NEW JERSEY SEPSIS LEARNING ACTION COLLABORATIVE

Toolkit for Post-Acute Care Settings

*TO SAVE LIVES: **Early** Identification • **Early** Treatment*

Health Research and Educational Trust of New Jersey
HRET
New Jersey Hospital Association
Institute for Quality & Patient Safety

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Published by the Health Research and Educational Trust of New Jersey, a non-profit affiliate of the New Jersey Hospital Association, 760 Alexander Road, Princeton, NJ 08543-0001, www.njha.com.

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OVERVIEW

This toolkit is a resource to assist healthcare organizations in implementing an early severe sepsis identification and treatment program in the post-acute (facility-based) healthcare setting. It is designed to provide post-acute healthcare organizations with an evidence-based communication tool, staff education and care pathway to assist in improving care processes to more quickly identify patients with severe sepsis and to provide timely and effective treatment.

The New Jersey Hospital Association's Institute for Quality and Patient Safety extends its gratitude to collaborative faculty leaders, Dr. Phil Dellinger, MD, MCCM, and Christa Schorr, RN, MSN, FCCM, of Cooper University Hospital and the Surviving Sepsis Campaign, for their expertise and support in this endeavor to improve sepsis-related care. Additionally, we acknowledge the following post-acute care organizations for their commitment to working with us to design and implement this toolkit:

- Allendale Community for Senior Living, Allendale
- Bergen Regional Medical Center Long term Care, Paramus
- HealthSouth Rehabilitation Hospital of Tinton Falls
- HealthSouth Rehabilitation Hospital of Toms River
- Preakness Healthcare Center, Wayne
- St. Lawrence Rehabilitation Center, Lawrenceville

To learn more about the New Jersey Sepsis Learning Action Collaborative, please visit www.NJHA.com/sepsis or contact Shannon Davila, RN, MSN, CIC, CPHQ, Clinical Quality Improvement Manager, New Jersey Hospital Association, at sdavila@njha.com.

INSTRUCTIONS FOR USE OF THE TRAINING MATERIALS

(All referenced materials are included in this toolkit.)

To effectively educate and train healthcare staff within your facility on sepsis using this toolkit, we suggest following these steps:

1. Identify the facility education and training coordinator within your facility who is the primary contact and liaison with the NJ Sepsis Learning-Action Collaborative.

2. Print the following materials ***before*** accessing the education session Web link (below). One copy of each per person:
    a. Sepsis Education Pre-Test - to be completed by staff *prior* to viewing the educational session
    b. Sepsis Educational Slides - *Definitions and Early Identification of Severe Sepsis and Septic Shock* presented by Dr. R. Phillip Dellinger, MD, MCCM and Christa Schorr, RN, MSN, FCCM. Staff may use the handout to take notes and refer to during the education session presentation.
    c. Sepsis Education Post-Test - to be completed by staff *after* viewing the education session
    d. Sepsis Training Evaluation Form - to be completed by staff at the *conclusion* of the training

3. Staff participating in this training should complete each form at the appropriate time during the training. Pre- and Post-tests should be returned to the facility education and training coordinator.

Click here to access the Sepsis Educational Session:
https://njha.webex.com/njha/lsr.php?RCID=20ed3615b3394c179afb11ce4f4acf59

As an additional step to properly identify and treat patients who present with sepsis and to improve future sepsis education and trainings, the completed pre-tests, post-tests and de-identifiable evaluation forms returned to the facility coordinator should be forwarded to the New Jersey Sepsis Learning-Action Collaborative coordinator at sdavila@njha.com.

Definitions and Early Identification of Severe Sepsis and Septic Shock

Education material for staff in long-term care, rehabilitation facilities and short-term acute care

Christa Schorr, RN, MSN, FCCM
Associate Professor of Medicine
R. Phillip Dellinger, MD, MCCM
Professor of Medicine

