STOP SEPSIS COLLABORATIVE TOOLKIT

A PROTOCOL-BASED APPROACH TO EARLY IDENTIFICATION AND TREATMENT OF SEVERE SEPSIS IN THE EMERGENCY DEPARTMENT
The information contained in this toolkit is provided by the Greater New York Hospital Association (GNYHA) for informational purposes only. While GNYHA endeavors to keep the information up-to-date and correct, we make no representations, guarantees or warranties of any kind, express or implied, about the completeness, accuracy, reliability, or suitability with respect to any of the information contained herein. GNYHA disclaims any liability for any and all damages or losses arising out of the use of this information. This toolkit is not meant to provide medical advice nor is it a substitute for professional medical or clinical judgment.

The entire content of this toolkit is the property of the GNYHA. GNYHA hereby grants permission for you to use the toolkit subject to the restrictions and limitations contained herein. Use of this toolkit is permitted solely for your use in your healthcare institution in furtherance of efforts to improve the quality of patient care. Any other use, including but not limited to the reproduction, distribution, or sale of the content of this toolkit is strictly prohibited. You further agree not to remove this disclaimer or change or delete any proprietary notice from the toolkit or any other materials downloaded or printed from GNYHA’s website.

GNYHA and UHF make no guarantees or warranties of any kind regarding the toolkit, including, without limitation, guarantees as to the accuracy of the information provided herein and warranties relating to the fitness of the information for any particular use or purpose. The information provided is not medical advice and should not be relied upon as such, nor should the information be used as a substitute for clinical or medical judgment. GNYHA and UHF do not assume liability for any damage or injury resulting from the use or misuse of any information provided herein.

This toolkit was funded by a grant from UHF.
# TABLE OF CONTENTS

I. WHY FOCUS ON SEVERE SEPSIS? ................................................................. 3  
   Introduction  
   GNYHA/UHF STOP Sepsis Collaborative Overview  

II. GETTING STARTED ................................................................................... 4  
   Assessing Current Practices and Skills Gaps  
   Establishing an Interdisciplinary Sepsis Team  
   Setting Goals  

III. ESSENTIAL TOOLS FOR EFFECTING CHANGE .................................. 6  
   Early Identification of Sepsis  
   Rapid Treatment of Sepsis  
   Invasive Versus Non-Invasive Protocols  
   Resuscitation Checklist  

IV. DATA COLLECTION STRATEGIES AND TOOLS ................................ 8  

V. END NOTES ........................................................................................... 9  

VI. APPENDICES ....................................................................................... 10
This toolkit is a resource to help hospitals implement a targeted, sustainable infrastructure to reduce mortality associated with severe sepsis and septic shock in adult patients presenting to the emergency department (ED). It is designed to support hospitals in improving care processes to more quickly identify patients with severe sepsis and to provide timely and effective treatment through the use of evidence-based protocols.

These materials are intended to provide a framework that can be customized to meet the needs of an individual institution regardless of size, academic status, staffing model, patient population, level of implementation, and available resources. In fact, the materials were initially developed as part of the GNYHA and United Hospital Fund (UHF) Strengthening Treatment and Outcomes for Patients (STOP) Sepsis Collaborative, which included 57 diverse participating hospitals. Although each institution faces unique challenges, this toolkit is designed to provide each hospital with a guide to develop comprehensive practices to ultimately reduce severe sepsis mortality rates.
INTRODUCTION
Sepsis is a severe illness caused by the body’s immune response to infection. The incidence and impact of severe sepsis is generally underappreciated; it is the 10th leading cause of death in the United States, with an estimated 750,000 hospitalizations each year, a mortality rate of 30%–50%, and costs the health care system an estimated $17 billion.1,2,3

With the incidence of severe sepsis increasing, largely owing to an aging population, there is an undeniable need for a targeted focus on early recognition and consistent, standardized treatment that is shown to improve outcomes in patients with severe sepsis and septic shock.

GNYHA/UHF STOP SEPSIS COLLABORATIVE OVERVIEW
In late 2010, GNYHA and UHF launched a quality improvement initiative focused on supporting hospitals with implementing protocols for identifying and treating severe sepsis. The goals of this joint initiative—the STOP (Strengthening Treatment and Outcomes for Patients) Sepsis Collaborative—are to improve care processes and reduce mortality in patients ages 18 and older with severe sepsis and septic shock presenting in the ED by treating severe sepsis and septic shock as a medical emergency. Improving communication and patient flow between EDs and other areas of the hospital has also been an important objective of the initiative.

All GNYHA member hospitals were invited to participate in STOP Sepsis through an application process that required written executive leadership support and formation of an interdisciplinary team to manage each institution’s efforts. More than 50 hospitals joined, and from January 2011 (when formal, monthly data collection began) through September 2012 they achieved an overall 22% reduction in hospital mortality in patients with severe sepsis and septic shock.

Given the successful implementation of STOP Sepsis protocols in the ED, GNYHA and UHF are expanding the Collaborative hospital-wide, including all adult inpatient and pediatric units. Tools and resources for supporting hospitals in addressing sepsis in the inpatient setting and in pediatrics are forthcoming.

For more on the GNYHA/UHF STOP Sepsis Collaborative, its results, and participants, visit http://www.gnyha.org/sepsis.
ASSESSING CURRENT PRACTICES AND SKILL GAPS
An initial assessment of your hospital’s current sepsis practices will aid in identifying process and education gaps to target improvement opportunities. A thorough assessment of current practices should include a review of the existing strategies to triage and coordinate care beginning in the ED and throughout the hospital. It should also look at protocols already in place and whether all clinical staff understand and adhere to them. Appendix A is an example of a survey instrument that hospitals can use or adapt to assess their current practices for addressing severe sepsis.

Hospitals may also identify gaps in knowledge and skills related to evidence-based sepsis guidelines. With this analysis, a hospital can better understand the staff’s current knowledge and implement a targeted plan to develop the necessary expertise to achieve its goals. Appendix B provides sample skill gap assessments for ED and intensive care unit (ICU) physicians and nurses.

ESTABLISHING AN INTERDISCIPLINARY SEPSIS TEAM
Implementing an effective and sustainable program to address severe sepsis requires a dedicated team who communicates and collaborates among multiple disciplines and across departments. It is critical to establish regular, open communication among clinicians in the ED and ICU settings. The core team is responsible for developing, implementing, and managing the hospital’s overall strategy to improve processes of care and reduce mortality from severe sepsis. Team members should meet regularly and consistently (e.g., every other week or monthly) to agree on processes and measurements, acknowledge program successes, review data, and identify and manage challenges. Essential team members to consider for an initiative to reduce mortality associated with severe sepsis include:

- Senior Leadership (Administrative, Physician, and Nursing)
- ED Physician Champion (typically the project lead)
- ED Nurse Champion
- Critical Care Physician Champion
- Critical Care Nurse Champion
- Infection Preventionist
- Data Collection Support (e.g., Quality Improvement personnel)
- Rapid Response Team Representative
- Information Technology Representative
- Laboratory Representative

Senior leadership involvement and support are crucial to the success and sustainability of any process change. Improving processes to diagnose and treat severe sepsis will reliably reduce sepsis-related hospital mortality rates and costs, and a successful sepsis quality improvement initiative must be a priority program.

SETTING GOALS
It is important to set clear, realistic, and measurable goals for the near- and long-term to focus your efforts. This will enable your team to assess its progress along the way and modify your interventions accordingly.

Use the STOP Sepsis Collaborative’s stated goals, found in Appendix C, to develop similar goals during your hospital’s planning process.

A planning tool in Appendix D includes template worksheets and instructions that can guide teams through the planning process and identify specific actions and parties responsible for each step along the way. This kind of team planning at the beginning of the initiative is es-
sential to reach consensus on the best way to approach your hospital’s efforts to improve outcomes from severe sepsis. Additionally, hospitals should re-evaluate their initial actions regularly (e.g., once per month) to identify obstacles and accomplishments.

