<table>
<thead>
<tr>
<th>TABLE OF CONTENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Department Pediatric and Neonatal Sepsis Workflows ........................................................................................................1</td>
</tr>
<tr>
<td>Overview ......................................................................................................................................................................................... 3</td>
</tr>
<tr>
<td>Emergency Department Workflows .......................................................................................................................................................... 5</td>
</tr>
<tr>
<td>Pediatric Severe Sepsis Screening, Best Practice Advisories and Order Sets ................................................................. 5</td>
</tr>
<tr>
<td>Neonatal Severe Sepsis Screening, Best Practice Advisories and Order Sets ................................................................. 14</td>
</tr>
<tr>
<td>Adding Order Sets to Your Favorites .................................................................................................................................................... 19</td>
</tr>
</tbody>
</table>
In 1992, the American College of Chest Physicians and Society for Critical Care Medicine defined sepsis, severe sepsis and septic shock as a spectrum of disease resulting from a host response to systemic infection.\(^1\) SIRS (Systemic Inflammatory Response Syndrome) is an inflammatory response common in bacterial infections, but non-infectious causes may include burns, trauma and hemorrhage.\(^2\) Sepsis occurs when a patient with SIRS has a presumed or confirmed infection. Severe Sepsis is defined as sepsis associated with organ dysfunction. Septic Shock is defined as severe sepsis in a patient that despite receiving adequate fluid resuscitation continues to have systolic blood pressure less than 90 mmHg.\(^3\)

It has been estimated that severe sepsis affects 750,000 hospitalized Americans a year\(^4\), and as many as one in two patients who die while hospitalized have sepsis.\(^5\) New York State regulations required hospitals to implement evidence-based protocols for the early recognition and treatment of patients with severe sepsis and septic shock by December 31, 2013.\(^6\) The Department of Health has released a Dictionary of data elements that will need to be reported for all severe sepsis and septic shock-related discharges occurring after April 1, 2014.\(^9\)

Jamaica Hospital Medical Center has adopted a Sepsis Protocol that calls for the screening, detection and timely treatment of patients with severe sepsis and septic shock.

The Sepsis Protocol process focuses on four basic steps: screening, alert, notification, and treatment. When patients meet certain criteria based on documentation of abnormal vital signs, and/or nurses utilize the Sepsis Screening tool, Best Practice Advisories (BPAs) fire that alert both the nurse and the physician. Doctors can then open an order set that will recommend a set of medications and other relevant orders.

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\(^2\) Mayr F.B., Yende S. and Angus,D.C. Epidemiology of Severe Sepsis. *Virulence*. 2014; 5: 4-11


6 http://www.health.ny.gov/regulations/public_health_law/section/405/


9 http://protocol.sepsis.ipro.org/accounts/login
In the Pediatric Emergency Room, during Triage, nurses document the patient’s vital signs (e.g. temperature, heart rate, blood pressure, etc.). The following are some of the criteria used to screen for sepsis in the Epic workflows:

**Temperature**

≥ 100.4 or ≤ 96.8

**Heart Rate**

Greater than normal limit for age and corrected for temperature (see table below)

**Blood Pressure**

Systolic Blood Pressure < 70 + 2X age year (if < 10 YO)

Systolic Blood Pressure < 90 (if ≥ 10 YO)

**Heart Rate (upper limit of normal) for Temperature:**

<table>
<thead>
<tr>
<th>Temperature</th>
<th>0-1y/o</th>
<th>2-5 y/o</th>
<th>6-12 y/o</th>
<th>13-18 y/o</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;100F</td>
<td>180</td>
<td>140</td>
<td>130</td>
<td>110</td>
</tr>
<tr>
<td>101F</td>
<td>185</td>
<td>145</td>
<td>135</td>
<td>115</td>
</tr>
<tr>
<td>102F</td>
<td>190</td>
<td>150</td>
<td>140</td>
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<td>103F</td>
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<td>104F</td>
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<td>105F</td>
<td>205</td>
<td>165</td>
<td>155</td>
<td>135</td>
</tr>
<tr>
<td>106F</td>
<td>210</td>
<td>170</td>
<td>160</td>
<td>140</td>
</tr>
</tbody>
</table>

