LARA
LICENSING AND REGULATORY AFFAIRS
CUSTOMER DRIVEN. BUSINESS MINDED.

# Sepsis

## Early Recognition and Provider Collaboration

*Teri Lee Dyke, RN, MSN, CIC*
*Director Health Facility Licensing, Permits and Support*

CUSTOMER DRIVEN. BUSINESS MINDED.

## Infection Control

F441

## F 441 Infection Control

- The facility must establish and maintain an Infection Control Program designed to provide a safe, sanitary and comfortable environment and to help prevent the development and transmission of disease and infection.

## Infection Control

Infections are a significant source of morbidity and mortality for nursing home residents and account for up to half of all nursing home resident transfers to hospitals.

Infections occur an average of 2 to 4 times per year for each nursing home resident.


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## Intent

The intent of this regulation is to assure that the facility develops, implements and maintains an Infection Prevention and Control Program in order to:

**Prevent, Recognize & Control**

the onset and spread of infection within the facility.

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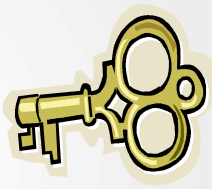
# Early Recognition and Management of Sepsis in Post Hospital-ECF



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## Objectives

- Define sepsis incidence and impact
- Define the sepsis continuum
- Understand the pathophysiology of sepsis
- Discuss early recognition through screening
- Define early interventions for patients with severe sepsis

## Why sepsis? Why now?

- Faces of Sepsis http://sepsis.org/faces/

## Incidence of Severe Sepsis

Worldwide is the major cause of morbidity and mortality

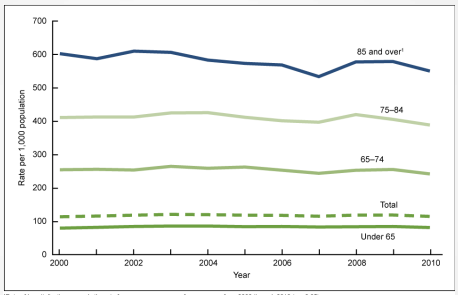
- Leading Cause of Death in US in noncoronary ICUs
- Overall is the 10th leading cause of death in US

Annually in US more than 750,000 cases of severe sepsis

500 patients die every day in the US of severe sepsis

- The equivalent of two airplane crashes daily

## Hospitalization by age: US 2000-2010




¹Rate of hospitalization exceeds the rate for younger age groups for every year from 2000 through 2010 ($p < 0.05$).
SOURCE: CDC/NCHS, National Hospital Discharge Survey, 2000–2010.

Levant S, Chari K, DeFrances CJ. Hospitalizations for patients aged 85 and over in the United States, 2000–2010. NCHS data brief, no 182. Hyattsville, MD: National Center for Health Statistics. 2015.

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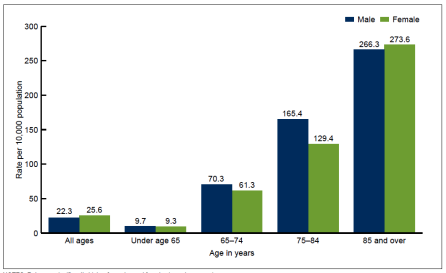
**Hospitalization rates for sepsis or septicemia were similar for males and females and increased with age.**

Figure 2. Rates of hospitalization for septicemia or sepsis, by sex and age, 2008




NOTES: Rates are significantly higher for males and females in each successive age group.
SOURCE: CDC/NCHS, National Hospital Discharge Survey, 2008.

http://www.cdc.gov/nchs/data/databriefs/db62.pdf

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## Common Causes of Hospitalization Adults aged 85 and over: U.S.

| First-listed diagnosis | 2000 | 2005 | 2010 | Percent change[1] (2000 to 2010) |
|---|---|---|---|---|
| | Rate of hospitalization per 1,000 population | | | |
| Congestive heart failure | 48 | 47 | 43 | −9.5 |
| Pneumonia | 51 | 52 | 34 | −32.8 |
| Urinary tract infection | 19 | 24 | 30 | +55.9 |
| Septicemia | 15 | 18 | 28 | +84.8 |
| Stroke | 37 | 27 | 28 | −25.0 |
| Hip fracture | 28 | 23 | 21 | −25.4 |

[1]Percent change for each diagnosis is significant from 2000 through 2010 ($p < 0.05$).