Cooper University Hospital
Cooper Medical School of Rowan University

Overview

Background

Definitions - Signs & Symptoms

Treatment

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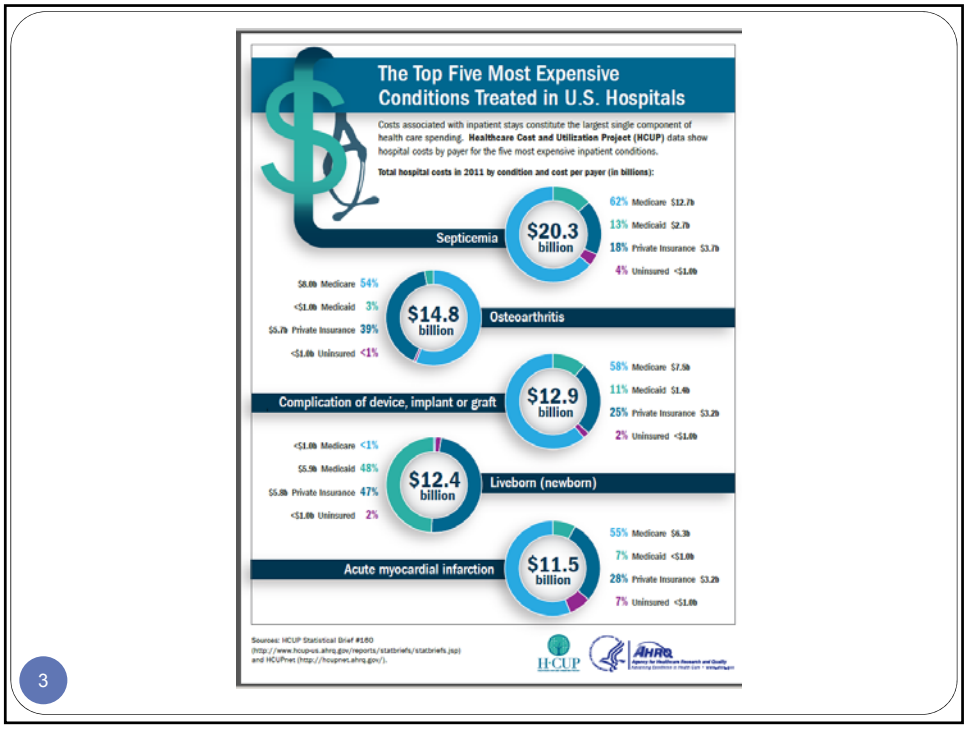
The Top Five Most Expensive Conditions Treated in U.S. Hospitals
Costs associated with inpatient stays constitute the largest single component of health care spending. Healthcare Cost and Utilization Project (HCUP) data show hospital costs by payer for the five most expensive inpatient conditions.
Total hospital costs in 2011 by condition and cost per payer (in billions):
Septicemia
$20.3 billion
62% Medicare $12.7b
13% Medicaid $2.7b
18% Private Insurance $3.7b
4% Uninsured <$1.0b
$14.8 billion
Osteoarthritis
$8.0b Medicare 54%
<$1.0b Medicaid 3%
$5.7b Private Insurance 39%
<$1.0b Uninsured <1%
Complication of device, implant or graft
$12.9 billion
58% Medicare $7.5b
11% Medicaid $1.4b
25% Private Insurance $3.2b
2% Uninsured <$1.0b
$12.4 billion
Liveborn (newborn)
<$1.0b Medicare <1%
$5.9b Medicaid 48%
$5.8b Private Insurance 47%
<$1.0b Uninsured 2%
Acute myocardial infarction
$11.5 billion
55% Medicare $6.3b
7% Medicaid <$1.0b
28% Private Insurance $3.2b
7% Uninsured <$1.0b
Sources: HCUP Statistical Brief #160
H-CUP
AHRQ

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The Top Five Most Expensive Conditions Treated in U.S. Hospitals
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Sources: HCUP Statistical Brief #160
H-CUP
AHRQ

Severe Sepsis

- Severe Sepsis is the Leading Cause of Hospital Death
- Admissions with severe sepsis 8X > chance of death than other conditions
- Most expensive condition treated in the hospital ($23 billion per annum)
- **Enormous economic burden that can be lessened with early identification and early appropriate evidence based medicine care**

NCHS data brief #62, 2011
US National Lib Med, NIH, 2010
HCUP Statistical Brief #160

Journal of Critical Care (2013) **28**, 606–611

ELSEVIER

Journal of Critical Care

Impact of older age and nursing home residence on clinical outcomes of US emergency department visits for severe sepsis☆

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[b]*Division of Pulmonary Sciences and Critical Care Medicine, University of Colorado School of Medicine, Aurora, CO 80045, USA*
[c]*Division of Geriatric Medicine, University of Colorado School of Medicine, Aurora, CO 80045, USA*
[d]*Department of Emergency Medicine, Beth Israel Deaconess Medical Center, Boston, MA 02215, USA*

