


Providence Tarzana Medical Center

“SEPSIS: FROM LAST TO FIRST”

**“Severe Sepsis and Septic Shock
Early Recognition and Treatment”**


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January 23, 2013



Disclosure

PTMC participated in the 2011 Institute for HealthCare Improvement (IHI), “Sepsis Detection and Initial Management” Expedition. Several slides in this presentation contain material from the IHI Expedition presentations.

 An IHI Expedition Sepsis Detection & Initial Management Begins August 10, 2011




Objectives

- Sepsis introduction and overview
- Study Group development
- Education commitment
- Tools and checklists
- Strategies for success
- Data and data sharing


Sepsis Alliance Video





Sepsis Statistics



- 10th Leading Cause of Death in US
- 750,000 new cases in US Annually
- Severe Sepsis: 30%-50% mortality
- Septic Shock: 50%-60% mortality
- Approximately 1,300 deaths worldwide daily
- More than 500 deaths from severe sepsis daily in US
- \$17 Billion spent annually




Severe Sepsis v. other Priorities



| Care Priorities | US Incidence | # of Deaths | Mortality Rate |
|-----------------|--------------|-------------|----------------|
| SEVERE SEPSIS | 751,000 | 215,000 | 29% |
| AMI | 900,000 | 225,000 | 25% |
| STROKE | 700,000 | 163,500 | 23% |
| TRAUMA (MVA) | 2.9 million | 42,643 | 1.5% |


Source: JH/


Sources: ACC/AHA, AHA, National Highway Safety Administration, Motor Vehicle crash data and Critical Care Medicine

Time Sensitive Interventions 


- **STEMI/AMI – “Code 54”**
 - Focus on the timely return of blood flow to the affected areas of the heart
- **STROKE – “Code Brain”**
 - The sooner treatment begins, the better are one’s chances of survival without disability.
- **Trauma – “The Golden Hour”**
 - Requires immediate response and medical care “on the scene”
 - Patients typically transferred to a qualified trauma center.
- **Severe Sepsis/Septic Shock – Time sensitive**
 - Early Recognition
 - Rapid administration of fluids and antibiotics

Source: #8



Surviving Sepsis Campaign 

- **International effort developed by MDs**
- **Evidenced based guidelines to improve diagnosis and treatment of sepsis**
- **Screening high risk patients, blood cultures IV fluids, ABX**
- **Improve patient outcomes, decrease mortality**



Inter-Disciplinary Approach 

| | |
|--|--|
| <ul style="list-style-type: none">▪ Chief Medical Officer▪ ED Medical Director▪ ICU Medical Director▪ Sepsis Program Manager▪ Clinical Pharmacist▪ Lab Director | <ul style="list-style-type: none">▪ Nursing Administration▪ Education▪ PI Department▪ Clinical Documentation Specialist▪ Respiratory Department▪ Medical Record Coder |
|--|--|





6 Hour Sepsis Bundle

- Serum lactate
- Blood cultures prior to antibiotic administration
- Broad-spectrum antibiotics (within 3 hours of ED admission or 1 hour non-ED admission)
- If hypotensive and/or serum lactate >4:
 - Fluid resuscitation (20-40 ml/kg with minimum of 20)
 - Vasopressors
- CVP/SVcO₂ measures
- Inotropes and/or PRBC's

6 hr

24 Hour Management Bundle

- Low dose steroid for septic shock
- Glucose control:
 - Maintain a median glucose level >70 and <150 over the 1st 24 hours
- Ventilator Pressure:
 - IPP <30 on ventilated patients over the 1st 24 hours

24 hr

Why is the Diagnosis so Difficult ?



- No single criteria makes the diagnosis (unlike new ST elevation on EKG, or new onset focal neurological exam)
- Changing patient status during presentation
- Diagnosis not black and white but, gray
- Patient may look good but, crash two hours later
- Many physicians prefer an observation period before reacting and lose the critical window of opportunity



Source: IHI

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An IHI Expedition
Sepsis Detection & Initial Management
Begins August 10, 2011

What we did in 2011!