NOTE: First-listed diagnosis is considered to be the main cause or reason for the hospitalization. The diagnoses were chosen because they were the top six first-listed diagnoses in 2010.

SOURCE: CDC/NCHS, National Hospital Discharge Survey, 2000–2010.

Levant S, Chari K, DeFrances CJ. Hospitalizations for patients aged 85 and over in the United States, 2000–2010. NCHS data brief, no 182. Hyattsville, MD: National Center for Health Statistics. 2015.

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## Mortality and Cost

- Sepsis is a leading cause of death and the most expensive disease in U.S. hospitals
- Mortality increased 26% in patients 60-64 and 38% in those ≥85 years of age.

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## Discharge Disposition After Sepsis

| | Septicemia or sepsis | Other diagnoses |
|---|---|---|
| Disposition | Percent | |
| Routine | 39 | 79 |
| Transfer to other short-term care facility | 6 | 3 |
| Transfer to long-term care institution | 30 | 10 |
| Died during the hospitalization | 17 | 2 |
| Other or not stated | 8 | 6 |
| Total | 100 | 100 |

[1]Difference is statistically significant at the 0.05 level. SOURCE: CDC/NCHS, National Hospital Discharge Survey, 2008.

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## Total all-cause, 30 day readmissions and aggregate cost by payer 2011

| Study population | Number of readmissions | | Cost of readmissions | | Readmission rate (per 100 admissions) |
|---|---|---|---|---|---|
| | Number of all-cause, 30-day readmissions (in thousands) | Readmissions as a percentage of total study population readmissions | Total cost of all-cause, 30-day readmissions (in millions), $ | Readmission total cost as a percentage of total cost of study population readmissions | |
| Medicare (65+ years) | 1,800 | 55.9 | 24,000 | 58.2 | 17.2 |
| Medicaid (18 to 64 years) | 700 | 20.6 | 7,600 | 18.4 | 14.6 |
| Privately Insured (18 to 64 years) | 600 | 18.6 | 8,100 | 19.6 | 8.7 |
| Uninsured (18 to 64 years) | 200 | 4.9 | 1,500 | 3.7 | 10.6 |
| **Total** | **3,300** | **100.0** | **41,300** | **100.0** | **13.8** |

Source: Weighted national estimates from a readmissions analysis file derived from the Agency for Healthcare Research and Quality (AHRQ), Center for Delivery, Organization, and Markets, Healthcare Cost and Utilization Project (HCUP), State Inpatient Databases (SID), 2011

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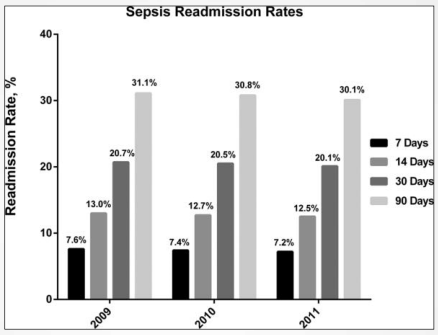


Chang DW, Tseng CH, Shapiro MF. Critical Care Medicine. 43(10):2085-93, 2015 Oct.

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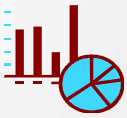
## Michigan 2014 SNF Readmission Statistics

### Selected Diagnosis Codes for All Cause Readmissions

- Congestive Heart Failure (CHF) 28.57%
- Acute Myocardial Infarction (AMI) 24.77%
- Chronic Obstructive Lung Disease (COPD) 26.76%
- Dialysis/End Stage Renal Disease 38.27%
- **Pneumonia 21.7%**
- **Sepsis 26.42%**



All-Cause Readmission Within 30 Days of Index Discharge from State of Michigan Acute Care Facilities by Selected Population Segments, State of Michigan Medicare Fee-For-Service (FFS) Beneficiaries [Q1, 2014- Q4, 2014 ] MPRO July 2015

## Impact on the Elderly

- Age itself independent risk factor for death
- More likely admitted to ICU
- Highest mortality in the old elderly (85+)
- Prolonged hospitalization


Post Sepsis Impact

- Contributes to Cognitive decline
- Contributes to Physical long term disabilities (walking, ADLs, and IADLs)

Crit Care Med. 2006 Jan;34(1):15-21

## Sepsis Recognition Challenges

- Febrile response not present in 47% of elderly
  - Temperature >101 generally indicates severe infection