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Table 2.
Age and nursing home residence among US ED visits for severe sepsis resulting in hospital death vs discharged alive and ICU vs non-ICU admission

Characteristics	In-hospital death, % (95% CI)	Discharged alive, % (95% CI)	ICU admission, % (95% CI)	Non-ICU admission, % (95% CI)
Age, y, median (IQR)	76 (64-82)	66 (47-80)	71 (61-83)	70 (54-82)
18-44	5% (NC)	18% (15-23)	4.3% (NC)	14% (9.1-20)
45-64	24% (NC)	28% (22-34)	32% (22-46)	25% (19-33)
65-79	31% (17-50)	28% (23-34)	32% (23-42)	32% (24-40)
≥ 80	39% (25-55)	26% (20-32)	28% (22-35)	29% (23-36)
Nursing home resident	48% (31-64)	20% (15-26)	39% (27-52)	21% (16-29)

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Table 2.

Older age and nursing home residence were both associated with a greater likelihood of death and with ICU admission.

Which patients are at risk of sepsis?

Patients who have one or more of the following:

- Recent hospitalization
- Indwelling catheters
- Immobility
- Wounds
- Recent treatment for an infection
- Immunocompromised

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What is sepsis, severe sepsis and septic shock?

Definitions
Signs and symptoms
Treatment

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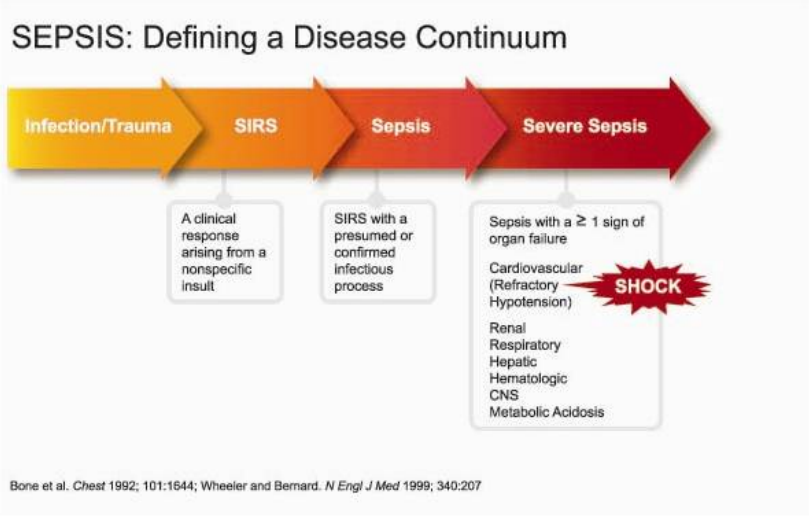

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Definitions

- **Sepsis**: presence (suspected or confirmed) of infection with systemic manifestations of infection
- **Severe Sepsis**: Sepsis-induced tissue hypoperfusion or organ dysfunction
- **Septic Shock**: Hypotension that persists despite adequate fluid resuscitation

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Systemic Manifestations of Infection

- Modified systemic inflammatory response (SIRS) criteria
- 2 or more of the following:
  - Hyperthermia >38.3 C or 101.0 F
  - Hypothermia <36 C or 96.8 F
  - Altered mental status-(change from baseline)
  - Tachycardia >90 bpm
  - Tachypnea >20 bpm
  - Leukocytosis (WBC >12K)
  - Leukopenia (WBC <4K)

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Organ Dysfunction

- SBP <90 mmHg or MAP <65 mmHg
- SBP decrease >40 mm Hg from baseline
- Creatinine >2.0 mg/dl (176.8 mmol/L) or urine output <0.5 ml/kg/hour for 2 hours
- Bilirubin >2 mg/dl (34.2 mmol/L)
- Platelet count <100,000 µL
- Lactate >2 mmol/L (18.0 mg/dl)
- Coagulopathy (INR >1.5 or aPTT >60 secs)
- Acute lung injury with PaO2/FiO2 <250 in the absence of pneumonia as infection source
- Acute lung injury with PaO2/FiO2 <200 in the presence of pneumonia as infection source

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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.

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

Case Study & Treatment

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Applying the Definitions: Case

- 67 yo man who was admitted for an acute stroke, with left sided hemiplegia.
- On rehabilitation day 5 his vital signs are: T 102.4, HR 112, R 24, BP 98/55, SpO2 94% on room air. He is coughing and has right lower lobe crackles on exam.
- What additional information do you need to determine if this is sepsis, severe sepsis, or septic shock?

