Barriers against Nursing Implementation of Surviving Sepsis Campaign Guidelines and Considerations for more Compliance

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Sepsis: The leading Cause of ICU Death

• More than 750,000 cases of severe sepsis in the US each year (~3 per 1000 population).

• 10th most common cause of death and is the leading cause of death for critically ill patients in the US

• Economic cost of $17 billion each year

• Incidence is projected to increase by 1.5% yearly

• Although prognosis has improved, because of increased incidence, actual deaths will increase
Differentiating Stages of Sepsis

- **SIRS**
  - A clinical response arising from a nonspecific insult, with $\geq 2$ of the following:
    - $T > 38^\circ C$ or $< 36^\circ C$
    - $HR > 90$ beats/min
    - $RR > 20$/min
    - $WBC > 12,000/mm^3$ or $< 4,000/mm^3$ or $> 10\%$ bands

- **Sepsis**
  - SIRS that has a proven or suspected microbial etiology

- **Severe Sepsis**
  - Sepsis with one or more signs of organ dysfunction

- **Septic Shock**
  - Sepsis with Hypotension for at least 1 h despite adequate fluid resuscitation

SIRS = systemic inflammatory response syndrome
More ....

• **Refractory septic shock**
  Septic shock that lasts for >1 h and does not respond to fluid or pressor administration.

• **Multiple-organ dysfunction syndrome (MODS)**
  Dysfunction of more than one organ, requiring interventions to maintain function.
## Diagnostic Criteria for Sepsis

### General variables
- **Fever** (> 38.3°C)
- **Hypothermia** (core temperature < 36°C)
- **Heart rate** > 90/min⁻¹ or more than two SD above the normal value for age
- **Tachypnea**
- **Altered mental status**
- **Significant edema or positive fluid balance** (> 20mL/kg over 24 hr)
- **Hyperglycemia** (plasma glucose > 140mg/dL or 7.7 mmol/L) in the absence of diabetes

### Inflammatory variables
- **Leukocytosis** (WBC count > 12,000 μL⁻¹)
- **Leukopenia** (WBC count < 4000 μL⁻¹)
- Normal WBC count with greater than 10% immature forms
- **Plasma C-reactive protein** more than two SD above the normal value
- **Plasma procalcitonin** more than two SD above the normal value

### Hemodynamic variables
- **Arterial hypotension** (SBP < 90mm Hg, MAP < 70mm Hg, or an SBP decrease > 40mm Hg in adults or less than two SD below normal for age)

### Organ dysfunction variables
- **Arterial hypoxemia** (Pao₂/Fio₂ < 300)
- **Acute oliguria** (urine output < 0.5mL/kg/hr for at least 2 hrs despite adequate fluid resuscitation)
- **Creatinine increase** > 0.5mg/dL or 44.2 μmol/L
- **Coagulation abnormalities** (INR > 1.5 or aPTT > 60 s)
- **Ileus** (absent bowel sounds)
- **Thrombocytopenia** (platelet count < 100,000 μL⁻¹)
- **Hyperbilirubinemia** (plasma total bilirubin > 4mg/dL or 70 μmol/L)

### Tissue perfusion variables
- **Hyperlactatemia** (> 1 mmol/L)
- **Decreased capillary refill or mottling**

WBC = white blood cell; SBP = systolic blood pressure; MAP = mean arterial pressure; INR = international normalized ratio; aPTT = activated partial thromboplastin time.

Diagnostic criteria for sepsis in the pediatric population are signs and symptoms of inflammation plus infection with hyper- or hypothermia (rectal temperature > 38.5°C or < 36°C), tachycardia (may be absent in hypothermic patients), and at least one of the following indications of altered organ function: altered mental status, hypoxemia, increased serum lactate level, or bounding pulses.