Delirium occurs in 50% of older adults with sepsis

- Dementia can make obtaining a history challenging
- Positioning for tests due to osteoarthritis presents challenges

**Girard et al** Insights into severe sepsis in older patients: from epidemiology to evidence-based management. *Clin Infect Dis* 2005; **40**: 719-727

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## Severe Sepsis: Defining a Disease Continuum

**Infection** → SIRS → **Sepsis** → **Severe Sepsis**

**Adult Criteria**
A clinical response arising from a nonspecific insult, including ≥ 2 of the following:

- **Temperature:** > 38°C or < 36°C
- **Heart Rate:** > 90 beats/min
- **Respirations:** > 20/min
- **WBC count:** > 12,000/mm³, or < 4,000/mm³, or > 10% immature neutrophils

**SIRS with a presumed or confirmed infectious process**

**Sepsis with ≥1 sign of organ dysfunction, hypoperfusion or hypotension.**

**Examples:**
- Cardiovascular (refractory hypotension)
- Renal
- Respiratory
- Hepatic
- Hematologic
- CNS
- Unexplained metabolic acidosis

**Shock**

Bone et al. *Chest.* 1992;101:1644-55

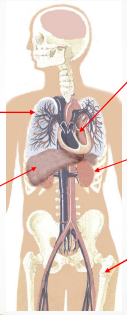
## Identifying Acute Organ Dysfunction as a Marker of Severe Sepsis

**Respiratory**

**Increased O2 requirements**
**SaO2 < 90%**

**Cardiovascular**

Tachycardia
SBP<90mmHg



**Renal**

UO <0.5 ml/kg per hr
(despite fluid)

**Metabolic**

Unexplained
metabolic acidosis
•pH≤7.30 or Base
deficit ≥ 5.0 mEq/l
•Lactate > 4

**Neurological**

Altered level of
consciousness
(unrelated to primary
neuro pathology)

## Definitions

- Infection
- Sepsis: infection plus 2 or more SIRS
- Severe Sepsis: infection plus 2 or more SIRS plus new organ dysfunction
- Septic Shock: severe sepsis with a lactic acid greater than or equal to 4mmol/L OR continued hypotension (systolic BP<90 or 40mmHg decrease from their baseline) after initial fluid bolus (30ml/kg)

***Except on few occasions, the patient appears to die from the body's response to infection rather than from it."***

**Sir William Osler – 1904**
**The Evolution of Modern Medicine**

## Homeostasis Is Unbalanced in Severe Sepsis

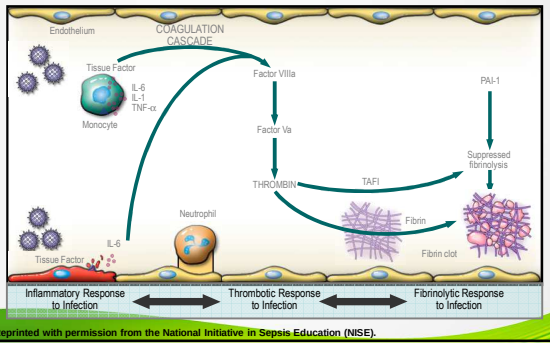
⇧ **Coagulation**

⇧ **Inflammation**

⇩ **Fibrinolysis**

Carvalho AC, Freeman NJ. *J Crit Illness.* 1994;9:51-75; Kidokoro A et al. *Shock.* 1996;5:223-8; Vervloet MG et al. *Semin Thromb Hemost.* 1998;24:33-44.

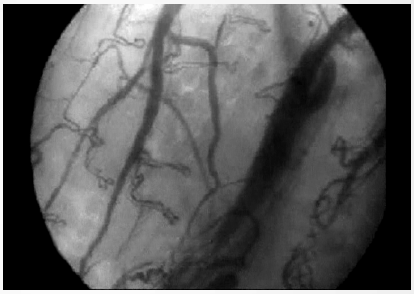
## Inflammation, Coagulation and Impaired Fibrinolysis In Severe Sepsis




Reprinted with permission from the National Initiative in Sepsis Education (NISE).