Contact GNYHA for additional support in planning your implementation strategies.
EARLY IDENTIFICATION OF SEPSIS

Early recognition of severe sepsis is critical to improving patient outcomes. The initial signs of sepsis can be subtle and difficult to identify. Many hospitals established a standard ED triage process that screens patients for severe sepsis on presentation. Severe sepsis criteria can be incorporated into institution-specific triage screening forms, or stand-alone screening protocols and simple checklists.

Once the sepsis team agrees on a standard screening tool, appropriate ED and ICU staff should be educated about its purpose and implementation. Hospitals should also consider incorporating sepsis screening into their electronic triage process and electronic health record clinical decision support functionality.

STOP Sepsis Collaborative participants used the following algorithm during triage screening for severe sepsis. Patients are flagged if they meet any three of the following criteria:

- Suspected serious infection;
- Temperature > 100.4 or < 96.8, or rigors;
- Heart rate > 90/min.;
- Respiratory rate > 20/min.;
- Unexplained alteration of mental status;
- O2 saturation < 90%
- Systolic blood pressure < 90 mmHg; or
- Suspected or known immune compromise.

Refer to Appendix E, the STOP Sepsis Collaborative template triage screening form, and Appendix F, which provides prompts to measure serum lactate in the recognition of severe sepsis.

Rapid Treatment of Sepsis

Since timing of recognition and treatment of patients with severe sepsis can greatly improve outcomes, a severe sepsis treatment protocol should immediately be initiated for patients who meet criteria from the triage screening checklist. Consistent adherence to a systematic algorithm of volume resuscitation, antibiotics, vasopressors, infectious source control, and frequent assessments of the patient’s response to therapy are all associated with a reduction in mortality.

Invasive Versus Non-Invasive Protocols

Recommendations for invasive interventions, including placing central venous catheters to guide resuscitation, have been an obstacle to widely applying a protocol-based treatment of severe sepsis. The invasive protocol had been difficult to achieve because of gaps in training and limited staff and equipment. The GNYHA/UHF STOP Sepsis Collaborative addressed this by offering an alternative protocol of non-invasive options, including using ultrasonography in assessing volume administration and measuring serum lactate as a surrogate marker of tissue oxygenation. Hospitals that chose the non-invasive protocol over the invasive approach still achieved a comparable mortality benefit.

The STOP Sepsis Collaborative's non-invasive and invasive severe sepsis protocols were applied only in patients with severe sepsis who came into the hospital through the ED and whose goals of care were curative; they all had severe sepsis or septic shock, with hypotension despite being given 2 L of fluids, or their serum lactate level was elevated at >4 mmol/L. The following is a list of tools to use with implementing either protocol, including videos and a bibliography.

Tools: Early Identification of Sepsis

- Severe Sepsis Triage Screening Tool (Appendix E)
- Prompts to Encourage Lactate Screening and Severe Sepsis Recognition (Appendix F)
A resuscitation checklist helps hospitals follow a step-by-step process to ensure compliance with the protocol and that an optimal standard of care is provided to every patient. A sample resuscitation checklist that STOP Sepsis Collaborative participants implemented is available in Appendix O.

**TOOL: Severe Sepsis Resuscitation Checklist (APPENDIX O)**
SEVERE SEPSIS DATA ELEMENTS
Severe sepsis–related process and outcome measures can be used by hospitals to improve quality of care and patient outcomes. After using Appendix A to assess current practices to identify areas for improvement and adopting a protocol-based approach to care, hospital teams must select appropriate measures to continuously monitor the effects of improvement efforts. Process and outcome measures should be identified carefully to provide meaningful feedback on progress made toward achieving hospitals’ goals and objectives throughout the implementation of a severe sepsis quality improvement initiative. The measures chosen should be clearly defined and directly map back to the initial goals and objectives stated by the team at the beginning of the initiative. A number of tools, including data elements, a training video, and sample reports that can help hospitals measure progress, are available in the box below.

TOOLS: Severe Sepsis Data Elements
- Severe Sepsis Data Elements (APPENDIX P)
- Severe Sepsis Data Definitions (APPENDIX Q)
- Severe Sepsis Data and Measures Frequently Asked Questions (APPENDIX R)
- How to Collect and Submit Data Concurrently Training Video (APPENDIX S)
- Sample Hospital Performance Report (APPENDIX T)


4. See note 1.

5. See note 3.
## CHAPTER VI: APPENDICES

<table>
<thead>
<tr>
<th>Appendix</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix A</td>
<td>Assessment of Current Practice Survey</td>
</tr>
<tr>
<td>Appendix B</td>
<td>Skill Gap Assessments for ED and ICU Physicians and Nurses</td>
</tr>
<tr>
<td>Appendix C</td>
<td>STOP Sepsis Collaborative Goals</td>
</tr>
<tr>
<td>Appendix D</td>
<td>Team Planning Worksheets</td>
</tr>
<tr>
<td>Appendix E</td>
<td>Severe Sepsis Triage Screening Tool</td>
</tr>
<tr>
<td>Appendix F</td>
<td>Prompts to Encourage Lactate Screening and Severe Sepsis Recognition</td>
</tr>
<tr>
<td>Appendix G</td>
<td>Severe Sepsis Resuscitation Protocol: Invasive</td>
</tr>
<tr>
<td>Appendix H</td>
<td>Severe Sepsis Resuscitation Protocol: Non-Invasive</td>
</tr>
<tr>
<td>Appendix I</td>
<td>Protocol Frequently Asked Questions</td>
</tr>
<tr>
<td>Appendix J</td>
<td>Evidence for the Protocols</td>
</tr>
<tr>
<td>Appendix K</td>
<td>Sepsis Identification and Resuscitation Protocols Training Video</td>
</tr>
<tr>
<td>Appendix L</td>
<td>IVC Ultrasound for Non-Invasive Sepsis Protocol Training Video</td>
</tr>
<tr>
<td>Appendix M</td>
<td>Lactate Frequently Asked Questions</td>
</tr>
<tr>
<td>Appendix N</td>
<td>Assessing Fluid Responsiveness</td>
</tr>
<tr>
<td>Appendix O</td>
<td>Severe Sepsis Resuscitation Checklist</td>
</tr>
<tr>
<td>Appendix P</td>
<td>Severe Sepsis Data Elements</td>
</tr>
<tr>
<td>Appendix Q</td>
<td>Severe Sepsis Data Definitions</td>
</tr>
<tr>
<td>Appendix R</td>
<td>Severe Sepsis Data and Measures Frequently Asked Questions</td>
</tr>
<tr>
<td>Appendix S</td>
<td>How to Collect and Submit Data Concurrently Training Video</td>
</tr>
<tr>
<td>Appendix T</td>
<td>Sample Hospital Performance Report</td>
</tr>
</tbody>
</table>

Electronic Versions of Appendices are available as attachments to this toolkit.
APPENDIX A: ASSESSMENT OF CURRENT PRACTICE SURVEY

Greater New York Hospital Association/United Hospital Fund Quality Initiatives

STOP SEPSIS COLLABORATIVE

ASSESSMENT OF CURRENT PRACTICE SURVEY

The following assessment is designed to improve our understanding of existing hospital protocols and processes related to the identification and treatment of severe sepsis. With this information, GNYHA and UHF hope to gain insight into opportunities for standardization in sepsis treatment processes and develop a structured severe sepsis improvement initiative.

As with all GNYHA/UHF data collection efforts, data that is submitted by hospitals will remain confidential. Thank you for your time and for sharing your hospital’s information.