In addition, nurses will find the “High Risk Sepsis Screening” and the “Standard Risk Sepsis Screening” sections under the “Vitals” navigator.
Vitals Navigator

The “Standard Risk Sepsis Screening” section has specific options that can be selected for the following clinical data:

- Ill Appearing: Yes or No
- Altered Mental Status: Irritable, Inconsolable, Lethargic, or Obtunded
- Poor Perfusion: Capillary refill > 2 sec or flash or cool extremities
- Pulses: Decreased, or Bounding
- Skin: Cool, Mottled, Flushed, or Ruddy

The “High Risk Sepsis Screening” section has options for the following elements:

- Immunocompromised: Chemotherapy, Transplant, Steroids/Immunocompromised, Sickle cell disease
- Neuromuscular Disease: Yes or No
- Invasive Devices: PICC Line, Mediport, Foley Catheter, Tracheostomy, CSF Shunt, Gastrostomy
These sections can also be accessed by clicking on the “Peds Severe Sepsis” Screening navigator.

“Peds Severe Sepsis” Screening Tool

A Sepsis Best Practice Advisory (BPA) for pediatric populations (including 29 day-olds through 17 year-olds and excluding neonates-0 to 28 days) will fire to the nurse if any of the following conditions are met:

1) Any combination of three criteria, including abnormal vital signs (abnormal temperature, heart rate greater than the normal limit for age, blood pressure less than the normal limit for age), or any of the “Standard Risk Sepsis Screening” criteria. For example, a BPA would be triggered if a patient has a filed temperature of 100.4°F, and has “Decreased” pulses and “Mottled” skin documented in the screening tool.

2) Hypotension (blood pressure lower than normal limit for age) and one other measure (abnormal vital signs or “Standard Risk Sepsis Screening” criteria).

3) Fever (≥ 100.4°F) or hypothermia (≤ 96.8°F) and one of the “High Risk Sepsis Screening” criteria.

If the pediatric patient meets the screening criteria, and the nurse’s BPA fires, he/she should select the acknowledge reason “MD to be Notified”, alert the ED Attending immediately, and document the name of the physician notified in a note. The doctor must evaluate the patient at once, and determine if the patient is a candidate for inclusion in the sepsis protocol.
[Note: There is only one “Acknowledge Reason” in the nurse’s BPA: “MD to be Notified”. This field is required, indicated by the red stop sign. Nurses need to document the actual time the physician was notified in a note.]

Nurse’s Best Practice Advisory

In addition to the nurse’s BPA, In Basket messages are sent to Performance Improvement users for purposes of compliance monitoring.

Answers to the questions in the sepsis screening tool are displayed within the “Patient Care Timeline”. You can also see the name of the user who answered the questions. In addition, an entry (“Sepsis Event Triggered”) is time-stamped when the BPA fires.

Patient Care Timeline
When the nurse alerts the ED Attending, and he/she opens the patient’s chart, a BPA alert displays:

**Physician’s Best Practice Advisory**

Filed vital signs, the answers to the “Standard Risk Sepsis Screening” and the “High Risk Sepsis Screening” criteria questions are displayed within the alert. The “Open Order Set” box is checked off by default.

Unchecking the “Open Order Set” box, causes a red stop sign to appear in the “Acknowledge reason” field. This indicates an entry is required if the “JH Pediatric Sepsis/Septic Shock Admission” orderset will not be used. Clicking on the magnifying glass next to the “Acknowledge reason” field allows you to browse through the available choices. The options are based on directives from the Department of Health. Contraindications not listed in the “Acknowledge reasons” can be formally submitted to the Department of Health for approval.
Selecting an “Acknowledge Reason” causes the Open Order Set box to be automatically unchecked.