## Microcirculation of Septic Patient: Othogonal Polarization Spectral Imaging

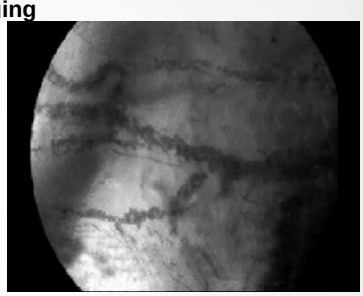
- BP: 120/80 Hg
- $SaO_2$: 98%



1. www.opsimaging.net. Accessed April 2004.
2. Spronk PE, Ince C, Gardien MJ, et al. Nitroglycerin in septic shock after intravascular volume resuscitation. Lancet. 2002; 360:1395-1396.

## Microcirculation of Septic Shock Patient: Othogonal Polarization Spectral Imaging

- Resuscitated with
- fluids and dopamine
  - HR: 82 BPM
  - BP: 90/35 mm Hg
  - $SaO_2$: 98%
  - CVP: 25 mm Hg



1. www.opsimaging.net. Accessed April 2004.
2. Spronk PE, Ince C, Gardien MJ, et al. Nitroglycerin in septic shock after intravascular volume resuscitation. Lancet. 2002; 360:1395-1396.

## CORNERSTONES OF MULTIDISCIPLINARY MANAGEMENT OF SEVERE SEPSIS

- **Prevention**
- **Screening and Early Identification**
- **Early Intervention: Source control, Blood cultures and broad spectrum antibiotics**
- **Initial Resuscitation Bundle**
- **Septic Shock Bundle– at the hospital**

## Surviving Sepsis Campaign Guidelines: 2012

- Consensus committee of 68 international experts presenting 30 international organizations
- Used GRADE system to guide assessment of quality of evidence from high (A) to very low (D) and to determine the strength of recommendations as strong (1) or weak (2)
- Some recommendations were ungraded (UG)
- Guidelines included recommendations in 3 areas:
  1. Directly targeting severe sepsis
  2. Targeting general care of critically ill patient, considered high priority in severe sepsis
  3. Pediatric considerations

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## *SEP-1*

TO BE COMPLETED WITHIN 3 HOURS OF TIME OF PRESENTATION † :

1. Measure lactate level
2. Obtain blood cultures prior to administration of antibiotics
3. Administer broad spectrum antibiotics
4. Administer 30ml/kg crystalloid for hypotension or lactate ≥4mmol/L

† *"time of presentation" is defined as the time of earliest chart annotation consistent with all elements severe sepsis or septic shock ascertained through chart review.*

## *SEP-1*

TO BE COMPLETED WITHIN 6 HOURS OF TIME OF PRESENTATION:

5. Apply vasopressors (for hypotension that does not respond to initial fluid resuscitation) to maintain a mean arterial pressure (MAP) ≥65mmHg
6. In the event of persistent hypotension after initial fluid administration (MAP < 65 mm Hg) or if initial lactate was ≥4 mmol/L, re-assess volume status and tissue perfusion and document findings according to table 1.
7. Re-measure lactate if initial lactate elevated.

## CORNERSTONES OF MULTIDISCIPLINARY MANAGEMENT OF SEVERE SEPSIS

- Prevention
- **Screening and Early Identification**
- Early Intervention: Source control, Blood cultures and broad spectrum antibiotics
- Initial Resuscitation Bundle
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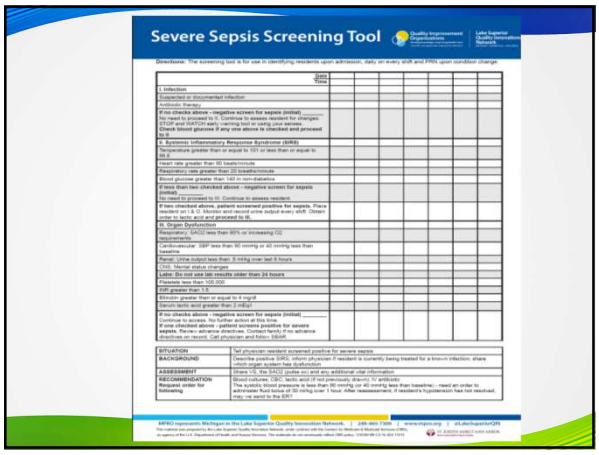
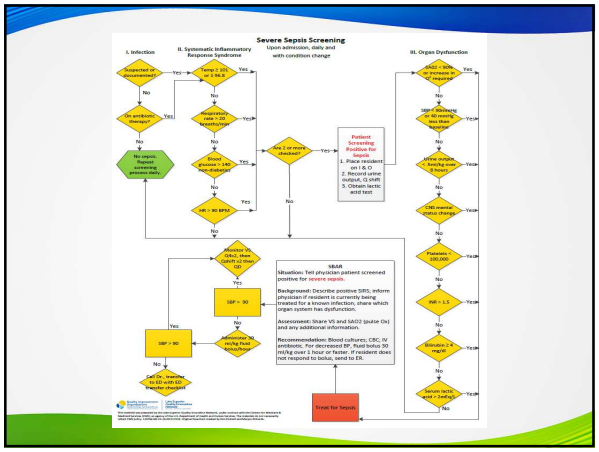



