Taking Better Care of Sepsis Patients

Diana Tarone, MSN, MBA, RN
Jennifer Axelband, DO
### Sepsis by the Numbers

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Details</th>
</tr>
</thead>
</table>
| 1.7 Million | • More than 1.7 Million people get sepsis each year in the US  
• About 84,000 admissions in PA annually |
| 270,000 | • At least 270,000 Americans die from sepsis each year (that’s one every two minutes!)  
• About 7,000 deaths in PA annually |
| 1 in 3 Patients | • About 1 in 3 patients who die in the hospital have sepsis |
| 1 in 15 | • 1 in 15 severe sepsis discharges will be readmitted within 7 days  
• 1 in 5 are readmitted within 30 days |
| 55% | • Just over half of all Americans know the signs and what sepsis is |
| 1/3\textsuperscript{rd} | • Only about one third of sepsis patients nationwide receive the best care  
• Late and missed diagnoses are common |
| $24 Billion | • Total annual US hospital costs for treating sepsis |

[www.cdc.gov](http://www.cdc.gov)  
[www.sepsis.org](http://www.sepsis.org)

HAP Raising the Bar for Sepsis Care in Pennsylvania, September 6, 2017, Harrisburg, PA
Our Sepsis Story

- Our sepsis journey began in 2012
  - PI project with a private payer
- Higher volume diagnosis
- Higher associated cost
- Higher associated mortality rate
- CMS publically reported measure
  - CMS mandated reporting beginning with Oct 2015 discharges
  - First posted on Hospital Compare July 2018
Quality/PI Structure

- Network Sepsis PI Team
  - Report out to Network PI Council
  - Executive sponsor
  - Various disciplines represented
  - Representation from every campus

- Monthly meetings

- Data reviewed and discussed
  - Premier
    - CMS Sep-1 Core Measure compliance

- Trends and opportunities are identified

- Seek feedback and recommendations
Opportunities For Improvement

- Feedback on measure failure is provided
- Each measure failure is reviewed for opportunities and feedback is solicited
- Measure failures are viewed as learning opportunities
- Opportunity letters
**CMS Sepsis-1 Core Measure**

**St. Luke’s University Health Network**

**Severe Sepsis Bundle**

(Use Order Set)

Within 3 hours of time of presentation:
- Draw Initial Lactate
- Draw Blood Cultures x2 before Antibiotics
- Administer Broad Spectrum Antibiotics

If patient exhibits initial hypotension:
- Two low BP readings 6 hrs prior/after time of severe sepsis presentation (SBP < 90 or MAP < 65 or ↓SBP by > 40 points)
- Administer 30ml/kg IV crystalloid fluid bolus
- Use actual body weight
- May use IBW if BMI > 30. Provider must clearly document
- Based on IBW

Within 6 hours of time of presentation:
- If Initial Lactate is > 2, repeat Lactate in 2 hours

**Septic Shock Bundle**

(Use Order Set)

Initiate all elements required for Severe Sepsis Bundle

Within 3 hours of time of presentation:
- Administer 30ml/kg IV crystalloid fluid bolus. Use actual body weight
- May use IBW if BMI > 30. Provider must clearly document
- Based on IBW

Within 6 hours of time of presentation:
- Only if hypotension persists. Two consecutive measurements MAP < 65 or ↓SBP by > 40 points after fluid resuscitation
- Administer vasopressors
- Focused reassessment of Volume Status and Tissue Perfusion

*Note: patient may need additional antibiotics with combination therapy above, dependent upon presumed source (e.g., Metronidazole for anaerobic coverage) or concern for resistant pathogens (e.g., Vancomycin if MRSA severe)*

**Organ Dysfunction:**
- SBP < 90 or MAP < 65 or ↓SBP by > 40 points (related to infection)
- Acute respiratory failure (new need for invasive or noninvasive mechanical ventilation)
- Creatinine > 2.0 or > 0.5 increase from baseline with CKD
- Urine output < 0.5 ml/kg/hr for 2 hours
- Bilirubin > 2mg/dL (34.2 mmol/L)
- Platelet count < 100,000
- INR > 1.5 or aPTT > 60 seconds