STOP Note: The “Open Order Set” box is checked off by default when the BPA fires. An Acknowledge reason is only required if the patient will not be included in the protocol. Selecting an acknowledge reason automatically unchecks the “Open Order Set” box.

When a patient meets the screening criteria for sepsis, the physician needs to evaluate and determine if the patient meets the severe sepsis/septic shock criteria as well as decide if the patient will or will not be included in the protocol. If the patient does not have severe sepsis/septic shock, the following acknowledge reason must be selected: “Patient does not have severe sepsis or septic shock.” If the patient has severe sepsis/septic shock, but has a valid reason not to be treated, any of the other acknowledge reasons (exclusions) should be chosen. Finally, if the patient has severe sepsis/septic shock and no contraindications to treatment, the “JH Pediatric Sepsis/Septic Shock Admission” orderset should be opened and relevant orders should be placed. Use of the order set marks the initiation of the protocol.

[Note: All cases of severe sepsis/septic shock are reported quarterly to the Department of Health. Currently, 73 data elements are reported per case].

A free-text comment can be added (if desired) within the BPA by clicking on the paper icon next to the “Acknowledge reason” field.
Clicking “Accept” on the BPA screen without either checking the “Open Order Set” box or selecting an “Acknowledge reason” triggers an error message:

“There are active Best Practice Advisories with required acknowledge reasons. Please select a reason and/or choose a follow-up, then click Accept to continue.”

If a patient does not meet the criteria to be included in the protocol, one of the following “Acknowledge Reasons” must be selected:
Opening the order set and placing pertinent orders indicates the patient will be included in the Sepsis protocol and marks the initiation of the protocol. Selecting an Acknowledge reason indicates the patient is either deemed to not have severe sepsis/septic shock or the patient has reasons not to be treated for severe sepsis/septic shock. The date and time of initiation or exclusion from the protocol is reported to the Department of Health.

If the Open Order Set box is checked, and you click “Accept”, the “JH Pediatric Sepsis/Septic Shock Admission” orderset displays. From this screen, physicians can order the required elements of the protocol (as well as optional orders) all at once:

1) Blood cultures (Required-Recommendation is to obtain blood cultures prior to antibiotic administration, and within one hour of presentation)

2) Broad spectrum antibiotics (Required-The Jamaica Hospital Sepsis Protocol indicates that broad-spectrum antibiotic administration should begin within 1 hour of identification of severe sepsis or septic shock)

3) IV fluids for initial resuscitation (Required-Recommendation is to administer at least 20 cc/kg isotonic saline over 30 minutes. This volume recommendation is not a maximum cap; some patients may need more fluids).

4) Vasopressors IV/IO for fluid refractory shock (Conditional).

5) Serum lactate if available (Conditional).

6) Other tests not specific to the protocol, but that are clinically relevant.

Dates and times of administration and/or completion of these elements are reported to the Department of Health. Examples of reportable elements include: the start date and time of antibiotic administration, and the completion date and time of giving at least 20 cc/kg isotonic saline.

We are required to start treatment as soon as possible. For ED patients, the “clock” (also referred to as “start time” or “time zero”) starts at ED arrival, and for the inpatient population as soon as severe sepsis/septic shock is first recognized.

If the sepsis BPA did not fire for a patient, but based on the clinical evaluation it is concluded that the patient has severe sepsis/septic shock, the “JH Pediatric Sepsis/Septic Shock Admission” orderset should be used. Ordersets can be added to your “Favorites” for easy access.
JH PEDIATRIC SEPSIS/SEPTIC SHOCK ADMISSION Orderset (Excerpt)
NEONATAL SEVERE SEPSIS SCREENING, BEST PRACTICE ADVISORIES AND ORDER SETS

If the patient is younger than 29 days of age, and the nurse documents a temperature greater than or equal to 100.4 (fever) or less than or equal to 96.8 (hypothermia), the Sepsis BPA will fire to the nurse.