Sepsis: A Complex Disease
POTENTIAL RISK FACTORS LEADING TO SEPSIS

Genetic polymorphisms
- For example in genes regulating
  - Cytokine responses
  - Coagulation
  - Mannose binding proteins

Intrinsic factors
- Age
- Co-morbidities
- Immunosuppression
- Vaccination
- Nutrition
- Mucosal integrity

Surgery
- Wounds
- 'Dirty' vs clean procedure
- Emergency vs elective
- Prosthetic material

Community factors
- Travel
- Disease outbreaks
- Contacts
- Specific exposure

Hospital factors
- Duration of hospitalization
- Where in hospital (e.g. intensive care unit)
- Local anti-microbial resistance rates
- Outbreaks

Procedures
- Urinary catheters
- Intravenous cannulas
- Wound dressings
Where’s the infection?

- Lung: 47%
- Abdomen: 15%
- Culture Negative: 20%
- Urine: 10%
- Other: 8%
Organ failure in sepsis

Nurses’ Role

• Critical care nurses are directly involved in the assessment of patients at risk for developing sepsis and in the treatment of patients with sepsis and can, therefore, affect outcomes for critically ill patients.

• Nurses play an important role in promoting optimal care for patients with sepsis, so awareness of the new guidelines and their implications for nursing care is essential for nurses working in acute and critical care settings.
SSC 2012 Guidelines
Initial Resuscitation

Hemodynamic Support

- Initial Resuscitation
- Fluid Therapy
- Vasopressor Therapy
- Inotropic Therapy

# Grades of Recommendations

## GRADE Criteria

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<td><strong>Strong</strong></td>
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<tr>
<td>• Do it</td>
<td>High, e.g., well-conducted randomized control trial</td>
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<td>• We recommend</td>
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<td><strong>Weak</strong></td>
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<td>• Probably do it</td>
<td>Moderate, e.g., downgraded randomized control trial or upgraded observational studies</td>
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<td>• We suggest</td>
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<td>Low, e.g., well-done observational studies</td>
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<td>Very low, e.g., case series or expert opinion</td>
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Initial Resuscitation

- Protocolized, quantitative resuscitation of patients with sepsis-induced tissue hypoperfusion (defined as hypotension persisting after initial fluid challenge or lactate ≥4 mmol/L) is recommended.

- This protocol should be initiated as soon as hypoperfusion is recognized and should not be delayed pending ICU admission.

Initial Resuscitation

• During the first 6 hours, the goals of initial resuscitation of sepsis-induced hypoperfusion should include all of the following as a part of a treatment protocol (Grade 1C):

  – Central venous pressure 8-12 mm Hg
  – Mean arterial pressure ≥65 mm Hg
  – Urine output ≥0.5 mL/kg/h
  – Central venous (superior vena cava) or mixed venous oxygen saturation 70% or 65%, respectively

Early Goal-Directed Therapy in the Treatment of Severe Sepsis and Septic Shock

- Early goal-directed therapy
  - Hospital: 30%
  - 28-day: 40%
  - 60-day: 50%

- Standard therapy
  - Hospital: 50%
  - 28-day: 60%
  - 60-day: 60%

Initial Resuscitation

• Targeting resuscitation to normalize lactate as rapidly as possible in patients with elevated lactate levels as a marker of tissue hypoperfusion is suggested. *(Grade 2C)*
Initial Resuscitation

• This change has implications for nursing care of patients in emergency departments and patients in general clinical units awaiting transfer to the ICU.
Fluid Therapy

• Crystalloids be used as the initial fluid of choice in the resuscitation of severe sepsis and septic shock is recommended.  
  \( \text{(Grade 1B)} \)

• The use of hydroxy-ethyl starches for fluid resuscitation of severe sepsis and septic shock is not recommended.  
  \( \text{(Grade 1B)} \)

• We suggest the use of albumin in the fluid resuscitation of severe sepsis and septic shock when patients require repeated boluses of crystalloids.  
  \( \text{(Grade 2C)} \)

Fluid Therapy

• An initial fluid challenge in patients with sepsis-induced tissue hypoperfusion with suspicion of hypovolemia to achieve a minimum of 30 mL/kg of crystalloids (a portion of this may be albumin equivalent) is recommended. More rapid administration and greater amounts of fluid may be needed in some patients. (Grade 1C)
Fluid Therapy; Nurses’ Role