1. Sepsis Identification
   1. Does your hospital have a structured collaboration in place (e.g., regularly scheduled meetings, collaborative efforts, regular communication) between the emergency department and intensive care units?
      □ YES □ NO

   2. How often do you have meetings between the ED and ICU to discuss sepsis related activities?
      □ MORE THAN ONCE A MONTH
      □ APPROXIMATELY ONCE A MONTH
      □ APPROXIMATELY ONCE A QUARTER
      □ OTHER (PLEASE SPECIFY)

   How often do you have meetings between the ED and ICU to discuss sepsis related-activities?

   3. Are these meetings…?
      □ SPECIFICALLY FOR SEPSIS REVIEW
      □ PART OF A LARGER COMMITTEE (E.G. CRITICAL CARE, QUALITY, ETC.)
      □ OTHER (PLEASE SPECIFY)
Assessment of Current Practice Survey cont.

For what other reason do you have meetings between the ED and the ICU to discuss sepsis-related activities?

4. Does your hospital have a protocol or algorithm to identify patients with sepsis? Please check all that apply.
   - [ ] YES, IN THE EMERGENCY DEPARTMENT
   - [ ] YES, IN THE MEDICAL/SURGICAL DEPARTMENT
   - [ ] YES, IN THE INTENSIVE CARE UNIT
   - [ ] NONE OF THE ABOVE

   Please describe the protocol or algorithm used to identify patients with sepsis.

   What percentage of sepsis cases in your hospital are identified using the protocol or algorithm?

5. Does your hospital have the resources to (please check all that apply):
   - [ ] PLACE AN INTERNAL JUGULAR OR SUBCLAVIAN CENTRAL LINE IN THE EMERGENCY DEPARTMENT
   - [ ] MONITOR CENTRAL VENOUS PRESSURE IN THE EMERGENCY DEPARTMENT
   - [ ] AGGRESSIVELY RESUSCITATE A SEPTIC PATIENT IN THE EMERGENCY DEPARTMENT
   - [ ] NONE OF THE ABOVE

   If you answered “none of above,” what resources are lacking?

II. Sepsis Resuscitation Protocol

6. Has your hospital implemented a sepsis resuscitation protocol? Please check all that apply. “Resuscitation” refers to the first 6 hours after identification of severe sepsis.
   - [ ] YES, IN THE EMERGENCY DEPARTMENT
   - [ ] YES, IN THE MEDICAL/SURGICAL DEPARTMENT
   - [ ] YES, IN THE INTENSIVE CARE UNIT
   - [ ] NONE OF THE ABOVE

   Does your hospital track clinician adherence to the sepsis resuscitation protocol?
   - [ ] YES
   - [ ] NO
Please list the specific protocol elements that your hospital tracks.

If applicable, for what percentage of sepsis cases in your hospital is the sepsis resuscitation protocol used?

7. Is there a designated person at your hospital who is responsible for educating staff about the sepsis resuscitation protocol?
   □ YES □ NO

   If so, is this person based in the:
   □ EMERGENCY DEPARTMENT
   □ MEDICAL/SURGICAL UNIT
   □ INTENSIVE CARE UNIT
   □ NOT APPLICABLE
   □ OTHER: [ ]

   Please list the department the person responsible for educating staff is based in.

III. Sepsis Outcome Data

8. Does your hospital track the outcomes of patients with sepsis?
   □ YES □ NO

   What outcomes do you track?

   If you have a designated person who collects the outcomes data for patients with severe sepsis, what is that person’s position within the hospital?

9. What are some challenges (clinical or otherwise) your hospital is facing related to implementing the STOP Sepsis Collaborative to date? Please list your top 3.
1. What is your job title?
   - [ ] ED ATTENDING
   - [ ] NURSE PRACTITIONER
   - [ ] EM RESIDENT
   - [ ] OTHER RESIDENT (PLEASE SPECIFY)

2. In your experience, what is the single greatest contributor to delays in treatment of severe sepsis and septic shock in our department?
   - [ ] LACK OF RECOGNITION OF POTENTIAL SEPSIS IN TRIAGE
   - [ ] DELAY IN DIAGNOSIS OF SEPSIS BY PHYSICIANS
   - [ ] KNOWLEDGE DEFICIT REGARDING APPROPRIATE MANAGEMENT
   - [ ] NURSING DELAYS (TIME TO COMPLETION OF ORDERS)
   - [ ] PHARMACY DELAYS (E.G. PROFILING OF ZOSYN)
   - [ ] LAB DELAYS
   - [ ] LACK OF NECESSARY EQUIPMENT (PLEASE EXPLAIN BELOW)
   - [ ] DELAY IN AVAILABILITY OF ICU BEDS
   - [ ] OTHER (PLEASE EXPLAIN BELOW)

3. Would protocolized order sheets like those for pneumonia and ACS help you to manage septic patients?
   - [ ] YES  [ ] NO
   
   COMMENTS

Published with permission from NewYork-Presbyterian Hospital. Adapted for the STOP Sepsis Collaborative.
4. Which of the following would be significant barriers to the implementation of a protocolized approach similar to Rivers/Early Goal Directed Therapy (EGDT) for resuscitation of severe sepsis in our department (check all that apply)?

- Lack of Agreement with Protocol Outlined by EGDT
- Central Catheter Insertion
- Measuring Lactate
- Nursing Staff Required to Perform EGDT
- Access to Protocol Medications (Pressors, Dobutamine)
- Access to CVP/SvCO2 Monitoring
- Physical Space in the ED
- Handoff Between ED and ICU (Transfer of Care)
- Other (Please Specify)

5. When ordering blood cultures, do you also order lactate?

- Always
- Sometimes
- Hardly Ever

6. Studies demonstrate a correlation between arterial and venous lactate measurements of

- >90%
- 75–90%
- <70%

7. What is the minimum value of venous lactate that would concern you for severe sepsis? (Please do not enter a range.)

8. How much fluid on average would you anticipate giving the severely septic/septic shock patient during a six-hour stay in the ED? (Enter in liters; please do not enter a range.)

9. Please rate your competence in the performance of IVC ultrasound to assess fluid responsiveness in the hypotensive patient.

- Very Competent
- Somewhat Competent
- Not at All Competent

Published with permission from NewYork-Presbyterian Hospital. Adapted for the STOP Sepsis Collaborative.
10. How often do you use vasopressors and/or dopamine for the severe sepsis/septic shock patient?

**VASOPRESSORS**
- [ ] OFTEN
- [ ] SOMETIMES
- [ ] HARDLY EVER

**DOPAMINE**
- [ ] OFTEN
- [ ] SOMETIMES
- [ ] HARDLY EVER

Which vasopressors? Always through a central line?

11. Please rate your confidence in your ability to choose appropriate antibiotics for the severely septic patient.
- [ ] VERY CONFIDENT
- [ ] SOMewhat CONFIDENT
- [ ] NOT AT ALL CONFIDENT

12. Are you familiar with the SIRS (systemic inflammatory response syndrome) criteria?
- [ ] YES
- [ ] SOMewhat
- [ ] NOT AT ALL

13. Please provide your suggestions on ways to improve our department’s performance in the early recognition and treatment of severe sepsis and septic shock.

Published with permission from NewYork-Presbyterian Hospital. Adapted for the STOP Sepsis Collaborative.
1. How long have you been in practice?

- □ 0–2 YEARS
- □ 2–5 YEARS
- □ 5–10 YEARS
- □ 10+ YEARS

2. In your experience, what is the single greatest contributor to delays in treatment of severe sepsis and septic shock in our department?