**SIRS Criteria:**
- Temp > 38.3C (100.9F) or < 36C (96.8F)
- HR > 90
- RR > 20
- WBC >12,000 or < 4,000 or >10% bands

**Sepsis/Severe Sepsis Septic Shock Algorithm**

**Follows CMS SEP-1 Measure 1.7.2019**

**Antibiotic Selection for CMS Sepsis Measure**

Monotherapy

- Ampicillin-Sulbactam (if Pseudomonas unlikely)
- Ceftiraxone (if Pseudomonas unlikely)
- Cefepime

Combination Therapy

Select one from Column A (Gram-Neg) and one from Column B (Gram-Pos)

**Note:** provider documentation of all:
- Vital Signs
- Cardiopulmonary Exam
- Capillary Refill Evaluation
- Peripheral Pulse Evaluation
- Skin Examination
- Arterial oxygen saturation or pulse oximetry
- Urine output
- Shock Index
- OR...
- Any 1 of the following:
  - CVP measurement
  - ScVO2 measurement
  - Bedside Cardiovascular US
  - Passive Leg Raise or Fluid Challenge

**Focused reassessment:**

Provider completion and documentation of the following by provider (all):
- Vital Signs
- Cardiopulmonary Exam
- Capillary Refill Evaluation
- Skin Examination
- Arterial Oxygen saturation or pulse oximetry
- Urine output
- Shock Index

**Sepsis/Severe Sepsis/Septic Shock Algorithm**

Follows CMS SEP-1 Measure 1.7.2019

**Organ Dysfunction:**
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**SIRS Criteria:**
- Temp > 38.3C (100.9F) or < 36C (96.8F)
- HR > 90
- RR > 20
- WBC >12,000 or < 4,000 or >10% bands

**Diagnosis:**

- Severe Sepsis
- Septic Shock

**Perform Focused Reassessment in one hour after bolus initiated**

**Note time of presentation:**

Infection (suspected or documented)

≥ 2 SIRS?

Lactate ≥ 4?

Lactate ≥ 2? (but < 4)

SBP < 90?

Give 30ml/kg crystalloid IV bolus (use actual body weight)

Lactate remains ≥ 2? (but < 4)

Monitor vital signs

**Perform Focused Reassessment in one hour after bolus initiated**

Or... Any 1 of the following:

- CVP measurement
- ScVO2 measurement
- Bedside Cardiovascular US
- Passive Leg Raise or Fluid Challenge

**Diagnosis:**

- Severe Sepsis
- Septic Shock

**Perform Focused Reassessment in one hour after bolus initiated**

**Notes:**

- Follows CMS SEP-1 Measure 1.7.2019
- Lactate ≥ 2? (but < 4)
- Lactate remains ≥ 2? (but < 4)
- SBP remains < 90?
- Lactate ≥ 2? (but < 4)
- Lactate ≥ 2? (but < 4)
- Lactate ≥ 2? (but < 4)
- Lactate ≥ 2? (but < 4)

**Follows CMS SEP-1 Measure 1.7.2019**
Basic Workflow

Automated IT functions

Actions built into IT system

Human action/decision

Legend
The “Purple Sepsis Checklist”

- Process prior to EPIC
- Limitations of legacy product
- Numerous paper processes
- “The purple sepsis checklist”

