Sepsis Detection & Management
Establish reliable detection and treatment for severe sepsis.

Domain
- **Patient Care Processes:**
  Clinical processes that ensure delivery of high-quality care to individual patients

Aims
- **Effective:**
  An evidence-based practice that produces better outcomes than its alternative
- **Timely:**
  Care delivery that is prompt and provided without delay to mitigate any harm to a patient

Process Attributes

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<th>Symbol</th>
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| $      | Cost to Implement | The monetary resources required to implement this process
|        | **Moderate:** | In addition to the improvement effort, relies on additional personnel and/or technology |
|        | Time to Implement | The amount of time, from months to years, it will take on average to establish this process
|        | **More than 2 years** |
|        | Difficulty to Implement | The challenges of implementing this process
|        | **Most Challenging:** | Involves multiple units or disciplines AND requires a substantial shift in culture and/or operations |
|        | Level of Evidence | The degree to which the actions in this process are supported by research and experience; based on the Cochrane scale
|        | **Strong Evidence:** | Level I or Level II — Studies published using randomized trials |

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**Details**

**Elements**

- **Implement the Sepsis Resuscitation Bundle:** to be completed within 6 hours for patients with severe sepsis, septic shock, and/or lactate $> 4 \text{ mmol/L (36 mg/dl)}$
  - Serum lactate measured.
  - Blood cultures obtained prior to antibiotic administration.
  - Improve time to broad-spectrum antibiotics: within 3 hours for ED admissions and 1 hour for non-ED ICU admissions.
  - In the event of hypotension and/or lactate $> 4 \text{ mmol/L (36 mg/dl)}$:
    - Deliver an initial minimum of 20 ml/kg of crystalloid (or colloid equivalent).
    - Apply vasopressors for hypotension not responding to initial fluid resuscitation to maintain mean arterial pressure (MAP) $> 65 \text{ mm Hg}$.
  - In the event of persistent hypotension despite fluid resuscitation (septic shock) and/or lactate $> 4 \text{ mmol/L (36 mg/dl)}$:
    - Achieve central venous pressure (CVP) of $> 8 \text{ mm Hg}$.
    - Achieve central venous oxygen saturation (ScvO2) of $> 70\%$.

- **Implement the Sepsis Management Bundle:** to be completed within 24 hours for patients with severe sepsis, septic shock, and/or lactate $> 4 \text{ mmol/L (36 mg/dl)}$
  - Low-dose steroids administered for septic shock in accordance with a standardized ICU policy.
  - Drotrecogin alfa (activated) administered in accordance with a standardized ICU policy.
  - Glucose control maintained $> \text{ lower limit of normal, but } < 180 \text{ mg/dl (10 mmol/L)}$.
  - Inspiratory plateau pressures maintained $< 30 \text{ cm H2O for mechanically ventilated patients}$.

- **Make the elements of the Sepsis Bundles more reliable:**
  - Coordinate strong partnerships among emergency department, critical care, and medical-surgical units.
  - Tie blood culture collection to lactate collection.
  - Have a pre-mixed quantity of broad spectrum antibiotics available in the ED.
  - Utilize pre-formatted order sets that include the drugs of choice as options.
  - Broker an agreement for line placement with other services.
  - Consider purchasing a portable ultrasound for the ED to make central line placement easy.

**Outcomes**

- **Mortality (HSMR):** Decreased mortality (hospital standardized mortality ratio, or HSMR)
- **Cost of Care:** Decreased cost per inpatient case
- **Time in ICU:** Decreased time in intensive care in the last 6 months of life (Dartmouth Atlas)

**Service Lines and Critical Functions**

- Applies in All Patient Settings
- Emergency Department
- Hospital Medicine, Adult
- Intensive Care

**Key Measures**

- **Percent Compliance with Sepsis Management Bundle**
  - Percent of cases of severe sepsis and septic shock where all applicable elements of the Sepsis Management Bundle were completed
- **Percent Compliance with Sepsis Resuscitation Bundle**
  - Percent of cases of severe sepsis and septic shock where all applicable elements of the Sepsis Resuscitation Bundle were completed

**Recommendation**

We strongly recommend using the Surviving Sepsis Campaign Chart Review Database for collection of sepsis mortality and bundle compliance data. This tool is available free through the Surviving Sepsis Campaign.

**Sepsis Mortality**

- **Numerator:** Number of deaths due to severe sepsis and septic shock
- **Denominator:** Total number of patients with severe sepsis and septic shock
Reasons and Implications

Importance for Patients and Families
Sepsis can harm and kill patients if not treated quickly. Following these steps can save thousands of patients’ lives.

Requirement, Standards, Policies, and Guidelines

- **International Sepsis Forum**
- **National Priorities Partnership (NPP)**
  Safety
- **National Quality Forum (NQF)**
  Safe Practice for Better Healthcare—2009 Update
  Safe Practice 11: Intensive Care Unit Care
- **Surviving Sepsis Campaign**

Financial Implications
- Expense reduction due to reduced ICU length of stay and costs of care with early treatment

Prerequisites
It is very helpful to have experience with “bundles” and all-or-none measurement, as well as a physician champion in the ICU and in the ED.

Resources

Additional Resources

- **Agency for Healthcare Research and Quality (AHRQ)**
  Patient Safety and Quality: An Evidence-Based Handbook for Nurses [2008]
  Chapter 42. Targeting Health Care-Associated Infections: Evidence-Based Strategies
- **Agency for Healthcare Research and Quality (AHRQ)**
  Technology Assessment Report: Negative Pressure Wound Therapy Devices [June 2009]
- **Surviving Sepsis Campaign**
- **American Hospital Association (AHA)**
  Hospitals in Pursuit of Excellence – Individual Case Studies
  Reducing Sepsis Mortality
  Stony Brook University Medical Center

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