- **IHI Sepsis Expedition**
- **Identified barriers to success**
- **Initiated “small tests of change”**
- **Sepsis video – mandatory nursing education**
- **Strategic initiative for the Providence Health System**

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Current State




- **No current real-time method to identify sepsis patients in-house**
- **Using specific markers in ED (blood cultures, lactic acid, ABX, fluid resuscitation)**
- **ED using pre-printed severe sepsis/septic shock order sets with success (not mandatory)**
- **Fallouts occurring in inpatient areas – days and nights**



Barriers to Success



- Limited awareness of SIRS/Sepsis/Severe Sepsis/Septic Shock
- Late identification of patients
- Inconsistent participation of intensivists and internists
- Confusion regarding pre-printed order sets
- Hesitancy to use pre-printed order sets
- No RRT out-of-count to round and evaluate
- Not using any screening tool



| | |
|----------------------|---|
| SIRS | <p style="text-align: center;">Systemic Inflammatory Response Syndrome</p> <p style="text-align: center;"><small>Defined by the presence of two or more of the following:</small></p> <p>1. Temperature > 38 degrees C or < 36 degrees C 2. Heart rate > 90 beats/minute 3. Respiratory rate > 20 breaths / min or PaCO2 < 32 mm Hg 4. Leukocyte count > 12,000, < 4,000 or > 10% bands</p> |
| SEPSIS | <p style="text-align: center;">SIRS plus a suspected or confirmed site of infection, Examples: Urinary tract infection, Pneumonia, Decubitus ulceration</p> |
| SEVERE SEPSIS | <p style="text-align: center;">Defined as: Sepsis with organ system dysfunction (examples below)</p> <ul style="list-style-type: none"> • Altered LOC (increased agitation, confusion, decreased Glasgow Coma Score) • Renal failure/insufficiency (Creatinine > 2.0 and/ or urine output < 0.5 ml/kg/hour) • Respiratory failure (room air pulse oximetry < 92%, pO2/FiO2 < 300, need for mechanical ventilation) • Metabolic/ Hepatic/ Hematologic, (Lactate level > 2.0, liver enzymes > 2X upper limit of normal, Platelet count < 100k, INR > 1.5 w/o Warfarin) <p style="text-align: center;">Order: Lactic acid, Blood Cx prior to ABX, Early fluid (20ml/ Kg) and antibiotic</p> <p style="text-align: center;">Antibiotic administration: (ED < 3 hours inpatient < 1 hour)</p> |
| SEPTIC SHOCK | <p style="text-align: center;">Septic Shock and/or Severe Sepsis w/ Lactate > 4.0</p> <p style="text-align: center;">Defined As: Severe sepsis with SBP < 90 unresponsive to initial fluid resuscitation and/ or lactate level > 4.0</p> <p style="text-align: center;">Order: Lactic acid, Blood Cx prior to ABX, Early fluid (20ml/ Kg) and antibiotic</p> <p style="text-align: center;">Antibiotic administration: (ED < 3 hours inpatient < 1 hour)</p> <p style="text-align: center;">Use printed septic shock order set for ED or inpatient</p> |

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Evaluation for Severe Sepsis Screening Tool

Instructions: Use this optional tool to screen patients for severe sepsis/septic shock in all adult areas.

1. Is the patient's history suggestive of a new infection?

| | | |
|---|---|---|
| <input type="checkbox"/> Pneumonia, empyema | <input type="checkbox"/> Bone/joint infection | <input type="checkbox"/> Implantable device infection |
| <input type="checkbox"/> Urinary tract infection | <input type="checkbox"/> Wound infection | <input type="checkbox"/> Other _____ |
| <input type="checkbox"/> Acute abdominal infection | <input type="checkbox"/> Bloodstream catheter infection | |
| <input type="checkbox"/> Meningitis | <input type="checkbox"/> Endocarditis | YES _____ NO _____ |
| <input type="checkbox"/> Skin/soft tissue infection | | |