<table>
<thead>
<tr>
<th>TIME</th>
<th>ITEM TO BE COMPLETED</th>
<th>TIME REQUIREMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SEPSIS SCREENING upon arrival to bed or if warrants in triage</td>
<td>IMMEDIATELY</td>
</tr>
<tr>
<td></td>
<td>2 or more SIRS criteria (see back of form) AND suspected infection AND organ dysfunction (see back of form): Document the time internal sepsis alert was initiated</td>
<td>IMMEDIATELY</td>
</tr>
<tr>
<td></td>
<td>Begin first nurse sepsis order set if screening is positive or you suspect sepsis AND notify provider OR Ensure that the sepsis order set is being utilized by the provider so that no order/measure is missed</td>
<td>IMMEDIATELY</td>
</tr>
<tr>
<td>1st</td>
<td>INITIAL LACTATE WITH REPEAT LACTATE [≥2] within 2 hours- this is preselected in order sets. Two lab stickers will print in ED/Normal lab printing process for inpatient. The second lactate is to be sent WITHIN 2 hours of the first lactate</td>
<td>IMMEDIATELY AND PRIOR TO 2 hours</td>
</tr>
<tr>
<td>2nd</td>
<td>BLOOD CULTURES prior to antibiotics- Enter the actual DRAW time in EPIC and make sure it precedes the antibiotic start infusion time <strong>Be careful not to scan blood cultures after antibiotic is hung — must be re-timed in EPIC</strong></td>
<td>IMMEDIATELY</td>
</tr>
<tr>
<td></td>
<td>ANTIBIOTICS: NEED to be INITIATED within 1 hour of presentation time. Use appropriate mono- or combo therapy from the CMS antibiotic list. <em>Start and Stop times MUST be documented in EPIC</em> <em>Run FASTEST antibiotics first</em></td>
<td>WITHIN 1 hour</td>
</tr>
<tr>
<td></td>
<td>ANTIBIOTICS: If a second antibiotic is ordered, it has to be INITIATED before 8 hours after presentation time</td>
<td>START PRIOR TO 3 HOURS</td>
</tr>
<tr>
<td></td>
<td>IV FLUIDS: 30cc/kg fluid resuscitation infused within 3 hours of presentation of Initial hypotension or lactate ≥ 4. <strong>Must document accurate start/stop times in EPIC</strong> <strong>Must have documented Weight of Patient in EPIC</strong></td>
<td>WITHIN 3 HOURS</td>
</tr>
<tr>
<td></td>
<td>Patients weight ________ kg x 30= _________ ml of fluid</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>May use ideal body weight if BMI is GREATER THAN 30</strong> <strong>Provider must document that ideal body weight is being used to calculate fluids</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>VASOPRESSORS: If persistently hypotensive after fluids</td>
<td></td>
</tr>
<tr>
<td></td>
<td>REASSESSMENT BY PHYSICIAN: provider needs to document a reassessment one hour after fluid resuscitation initiated **Use the Sepsis Navigator/Sepsis Reassessment to meet all criteria</td>
<td>1 hour after fluids initiated</td>
</tr>
</tbody>
</table>

Send original copy with patient. Provide copy of checklist to manager or other designee.

(Not a part of the permanent medical record)
The “Purple Sepsis Checklist”

