue perfusion assessment, including passive leg raises and/or invasive monitoring, as appropriate
Bundle approach (1 + 1 = 3)

- **Advantages**
  - Aligns process measure data collection with education/best practice literature
  - Captures several/many interventions that have been shown to improve outcomes without ranking them
  - Simplifies sharing feedback—“all or nothing” concept

- **Example**
  - Of the 10 patients with a discharge diagnosis of sepsis, 8 received all elements of the bundle = 80%.

- **What is the disadvantage?**
The One Hour Bundle

Prioritizes the following:

- Measure lactate level. Re-measure if initial lactate is greater than 2mmol/L.
- Obtain blood cultures prior to administration of antibiotics.
- Administer broad spectrum antibiotics.
- Rapidly administer 30ml/kg crystalloid for hypotension or lactate $\geq 4$mmol/L.
- Apply vasopressors if patient is hypotensive during or after fluid resuscitation to maintain MAP $\geq 65$. 


Perspective Change
- What CMS requires v. what will give us the best outcomes
- “Aspirational”* – extremely difficult to meet this in a highly reliable way
- View this as one more measure to help us improve care.
- At this level, you may find you are very good at some things within an hour, but not others.

*What we know: every hour antibiotics are delayed, increases risk of disability and death!
What is a “cross-cutting” measure*

- An intervention that has the potential to positively impact more than one harm area.
- Measures that prevent CAUTI, CLABSI, SSI, and pneumonia also in turn prevent sepsis!
- To coin a phrase, we can “kill 2 (or multiple) birds with one stone”, but....
Infection Prevention

- Prevent device related infections*
  - CLABSI
  - CAUTI
  - VAP
- Prevent SSIs
- Prevent skin breakdown
- Burden reduction strategies, e.g., CHG bathing/application and/or oral rinse
- Wellness Optimization
  - Hydration
  - Nutrition
  - Hygiene

*See archived webinars for process measures related to the above!
Monitoring – how to prioritize?

- Rates of infection by type/location/specialty
- Results of prior surveys, rounding
- Findings from RCAs
- Ask your staff!
  - EVS
  - Nursing
  - Ancillary departments

Start small and build!
Don’t try to do it alone!
Remember: RI = the difference between a great policy and actual best practice at the bedside consistently every day every time for every patient. *Including sepsis processes*

How do we get there?

- Surveillance is the best way to ensure appropriate compliance.

Recent study showed that in past initiatives, the harm did not decrease significantly until the bundle compliance reached 80%.
Recognition*

- Pre-hospital setting
  - Public education
  - Primary Care Providers
  - EMS
- Emergency Departments
- Inpatient areas

* Each requires a different approach!**

- Measurement: Time from recognition to interventions v. Time from when clinical indicators were met to interventions***
Educating the public and first responders

- S–Shivering
- E–Extremely uncomfortable
- P–Pale or discolored skin
- S–Sleepy, confused
- I–“I feel like I may die”
- S–Short of breath

- T–Temp
- I–Infection
- M–Mental changes
- E–Extremely ill
Was a blood culture drawn before antibiotics given?

Did pt receive appropriate amount of IVF?

Elapsed time from “Time 0” to IV fluid bolus

Time from “Time 0” to first dose of antibiotics

What do these last 2 process measures have in common? They are related to treatment as opposed to recognition [UNLESS] we are looking back and comparing our Time 0 (when we recognized possible sepsis) to the true Time 0—when the clinical indicators were met.
Elements of Recognition for Hospitals

- **Screening**
  - Screening tools built in to triage and inpatient routine assessment documentation
- **Sepsis Alert/Sepsis huddles**
- **EMR triggers**
- **What can help?**
  - Sepsis team to perform a lit review and gap analysis/review data/plan interventions/test ideas
  - Standardized order sets
  - Clocks/timers
  - Badge cards/ wall posters
- **Sepsis “watch”** v. alert

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### Severe Sepsis

3 of the following symptoms within 6 hours of each other:

A. Documentation of a suspected source of clinical infection. There may be reference to “possible infection from ...”, “suspect infection from ...”, or similar statement in the progress notes, consult notes or other MD/APN/PA documentation.

B. 2 or more manifestations of systemic infection according to the SIRS criteria, which are:
- Temp > 38.3°C/100.9°F or < 36.0°C/96.8°F
- HR > 90 bpm
- Resp > 20 per min
- WBC >12,000 < 4000 or >10% bands

C. Organ dysfunction evidenced by any 1 of the following:
- SEP < 90, or MAP < 65, or a SEP decrease > 40 mmHg
- Cr > 2.0, or urine output < 0.5 mL/kg/hour x 2 hours
- Bilirubin > 2 mg/dL
- Platelet count < 100,000
- INR > 1.5 or aPTT > 60 seconds
- Lactate > 2 mmol/L
- Acute Respiratory Failure as evidenced by a need for BIPAP/Cpap/ Mechanical Vent

### Septic Shock

Documentation of “Severe Sepsis” AND:

A. Tissue hypoperfusion persists after crystalloid fluid administration, evidenced by ANY of the following:
- SBP < 90 mmHg
- Mean arterial pressure < 65
- A decrease in SBP by > 40 mmHg
- Lactate level > 4 mmol/L

B. OR if criteria for Septic Shock are not met but there is MD/APN/PA documentation of Septic Shock or suspected Septic Shock.