• Fundamental role to facilitate optimal resuscitation
• Vary according to the clinical area concerned.
• Early recognition
• Rapid insertion of large bore IV catheters
• Rapid initiation of crystalloids
• Monitoring clinical observations
• Monitoring hemodynamic status.
• The nurse’s role does not end when medical staff members arrive on the scene. Successful resuscitation depends on collaborative integration of the skills and expertise of all members of the multidisciplinary team.
Vasopressor Therapy

• Vasopressor therapy initially target a mean arterial pressure (MAP) of 65 mm Hg is recommended. *(Grade 1C)*

• Norepinephrine as the first-choice vasopressor. *(Grade 1B)*

• It is suggested that epinephrine (added to and potentially substituted for norepinephrine) when an additional agent is needed to maintain adequate blood pressure. *(Grade 2B)*

• It is recommended that Low-dose dopamine not be used for renal protection. *(Grade 1A)*

• We recommend that all patients requiring vasopressors have an arterial catheter placed as soon as practical if resources are available

Inotropic Therapy

- We recommend that a trial of dobutamine infusion up to 20 μg/kg/min be administered or added to vasopressor (if in use) in the presence of:
  - Myocardial dysfunction as suggested by elevated cardiac filling pressures and low cardiac output, or
  - Ongoing signs of hypoperfusion, despite achieving adequate intravascular volume and adequate mean arterial pressure. *(Grade 1C)*

Vasopressor and Inotropic Therapy; Nurses’ Role

• Direct care role of critical care nurses.
• Oversight.
• Administration and titration dosages (protocol-based).
• Monitoring the response to therapy which includes assessment of clinical end points such as blood pressure, regional and global perfusion (including blood lactate concentrations and skin perfusion), mental status, and urine output, as well as complications.
SSC 2012 Guidelines
Infection-Related Issues

• Screening
• Diagnosis
• Antimicrobial therapy
• Source control
• Infection Prevention

Screening for Sepsis

• It is recommended to routinely screen potentially infected seriously ill patients for severe sepsis to increase the early identification of sepsis and allow implementation of early sepsis therapy (Grade 1C).

• Nurses play a pivotal role in the early identification of deteriorating patients (Kleinpell R; 2005). Nurses can recognize the clinical findings of SIRS and sepsis through direct patient care, including the taking of vital signs.

Diagnosis

- It is recommended to obtain appropriate cultures before antimicrobial therapy is initiated if such cultures do not cause significant delay ($>45$ minutes) in the start of antimicrobial(s) administration (*Grade 1C*).
- To optimize identification of causative organisms, it is recommended to obtain at least two sets of blood cultures (*both aerobic and anaerobic bottles*) before antimicrobial therapy, with at least one drawn percutaneously and one drawn through each vascular access device, unless the device was recently (<48 hours) inserted. Blood cultures can be drawn at the same time if from a different anatomic site (*Grade 1C*).

Diagnosis; Nurses’ Role

• Taking cultures:
  ➢ Within 45 minutes accurately
  ➢ Taking cultures in a strict sterile technique
  ➢ From different sites, peripheral and central
  ➢ 2 sets of blood samples
  ➢ Take/assist in obtaining other samples

• Careful transport for imaging studies or other procedures
Antimicrobial Therapy

- The administration of effective IV antimicrobials within the first hour of recognition of septic shock (*Grade 1B*) and severe sepsis without septic shock (*Grade 1C*) should be the goal of therapy.

- It is suggested that antiviral therapy be initiated as early as possible in patients with severe sepsis or septic shock of viral origin (*Grade 2C*).

- It is recommended that antimicrobial agents not be used in patients with severe inflammatory states determined to be of noninfectious cause (*Ungraded*).

- *Nurses are directly responsible for rapid providing and administration of antimicrobial therapy in the proper techniques.*

Source Control

• Once identified, appropriate interventions should be undertaken quickly, when possible within the first 12 hours after the diagnosis is made (grade 1C).

• Measures for source control include surgical debridement for an abscess or infected necrosis, removal of infected IV access devices (after establishing other accesses) or other invasive catheters, or other measures to remove the potential source of infection.

Source Control; Nurses’ Role

• Nurses are the first clinicians to assess patients thoroughly.