- Built the sepsis checklist into EPIC
Inpatient and ED RN Screening Process

SIRS Criteria Options

Organ Dysfunction Options
ED First Nurse Sepsis Protocol

**First Nurse Sepsis**

- **Insert and maintain peripheral IV**
- **Insert and maintain peripheral IV x 2 (18 gauge or >)**
  - STAT, Once, First occurrence today at 0920
- **Vital Signs**
- **Continuous cardiac monitoring**
  - STAT, Once, First occurrence today at 0920
- **Oxygen Therapy Orders**
  - Nasal cannula oxygen
    - STAT, Give 2 L/min oxygen, to keep sats > 92%
- **Labs - Blood**
  - APTT ( $$ $$)
    - Once, First occurrence today at 0920
    - Blood
  - Protamine-INR ($)
    - Once, First occurrence today at 0920
    - Blood
  - Blood culture #1 ( $$ $$ $$)
    - Once, First occurrence today at 0920
  - Blood culture #2 ( $$ $$ $$)
    - Once, First occurrence today at 0920
  - CBC and differential ( $$ $$ $$)
- **Comprehensive metabolic panel ( $$ $$ $$)**
  - Once, First occurrence today at 0920
  - Blood
- **Lactate x2 ( $$ $$ $$)**
  - Now then every 2 hours, First occurrence today at 0920, Last occurrence today at 1120, for 2 occurrences
  - Blood
- **Troponin I ( $$ $$)**
  - Once
- **Gold top on hold**
  - Once, Blood
- **Green / Black tube on hold**
  - Once, Blood
- **Green / Yellow tube on hold**
  - Once, Blood
- **Lavender Top 7ml on hold**
  - Once, Blood
- **Red top on hold**
  - Once, Blood
- **Bladder Catheter and Labs - Urine**
  - Insert, non-dwelling bladder catheter
    - STAT, Once, if patient does not urinate within 1 hour
  - POCT urinalysis dipstick ($)
    - STAT, Once
- **Urine dip analyzer**
  - STAT, Once
- **Cardiac Tests - ECG**
  - **ECG 12 lead**
    - STAT, Once, First occurrence today at 0920
- **Imaging**
  - XR chest 1 view portable ($ $$)
    - STAT, 1 time imaging
  - XR chest 2 views ($ $$)
    - STAT, 1 time imaging
- **Nursing Orders**
  - Notify physician if BP < 90
    - STAT, Until discontinued, starting today at 0920, Until Specified
    - Systolic blood pressure less than: 90
- **NS Bolus**
  - Sodium chloride 0.9 % bolus ($ $$)
    - 1,000 mL, Intravenous, Once
  - Fever Medications

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### Provider Initial Sepsis Assessment

<table>
<thead>
<tr>
<th>qSOFA (Quick SOFA) Score for Sepsis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altered mental status GCS &lt; 15</td>
</tr>
<tr>
<td>Systolic BP &lt; ~100</td>
</tr>
</tbody>
</table>

### Initial Sepsis Screening

- **Is the patient's history suggestive of a new or worsening infection?**
  - Yes (Proceed): No

- **Suspected source of infection**
  - Pneumonia
  - Soft tissue
  - Infection of unknown origin

- **Organ dysfunction**
  - Hypotension: SBP < 90 mmHg
  - Tachycardia: HR > 100 bpm

### Indicate SIRS criteria

- **Hyperthermia**: Temperature > 38°C (100.4°F)
- **Leukocytosis**: White blood cell count > 12,000/μL
- **Leukopenia**: White blood cell count < 4,000/μL
- **WBC > 10% bands**: Polymorphonuclear leukocytes > 10%

### If the answer is yes to both questions, suspicion of sepsis is present

- **Organ dysfunction**
  - SBP decrease > 40 mmHg from baseline
  - SBP decrease > 40 points/mmHg

### Shock

- **Tissue hypoperfusion persists in the hour after fluid resuscitation or lactate > = 4, the patient meets criteria for SEPTIC SHOCK**

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- Providers can add weights to the banner
- Impacts functionality of order sets
St. Luke's University Health Network
Studies suggest use of a balanced crystalloid (LR or Isolyte) for patients at risk for AKI.

**IVF Bolus 133.4 KG - 166.6 KG**
- LR Bolus + Vital Signs
- NS Bolus + Vital Signs
- Isolyte Bolus + Vital Signs

**IV Fluid Boluses for BMI > 30**
Patient’s Body mass index is 56.03 kg/m². Consider using Ideal body weight: 61.5 kg (135 lb 9.3 oz) to calculate IV fluid bolus.