**ACT FAST!**

**Early Detection of SEPSIS requires fast action**

- *Link with current process*
- *Educate CNAs*

**STOP AND WATCH (INTERACT)**
**S – Seems different than usual**
**T – Talks or communicates less**
**O – Overall needs more help**
**P – Pain- new or worsening; Participated less in activities**
**A– Ate less**
**N – No bowel movement in 3 days; or diarrhea**
**D – Drank less**
**W – Weight change**
**A – Agitated or nervous more than usual**
**T – Tired, weak, confused, or drowsy**
**C – Change in skin color or condition**
**H – Help with walking, transferring, and toileting more than usual**



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## SSC Guidelines
## Antibiotics

- We recommend that intravenous antibiotic therapy be started as early as possible and within the first hour of recognition of septic shock (1B) and severe sepsis without septic shock (1C)

**Remark: although the weight of evidence supports prompt administration of antibiotics following the recognition of severe sepsis or septic shock, the feasibility with which clinicians may achieve this ideal state has not been scientifically validated**

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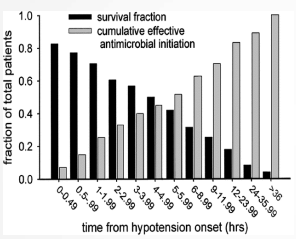
## Duration of hypotension before initiation of effective antimicrobial therapy is the critical determinant of survival in human septic shock




CCM 2006 Vol. 34 No.6

***2,154 septic shock patients**

***Effective antimicrobial administration within the 1st hour of documented hypotension was associated with increased survival in patients with septic shock.**

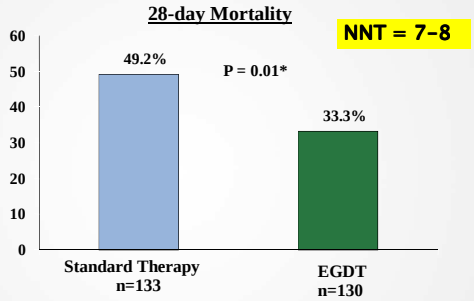
# Early Goal Directed Therapy

**Methodology: 263 severe sepsis patients**

- Early Goal-Directed Therapy (EGDT)
  - Continuous ScvO2 monitoring & tx with fluids, blood, inotropes &/or vasoactives to maintain:
    - ScvO2 ≥70%, SaO2 ≥ 93%, Hct ≥ 30%, CI/VO2
    - CVP ≥ 8-12
    - MAP ≥ 65
    - UO ≥ .5ml/kg/hr
- Standard Therapy
  - CVP ≥ 8-12
  - MAP ≥ 65
  - UO ≥ .5ml/kg/hr

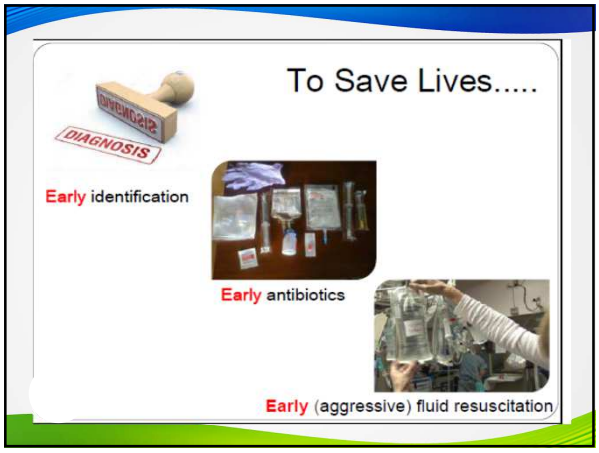
Rivers et. al. N Engl J Med. 2001;345;19:1368-1377.