- □ LACK OF RECOGNITION OF POTENTIAL SEPSIS IN TRIAGE
- □ DELAY IN DIAGNOSIS OF SEPSIS BY PHYSICIANS
- □ KNOWLEDGE DEFICIT REGARDING APPROPRIATE MANAGEMENT
- □ NURSING DELAYS (TIME TO COMPLETION OF ORDERS)
- □ PHARMACY DELAYS (E.G., PROFILING OF ZOSYN)
- □ LAB DELAYS
- □ LACK OF NECESSARY EQUIPMENT (PLEASE EXPLAIN BELOW)
- □ DELAY IN AVAILABILITY OF ICU BEDS
- □ OTHER (PLEASE EXPLAIN BELOW)

3. How confident do you feel in your ability to recognize the following conditions in triage?

<table>
<thead>
<tr>
<th>Condition</th>
<th>Very Confident</th>
<th>Somewhat Confident</th>
<th>Not at All Confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>PNEUMONIA</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>SEVERE SEPSIS</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>SEPTIC SHOCK</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

4. Would protocolized order sheets like those for pneumonia and ACS help you to manage septic patients?

- □ YES
- □ NO

COMMENTS

Published with permission from NewYork-Presbyterian Hospital. Adapted for the STOP Sepsis Collaborative.
5. Which of the following would be significant barriers to the implementation of a protocolized approach for resuscitation of severe sepsis in our department (check all that apply)?

- CENTRAL CATHETER INSERTION
- MEASURING LACTATE
- TIME REQUIRED TO CARRY OUT ORDERS
- ACCESS TO PROTOCOL MEDICATIONS (PRESSORS, DOBUTAMINE)
- ACCESS TO CVP/SVCO2 MONITORING
- PHYSICAL SPACE IN THE ED
- HANDOFF BETWEEN ED AND ICU (TRANSFER OF CARE)
- OTHER (PLEASE SPECIFY)

6. Do you feel that abnormal vital signs are reported to you in a timely fashion by support staff?

- YES, ALMOST ALWAYS
- SOMETIMES
- NO, HARDLY EVER

COMMENTS

7. When blood cultures are ordered, do you often also see venous lactate ordered?

- ALWAYS
- SOMETIMES
- HARDLY EVER

COMMENTS

8. Studies demonstrate a correlation between arterial and venous lactate measurements of

- >90%
- 75–90%
- <70%
- NOT SURE

9. Which is the appropriate tube for sending venous lactate?

- GOLD TOP
- GOLD TOP ON ICE
- LIGHT GREEN TOP ON ICE
- LAVENDAR TOP

10. What is the minimum value of venous lactate that would concern you for severe sepsis? (Please do not enter a range.)
ED Baseline 2010 (RN version) cont

11. How much fluid on average would you anticipate giving the severely septic/septic shock patient during a six-hour stay in the ED? (Enter in liters; please do not enter a range.)

12. How often do you use vasopressors and/or dopamine for the severe sepsis/septic shock patient?

**VASOPRESSORS**
- [ ] OFTEN
- [ ] SOMETIMES
- [ ] HARDLY EVER

**DOPAMINE**
- [ ] OFTEN
- [ ] SOMETIMES
- [ ] HARDLY EVER

Which vasopressors? Always through a central line?

13. Are you familiar with the SIRS (systemic inflammatory response syndrome) criteria?
- [ ] YES
- [ ] SOMEWHAT
- [ ] NOT AT ALL

14. Please provide your suggestions on ways to improve our department’s performance in the early recognition and treatment of severe sepsis and septic shock.

Published with permission from NewYork-Presbyterian Hospital. Adapted for the STOP Sepsis Collaborative.
1. What is your job title?
   - [ ] ICU ATTENDING
   - [ ] NURSE PRACTITIONER
   - [ ] CRITICAL CARE FELLOW
   - [ ] RESIDENT
   - [ ] INTERN
   - [ ] OTHER RESIDENT (PLEASE SPECIFY)

2. In your experience, what is the single greatest contributor to delays in treatment of severe sepsis and septic shock in our department?
   - [ ] KNOWLEDGE DEFICIT REGARDING APPROPRIATE MANAGEMENT
   - [ ] NURSING DELAYS (TIME TO COMPLETION OF ORDERS)
   - [ ] PHARMACY DELAYS (OBTAINING NEEDED MEDICATIONS)
   - [ ] LAB DELAYS
   - [ ] LACK OF NECESSARY EQUIPMENT (PLEASE EXPLAIN BELOW)
   - [ ] DELAY IN TREATMENT IN THE ED
   - [ ] DELAY IN TREATMENT ON THE FLOOR
   - [ ] DELAY IN TRANSFER FROM ED
   - [ ] DELAY IN TRANSFER FROM THE FLOOR
   - [ ] OTHER (PLEASE EXPLAIN BELOW)

3. Would Eclypsis order sets help you to manage sepsis?
   - [ ] YES
   - [ ] NO

   COMMENTS

Published with permission from NewYork-Presbyterian Hospital. Adapted for the STOP Sepsis Collaborative.
ICU Baseline 2010 (MD version) cont.

4. Which of the following would be significant barriers to the implementation of a protocolized approach similar to Rivers/Early Goal Directed Therapy (EGDT) for resuscitation of severe sepsis in our department (check all that apply)?
   - LACK OF AGREEMENT WITH PROTOCOL OUTLINED BY EGDT
   - CENTRAL CATHETER INSERTION
   - MEASURING LACTATE
   - NURSING STAFF REQUIRED TO PERFORM EGDT
   - ACCESS TO PROTOCOL MEDICATIONS (ANTIBIOTICS)
   - ACCESS TO CVP MONITORING
   - ACCESS SVO2 SAT MONITORING
   - HANDOFF BETWEEN ED AND ICU (TRANSFER OF CARE)
   - HANDOFF BETWEEN FLOOR AND ICU NURSING DELAYS (TIME TO COMPLETION OF ORDERS)
   - OTHER (PLEASE EXPLAIN BELOW)

5. When ordering blood cultures, do you also order lactate?
   - ALWAYS
   - SOMETIMES
   - HARDLY EVER
   - COMMENTS

6. Studies demonstrate a correlation between arterial and venous lactate measurements of
   - >90%
   - 75–90%
   - <70%

7. What is the minimum value of venous lactate that would concern you for severe sepsis? (Please do not enter a range.)

8. How much fluid on average would you anticipate giving the severely septic/septic shock patient during the first six hours following diagnosis? (Enter in liters; please do not enter a range.)

Published with permission from NewYork-Presbyterian Hospital. Adapted for the STOP Sepsis Collaborative.
ICU Baseline 2010 (MD version) cont.

9. Please rate your competence in the performance of IVC ultrasound to assess fluid responsiveness in the hypotensive patient.
   - [ ] VERY COMPETENT
   - [ ] SOMEWHAT COMPETENT
   - [ ] NOT AT ALL COMPETENT

10. How often do you use vasopressors and/or dopamine for the severe sepsis/septic shock patient?

<table>
<thead>
<tr>
<th>Vasopressor</th>
<th>Often</th>
<th>Sometimes</th>
<th>Hardly Ever</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vasopressin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noradrenaline</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phenylephrine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dobutamine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dopamine</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Which vasopressors? Always through a central line?

11. Please rate your confidence in your ability to choose appropriate antibiotics for the severely septic patient.
   - [ ] VERY CONFIDENT
   - [ ] SOMEWHAT CONFIDENT
   - [ ] NOT AT ALL CONFIDENT

12. Are you familiar with the SIRS (systemic inflammatory response syndrome) criteria?
   - [ ] YES
   - [ ] SOMEWHAT
   - [ ] NOT AT ALL

13. Please provide your suggestions on ways to improve our department’s performance in the early recognition and treatment of severe sepsis and septic shock on the floor and in the ICU.