• Astute clinical assessment and reporting of signs and symptoms that may help to identify the source of infection are nursing measures that can additionally promote source control.
Infection Prevention

• The use of careful infection control practices including hand hygiene, barrier precautions, catheter care, head-of-bed elevation, comprehensive oral care with use of subglottic suctioning, and other measures should be maintained to prevent further complications.

• Selective oral decontamination and selective digestive decontamination should be considered as methods to reduce the incidence of VAP (grade 2B).

• In addition, oropharyngeal decontamination with oral chlorhexidine gluconate is suggested to reduce the risk of VAP in ICU patients with severe sepsis (grade 2B).

Infection Prevention ; Nurses’ Role

• Infection prevention measures are a prime area of focus of nursing care.

• Critically ill patients are at high risk of acquiring a hospital-associated infection because of the presence of invasive catheters and tubing, drains and tubes, wounds, and other complex therapies they receive.

• Infection prevention measures relate to accountability, education, surveillance of nosocomial infection, hand hygiene, and prevention of respiratory, central catheter–related, surgical site, and urinary tract infections.
<table>
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<th>Table 1</th>
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<td><strong>Surviving Sepsis Campaign care bundles</strong>&lt;sup&gt;a&lt;/sup&gt;</td>
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</table>

**Within 3 hours of severe sepsis**

1. Measure lactate level
2. Obtain blood cultures before administration of antibiotics
3. Administer broad-spectrum antibiotics
4. Administer 30 mL/kg crystalloids for hypotension or lactate ≥4 mmol/L

**Within 6 hours of initial signs and symptoms of septic shock**

5. Apply vasopressors (for hypotension that does not respond to initial fluid resuscitation to maintain a mean arterial pressure ≥ 65 mm Hg)
6. In the event of persistent arterial hypotension despite volume resuscitation (septic shock) or initial lactate ≥4 mmol/L (36 mg/dL):
   - Measure central venous pressure<sup>b</sup>
   - Measure central venous oxygen saturation<sup>b</sup>
7. Remeasure lactate level if initial lactate level was elevated<sup>b</sup>

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<sup>a</sup> Adapted from Dellinger et al.<sup>1</sup>

<sup>b</sup> Targets for quantitative fluid resuscitation included in the guidelines are a central venous pressure of 8 mm Hg or greater, central venous oxygen saturation of at least 70%, and return of lactate level to normal.
SSC 2012 Guidelines
Adjunctive Therapy

- Blood Product Administration
- Corticosteroids
- Mechanical Ventilation of Sepsis-Induced Respiratory Distress Syndrome
- Bicarbonate Therapy
- Sedation, Analgesia, and Neuromuscular Blockade in Sepsis
- Glucose Control
- Renal Replacement Therapy
- Deep Vein Thrombosis Prophylaxis
- Stress Ulcer Prophylaxis
- Nutrition
- Setting Goals of Care

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Administration of Blood Products

- There is a general move toward less use of blood products in patients with sepsis.

- Specifically, RBC transfusion is recommended only if Hb level < 7 g/dL to target a Hb of 7.0 to 9.0 g/dL in adults (grade 1B).

- Fresh frozen plasma is not recommended to correct laboratory clotting abnormalities in the absence of bleeding or planned invasive procedures (grade 2D).

- We recommend against antithrombin administration for the treatment of severe sepsis and septic shock (Grade 1B).

Administration of Blood Products

• In contrast, platelet therapy is advocated for patients with severe sepsis:
  ➢ When counts are 10,000/mm$^3$ or less ($\leq 10 \times 10^9$/L) in the absence of apparent bleeding
  ➢ When counts are 20,000/mm$^3$ or less ($\leq 20 \times 10^9$/L) if the patient has a significant risk of bleeding.
  ➢ Higher platelet counts ($\geq 50,000$/mm$^3$ [$50 \times 10^9$/L]) are advised for active bleeding, surgery, or invasive procedures (grade 2D).

Blood Products; Nurses’ Role

• As nurses are responsible for the whole process of transfusion administration therapies, awareness of the new recommendations can help to decrease the overall risks associated with transfusions.
Corticosteroids

• It is suggested not to use intravenous Hydrocortisone as a treatment of adult septic shock patients if adequate fluid resuscitation and vasopressor therapy are able to restore hemodynamic stability.