**IVF Bolus for Ideal Body Weight 33.4 kg - 66.6 kg**
- LR Bolus + Vital Signs
  - Lactated ringsers bolus 1,000 mL
    1,000 mL Intravenous, Administer over 30 Minutes. Once, today at 1615, For 1 dose
    Bag #1 of 2 Based on Ideal body weight: 61.5 kg (135 lb 9.3 oz)
    Followed by
    lactated ringsers bolus 1,000 mL
    1,000 mL Intravenous, Administer over 30 Minutes. Once, today at 1645, For 1 dose
    Bag #2 of 2 RN to Stop at 1845mL. Total Volume Final Bag Volume to infuse ≤ 845mL. Based on Ideal body weight: 61.5 kg (135 lb 9.3 oz)
  - Vital signs
    Vital signs every 15 minutes x 4 after fluid bolus
    Routine, Every 15 min, First occurrence today at 1715, for 4 occurrences
### Vasopressors

- [ ] norepinephrine (LEVOPHED) in dextrose 5 % 250 mL iv infusion
- [ ] EPINEPHrine (ADRENALIN) in sodium chloride 0.9 % infusion
- [ ] vasopressin (PITRESSIN) 0.2 Units/mL in sodium chloride 0.9 % 100 mL infusion
- [ ] DOPamine (INTROPIN) 400 mg in 250 mL infusion (premix)

### Additional SmartSet Orders

You can search for an order by typing in the header of this section.

[Search]

[✔ Close]
Provider Sepsis Reassessment

Repeat Volume Status and Tissue Perfusion Assessment Performed

- Repeat Volume Status and Tissue Perfusion Assessment Performed
  - Yes

Volume Status and Tissue Perfusion Post Fluid Resuscitation * Must Document All *

- Vital Signs Reviewed (HR, RR, BP, T)
  - Yes
- Shock Index Reviewed
  - Yes
- Arterial Oxygen Saturation Reviewed (POx, SaO2 or SpO2)
  - Yes (comment %)
- Cardio
  - Normal S1/S2
  - Regular rate and rhythm
  - No murmur
  - No rub or gallop
  - Tachycardia
  - Irregular rhythm
  - Bradycardia
  - Other (comment)
- Pulmonary
  - Normal effort
  - Clear to auscultation
  - Wheezes
  - Rales
  - Tachypnea
  - Respiratory distress
  - Rhonchi
  - Other (comment)
- Capillary Refill
  - Brisk
  - Sluggish
  - Other (comment)
- Peripheral Pulses
  - Radial
  - Dorsalis Pedis
  - Posterior Tibialis
- Skin
  - Warm
  - Cool
  - Dry
  - Diaphoretic
  - Flushed
  - Pale
  - Mottled
  - Normal
  - Other/Abnormal (Comment)
- Urine output assessed
  - Adequate
  - Decreased
  - None
  - Other (comment)
<table>
<thead>
<tr>
<th>Field</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urine output assessed</td>
<td>Adequate, Decreased, None, Other (comment)</td>
</tr>
</tbody>
</table>

**OR** Intensive Monitoring - Must Document One of the Following Four **:**

- Vital Signs Reviewed: Yes
- Central Venous Pressure (CVP or RAP) [ ]
- Central Venous Oxygen (ScvO2, Svo2 or Oxygen Saturation via central catheter) [ ]
- Bedside Cardiovascular US in IVC diameter and % collapse: CO, EF, IVC Diameter, % Collapse
- Passive Leg Raise OR Crystalloid Challenge: Passive leg exam, Crystalloid fluid challenge completed

**Sepsis Note**

Create Note, See All Notes, Refresh

You have no filed Sepsis Note for this patient within the last 24 hours.
# Sepsis Notes

**Sepsis Note**

Frank Asparagus 56 y.o. male MRN: 129000010
Unit/Bed#: TRN ORDERS ED Pool 02 Encounter: 1013089905

## Default Flowsheet Data (last 720 hours)

### Sepsis Reassess

<table>
<thead>
<tr>
<th>Row Name</th>
<th>08/16/19</th>
<th>1450</th>
</tr>
</thead>
</table>