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See approved antibiotics and vasopressor list on the other side

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Process Measures around recognition

- Elapsed time from arrival to ED to time of triage/sepsis screening
- Elapsed time from positive sepsis screen to sepsis alert/sepsis huddle called/performed
- Time from EMR triggered alert to time of MD notification
- # of patients with a sepsis diagnosis for whom a sepsis huddle was called/total sepsis pts
- # pts screened as negative inappropriately—this may prompt a revision of your tool or change in staff education
Treatment

- Early source control
  - Removal of invasive devices
  - Draining of abscesses

- Timely antibiotic administration
  - Policy – push first dose of antibiotics
  - Antibiotic reference sheet
  - Antibiotics made available on all units
  - Role assignment*

- 24/7 sepsis nurse (RRT nurse with additional training)

- Additional training for existing RRT
Treatment

- Blood Culture collection technique/process/contamination rate
  - Education around technique, e.g., avoiding under-filling which leads to increased time to positivity
  - Disinfection caps
  - Kits
  - Specimen diversion device (Steri-path)
- Process for rapid infusion of bolus
Bacteremia Testing Considerations

- Contaminated specimens drawn for blood culture
  - From CVLs which have biofilm present
  - From venipunctures with poor technique…and maybe even good technique

- AHA Webinar, Emergency Department, Lab, and Antimicrobial Stewardship: Connecting the Dots. *Addressing a Clinical Decision Dilemma at the Source* conducted by Christopher D. Doern Ph.D. Director of Clinical Microbiology VCU, Medical College of Virginia and Lindsey Nielsen PhD, University of Nebraska Medical Center.

Isotonic fluid preferable to avoid hyponatremia (Balanced IVF may be better as well– jury is still out)

Use standard order sets with “opt out” choice as opposed to “opt in” process to facilitate best practice (Lactate orders?)

New technologies for rapid diagnoses
  ◦ 3–4 hours v. 3–4 days
  ◦ Some are accurate despite antibiotic administration prior to specimen draw   (EMS could give first dose)
Process Measures

- Time from sepsis alert to removal of indwelling device(s) if present
- \# correct technique during BC specimen collection/\# observed (Include CVL data*)
- Blood Culture contamination rate (Goal→0)
  - Rate of under-filled specimens
- Elapsed time from Time 0 to IVF bolus
- Time 0 to time of first dose of empiric antibiotics
- Time 0 to time of first dose of correct/effective antibiotics
Most recent evidence supports intense focus on this intervention.
  - NY study— each hour delay (past 3 hours) increased mortality by 4%.
  - Canada study— showed a 12% increase

Guessed wrong? Antibiograms are very valuable, but empiric abx are an educated guess. Remember this does not take into account the initial incorrect choice.

This also does not capture morbidity caused by delay, e.g., loss of limbs, etc.
Gold standard?

- Sepsis prevention using evidence based infection control processes reliably
- Rapid recognition through effective screening
- Timely evidence based treatment

New technologies
- Innovative tests for same day pathogen identification
- Pro–calcitonin, other labs
- Research if/when steroids can be useful

- Use of simulation to hone process
- Sepsis Coordinator**
- Transfer protocols*– rural/CAH to tertiary center as needed
Barriers*

- Fear of fluid overload
  - Studies show CHF and renal patients need the fluid resuscitation. Their tanks are equally depleted as a result of the effects of sepsis.

- False alarms
  - If we are doing a good job of screening for sepsis, we must be tolerant of some degree of over calling.

- Fear of conflict with antibiotic stewardship efforts
  - De-escalation, IV to PO, more targeted antibiotic therapy v. broad spectrum, timely discontinuation of antibiotics.
What does the data look like?

- Numerator (number of patients who were screened for sepsis) v. Denominator (total number of patients presenting to the ED)

- All or nothing sepsis bundle
  - Example – 10 sepsis alerts called, 5 patients received the entire bundle by the end of the first hour. \( \frac{5}{10} = 50\% \)
  - Of the 5 patients who did not, 4 did not receive their first dose of antibiotics. 1 did not receive an effective IV fluid bolus.*
Using Your Process Measure Data

- Share it— not just the numbers/not just on dashboards and at meetings!!
- What issues are you seeing? Use for training and re-training!
- Regular agenda item to keep topic top of mind to get resources needed
- Discover (and work to overcome) barriers!!
  - Real (availability of antibiotics)
  - Not based on evidence (fear of fluid overload)
- Provider specific data*
Goal Setting

- 100% v. incremental goals
- Focus on process measures v. outcome measures
- Use competition—make it fun!
  - Compete against your past performance
  - Compare units/departments/disciplines
- Celebrate success!
Not a destination!
A Never Ending Path
Job Security?
Not a straight line either! More like this
The Journey to Excellence

- Outcomes matter, but processes drive them!
Questions?

PLEASE let us help if this is new for you or you would just like a second opinion or advice from someone outside your everyday work flow!!

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Coming soon: K–HIIN Infection Prevention Education Day
November 13, 2018  10am–4pm ET