# Early Goal-Directed Therapy Results




*Key difference was in sudden CV collapse, not MODS

Rivers et. al. N Engl J Med. 2001;345;19:1368-1377.



## ECF-Severe Sepsis Bundle

For patients with a known/suspected infection + 2 or more SIRS + new organ dysfunction
(provide the following interventions per physician order)

Blood cultures x 2 (prior to antibiotics)
Obtain lactic acid, if greater than 2 get repeat in 6 hours
Broad spectrum IV antibiotic(s) within 1 hour of screening positive for severe sepsis.
Vital signs: every 4 hours x2 then every shift x2 then per facility routine ( if a PRISM 1 or 2: every 4 hours x 4, then every shift x 2, then qd)
Monitor I & O every shift
If SBP <90 mmHg or 40mmHg decrease from their baseline, administer a 30ml/kg fluid bolus as fast as possible
IF resident's hypotension has not resolved,
call physician regarding transfer to the ED

***Perform severe sepsis screen every shift and with a condition change or a STOP and WATCH notification***

## The Importance of Early Detection

- Efforts to **just treat recognized sepsis** alone is not enough.
- A critical aspect of **mortality reduction** has been pushing practitioners to identify sepsis early.
  1. It may well be that **earlier recognition** accounts for much of the signal in mortality reduction and partially explains sharply increasing incidence.
  2. Without recognition that the **clock is ticking**, there is simply no incentive to recognize a challenging diagnosis early.

Levy MM, Dellinger RP, Townsend SR ,et al. Crit Care Med. 2010 Feb;38(2):367-74.
2. Gaieski 13 DF, Edwards JM, Kallan MJ, et al. Crit Care Med. 2013 Feb 25

## Early Recognition and Management of Sepsis
### Overview of Training Program

- Monthly one hour face to face meetings Jan to June
  - Will follow the ECC meeting
  - Walk through action plan to implement a sepsis early identification and management program that includes a focus on infection prevention
- Monthly site specific coaching calls, starting in February to provide individualized support
- Provide training and educational materials
- Defined process and outcome measures to evaluate success of the program

## Roles and Responsibilities

- Each facility must have a team identified to do this work
  - Should include: medical director, DON, infection prevention nurse at a minimum
- Team work through action plan provided in specified timeframe
- Implement screening process
- Implement early management of sepsis process
- Educate staff on screening and management processes
- Collect defined process and outcome data

## Thank You

## RESOURCES

- New Jersey Sepsis Learning-Action Collaborative www.njha.com/sepsis
- Surviving Sepsis Campaign http://www.survivingsepsis.org/Pages/default.aspx
- Centers for Disease Control and Prevention – Sepsis http://www.cdc.gov/sepsis/index.html
- Centers for Disease Control and Prevention - Nursing Homes and Assisted Living Resources http://www.cdc.gov/longtermcare/
- Minnesota Hospital Association "Seeing Sepsis Long Term Care Resources" http://www.mnhospitals.org/patient-safety/current-safety-quality-initiatives/severesepsis-
- and-septic-shock
- American Hospital Association's Health Research and Educational Trust "Sepsis Resources" http://www.hrethen.org/index.php?option=com_phocadownload&view=category&id=370&Itemid=369

**EVIDENCE-BASED LITERATURE RESOURCES**


- Goodwin, A.J., Rice, D. A., Simpson, K. N. & Ford, D. W. "Frequency, cost, and risk factors of readmissions among severe sepsis survivors." *Critical Care Medicine*. No. 43, Issue 4. (April 2015): 738-46. http://www.ncbi.nlm.nih.gov/pubmed/25746745
- Otego, A. et al. "Hospital-based acute care use in survivors of septic shock." *Critical Care Medicine*. No. 43, Issue 4. (April 2015): 729-37. http://www.ncbi.nlm.nih.gov/pubmed/25365724

# Sepsis Screening Assessment

Joyce Turner RN
Director of Clinical Program Development

CIENA HEALTHCARE

## Sepsis Screening

1. Does the patient have a suspected or documented infection? (Signs of Suspected Infection: Fever, Chills, Cough, Dyspnea, Change in Sputum Character, Cellulitis, Wound Drainage, Flank Pain, Dysuria, Weakness)
   - Yes
   - No
2. Is the resident on antibiotic therapy?
   - Yes
   - No
3. Does the resident have at least one of the above answered yes?
   - Yes
   - No
4. Is the resident a diabetic?
   - Yes
   - No