**Repeat Volume Status and Tissue Perfusion Assessment Performed**

- Yes - CB

**Volume Status and Tissue Perfusion Post Fluid Resuscitation** (Must Document All)

- Vital Signs Reviewed (HR, RR, BP, T)
- Yes - CB
- Shock Index Reviewed
- Yes - CB
- Arterial Oxygen Saturation Reviewed (PO2, SaO2 or SpO2)
- Yes (comment %) - CB

**Cardio**

1. Regular rate and rhythm; Tachycardia - CB

**Pulmonary**

**Capillary Refill**

- Brisk - CB

**Skin**

- Warm;Flushed - CB

**User Key**

(I) = Recorded By, (T) = Taken By, (C) = Cosigned By

<table>
<thead>
<tr>
<th>Initials</th>
<th>Name</th>
<th>Provider Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>CB</td>
<td>Chris Babypes, DO</td>
<td>Physician</td>
</tr>
</tbody>
</table>
Link from Sepsis Navigator

Includes:

- RN Sepsis Screening
- qSOFA
- Initial Sepsis Screen (provider)
- Sepsis Checklist
- Lactic Acid
- Other Labs
- Microbiology results
- Vital Signs and shock index
Best Practice Alert for RN

- Indicates SIRS criteria is met and sepsis should be considered
- Screen patient
- Notify provider as appropriate
- Lactate has not been completed
Indicates SIRS criteria is met and sepsis should be considered

Lactate has not been completed
# Sepsis Predictive Model

<table>
<thead>
<tr>
<th>Patient Identification</th>
<th>Deterioration Score Column</th>
<th>Early Detection of Sepsis Score</th>
<th>MEWS</th>
<th>Bed/Location</th>
<th>Problem</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Persistent atrial fibrillation (HCC) (Principal Hospital Problem)</td>
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<tr>
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<td></td>
<td></td>
<td>Respiratory failure (HCC), SOB (shortness of breath), COPD with acute exacerbati...</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Pyelonephritis, acute (Principal Hospital Problem)</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td>Acute on chronic respiratory failure with hypoxia (HCC) (Principal Hospital...</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Urinary tract infection (Principal Hospital Problem)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Chest pain (Admission Diagnosis)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AL XRAY</td>
<td>ED 14</td>
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<td>E4 MS 446-01</td>
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<td>E4 MS 443-01</td>
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<td></td>
<td></td>
<td></td>
<td>Paroxysmal atrial fibrillation (HCC) (Principal Hospital Problem)</td>
</tr>
</tbody>
</table>

**Early Detection of Sepsis**

- Age is 83
- Number of active cephalosporin orders is 2
- Diagnosis of hypertension is present
- Lymphocytes is low (0.57 Thousands/µL)
- Neutrophils is high (65 %)
- Diagnosis of diabetes mellitus is present
- Diagnosis of chronic kidney disease is present
- MCHC is low (30.7 g/dL)
- Diagnosis of chronic liver disease is present

Factors Contributing to Score:
- 17%
- 16%
- 10%
- 9%
- 9%
- 7%
- 7%
- 6%
- 4%

Total Score: 8

At Risk

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7% and 9% Best Practice Alerts

**Important (1)**

7% or Higher Warning: This patient’s Early Detection of Sepsis score indicates a high risk. Complete a sepsis screening at this time. If screening is positive, notify the physician. If negative, continue to monitor and screen every 2 hours until screening is positive and Sepsis treatment has been initiated OR score is below 7%.

- Complete Sepsis Screening

**Acknowledgment Reason**

- Screen patient
- Patient being treated for other condition...
- Patient being treated for Sepsis
- Leadership Rounding Chart Review

**Important (2)**

9% or Higher Warning: This patient's Early Detection of Sepsis score indicates a high risk. Perform sepsis screening at this time AND notify the physician.