2. Are any two of the following signs & symptoms of infection both present and new to the patient? (SIRS)

| | | |
|---|---|--|
| <input type="checkbox"/> Hypothermia > 38-C (100.4-F) | <input type="checkbox"/> Respiratory rate > 20/min or PaCO2 < 32 | <input type="checkbox"/> Leukopenia (WBC count < 4,000 μ -l) |
| <input type="checkbox"/> Hypothermia < 36-C (96.8-F) | <input type="checkbox"/> Leukocytosis (WBC count > 12,000 μ -l) | <input type="checkbox"/> > 10% bands |
| <input type="checkbox"/> Heart Rate > 90 bpm | | YES _____ NO _____ |

If the answer is "YES" to both question 1 and 2, suspicion of infection is present:

Obtain MD order for:

Lactic acid, blood cultures, CBC with differential, basic chemistry labs, PT/INR, AntCo.

At the physician's discretion obtain UA, chest x-ray, ampicillin, Spine, CRP, ABG

3. Are any of the following organ dysfunction criteria present at a site remote from the site of the infection that are not considered to be chronic conditions?

| | |
|---|--------------------|
| <input type="checkbox"/> Acutely altered mental status | |
| <input type="checkbox"/> SBP < 90 mmHg or MAP < 65 mmHg | |
| <input type="checkbox"/> Bilateral pulmonary infiltrates with a new (or increased) oxygen requirement to maintain SpO2 > 90 % | |
| <input type="checkbox"/> Creatinine \geq 2.0 mg/dl or urine output < 0.5 ml/kg/hour for > 2 hours | |
| <input type="checkbox"/> Bilirubin > 2 mg/dl | |
| <input type="checkbox"/> Platelet count < 100,000/ | |
| <input type="checkbox"/> INR > 1.5 (not on anticoagulant) | YES _____ NO _____ |
| <input type="checkbox"/> Lactate > 2 mmol/l | |

If suspicion of infection is present AND organ dysfunction is present, the patient meets the criteria for SEVERE SEPSIS. Ask MD to initiate severe sepsis orders.

If the patient has persistent hypotension and/or lactic acid > 4, obtain MD order to initiate septic shock pre printed order.

Date: _____ Time: _____ AM or PM _____ RN: _____




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EVALUATION FOR SEVERE SEPSIS SCREENING TOOL

PATIENT LABEL

NOT PART OF MEDICAL RECORD

Strategies for Success 

- To succeed, we must involve the front line clinicians
- Real-time data delivered in real time to clinician is key
- Promote use of screening tool
- Constant reminders
- Continuous education
- Pre-printed orders



What Should Nursing Do? 

- Enhance knowledge of pathophysiology, signs and symptoms and knowledge of treatment
- Know your patients so that early detection can occur
- Know the SIRS criteria
- Recognize the presence of sepsis
- Quickly initiate treatment measures



Education 

- Continue monthly sepsis committee meetings
- Medical staff presentation
- Nursing Education: staff meetings, story board presentations
- Develop on-line sepsis education module
- Include in new orientation and annual update
- Participation in Institute for Healthcare Improvement (IHI) sepsis expedition



For Severe Sepsis Think 2-1-1

2 Two or more signs of SIRS




1 One suspected/ actual site of infection

1 One or more organs in failure identify severe sepsis





Newer Strategies

- **Modified Early Warning System (MEWS)**
- RRT to evaluate each call with the sepsis screening tool



Modified Early Warning System

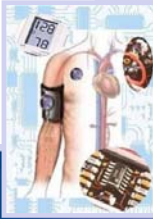
Provide early detection & alerts for physiologic decline that might signal an impending **EVENT**



Failure to Rescue


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California

- 80% of ICU patients have abnormal physiologic parameters up to 24 hours prior to transfer (Brit Med J 2001)
- 40–68% of cardiac arrests are preceded by abnormal parameters up to 12 hours before event (Resuscitate – 1999)
 - Tachypnea (58%)
 - Hyperpnea (48%)
 - Tachycardia (54%)
 - Altered mental state (46%)
 - Hypotension (46%)
 - Decreased urine output (29%)
 - Pyrexia (14%) Hypertension (9%)