• If this is not achievable, it is suggested to use intravenous hydrocortisone alone at a dose of 200 mg per day (Grade 2C), to be tapered when vasopressors are no longer required (Grade 2D).

• Not be administered for the treatment of sepsis in the absence of shock (Grade 1D).

• Awareness of the new guideline recommendations has direct implications for nursing care related to the administration of steroid therapy as a component of care for severe sepsis/septic shock.

Mechanical Ventilation in Patients With Sepsis-Induced Respiratory Distress Syndrome

- A tidal volume of 6 mL/kg predicted body weight is recommended for patients with sepsis-induced ARDS (grade 1A).

- Applying positive end-expiratory pressure (PEEP) should also be considered in the respiratory care of patients with sepsis (grade 1B).

- Use of recruitment maneuvers in severe refractory hypoxemia (grade 2C)

- Prone positioning in patients with Pao2/Fio2 ratio <100 mm Hg are supported. (grade 2B)

Sepsis-Induced ARDS; Nurses’ Role

• Nurse-directed weaning off of mechanical ventilation is effective in reducing duration of mechanical ventilation (Blackwood B, 2007; Burns S, 2006).

• In his survey (Rose L, et al. 2011) on decisional responsibility for mechanical ventilation and weaning, he found that nurses were more likely to make and implement decisions related to weaning, such as changing settings for pressure support and Fio$_2$, independently.

• Nurses play an important role in promoting adequate oxygenation and ventilation, as well as in weaning patients off of mechanical ventilation.
Bicarbonate Therapy

- We recommend against the use of sodium bicarbonate therapy for the purpose of improving hemodynamics or reducing vasopressor requirements in patients with hypoperfusion-induced lactic acidemia with pH $\geq 7.15$ (Grade 2B).

Sedation, Analgesia, and Neuromuscular Blockade in Patients With Sepsis

• Sedation, whether continuous or intermittent, should be minimized in sepsis patients receiving mechanical ventilation, targeting specific titration end points (grade 1B).

• In addition, neuromuscular blocking agents should be avoided if possible, or used in limited doses for less than 48 hours (grade 1C) where necessary.

• It is well recognized that limiting the use of sedation in critically ill patients can reduce the duration of mechanical ventilation and lengths of stay in the ICU and hospital (MacLaren R, et al. 2000; Strom T, et al. 2010).

Supportive Therapy for Severe Sepsis, Glucose Control

- A protocolized approach to blood glucose management is recommended

- Insulin dosing should begin when 2 consecutive blood glucose levels exceed 180 mg/dL.

- This protocolized approach targets an upper blood glucose level of 180 mg/dL or less rather than an upper target blood glucose level of 110 mg/dL or less (grade 1A).

- Blood glucose values should be monitored every 1 to 2 hours until glucose values and insulin infusion rates are stable, then every 4 hours thereafter (grade 1C).

Glucose Control; Nurses’ Role

• Glucose levels obtained with point-of-care testing of capillary blood should be interpreted with caution, as such measurements may not be accurate estimates of blood glucose values, especially in hypoglycemic and hyperglycemic glucose ranges and in hypotensive patients or patients receiving catecholamines.

• Nurses in ICUs titrate intravenous insulin therapy for patients with severe sepsis, monitor patients’ response, and obtain and assess for trends in blood glucose values.

• Research has shown that glucose-insulin protocols controlled by nurses are feasible, safe, and likely to result in better adherence to a target range for blood glucose (Chant C, et al. 2012; O’Connor e, et al. 2010; Carmona FJ, et al. 2012)
Renal Replacement Therapy

- Continuous renal replacement therapies and intermittent hemodialysis are considered equally effective in patients with severe sepsis and acute renal failure because they yield similar short-term survival rates (grade 2B).

- In many ICUs, nurses manage renal replacement therapy; prepare the patient, the circuit, and fluids; adjust fluid settings to provide fluid balance; prepare electrolyte additives; monitor acid base and electrolyte levels; monitor patients’ and machines’ “vital signs,” and diagnose circuit failure when necessary (Baldwin I, et al. 2009).