Published with permission from NewYork-Presbyterian Hospital. Adapted for the STOP Sepsis Collaborative.
ICU BASELINE 2010 (RN VERSION)

1. How long have you been in practice?
   - 0–2 YEARS
   - 2–5 YEARS
   - 5–10 YEARS
   - 10+ YEARS

2. In your experience, what is the single greatest contributor to delays in treatment of severe sepsis and septic shock in our department?
   - DELAY IN DIAGNOSIS OF SEPSIS BY PHYSICIANS
   - KNOWLEDGE DEFICIT REGARDING APPROPRIATE MANAGEMENT
   - NURSING DELAYS (OBTAINING NEEDED MEDICATIONS)
   - LAB DELAYS
   - LACK OF NECESSARY EQUIPMENT (PLEASE EXPLAIN BELOW)
   - DELAY IN TRANSFER FROM ED
   - DELAY IN TRANSFER FROM THE FLOOR
   - OTHER (PLEASE EXPLAIN BELOW)

3. How confident do you feel in your ability to recognize the following conditions?
   - PNEUMONIA
   - SEVERE SEPSIS
   - SEPTIC SHOCK

4. Would Eclipsys order sets help you to care for septic patients?
   - YES
   - NO

Published with permission from NewYork-Presbyterian Hospital. Adapted for the STOP Sepsis Collaborative.
ICU Baseline 2010 (RN version) cont.

5. Which of the following would be significant barriers to the implementation of a protocolized approach for resuscitation of severe sepsis in our department (check all that apply)?

- MEASURING LACTATE
- TIME REQUIRED TO CARRY OUT ORDERS
- ACCESS TO PROTOCOL MEDICATIONS (ANTIBIOTICS)
- CVP MONITORING
- SVCO2 MONITORING
- HANDOFF BETWEEN ED AND ICU (TRANSFER OF CARE)
- OTHER (PLEASE SPECIFY)

6. When blood cultures are ordered, do you often also see venous lactate ordered?

- ALWAYS
- SOMETIMES
- HARDLY EVER

COMMENTS

7. Studies demonstrate a correlation between arterial and venous lactate measurements of

- >90%
- 75–90%
- <70%
- NOT SURE

8. Which is the appropriate tube for sending venous lactate?

- GOLD TOP
- GOLD TOP ON ICE
- LIGHT GREEN TOP ON ICE
- LAVENDER TOP

9. What is the minimum value of venous lactate that would concern you for severe sepsis? (Please do not enter a range.)

10. How much fluid on average would you anticipate giving the severely septic/septic shock patient during the first six hours following diagnosis? (Enter in liters; please do not enter a range.)
ICU Baseline 2010 (RN version) cont.

11. How often do you see vasopressors and/or dopamine being used for the severe sepsis/septic shock patient?

<table>
<thead>
<tr>
<th></th>
<th>OFTEN</th>
<th>SOMETIMES</th>
<th>HARDLY EVER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vasopressin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norepinephrine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phenylephrine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dobutamine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dopamine</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Which vasopressors? Always through a central line?

12. Are you familiar with the SIRS (systemic inflammatory response syndrome) criteria?
- [ ] YES
- [ ] SOMEWHAT
- [ ] NOT AT ALL

13. Please provide your suggestions on ways to improve our department’s performance in the early recognition and treatment of severe sepsis and septic shock.
**APPENDIX C: STOP SEPSIS COLLABORATIVE GOALS**

Greater New York Hospital Association/United Hospital Fund Quality Initiatives

**STOP SEPSIS COLLABORATIVE**

**THE STOP SEPSIS COLLABORATIVE GOALS**

1. To reduce mortality in patients with severe sepsis and septic shock by implementing a protocol-based approach to case identification and resuscitation; and
2. To enhance communication and patient flow between the emergency department and other areas of the hospital, in particular, the intensive care units.

<table>
<thead>
<tr>
<th>COLLABORATIVE OBJECTIVES</th>
<th>RELATED MEASURE(S)</th>
<th>DATA COLLECTION METHOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% of participating hospitals implement a protocol or algorithm for identifying patients with sepsis starting in the ED and the ICUs within 6 months, with eventual spread to all med/surg units.</td>
<td>Formal process for identifying patients with sepsis implemented starting in the ED and the ICUs, with eventual spread to all med/surg units.</td>
<td>GNYHA/UHF Assessment of Current Practices (baseline and remeasurement)</td>
</tr>
<tr>
<td>100% of participating hospitals implement a sepsis resuscitation protocol starting in the ED and the ICUs within 6 months, with eventual spread to all med/surg units.</td>
<td>Formal resuscitation protocol for patients with sepsis implemented starting in the ED and the ICUs, with eventual spread to all med/surg units.</td>
<td>GNYHA/UHF Assessment of Current Practices (baseline and remeasurement)</td>
</tr>
<tr>
<td>Reduce the time of antibiotic initiation to within one hour of recognition of severe sepsis in the ED within 6 months.</td>
<td>≤ 1 hour between the time stamp for recognition of severe sepsis and time antibiotics started.</td>
<td>Monthly data collection form</td>
</tr>
<tr>
<td>Limit time to meeting sepsis resuscitation goals to 6 hours or less within 6 months.</td>
<td>≤ 6 hours between the time stamp for recognition of severe sepsis and either ScvO2 &gt; 70% OR serum lactate declined by ≥10%.</td>
<td>Monthly data collection form</td>
</tr>
<tr>
<td>Improve severe sepsis mortality rates by 10% in participating hospitals.</td>
<td>Survival to hospital discharge.</td>
<td>Monthly data collection form</td>
</tr>
</tbody>
</table>
### TEAM EXERCISE: PLANNING WORKSHEET

<table>
<thead>
<tr>
<th>NAME OF HOSPITAL</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME OF KEY CONTACT</td>
<td></td>
</tr>
<tr>
<td>E-MAIL ADDRESS OF KEY CONTACT</td>
<td></td>
</tr>
</tbody>
</table>

The **[Team Name]** Team intends to accomplish (general statement describing what you intend to accomplish as you work in the STOP Sepsis Collaborative).

by **[Time Frame]**

because (reasons to work on this improvement):

Our goals are: (what will you measure and monitor through the initiative?)

---

Please complete the grid on the reverse side of this page to use as a guide for developing your work plan.
## TEAM WORK PLAN

### SHORT-TERM OBJECTIVES (OVER THE NEXT MONTH)

<table>
<thead>
<tr>
<th>TOPIC/WHAT</th>
<th>HOW</th>
<th>WHO</th>
<th>STARTING WHEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Create STOP Sepsis Project Team within your hospital</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Completion of the Collaborative’s Baseline Assessment Survey</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan for roll-out of STOP Sepsis protocols</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development of Educational Programs to introduce staff to STOP Sepsis protocols</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dissemination of information about the STOP Sepsis initiative within the Emergency Department, ICU, and other inpatient settings</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plan for and implement method(s) for Collecting Data</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you have other short-term objectives you hope to accomplish during the STOP Sepsis Collaborative, please describe them here:
STOP SEPSIS COLLABORATIVE

TEAM PLANNING WORKSHEET: ADDRESSING CHALLENGES, GOALS, AND SUSTAINABILITY

NAME OF HOSPITAL

NAME OF KEY CONTACT

E-MAIL ADDRESS OF KEY CONTACT

The STOP Sepsis Collaborative Goals:
• To reduce mortality in patients with severe sepsis and septic shock by implementing a protocol-based approach to case identification and resuscitation; and
• To enhance communication and patient flow between the emergency department and other areas of the hospital, in particular, the intensive care units.

List any changes to existing processes that your team has made over the past year in implementing the stated Collaborative goals.

What is the biggest success your team has achieved thus far in the Collaborative? (This can be anything from implementing new care processes, meeting performance improvement/outcome goals, developing a useful method to pursue data collection/measurement, or establishing a new interdisciplinary sepsis committee that meets regularly within your institution.)

What would you consider your team’s biggest challenge(s) thus far with implementing the protocols and data collection process during the Collaborative and striving to meet its stated goals and objectives?

If your hospital is having difficulty sending and documenting/reporting repeat lactates as part of meeting the resuscitation targets, what are some of the specific challenges?

What will your team’s strategy to overcome your current challenges be over the next 12 months?
Please complete the grid below to use as a guide for developing your team’s work plan. List specific activities related to your team’s strategy to reach short- and long-term goals. Assign team member roles, target objectives, timeframes, etc. Be as specific as possible.