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Applying the Definitions: Case

- Labs:
  - WBC 16,000 with 15% bands
  - Creatinine 2.4 mg/dl (normal on admission)
  - Lactate 3.5 mmol/L
- Repeat vital signs:
  - BP 88/53, HR 118, R 22, SpO2 98%
- Is this sepsis, severe sepsis or septic shock?
- Do you need more information to make that determination?

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What should you expect to do next?

- Notify the physician of your assessment findings and laboratory results
  - Use SBAR to facilitate understanding and clarify next steps
    - SBAR (situation, background, assessment and recommendation)
- Plan for close monitoring
  - Increase vitals signs
  - Additional labs
- Initiation of the sepsis bundles
- Consider transfer to an acute care facility

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SSC BUNDLE

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 30 ml/kg crystalloid for hypotension or lactate ≥4 mmol/L

SSC BUNDLE

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) ≥65 mmHg)
6. In the event of persistent arterial hypotension despite volume resuscitation (septic shock) or initial lactate ≥4 mmol/L (36 mg/dl):
   - Reassess volume and tissue perfusion
7. Remeasure lactate if initial lactate was elevated. (>2 mmol/L)

To Save Lives.....

Early identification

Early antibiotics

Early (aggressive) fluid resuscitation

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SEPSIS EARLY IDENTIFICATION AND TREATMENT PATHWAY

Assess for Infection and SIRS

Does the patient have a possible or active infection?

Symptoms or signs of infection can include:

- Fever/chills
- Cough/shortness of breath
- Cellulitis/wound drainage
- Changes in urine (volume, painful urination, color, odor)

Does the patient have 2 or more of the SIRS criteria?
(SIRS= Systemic Inflammatory Response Syndrome)

SIRS Criteria include:

- Hyperthermia >38.3 C or >101.0 F
- Hypothermia <36 C or <96.8 F
- Change in mental status
- Tachycardia >90 bpm
- Tachypnea >20 bpm
- Leukocytosis (WBC >12K)
- Leukopenia (WBC <4K)

Yes to both? Think SEPSIS!

Prepare to contact medical provider:

- Review the record for medications, allergies, recent infections or antibiotic use
- Note the patient's advance directive or care wishes (if comfort care, suggested interventions below)
- Complete sepsis SBAR

Contact the medical provider

Prepare for these possible interventions to be completed as soon as possible:

- Transfer to higher level of care
- Draw Labs: Lactate, CBC w/ diff, blood cultures
- Establish IV access
- Administer broad spectrum intravenous antibiotics

For hypotension SBP less than 90 mmHg or lactate greater than 4:

- Administer IV fluid bolus at 30 ml/kg

Monitor the patient and notify the medical provider of any worsening or progression of sepsis.

Comfort Care Interventions:

- Pain control
- Medications to lower fever
- Frequent repositioning
- Frequent oral care
- Offer fluids *(if tolerated)*

SBAR FOR SEPSIS

S
(describe the situation)

- My name is _____and I am calling from _____.
- I need to speak to you about patient Mr. or Mrs. _____.
- This patient is showing signs and symptoms of infection and sepsis.

B
(provide background)

- The patient was admitted on _____ *(date)* with the diagnosis of_____ *(original condition).*
- The patient now is showing these signs of a possible infection _____ *(describe the signs and potential source of infection).*
- This started on _____ *(date).*
- The patient is allergic to_____.
- The patient's advance care directive is_____.

A
(describe the key assessment findings)

- My assessment of the situation is that the patient may be experiencing a new or worsening of his/her infection. Here are my assessment findings:
- The current vital signs:
- BP _____ HR _____ RR _____
- Temp _____ SPO2 _____ *(on room air or supplemental O2)*
- The patient has voided _____ times in the last 8 hours
- Mental status is *(changed or unchanged)* from baseline _____
- Other physical assessment findings that are related to possible infection or sepsis *(lung sounds, wound assessments, etc)*: _____

R
(recommendation)

- I am concerned this patient has sepsis. I recommend that you see the patient as soon as possible and that we order a serum lactate, blood cultures and a basic metabolic panel. Do you agree?
- *If the patient is hypotensive:* Should I start an IV and give a fluid bolus?
- ***The physician should confirm, clarify and request additional information and then work with the nurse to take appropriate action with this patient.***