Prophylaxis of Deep Vein Thrombosis

- Patients with severe sepsis should receive daily pharmacoprophylaxis against venous thromboembolism (VTE; grade 1B), preferably using daily subcutaneous low-molecular weight heparin (LMWH) (grade 1B) rather than unfractionated heparin 2 or 3 times daily (grade 2C).

- Importantly, if creatinine clearance is less than 30 mL/min, the use of dalteparin (grade 1A) or another form of LMWH that has a low degree of renal metabolism (grade 2C) or unfractionated heparin (grade 1A) is recommended.

- Additionally, patients with severe sepsis benefit from a combination of pharmacologic therapy and intermittent pneumatic compression devices whenever possible (grade 2C).

Prophylaxis of Deep Vein Thrombosis; Nurses’ Role

• Nurses administer pharmacoprophylaxis as ordered, initiate use of intermittent pneumatic compression devices, and institute early mobilization in the ICU as measures to prevent deep venous thrombosis from occurring in all critically ill patients, including those with sepsis.
Stress Ulcer Prophylaxis

- A histamine\(_2\) blocker or proton pump inhibitors should be given for stress ulcer prophylaxis to patients with sepsis who have bleeding risk factors (grade 1B), with a preference given to the use of proton pump inhibitors (grade 2D).

- Prophylaxis in patients without risk factors is not necessary (grade 2B).

- Administration of stress ulcer prophylaxis is an accepted ICU standard of care in reducing events of gastrointestinal bleeding.

Nutrition

• Oral or enteral feeding, as tolerated, is recommended rather than either fasting or provision of only intravenous glucose within the first 48 hours after a diagnosis of severe sepsis (grade 2C).

• It is suggested to avoid mandatory full caloric feeding in the first week, but rather low-dose feeding (e.g., up to 500 kcal per day), advancing only as tolerated (Grade 2B).

• Often, feeding is withheld unnecessarily in the ICU (Gupta B, et al. 2012)

Nutrition; Nurses’ Role

• Feedings should continue if gastric residual volumes are not considered excessive.

• Nurses importantly assess patient’s tolerance, gastric residual volumes and the risk for aspiration.
Setting Goals of Care

• We recommend that goals of care and prognosis be discussed with patients and families (Grade 1B).

• We recommend that the goals of care be incorporated into treatment and end-of-life care planning, utilizing palliative care principles where appropriate (Grade 1B).

• We suggest that goals of care be addressed as early as feasible, but no later than within 72 hours of ICU admission (Grade 2C).

Setting Goals of Care; Nurses’ Role

• Critical care nurses have a vital role in discussing different issues with sepsis patients’ families.

• Such discussion promotes communication and understanding between the patients’ family and the treating team, which leads to improved satisfaction among family members; decreased stress, anxiety, and depression in surviving relatives; improved end-of-life decision making; and shorter length of stay in the ICU for patients who die in the ICU (Curtis JR, et al. 2011).

• In addition, limitation of care to appropriately reflect the patient’s prognosis and goals of care can help reduce critical care nurses’ moral distress (Elpern EH, et al. 2005).
Conclusions

• Nurses play a critical role in the process of early recognition, diagnosis, and treatment of sepsis.

• Critical care nurses’ knowledge of the new guideline recommendations can help to ensure that patients with sepsis receive expert nursing care based on the latest scientific evidence to promote optimal outcomes.
<table>
<thead>
<tr>
<th>BARRIERS against Nursing Implementation of SSC Guidelines</th>
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| **Identification of sepsis / Delay in diagnosis of sepsis by physicians** | Ranked 1<sup>st</sup>: Turi S, and Von Ah D, 2013  
Burney M, et al; 2012  
Carlbom D, 2007 |
| **Knowledge and training of the ED nursing staff** | Ranked 2<sup>nd</sup>: Turi S, and Von Ah D, 2013  
Burney M, et al; 2012 |
| **The number of staff required to accomplish these recommendations** | Ranked 2<sup>nd</sup>: Turi S, and Von Ah D, 2013  
Burney M, et al; 2012  
Carlbom D, 2007 |
| **(a) Requirement of extra resources, (b) time and (c) equipment to implement the order set** | Micek S, Roubinian N, Heuring, et al., 2006  
Burney M, et al; 2012 |
| **(a) lack of ICU consultations (b) overcrowded ED (c) lack of recognition of severity of patient condition (d) residents working in ED** | De Miguel-Yanes et al., 2006 |
# BARRIERS against Nursing Implementation of SSC Guidelines

