Learning Outcomes

• Learn how technology can be used as an effective and timely adjunct to nursing assessments.

• Learn how technology can be used to transition best clinical practices into common clinical practices.
Fact:

More Americans die each year from sepsis than Heart Attack or Stroke

Severe Sepsis is a serious – and growing problem

Centers for Disease Control (www.cdc.gov):
- Hospitalization rate for sepsis/septicemia as a principal diagnosis more than doubled from 2000-2008
- The rate as a principal or secondary diagnosis increased by 70%
But unlike AMI or Stroke, few recognize early signs of developing sepsis

Source (www.sepsisalliance.org)

2003: Rubulotta, et al. Critical Care Medicine, 2009
2010/2011: Harris Interactive Poll commissioned by Sepsis Alliance
SIRS: Systemic Inflammatory Response Syndrome

SIRS
- Temp, pulse, respiration, WBC (2 must be present)

Sepsis
- SIRS + evidence of infection

Severe Sepsis
- Sepsis + organ dysfunction (new onset)

Septic Shock
- Severe Sepsis + severe low blood pressure

SIRS Rescue Initiative

Intervene HERE
(Mortality risk 28.6%)

Versus HERE
(Mortality risk 40% - 50%)

To prevent THIS

Death

Be treated well.

Le Bonheur Healthcare
Severe Sepsis Screening Tool
(Bacterial, viral, or fungal)

Problems with manual screening
• Assumes required lab values available
• Gap syncing lab with vital sign results
• Requires review of medical history with each screening to determine new onset
• Positive signs may appear moments after screening
• To be effective, must screen hourly
Challenge #1: Culture
Sepsis Myths – Common and Firmly Held

• “Everyone coming through the ED will screen positive.”
• “I can tell just by looking who is or isn’t seriously ill.”
• “You need a positive culture to diagnose sepsis.”
• “Only 80-year olds get severe sepsis.”
• “That patient doesn’t need to go to ICU.”
• “They don’t even have a fever.”
• “My patient does NOT have sepsis!”
• “You are calling too many things sepsis”
• “There are no early warnings for sepsis – especially not lactic acid!”
Challenge #2: Logistics
Doctors may see an incomplete clinical picture
Challenge #3: Technology

Needed data is spread throughout the chart

2 Signs of SIRS
+ 1 Sign of Organ Dysfunction

Case of Severe Sepsis
**SEPSIS RULE AUTO ALERT**
**CODE LOGIC—ASSESS FOR SIRS**

**POSITIVE SIGNS:**
- Respiration: > 20
- Heart rate: > 90
- Temperature: >38.3C or <36C
- WBC: > 12,000 or < 4000 uL

- **Process begins with most recent vital sign update in EMR**
- **Patient on Neupogen?**
- **2 or more positive signs?**

**IGNORE**
- ** Serum Glucose: > 120 mg/dL**
- **Patient a known diabetic?**

**YES**
- Continue to assess for organ dysfunction

**NO**
SEPSIS RULE AUTO ALERT
CODE LOGIC – ORGAN DYSFUNCTION

At least 1 sign of organ dysfunction in past 48 hrs?

- YES
  - Was the only sign elevated creatinine?
    - YES
      - Diagnosis of ESRD?
        - YES
          - Fire Alert
        - NO
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- NO
  - YES
    - Patient on Epoetin therapy?
      - YES
        - Fire Alert
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ORGAN DYSFUNCTION Signs:
- Lactate > 2.2 mmol/L
- SBP < 90 or MAP < 65 mmHg
- Creatinine > 2.0 gm/dl
- Bilirubin > 2 mg/dl
- Platelet count < 100,000
- Lethargic, confused, agitated, anxious
- SBP decrease > 40mmHg from baseline
- INR > 1.5 or aPTT > 60 secs
- PaO2/FiO2 ratio < 300
- New increased O2 requirement to maintain SpO2 > 90%
What Happens when Alert is Triggered?

Fire Alert

SEPSIS RULE FIRES ALERT

Location: MED/SURG

Location: CRITICAL CARE

Location: ED

IGNORE

SEPSIS BUG ICON

Be treated well.

Methodist Le Bonheur Healthcare
Location ‘ED’ orders sepsis bug icon to display
Challenge #4: Ensure alert is addressed

Nursing documentation requirements

If no action taken:
NURSING CLINICAL NOTE
NURSE to document acknowledgement of sepsis alert and reason for not taking further action.

If MRT assessed:
MRT ASSESSMENT
MRT to document findings of assessment and action taken.

If Physician contacted:
MD NOTIFICATION
Nurse to document communication with the physician in iView, including actions taken.

Valid reasons to not contact physician:
- Patient documented Comfort Measures Only
- Organ dysfunction is not new onset for patient
- Physician already treating severe sepsis and condition not worsening
- Clinical judgment, well-documented
Impact of Auto Alert on Sepsis Mortality

**Sepsis Mortality Rate**
Methodist North Hospital (Deaths with sepsis-related diagnosis)

- Baseline (28.3%)
- Auto Sepsis Alert (19.4%)
- ED Initiative

**Impact of Sepsis Alert on Mortality**

- Reduction statistically significant, p = 0.021
- Baseline: 23.3%
- Sepsis Alert: 19.4%
- ED Initiative: 17.5%

**Notes:**
- 2005 data sampled; 2006-2011 all discharges
- EGDT Benchmark from Rivers, et al.
- ED Initiative to reduce turnaround time, door-to-medical screen

Number of patients discharged to ‘Home’ or ‘Home Health’ rose 20%
Financial Impact of Early Intervention

5-year impact: $5,000,000

Annualized

Bed cost averaged at $500 per day

5-year impact: $5,000,000
Lessons Learned

• Engage physician champions early in the process – ED, Intensivist, and Internal Medicine
• Point-of-Care lactic acid testing invaluable – ED and MRT team (Respiratory Therapist)
• Feedback loop from ICU for delays in intervention
• Monitor alerts to ensure consistent engagement
• Provide scripting for nurse-physician communication
• Encourage/support nurses who may be faced with non-engaged physicians
• Celebrate improved outcomes
• Educate community on signs of sepsis
Questions
References


• Shapiro, NI, et al. (2006). *Critical Care Medicine*, 34: 1025-1032