Nurse’s Best Practice Advisory

If the neonate meets the screening criteria, and the nurse’s BPA fires, he/she should select the acknowledge reason “MD to be Notified”, alert the ED Attending immediately, and document the name of the physician notified in a note. The doctor must evaluate the patient at once, and determine if the patient is a candidate for inclusion in the sepsis protocol.

[Note: There is only one “Acknowledge Reason” in the nurse’s BPA: “MD to be Notified”. This field is required, indicated by the red stop sign. Nurses need to document the actual time the physician was notified in a note.]

In addition to the nurse’s BPA, In Basket messages are sent to Performance Improvement users for purposes of compliance monitoring.

When the doctor opens the neonate’s chart, the Sepsis Best Practice Advisory window opens which displays some of the patient’s clinical data and allows access to open the Neonatal Sepsis orderset.
Physician’s Best Practice Advisory

Unchecking the “Open Order Set” box, causes a red stop sign to appear in the “Acknowledge reason” field. This indicates an entry is required if the “Neonatal Sepsis” orderset will not be used. Selecting an “Acknowledge Reason” causes the Open Order Set box to be automatically unchecked. Clicking on the magnifying glass next to the “Acknowledge reason” field allows you to browse through the available choices. The options are based on directives from the Department of Health. Contraindications not listed in the “Acknowledge reasons” can be formally submitted to the Department of Health for approval.

When a neonate meets the screening criteria for sepsis, the physician needs to evaluate and determine if the neonate meets the severe sepsis/septic shock criteria as well as decide if the neonate will or will not be included in the protocol. If the patient does not have severe sepsis/septic shock, the following acknowledge reason must be selected: “Patient does not have severe sepsis or septic shock.” If the patient has severe sepsis/septic shock, but has a valid reason not to be treated, any of the other acknowledge reasons (exclusions) should be chosen. Finally, if the patient has severe sepsis/septic shock and no contraindications to treatment, the “Neonatal Sepsis” orderset should be opened and relevant orders should be placed. Use of the order set marks the initiation of the protocol.

[Note: All cases of severe sepsis/septic shock are reported quarterly to the Department of Health. Currently, 73 data elements are reported per case].
The following are the available “Acknowledge Reasons”:

If the patient will be included in the protocol, the “Neonatal Sepsis” order set must be opened, and the protocol’s relevant orders must be placed. Opening the order set and placing pertinent orders indicates the patient will be included in the Sepsis protocol and marks the initiation of the protocol.

The date and time of initiation or exclusion from the protocol is reported to the Department of Health.
If the Open Order Set box is checked, and you click “Accept”, the “Neonatal Sepsis” orderset displays. From this screen, physicians can order the required elements of the protocol (as well as optional orders) all at once:

1) Blood cultures (Required-Recommendation is to obtain blood cultures prior to antibiotic administration, and within one hour of presentation)

2) Broad spectrum antibiotics (Required-The Jamaica Hospital Sepsis Protocol indicates that broad-spectrum antibiotic administration should begin within 1 hour of identification of severe sepsis or septic shock)

3) IV fluids for initial resuscitation (Required-Recommendation is to administer at least 20 cc/kg isotonic saline over 30 minutes. This volume recommendation is not a maximum cap; some patients may need more fluids).

4) Vasopressors IV/IO for fluid refractory shock (Conditional).

5) Serum lactate if available (Conditional).

6) Other tests not specific to the protocol, but that are clinically relevant.

Dates and times of administration and/or completion of these elements are reported to the Department of Health. Examples of reportable elements include: the start date and time of antibiotic administration, and the completion date and time of giving at least 20 cc/kg isotonic saline.

We are required to start treatment as soon as possible. For ED patients, the “clock” (also referred to as “start time” or “time zero”) starts at ED arrival.