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<tr>
<td>Under-recognition of sepsis</td>
<td>Jones A. Focht et al., 2007</td>
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<td>(a) Staffing resources; (b) busy ED with physicians continually multitasking</td>
<td>Nguyen H. et al. 2007</td>
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<tr>
<td>(a) residents often see patients first and initiate “too little too late”; (b) poor communication between physicians and nurses; (c) antibiotics not readily available and (d) lack of training of central venous catheters for nursing</td>
<td>Baldwin L. et al., 2008</td>
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<tr>
<td>Delay/Unavailability of ICU beds</td>
<td>Burney M, et al; 2012</td>
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<td>Rezende E. et al., 2008</td>
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<td>Physical space in the ED</td>
<td>Burney M, et al; 2012</td>
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<td>Central catheter insertion</td>
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<td>Handoff between ED and ICU</td>
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<td>Measuring lactate</td>
<td>Burney M, et al; 2012</td>
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<tr>
<td>Nursing delays (eg, time to completion of orders)</td>
<td>Burney M, et al; 2012</td>
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<tr>
<td>Laboratory delays</td>
<td>Burney M, et al; 2012</td>
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<tr>
<td>Pharmacy delays</td>
<td>Burney M, et al; 2012</td>
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Considerations for more Nursing Compliance

• Considerations are brought Atiken et al through guidelines for nursing care which are designed to augment, not to replicate or replace, the current SSC guidelines.

I. INFECTION PREVENTION
II. INFECTION MANAGEMENT
III. INITIAL RESUSCITATION
IV. HEMODYNAMIC SUPPORT
V. OTHER SUPPORTIVE NURSING CARE
I. INFECTION PREVENTION

• A. Education
  ➢ Interactive, multifaceted, longitudinal educational programs and educational outreach to enhance guideline implementation. Traditional education are often not effective (grade 1A).

  ➢ Educational initiatives to reduce healthcare-associated infection rates (grade 1C).

• B. Accountability
  ➢ Promotion of a culture of patient safety and individual accountability (grade 2D).

I. INFECTION PREVENTION

• C. Surveillance of Nosocomial Infections
  ➢ Continuous surveillance program for the detection of nosocomial infection (grade 1B).

• D. Hand Hygiene

• E. Site-Specific Considerations
  ➢ Prevention of ventilator-associated pneumonia (VAP), catheter-related bloodstream infection (CR-BSI), surgical site infection (SSI), and urinary tract infection (UTI).

II. INFECTION MANAGEMENT

• **A. Infection Source Control Issues**
  - Prompt removal of intravascular catheters and subsequent catheter tip culturing in patients with proven bloodstream infection associated with severe sepsis as well as in hemodynamically unstable patients with suspected CR-BSI (grade 1C).

• **B. Transmission-Based Precautions**
  - We recommend transmission-based precautions for patients who are known to be or are suspected to be infected or colonized with infectious agents, including certain epidemiologically important pathogens (grade 1A).

III. INITIAL RESUSCITATION

• A. Recognizing Deterioration and Diagnosing Severe Sepsis

  ➢ All staff with a direct responsibility for patient care (including nursing assistants and healthcare assistants) be educated to recognize the SIRS criteria and signs of severe sepsis or septic shock (grade 1C), especially in high-risk patients.

  ➢ Use of early warning systems (EWS) (grade 1C).

  ➢ Use of sepsis screening (grade 2C).

  ➢ Electronic medical records could be programmed to alert the nurse when the assessment data show certain suspicious patterns, warranting further investigation.

• B. Initiating Early Resuscitation Measures
  ➢ It is suggested that the initial resuscitation of patients with sepsis be provided through the use of rapid response systems (grade 2B).

  ➢ Provision of adequate resources (grade 2D).

  ➢ Adequate nurse staffing levels be ensured (grade 1B).