- Complete Sepsis Screening

**Acknowledgment Reason**

- Screen & Notify
- Patient being treated for other condition...
- Patient already being treated for Sepsis
- Leadership Rounding Chart Review

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Failure Types

Network Quarterly Count of Failures by Type

- reassessment
- vasopressors
- fluids
- repeat lactate
- blood cultures
- antibiotic selection
- antibiotic time
- initial lactate

St. Luke’s University Health Network

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Performance Data

Network CMS Sep-1 Bundle Compliance

Rate

EPIC go-live
Sepsis Navigator
Simplified Abx List
Grand Rounds
Lactate >2 = critical lab value
Sepsis Alert
SLMC Opened
Optimize Weight Based Orders
Predictive Analytics
SLSH joined
Provider Reassessment BPA – background page to RRT
9% Page Functionality
Suspected Sepsis Report
Mandatory Education
7% and 9% BPAs
SLBM joined
87.1

Rate vs. Time

Oct-15
Dec-15
Feb-16
Apr-16
Jun-16
Aug-16
Oct-16
Dec-16
Feb-17
Apr-17
Jun-17
Aug-17
Oct-17
Dec-17
Feb-18
Apr-18
Jun-18
Aug-18
Oct-18
Dec-18
Feb-19
Apr-19
Jun-19
Aug-19

Rate
CMS top decile
CMS state compliance median
CMS national compliance median

St. Luke’s University Health Network

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St. Luke’s Hospital Compare Performance

CMS Hospital Compare Q4 2017 - Q3 2018
Sep-1 Measure Compliance July 2019 Update

- CMS top decile 78%
- CMS National Median 55%

Q1 2017 - Q3 2017
Q1 2017 – Q4 2017
Q2 2017 - Q1 2018
Q2 2017 - Q1 2018
Q3 2017 - Q2 2018
Q4 2017 - Q3 2018
Network

St. Luke’s University Health Network
## Hospital Compare – Regional

### Sep-1 Measure Compliance Comparison

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Jul18</th>
<th>Oct18</th>
<th>Feb19</th>
<th>Jul19</th>
</tr>
</thead>
<tbody>
<tr>
<td>SL Allentown/Bethlehem</td>
<td>77%</td>
<td>77%</td>
<td>78%</td>
<td>81%</td>
</tr>
<tr>
<td>SL Anderson</td>
<td>72%</td>
<td>78%</td>
<td>80%</td>
<td>86%</td>
</tr>
<tr>
<td>SL Miner’s</td>
<td>55%</td>
<td>57%</td>
<td>61%</td>
<td>80%</td>
</tr>
<tr>
<td>SL Quakertown</td>
<td>63%</td>
<td>68%</td>
<td>67%</td>
<td>82%</td>
</tr>
<tr>
<td>SL Warren</td>
<td>67%</td>
<td>68%</td>
<td>74%</td>
<td>76%</td>
</tr>
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<td>SL Monroe</td>
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<td>74%</td>
<td>71%</td>
<td>70%</td>
</tr>
<tr>
<td>SL Sacred Heart</td>
<td>27%</td>
<td>30%</td>
<td>34%</td>
<td>55%</td>
</tr>
<tr>
<td>SL Blue Mt. (SLGH)</td>
<td>63%</td>
<td>64%</td>
<td>63%</td>
<td>65%</td>
</tr>
<tr>
<td>Geisinger Danville</td>
<td>30%</td>
<td>31%</td>
<td>32%</td>
<td>41%</td>
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<tr>
<td>Grandview</td>
<td>44%</td>
<td>44%</td>
<td>47%</td>
<td>49%</td>
</tr>
<tr>
<td>Thomas Jefferson Univ.</td>
<td>51%</td>
<td>51%</td>
<td>50%</td>
<td>55%</td>
</tr>
<tr>
<td>HUP</td>
<td>75%</td>
<td>75%</td>
<td>74%</td>
<td>84%</td>
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</table>