Before Calling the Physician / NP / PA/other Healthcare Professional:

Evaluate the patient and complete this form

Check vital signs- be alert for the early sepsis warning signs

Review the patient record: recent hospitalization, lab values, medications, and progress notes

Note any allergies

Be aware of the patient's advance care wishes

Early Sepsis Warning Signs

Report any of these Findings:

Temp >38.3 C (101.0 F)
Temp <36.0 C (96.8 F)
Heart rate >90 bpm
Respiratory rate >20 bpm

White Blood Cell Count >12,000 µL-1 or <4,000 µL-1

Altered mental status

SPO2 <90%

Decreased urine output

From recently drawn labs *(within 24 hours):*
Creatinine >2.0 mg/dl (176.8 mmol/L)
Bilirubin >2 mg/dl (34.2 mmol/L)
Platelet count <100,000 µL
Lactate >2 mmol/L (18.0 mg/dl)
Coagulopathy (INR >1.5 or aPTT >60 secs)

SEPSIS EDUCATION PRE-TEST

(Learners should complete this test prior to viewing the sepsis presentation)

Name: _____

Facility: _____

Date: _____

1. Why is early detection of sepsis so important? _____

2. Which of the following patients is at high risk of developing sepsis?
   a) Heart failure patient
   b) Patient with dementia
   c) Patient recently hospitalized with severe urinary tract infection
   d) Patient recovering from a heart attack

3. Who should you notify if you suspect a patient has sepsis? _____

4. What does SIRS stand for? _____

5. List three SIRs symptoms:
   1. _____ 2. _____ 3. _____

6. What are the four stages of sepsis disease?
   1. _____ 3. _____
   2. _____ 4. _____

7. Blood cultures should be collected before the first dose of intravenous antibiotics are administered.
   True or False

8. What labs should be drawn when a patient has sepsis?
   a) Lactate
   b) Complete blood count
   c) Blood cultures
   d) All of the above

9. Which of the following labs would indicate a patient with sepsis has worsened to severe sepsis?
   a) Lactate 2.4 mmol/L
   b) Creatinine 3.0 mg/dl
   c) Platelet 80,000 uL
   d) All of the above

10. What is the volume of fluid that should be bolused to a hypotensive septic shock patient? _____

SEPSIS EDUCATION POST-TEST

(Learners should complete this test and the training evaluation after viewing the sepsis presentation)

Name: _____

Facility: _____

Date: _____

1. Which of the following patients is at high risk of developing sepsis?
   a) Heart failure patient
   b) Patient with dementia
   c) Patient recently hospitalized with severe urinary tract infection
   d) Patient recovering from a heart attack

2. What are the four stages of sepsis disease?
   1. _____ 3. _____
   2. _____ 4. _____

3. What does SIRS stand for? _____

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9. Blood cultures should be collected before the first dose of intravenous antibiotics are administered.
   True or False

10. What is the volume of fluid that should be bolused to a hypotensive septic shock patient? _____

SEPSIS EDUCATION TRAINING EVALUATION

Please rate your level of agreement with the following statements:

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The slide presentation was well organized.	○	○	○	○	○
Watching this presentation was an effective use of my time.	○	○	○	○	○
This training will help my organization improve sepsis identification.	○	○	○	○	○
I will be able to immediately use what I learned.	○	○	○	○	○
I am confident that I can perform the assessments and tasks that were trained.	○	○	○	○	○

Please rate your level of confidence in the following **before** this activity and **after** using the scale *(1="Very Low"; 2="Low"; 3="Neutral"; 4="High"; 5="Very High"):*

	Before Training	***After*** Training
My understanding of the criteria to define sepsis and severe sepsis.	1 2 3 4 5	1 2 3 4 5
My understanding of factors that place certain patients at high risk for developing severe sepsis.	1 2 3 4 5	1 2 3 4 5
My knowledge of sepsis symptoms, SIRS, and organ dysfunction criteria.	1 2 3 4 5	1 2 3 4 5
My understanding of the 3-hour bundle treatments.	1 2 3 4 5	1 2 3 4 5

What could make this training more effective?

_____
_____
_____

Comments:

_____
_____
_____

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/severe-sepsis-and-septic-shock

American Hospital Association's Health Research and Educational Trust "Sepsis Resources"
http://www.hret-hen.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

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