  ➢ Nurses be empowered to initiate the 6-hr resuscitation bundle. All nurses should be trained to take blood, cannulate, and administer IV fluids via standing orders for hypotension or increased lactate or both (grade 2C).
III. INITIAL RESUSCITATION

• B. Initiating Early Resuscitation Measures
  ➢ Supplies of commonly used, ready-mixed antibiotics should be available in all acute wards and departments (grade 1D).

  ➢ The institution of tracking systems including the use of daily sepsis rounds in critical care areas (grade 2C).

  ➢ ER nurses should liaise with medical colleagues and prehospital staff 2D).

  ➢ Further research on technology to aid the detection of sepsis (grade 2D).

III. INITIAL RESUSCITATION

• B. Initiating Early Resuscitation Measures
  ➢ The sepsis six approach be promoted in noncritical care areas to promote early identification and treatment of severe sepsis (grade 2D).

  ➢ The sepsis six interventions are:
    ✓ Administer high-flow oxygen
    ✓ Take blood cultures
    ✓ Administere intravenous antibiotics
    ✓ Start intravenous fluid resuscitation
    ✓ Check hemoglobin and lactate
    ✓ Measure accurate hourly urine output

IV. HEMODYNAMIC SUPPORT

• A. Improving Tissue Oxygenation
  - Continuous measurement of tissue oxygenation vs. intermittent measurement (grade 2D).
  - Consideration of noninvasive monitoring of tissue oxygenation when central venous access is less desired or unavailable (grade 2D).

• B. Improving Macrocirculation
  - Insertion of a peripherally inserted central catheter (PICC) in the event that subclavian central venous access cannot be obtained in patients with severe sepsis who meet the criteria for central line placement (grade 2D).

V. OTHER SUPPORTIVE NURSING CARE

• A. Nutrition Therapy
  ➢ Early enteral nutrition (initiated within 24 to 48 hrs of ICU admission) (grade 2A).

• B. Eye Care

• C. Pressure Ulcer Prevention and Management

Other Considerations

• Fair amount of “finger pointing” is done both between professions (nurses and physicians) and units (emergency department and ICU). This finding highlights the need for an interdisciplinary approach to protocol development and implementation, both to address current perceptions and to avoid possible pitfalls (Burney M, et al; 2012).

• Collaboration between ED and ICU nurses both to facilitate accurate handoff and timely transfer and to nurture a “culture of safety” (Institute for Healthcare Improvement, 2011) which will be crucial to the success of the pathway.
Other Considerations

• Because mental status changes are often subtle and may be the only sign of sepsis, the Confusion Assessment Method (CAM) should be a regular part of screening.

• Carefully attention to the patients’ family members reports about recent changes in mental function or behavior.

• Team work should be importantly enhanced.
Strategies for integrating the Surviving Sepsis Campaign guidelines in nursing practice

- Disseminate information on the new guidelines to members of the critical care team, including staff in the emergency department, where sepsis care measures are implemented before patients arrive in the intensive care unit.
- Include discussion of the guidelines during unit clinical care meetings and clinical rounds.
- Formulate a multidisciplinary/cross-departmental team and outline a timeline for implementing the guidelines.
- Use the new guidelines as a performance improvement initiative for clinicians in critical and noncritical care areas to improve recognition and treatment of patients with sepsis.
- Enlist nurse champions to spearhead components of the performance improvement process as many of the recommendations involve aspects of nursing care; nurses can therefore play an important role in promoting implementation of the guidelines.

Specific areas include:

- Aid in the early identification of sepsis, including recognizing patients at risk for sepsis developing (e.g., patients who are elderly, immunocompromised, have undergone surgical/invasive procedures, have indwelling catheters, are receiving mechanical ventilation) and monitoring physical assessment parameters including vital signs and perfusion status (e.g., urine output, mental status changes, skin color).
- Provide comprehensive sepsis treatment (circulatory support with fluids, inotropic agents, and vasopressors; supportive treatment with oxygenation and ventilation; antibiotic administration; use of measures recommended in sepsis guidelines; monitoring and reporting patients’ response to treatment).
- Promote patient- and family-centered care (patient and family teaching, addressing the needs of families of critically ill patients, setting goals of care, and holding family care conferences to discuss goals of care).

*Adapted from Kleinpell.*
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