### Benchmarks

<table>
<thead>
<tr>
<th></th>
<th>Jul18</th>
<th>Oct18</th>
<th>Feb19</th>
<th>Jul19</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top decile</td>
<td>76%</td>
<td>76%</td>
<td>76%</td>
<td>78%</td>
</tr>
<tr>
<td>PA Average</td>
<td>45%</td>
<td>46%</td>
<td>48%</td>
<td>53%</td>
</tr>
<tr>
<td>NJ Average</td>
<td>56%</td>
<td>57%</td>
<td>58%</td>
<td>61%</td>
</tr>
<tr>
<td>National Average</td>
<td>49%</td>
<td>50%</td>
<td>51%</td>
<td>55%</td>
</tr>
</tbody>
</table>

Data accessed: 8/2/2019

**Timeframes:**
- Jul 2018: Jan-Sep 2017
- Oct 2018: Jan-Dec 2017
- Feb 2019: Apr 2017-Mar 2018
- Jul 2019: Oct 2017-Sep 2018

Oct 2019: next update will drop oldest quarter and add newest quarter
Fewer patients Progress to Septic Shock

Percentage of Patients Coded with Severe Sepsis/Septic Shock

- **Severe**
- **Shock**
Network Sepsis Mortality Index APR DRG 720

Network Mortality Index APR DRG 720 Septicemia & Disseminated Infections

FY 2013
FY 2014
FY 2015
FY 2016
FY 2017
FY 2018
FY 2019

Index

Network
Premier top decile
top quartile
Actual Mortality Rates

Network Mortality APR DRG 720
Septicemia & Disseminated Infections

Rate


Network
Premier top decile
Premier top quartile
### Return on Investment and Case Mix Index

<table>
<thead>
<tr>
<th>Campus</th>
<th>Year</th>
<th>Cases</th>
<th>Case Mix Index</th>
<th>Average LOS</th>
<th>Operating Margin Per Case</th>
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<tbody>
<tr>
<td>SLA</td>
<td>2018</td>
<td>573</td>
<td>1.71</td>
<td>6.59</td>
<td>$2,371</td>
</tr>
<tr>
<td></td>
<td>2017</td>
<td>410</td>
<td>1.57</td>
<td>6.65</td>
<td>$1,584</td>
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<tr>
<td>SLB</td>
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<td>764</td>
<td>1.97</td>
<td>7.59</td>
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<td>2017</td>
<td>1005</td>
<td>1.74</td>
<td>6.72</td>
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<td>799</td>
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<tr>
<td>SLRA</td>
<td>2018</td>
<td>803</td>
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<td>5.35</td>
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<td>2017</td>
<td>683</td>
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<td>5.76</td>
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<td>2016</td>
<td>542</td>
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<td>5.96</td>
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<tr>
<td>Combined</td>
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<td>1677</td>
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</table>
Lessons Learned

- Leadership support is vital
- Physician buy-in and input
  - We had physicians involved in process development and the EPIC builds prior to go-live
- Empower your nursing staff
- Set clear expectations up front
- Feedback is essential
Clinical Governance Technology

Clinical Technology Governance Board

IT Team
Analysts: Clinical Informatics Nurses; Reporting; Instructional
Designers: Certified Trainers

Clinical Sub-Committees
- Cardiovascular
- Musculoskeletal
- Surgery
- OB/GYN
- Oncology
- Behavioral Health
- Pathology/Lab
- Neurosciences
- Pediatrics
- Nursing
- Pharmacy
- Internal Medicine
- Primary Care
- Radiology
- Emergency
- Rehab Services
- Research
- St. Luke’s Care Network
- Urgent Care
- Community Health
- Star Wellness

Committee Structure:
Provider Champion; Administrative Champion; BRM;
Other Operational Representatives
Next Steps

- Post Sepsis Syndrome
- Readmissions
  - Predictive model for readmissions
- Length of Stay
- Episode of care
- Current Deterioration Index Pilot and Implementation
  - Will augment our sepsis process
- Exploring potential use of TigerConnect
- Continued optimization of the EMR and our process