### TEAM WORK PLAN

**WHAT IS YOUR TEAM’S STRATEGY TO EXPAND YOUR SEPSIS IDENTIFICATION AND TREATMENT EFFORTS TO OTHER AREAS OF THE HOSPITAL BEYOND THE INITIAL EMERGENCY DEPARTMENT/INTENSIVE CARE UNIT FOCUS?**

<table>
<thead>
<tr>
<th>WHAT</th>
<th>HOW</th>
<th>WHO</th>
<th>STARTING WHEN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Over the Next Month</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Over the Next 6 Months</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>Over the Next Year</strong></td>
</tr>
</tbody>
</table>

**WHAT ARE YOUR HOSPITAL’S ADDITIONAL SHORT- AND LONGER-TERM GOALS IN THE COLLABORATIVE? LIST SPECIFIC ACTIVITIES YOUR TEAM WILL TRY TO ACCOMPLISH OVER THE NEXT SIX MONTHS TO A YEAR TO CONTINUE ITS CURRENT WORK AND WORK TOWARDS YOUR INTERNAL GOALS?**

<table>
<thead>
<tr>
<th>WHAT</th>
<th>HOW</th>
<th>WHO</th>
<th>STARTING WHEN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
STOP SEPSIS COLLABORATIVE DATA QUESTIONNAIRE

Instructions: Before completing this worksheet, please review your institution’s hospital-specific data report with your team members. We then ask that you complete the following information as a team.

Our intent is to use this information during the upcoming learning session to address common challenges that hospitals are experiencing with regard to data collection. Additionally, we would like to highlight successes that participating hospitals are experiencing so that others may benefit from hearing what has contributed to your accomplishments.

NAME OF HOSPITAL

NAME OF KEY CONTACT

E-MAIL ADDRESS OF KEY CONTACT

What have been your team’s successes with data collection for the Collaborative?

What have been some of your team’s challenges with the data collection?

What will your team’s strategy to overcome your current challenges be over the next four months?

Based on the online data reports available to you in the Collaborative, what are the major issues you need to improve in terms of data quality, or in your overall data collection approach? How will you address these issues?
STOP SEPSIS COLLABORATIVE

SEVERE SEPSIS TRIAGE SCREENING TOOL

Does the patient have any three of the following?

- Suspected Infection
- Temperature > 100.4 or < 96.5 or Rigors
- Heart Rate > 90/min.
- Respiratory Rate > 20/min.
- Any alteration of mental status
- O2 Saturation < 90%
- Systolic Blood Pressure < 90 mmHg
- Suspected/Known Immunocompromise (AIDS/Active Cancer/Organ transplant patient)

☐ Yes ☐ No

If Yes clicked: Go to Nursing Sepsis Panel Orders.

Triage Sepsis Panel Orders (all boxes should be checked by default)

- Notify Clinician to Initiate Verbal Order for Sepsis Panel
- Complete Blood Count (CBC)
- Metabolic Panel
- Lactate (Venous or Arterial)
- Draw and Hold PT/PTT
- Draw and Hold Blood Cultures
- Record Vital Signs Q1 Hour Plus Temperature

Is the patient’s SBP < 90 or MAP < 65

☐ Yes ☐ No

If Yes clicked: Present case to physician.

If patient meets criteria, but you feel the patient doesn’t need lab testing, please speak to attending.
STAFF NURSE SIGNS
On all blood culture bottle drawers are signs with the message, “Sending blood cultures, send a lactate as well.”

PANIC VALUE
Make lactate ≥ 4 a hospital-wide, or at least ED, critical value that has the lab call a clinician.

ELECTRONIC HEALTH RECORD PROMPTS
BLOOD CULTURE ORDER PROMPTING
If you are admitting or sending blood cultures on a patient who you believe might be infected, send a LACTATE.

ADMISSION PROMPTING
If admitting diagnosis is UTI, pneumonia, sepsis, urosepsis, fever, a prompt to screen for severe sepsis comes up.
**APPENDIX G: SEVERE SEPSIS RESUSCITATION PROTOCOL: INVASIVE**

**STOP SEPSIS COLLABORATIVE**

Greater New York Hospital Association/United Hospital Fund Quality Initiatives

### WHO

Septic Patient with Lactate ≥ 4 mmol/L or MAP < 65 after 2 liters crystalloid and goals of care are curative.

### INITIAL RESUSCITATION

- Administer 20–30 ml/kg isotonic crystalloid bolus over 20 minutes.
- Send cultures of all likely sources of infection.
- Think of source control. (Infected catheter? Operative intervention for infection? Drainable pus?)
- Administer antibiotics to cover all likely sources of infection.
- Place full-sterile central line in the IJ (preferably with ultrasound) or subclavian vein.

### SpO2

If patient’s O2 saturation is < 90% on high fio2 supplemental oxygen (non-rebreather mask), consider:
- **INTUBATION** (Beware, the patient may drop their blood pressure precipitously)
  - Place on lung protective ventilation.
  - Place on pain control regimen, administer sedation after pain controlled.

### FLUIDS

Choose 1 Strategy:
- **DYNAMIC IVC ULTRASOUND:** Keep giving 500–1000 ml boluses of isotonic crystalloid until there is < 30% change in IVC size if not intubated or > 12% if intubated.
- **CVP:** Administer fluids until CVP > 10 mm Hg in non-intubated patients and > 14 mm Hg in intubated patients.
- **EMPIRIC FLUID LOADING:** Patients with severe sepsis/septic shock may require at least 6 liters of fluid during their acute resuscitation (first 6 hours of care).

### RE-CHECKING MAP

- If MAP is < 65 after adequate fluid loading, start vasopressors.
- Titrate vasopressors to achieve a MAP ≥ 65.

### TISSUE OXYGENATION

- Send repeat lactate and ScvO2.
- If lactate has cleared by ≥ 10% and ScvO2 ≥ 70%, go to disposition.
- If ScvO2 < 70 or lactate hasn’t cleared by ≥ 10%, choose 1 Option:
  - IF HB < 7: transfuse 1 unit of PRBC or
  - ADDITIONAL FLUIDS: if using CVP to determine fluid status, administer an additional liter of isotonic crystalloid or
  - INOTROPES: especially if heart appears hypodynamic on echo. If calcium is low, replete that first. If not, administer dobutamine 5–20 mcg/kg/min or
  - INTUBATE: to decrease pulmonary metabolic load or
  - IF HB 7–10: consider transfusion. Especially in elderly patients or patients with coronary artery disease.
  - Send repeat lactate and ScvO2. If ScvO2 < 70 or if lactate still has not cleared by ≥10%, continue with the above, trending lactates and ScvO2 every 1 hour until these two goals are met.