## Systemic Inflammatory Response Syndrome SIRS

To screen positive on the SIRS criteria a resident must satisfy 2 or more of the following signs & symptoms

Does the patient have any of the following symptoms (SIRS)? Check all that apply

- 1. Temperature ≥ 101.0 °F
- 2. Temperature ≤ 96.8 °F
- 3. Respiratory Rate > than 20 breaths/min
- 4. Heart Rate > than 90 BPM
- 5. WBC >than 12,000 or < than 4,000 or >than 10% bands (labs must be within last 24 hours)

## Blood Glucose

Perform a blood glucose check only if **one** symptom is present (Question 1-5)

Do Not perform a blood glucose check in no symptoms are present, or 2 or more symptoms are present (Question 1-5)

6. Blood Glucose > than 140 in non-diabetics

## SIRS continued

Does the patient have 2 or more symptoms checked?

If yes the patient has screened positive for Sepsis.

- Yes
- No

## Sepsis is a Spectrum

SIRS + Infection = Sepsis
Sepsis + organ failure = Severe Sepsis
Severe Sepsis + ↓ B/P = Septic Shock
Septic Shock leads to Organ Failure = MODS (Multiple Organ Dysfunction Syndrome)

## Organ Dysfunction

Does the Patient exhibit any of the following conditions? (Check all that apply)

- 1. Respiratory: SAO2 $< than\ 90\%\ or\ increase\ in\ O2\ required$
- 2. Cardiovascular: SBP $< than\ 90\ mmHg\ or\ <$ $40\ mmHg$ from Baseline
- 3. Renal: Urine Output $< than\ 0.5$ ml/kg over last 8 hours
- 4. CNS: Mental status changes
- 5. Lab (last 24 hours): Platelets $< 100{,}000\ \mu L$
- 6. Lab (last 24 hours): INR $> than\ 1.5$
- 7. Lab (last 24 hours): Bilirubin $\geq 4$ mg/dl
- 8. Lab (last 24 hours): Serum Lactic acid $\geq 2\ mEq/L$

## Sepsis Protocol
## I. Initial Steps

1. Review the advance directive and options
2. Complete the e-Interact Change in Condition Evaluation
3. Notify the physician of findings, utilizing the information from the Sepsis Screen and e-Interact Change of Condition Evaluation
4. Educate the patient / family on possible diagnosis

## Sepsis Protocol
## II. Treatment at the facility

Provide the following recommendations / request to the physician

1. Labs:

- CBC with differential
- BMP
- Lactate level
- Urinalysis and culture
- Consider CXR if patient has adventitious breath sounds
- Blood cultures for two different sites, all sent ASAP

## II. Treatment at the facility continued

2. Establish IV Access:

- Normal Saline at 30cc/kg over 3 hours if SBP < $100\ mmHg$
  (subsequent rate determined by physician)
- Administer broad spectrum IV or IM antibiotics within one (1) hour of identification of sepsis
  - Suggestions include Zosyn and Levaquin, Rocephin and Levaquin
  - Check for drug allergies

## II. Treatment at the facility continued

3. Comfort Care:

- Pain Management
- Antipyretics for fever
- Keep family informed

## II. Treatment at the facility continued

4. Nursing Care:

- Vital signs every four (4) hours
- Intake/output monitoring
- Reposition frequently
- Encourage fluids
- Adjust care plan

## Sepsis Screening Assessment Schedule

**Admissions & Re-admissions**

- A 21-day schedule will automatically activate when a census line of admission (AA) or re-admission (RA) is entered into PCC on a resident. If after the initial 21-days the resident remains skilled or continues on antibiotics another 21-day schedule will need to be manually activated.

**For in-house patients started on antibiotics**

- A 21-day schedule will need to be manually activated.

## Additional Training Links

www.cdc.gov/sepsis/clinicaltools/index.html

http://www.sepsisalliance.org/resources/video/
Faces of Sepsis Video – 4 minutes

https://www.youtube.com/watch?v=emOgJCoUy6Q&list=PLV6y1ajSyDZFEHEY6o6okbUH3vAGniyQa&index=10
Sepsis – SIRS – Multiple Organ Dysfunction Syndrome
7.5 minutes

Link to Sepsis Alliance http://www.sepsisalliance.org/
Tri-fold educational brochure

## Closing

Question & Answers
Comments

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