If the sepsis BPA does not fire for a patient, but based on the clinical evaluation it is concluded that the patient has severe sepsis/septic shock, the “Neonatal Sepsis” orderset should be used. Ordersets can be added to your “Favorites” for easy access.
**Neonatal Sepsis Orderset (Excerpt)**

<table>
<thead>
<tr>
<th>Order Sets</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vital Signs, Pulse, and Respiratory Rate</strong></td>
<td><strong>2 of 3 selected</strong></td>
</tr>
<tr>
<td><strong>Isolation</strong></td>
<td><strong>0 of 5 selected</strong></td>
</tr>
<tr>
<td><strong>NPO Now</strong></td>
<td><strong>0 of 1 selected</strong></td>
</tr>
<tr>
<td><strong>Basic Pediatric Nursing Assessments</strong></td>
<td><strong>5 of 8 selected</strong></td>
</tr>
<tr>
<td>Measure height/length</td>
<td></td>
</tr>
<tr>
<td>Monitor intake and output</td>
<td></td>
</tr>
<tr>
<td>Cardiac monitoring</td>
<td></td>
</tr>
<tr>
<td>Measure head circumference</td>
<td></td>
</tr>
<tr>
<td><strong>Neonatal Mechanical Ventilation</strong></td>
<td><strong>0 of 4 selected</strong></td>
</tr>
<tr>
<td><strong>Pulmonary Invasive / Non Invasive Ventilation</strong></td>
<td><strong>0 of 7 selected</strong></td>
</tr>
<tr>
<td><strong>Neo / pediatric Oxygen Administration</strong></td>
<td><strong>0 of 2 selected</strong></td>
</tr>
<tr>
<td><strong>Consult - Pediatric Infectious Disease</strong></td>
<td><strong>0 of 1 selected</strong></td>
</tr>
<tr>
<td><strong>Ancillary Consults</strong></td>
<td><strong>0 of 7 selected</strong></td>
</tr>
<tr>
<td><strong>Labs</strong></td>
<td></td>
</tr>
</tbody>
</table>

Once, Post-op
ADDING ORDER SETS TO YOUR FAVORITES

If the sepsis BPA does not fire for any reason (e.g. patient does not meet the criteria at the time of vitals documentation or screening tool use), but the physician determines the patient should be included in the Sepsis Protocol during evaluation, the sepsis order set should be used.

If you enter “sepsis” in the “Order Sets” search field and click “Add”, the “Record Select” window opens.

From this window, select the appropriate orderset, and click “Accept”.

<table>
<thead>
<tr>
<th>Display Name</th>
<th>Record Name</th>
<th>ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>ED Septic Shock Treatment</td>
<td>ED SEPTIC SHOCK TREATMENT</td>
<td>160000050</td>
</tr>
<tr>
<td>Neonatal Antibiotics for Specific Bacteria</td>
<td>NEO ANTIBACTERIALS FOR SPECIFIC BACTERIA</td>
<td>3040000583</td>
</tr>
<tr>
<td>NeoFax 2008 Dosing of Common Antibiotics</td>
<td>NEO ANTIBACTERIALS NEOFAX 2008 Dosing of Common Antibiotics</td>
<td>3040000521</td>
</tr>
<tr>
<td>JH ED Sepsis Orderset</td>
<td>JH ED SEPSIS ORDER SET</td>
<td>160000183</td>
</tr>
<tr>
<td>JH Pediatric Sepsis/Septic Shock Admission</td>
<td>JH PEDIATRIC SEPSIS/SEPTIC SHOCK ADMISSION</td>
<td>617</td>
</tr>
<tr>
<td>Neonatal Sepsis</td>
<td>NEO NEONATAL SEPSIS FOCAL</td>
<td>3040000507</td>
</tr>
<tr>
<td>JH Adult Sepsis Admission</td>
<td>JH GEN ACULT SEPSIS ADMISSION</td>
<td>3040000389</td>
</tr>
</tbody>
</table>
For example, if the “JH ED Sepsis Orderset” is selected, and then you click “Accept”, the JH ED Sepsis Orderset is added. Note the check box next to the name.

Right-click on the check box, and select “Add to Favorites”.

Click on “Advanced”.

The “JH ED Sepsis Orderset” displays under your “Favorites”.
There is no limit to the number of order sets that can be added to your Favorites.