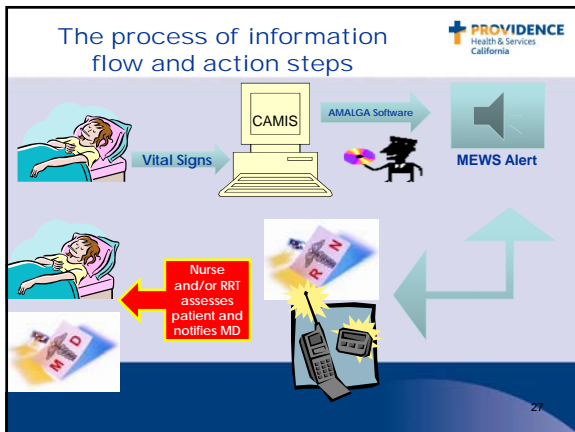
MEWS patients are the sickest patients in the hospital

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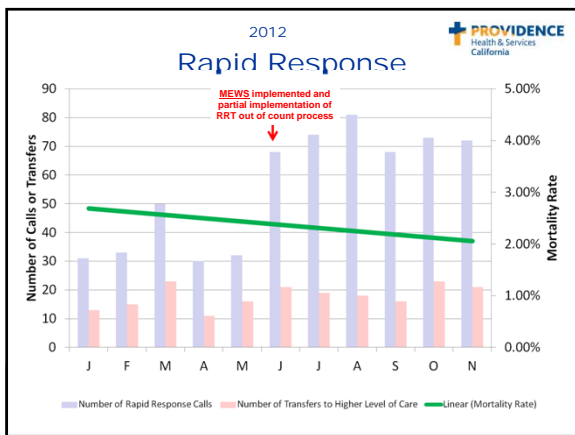
- Mortality is 12.4% for those with MEWS score of 5 or greater.

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Actions of Team Members

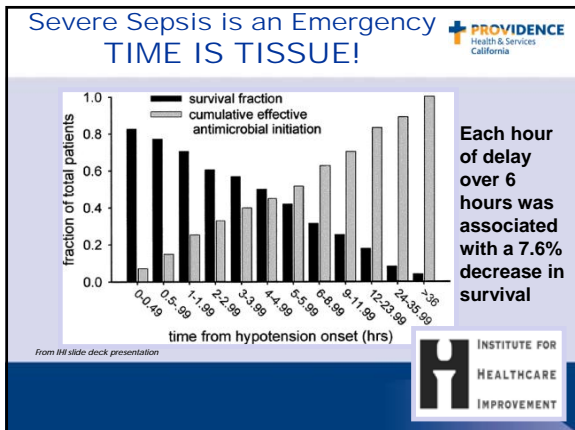
| MEWS Score | Nurse Intervention / Action <small>(Excludes DNR, Comfort care & Hospice Patients)</small> | Physician Intervention / Action |
|------------|---|---|
| 0 to 3 | Continue routine ordered Vital Signs | ----- |
| 4 | Charge nurse notifies primary nurse, assesses patient and takes vital signs within 15 min, documents in the EMR, notifies physician. Increase VS frequency to include O2 sat, to 1hr x 2. Calculate MEWS score each time. | Responds to Nurse Call, provides patient care orders. |
| 5 | Activate RRT. Inform MD of patient status. Increase VS frequency to q 1 hr x 2, include pulse ox. If pt. remains MEWS 5 for 3 consecutive readings, request possible orders for higher level of care transfer. Consider end of life discussion as appropriate with MD and family. | Responds to nurse call, assess pt., orders for patient care interventions, considers higher level of care, and or end of life discussions if appropriate. |