### DISPOSITION

- Patients should get ICU consultation. If not an ICU candidate, should go to appropriately monitored bed.
- Periodically recheck patient for MAP ≥ 65, good mental status, and good urine output.
- Consider trending lactate every Q 2–4 hours. If it starts rising again, restart protocol.
## APPENDIX H: SEVERE SEPSIS RESUSCITATION PROTOCOL: NON-INVASIVE

**Greater New York Hospital Association/United Hospital Fund Quality Initiatives**

**STOP SEPSIS COLLABORATIVE**

### SEVERE SEPSIS RESUSCITATION PROTOCOL: NON-INVASIVE

<table>
<thead>
<tr>
<th>WHO</th>
<th>Septic Patient with Lactate ≥ 4 mmol/L or MAP &lt; 65 after 2 liters crystalloid and goals of care are curative.</th>
</tr>
</thead>
</table>
| **INITIAL RESUSCITATION** | • Administer 20–30 ml/kg isotonic crystalloid bolus over 20 minutes.  
• Send cultures of all likely sources of infection.  
• Think of source control. (Infected catheter? Operative intervention for infection? Drainable pus?)  
• Administer antibiotics to cover all likely sources of infection. |
| **SpO2** | If patient’s O2 saturation is < 90% on high fiO₂ supplemental oxygen (non-rebreather mask), consider intubation and switching to invasive strategy. |
| **FLUIDS** | Choose 1 Strategy:  
• **DYNAMIC IVC ULTRASOUND:** Keep giving 500–1000 ml boluses of isotonic crystalloid until there is < 30% change in IVC size with inspiration.  
• **EMPIRIC FLUID LOADING:** Patients with severe sepsis/septic shock may require at least 6 liters of fluid during their acute resuscitation (first 6 hours of care). |
| **RE-CHECKING MAP** | • If MAP is < 65 after adequate fluid loading:  
  ◦ Place a full sterile central line in the IJ or SC vein (femoral site only if neck line not feasible);  
  ◦ Start vasopressors; titrate to a MAP ≥65;  
  ◦ Consider switching to invasive protocol. |
| **TISSUE OXYGENATION** | • Send repeat lactate when above goals are accomplished (send a 2nd lactate at 3-hour mark, if not already sent).  
  • If lactate has cleared by ≥ 10% (or is not rising if original lactate was ≤ 2 mmol/L), go to disposition.  
  • If lactate is rising or has cleared by < 10%, choose 1 option:  
    ◦ **IF HB < 7:** transfuse 1 unit of PRBC  
    ◦ **ADDITIONAL FLUIDS:** if patient had empiric fluid loading, give an additional liter of crystalloid or  
    ◦ **INOTROPES:** especially if heart appears hypodynamic on echo. If calcium is low, replete that first. If not, administer dobutamine 5–20 mcg/kg/min or  
    ◦ **IF HB 7–10:** consider transfusion. Especially in elderly patients or patients with coronary artery disease.  
  • Send 3rd lactate, if it still has not cleared by ≥10%, continue with the above, trending lactates every 1–2 hours until these two goals are met or switch to invasive strategy (send 3rd lactate at the 6-hour mark, if not already sent). |
| **DISPOSITION** | • Patients should get ICU consultation. If not an ICU candidate, should go to appropriately monitored bed.  
  • Periodically recheck patient for MAP ≥ 65, good mental status, and good urine output.  
  • Consider trending lactate every Q 2–4 hours. If it starts rising again, restart protocol. |
APPENDIX I: PROTOCOL FREQUENTLY ASKED QUESTIONS

Greater New York Hospital Association/United Hospital Fund Quality Initiatives

STOP SEPSIS COLLABORATIVE

PROTOCOL FREQUENTLY ASKED QUESTIONS

The FAQ below was designed to provide STOP Sepsis Collaborative teams with a concise framework to describe the clinical rationale for undertaking the non-invasive and invasive severe sepsis protocols, and to link evidence and clinical resources to the protocols.

The following sections outline key features of the components of the severe sepsis invasive and non-invasive protocols:

WHO?
Q: To which patients do the STOP Sepsis Collaborative’s noninvasive and invasive severe sepsis protocols apply?

A: Patients with severe sepsis who come into the hospital through the emergency department (ED) should be tracked. The Collaborative protocol is applied only in the following patients:

- Those who are hypotensive after being given 2 L of fluids or those with an elevated lactate (>4 mmol/L).
- Patients whose goals of care are curative.

Q: Which algorithm should be used during triage assessment to screen patients with severe sepsis?

A: Patients should be flagged if they meet any three of the following criteria:

- Suspected serious infection;
- Temp > 100.4 or < 96.5 or rigors;
- HR > 90/min.;
- RR > 20/min.;
- Unexplained alteration of mental status;
- O2 Sat < 90%; SBP < 90 mmHg; OR
- Suspected or known immune compromise.

NOTE: Refer to the STOP Sepsis Collaborative Triage Screening Tool at [www.gnyha.org/sepsis/tools](http://www.gnyha.org/sepsis/tools).

INITIAL RESUSCITATION
Q: What should be done after identifying a patient with possible severe sepsis or septic shock?

A: For initial resuscitation, the protocols have you complete all of the following:

- Administer 20–30 ml/kg isotonic crystalloid over 20 minutes
- Send cultures of all likely sources of infection
- Think of source control (Infected catheter? Operative intervention for infection? Purulent collection?)
- Administer antibiotics to cover all likely sources of infection

NOTE: If following the invasive protocol, additionally place a full-sterile central line in the IJ (preferably with ultrasound) or subclavian vein.

**Sp02**

Q: When following the noninvasive and invasive protocols, what are the steps to follow if the patient’s blood oxygen saturation level is <90% on high Fi02 supplemental oxygen (non-rebreather mask)?

A: See the chart below for the steps to follow:

<table>
<thead>
<tr>
<th>NON-INVASIVE PROTOCOL</th>
<th>INVASIVE PROTOCOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consider intubation and switching to invasive protocol</td>
<td>• Consider intubation</td>
</tr>
<tr>
<td></td>
<td>• Place patient on lung-protective ventilation</td>
</tr>
<tr>
<td></td>
<td>• Control pain, sedation after pain is controlled</td>
</tr>
</tbody>
</table>

**FLUIDS**

Q: How should clinicians assess fluid responsiveness in patients with severe sepsis?

A: Consider one strategy:

- Administer fluids guided by IVC ultrasound; OR
- Administer fluids using CVP if you are using the invasive protocol; OR
- If these are not available, administer fluids empirically. Patients with severe sepsis and septic shock may require at least 6 liters of fluid during their acute resuscitation (first 6 hours of care). Use isotonic crystalloid under pressure bag for fluid loading.

NOTE: For more information, refer to the Assessing Fluid Responsiveness (www.gnyha.org/10670/File.aspx) and Predicting Fluid Responsiveness in Resuscitated Septic Patients (www.gnyha.org/10671/File.aspx) resources presented by Scott Weingart, M.D., Elmhurst Hospital Center, Co-Chair of the STOP Sepsis Collaborative.

**RE-CHECKING MEAN ARTERIAL PRESSURE (MAP)**

Q: What should hospitals do if the patient’s MAP is less than 65 after fluid loading?

A: With the noninvasive protocol, place a central line in the IJ or SC vein (avoid femoral site); start vasopressors; titrate to a MAP ≥65; consider change to invasive protocol.

**TISSUE OXYGENATION**

Q: Why should clinicians measure a repeat lactate?

A: Repeated lactate measurements provide an indirect measure of tissue oxygenation, with lactate clearance indicating improved perfusion.

Q: What should clinicians do if the patient’s lactate has cleared by ≥10% and Scv02 is ≥70%?

A: Hospitals should follow the disposition process outlined on the noninvasive or invasive protocols, and follow the steps below:

- Patients should be evaluated for ICU admission. If admission is declined, the patient should go to an appropriately monitored bed.
- Periodically determine that MAP ≥ 65, mental status is intact, and urine output is satisfactory.
- Consider measuring lactate every Q 2–4 hours. If lactate increases, restart protocol.
Protocol Frequently Asked Questions cont.

Q: What should clinicians do if the resuscitation goals have not been met?

A: Choose one option:
- If Hb < 7: transfuse 1 unit of PRBC; OR
- Additional Fluids: if patient had empiric fluid loading, give an additional liter of isotonic crystalloid; OR
- Inotropes: especially if heart appears hypodynamic on echo. If serum calcium is low, replete that first. If not, administer dobutamine 5–20 mcg/kg/min.; OR
- If Hb 7–10: consider PRBC transfusion, especially in elderly patients or patients with coronary artery disease; OR
- When following the invasive protocol, consider intubation and mechanical ventilation to decrease work of breathing and muscle O2 demand.

NOTE: For more information, refer to the STOP Sepsis Collaborative’s Lactate: Frequently Asked Questions document at www.gnyha.org/sepsis/media.