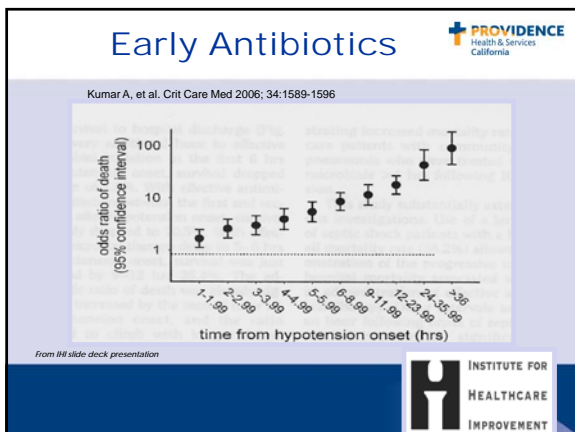


RRT Responsibilities

❖ Initiate Sepsis Protocol

- Sepsis panel (blood cultures x2 from two different sites; CBC with differential, CMP, serum lactate and PT/INR)
- Obtain sputum for culture – do not hold ABX if unable to obtain specimen
- Obtain urine for culture - do not hold ABX if unable to obtain specimen
- Obtain wound culture if applicable
- Obtain appropriate ABX order – must be started within one hour of identifying severe sepsis/septic shock
- Chest x-ray
- Administer normal saline 500 ml IV bolus, then 100ml/hour
- Consider transfer to higher level of care





Patient Population Criteria

Criteria

Inclusion: Population is limited to patients having only severe sepsis or septic shock (995.92 and 785.52) as principal and/or secondary dx.


- Patient must be an inpatient adult (>17 years of age).
- Patients who are **DNR and patients that are on comfort measures and not in IP Hospice status**

Exclusion: Discharge Status

- Discharged/Transferred to other facilities.
- Left Against Medical Advice. Inpatient Hospice.

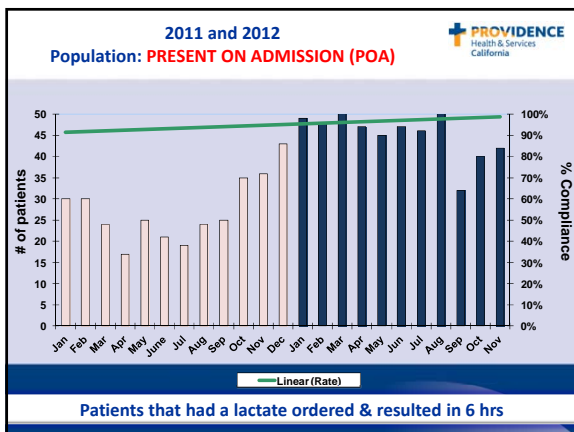
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Documentation Reminders for Appropriate Coding



- Cannot guess, “**connect the dots**” or make diagnoses based on signs & symptoms
- Cannot code effectively without **complete and timely** D/C Summaries
 1. List **all** significant diagnoses
 2. Consistency with bulk of medical record
- Physicians **must** document their **thought process**
 1. A condition is code-able even if uncertainty exists, as long as it is being treated and/or otherwise affects the hospitalization
- “**Continuity, consistency, and congruency**” are very helpful
 1. Continue to document when issue is “resolved”
 2. Document as “present on admission” - coding requirement
 3. Admitting doctors agree with consultants/partners and include agreement in his/her documentation – even with weekend coverage!


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What to Expect in 2013 

- IHI and the Surviving Sepsis campaign are currently revising the 2008 guidelines to incorporate recently published evidence.
- Within the Providence Health & Services system, we will continue to review the 6-hour bundle with an emphasis on timely antibiotic administration and fluid resuscitation.
- We are asking for a renewed commitment of our intensivists and senior leaders in the Department of Medicine to help champion our sepsis improvement efforts.
- The creation of a full-time, dedicated positions for nurses on our Rapid Response Team (RRT).
- Once we have our full-time dedicated RRT nurses in place, we will work to initiate a Code Sepsis and further improve our response.

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Parting Thoughts! 

- Don't let "perfect" be the enemy of "good"!
- Persist! Persist! Persist!
- Change is slow – celebrate the small victories!
- Always keep in mind that the end goal is to save lives!



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Never doubt that a small group of thoughtful, committed citizens can change the world; indeed, it's the only thing that ever has.

Margaret Mead