DISPOSITION

Q: How should clinicians monitor patients that were treated for severe sepsis and septic shock?

A: The patient should be admitted to the ICU or another appropriately monitored bed. Recheck the patient’s MAP, mental status, and urine output. Consider trending lactate Q 2–4 hours. If the lactate level starts to rise, hospitals restart the protocol.

STOP SEPSIS COLLABORATIVE

EVIDENCE FOR THE PROTOCOLS

EVIDENCE FOR NON-INVASIVE PROTOCOL


EVIDENCE FOR THE INVASIVE PROTOCOL


SONOGRAPHY OF THE IVC FOR PREDICTION OF FLUID RESPONSIVENESS


LACTATE AS A MARKER FOR ADEQUATE RESUSCITATION


This video discusses the important components of severe sepsis identification and resuscitation, and reviews the triage screening form and treatment protocols.

Developed by Scott Weingart, M.D., STOP Sepsis Collaborative Co-Chair and Director, ED Critical Care, Elmhurst Hospital Center, Mount Sinai School of Medicine.
This is a short instructional video on using ultrasound of the inferior vena cava to assess fluid responsiveness.

Developed by Scott Weingart, M.D., STOP Sepsis Collaborative Co-Chair and Director, ED Critical Care, Elmhurst Hospital Center, Mount Sinai School of Medicine.
Q: Why do these guys keep talking about lactate?

A: An elevated lactate is associated with increased mortality. If the lactate is cleared it is associated with better outcome. Lactate is the best means to screen for occult severe sepsis (occult sepsis is when the patient’s blood pressure and mental status are good, but the patient is still at high risk of death). In the River’s Trial, almost 1/5 of the patients with severe sepsis had a completely normal blood pressure (MAP > 100). Almost 1/5 of the patients didn’t have a SSP < 90 when their lactate was discovered to be high.

Q: Ahh, so an elevated lactate is a sign of anaerobic metabolism. Tissue oxygen delivery goes down so lactate goes up; makes total sense...right?

A: Unfortunately, it is not that simple. Most of the cases of elevated lactate are probably occurring with good global oxygen delivery. Even the theory of regional hypoxia is probably not the explanation. More likely, the adrenergic state and the cytokine storm changes glucose metabolism, lactate metabolism, and lactate use. The heart and the brain can actually take up lactate and use it for energy, so lactate generation is probably an adaptive response to stress situations. Much of the lactate may be from the lung in sepsis and acute lung injury.

Q: What is the unit of measurement? Oh, and what is this d-lactate stuff I’ve heard about? And how does lactic acid fit in with all of this?

A: Lactate should be measured in mmol/L; this is what we mean when we are discussing a threshold of 4. If your lab measures in mg/dl, you can convert to mmol/L by multiplying by 9. If for some reason you wanted to convert mmol/L to mg/dl, multiply by 0.111. When lactate is calculated in mmol/L, it can be subtracted from the anion gap directly.

The lactate we’re talking about is L-lactate. The stereoisomer D-lactate is seen in patients with short gut and you need a specialized assay to measure the levels.

Lactate to lactic acid is in a ratio of 3548:1 at pH 7.4. When you hear lactic acid in a clinical setting, you should just consider it to be synonymous with lactate. If you are making cheese, then it is a different story.

Q: So I need an arterial stick, right?

A: Nope, venous lactate is absolutely fine. If you get a value that is wildly discordant with the patient’s condition, you can confirm with an arterial lactate, but this happens infrequently. A properly done venous sample that is low will always have a low arterial value. If the venous lactate is wildly discordant with the patient appearance, I would probably send a properly drawn second venous sample rather than doing an arterial stick. If the patient has an arterial line, the arterial lactate can be used interchangeably.
Lactate FAQ cont.

Q: Do I need to take off the tourniquet before drawing a venous sample?

A: Absolutely not. It would be better if the lactate was one of the first lab tubes drawn and it was not drawn if there was a twenty minute vein hunt prior. In that latter circumstance, it would not be a horrible idea to drop the tourniquet for 20 seconds and then put it back on to grab the lactate sample.

Q: I forgot to put the lactate on ice, should I throw away the sample?

A: If the sample is going to be sitting for a while, it is probably better to put it on ice, but even if you forget, the result will be unchanged for ~15 minutes at room temperature.

Q: What is an acceptable turnaround time for lactate results?

A: Most hospital labs use a blood gas analyzer for venous and arterial samples. The turnaround time of the actual test is < 1 minute, so it is reasonable to expect a reporting time of <30 minutes. If the lab can’t meet this time, then consideration should be given to POC blood gas analyzers in the ED.

Q: Can’t I just get an Electrolyte Panel and check the Bicarb or Anion Gap?

A: Unfortunately, it doesn’t work. This was shown in River’s original trial and subsequent studies. A normal bicarbonate level or anion gap was observed in 22.2% and 25.0%, respectively, of patients with lactate levels of 4.0 to 6.9 mmol/L.

Q: Are there false positives?

A: Usually a lactate ≥ 4 is associated with badness regardless of whether it is from sepsis or not. However, in patients using beta-agonists (e.g. an acute asthma exacerbation) the lactate may be quite high. If you take the lactate of any patient who has just completed extreme exercise, their lactates will be high. Patients with seizures will also have remarkably high lactates immediately after their ictal period. In all of these cases, the lactate should quickly clear after the inciting situation.

Patients with hepatic failure can have elevated lactate from decreased clearance. They are also prone to sepsis or hypotension, so I am likely to be more, rather than less aggressive in these patients.

In terms of badness with elevated lactate other, non-septic possibilities include any shock state, dead bowel or gut, necrotizing fasciitis, and then a multitude of toxicological causes.

Q: What if a patient comes in who is sick, but their lactate is 3.8?

A: These patients should clearly be admitted, they should be resuscitated, but unless they drop their pressure they should not be included in the data set. When I have these elevations that don’t meet the threshold, we admit them and discuss with the team trending the lactate q 4–6 hours until it is back to normal.

Q: We have had patients who were severely septic and their lactates never went over 2, what gives?

A: Patients can be hypotensive and sick, requiring pressors with a normal lactate. I’ve seen this especially in the elderly population.
Appendix M: Lactate Frequently Asked Questions cont.

Lactate FAQ cont.

Q: What about the expense?

A: Lactate is a cheap test, especially compared to the routine, but often useless cbc.

**STOP SEPSIS COLLABORATIVE**

**ASSESSING FLUID RESPONSIVENESS**

**CVP (IF CENTRAL LINE ALREADY IN PLACE)**
CVP can serve as a starting point for adequate fluid loading. However, reaching these CVP thresholds does not guarantee adequate fluid loading. While a very low CVP usually indicates an under-resuscitated patient, the opposite is not true.

- In non-intubated patients, fluid load until CVP > 10
- In intubated patients, fluid load until CVP > 14

**IF YOU HAVE ULTRASOUND, USE B-LINES ON LUNG ULTRASOUND**
- 3 or more B-Lines in one Intercostal Space

**IF NOT TUBED–USE DYNAMIC IVC**
- If IVC collapses with inspiration (>30%), give fluid bolus
- Measure just caudal to hepatic veins

**IF NOT TUBED AND PATIENT IS HYPERPNEIC–CAN USE DYNAMIC CVP**
- If CVP decreases 2 mmHg with deep inspiration, administer fluid

**IF TUBED, REGULAR HEART RHYTHM, ALINE, NOT SPONT BREATHING—USE SYSTOLIC OR PULSE PRESSURE VARIATION**
- Increase Vt to 10 ml/kg
- If there is a visible decrease in systolic or pulse pressure with mechanical breaths, give fluid
- After observation, change Vt back to lung protective settings
- Limited evidence would indicate the pulse ox pleth wave may be used the same way

**IF ALINE IN PLACE–USE PASSIVE LEG RAISE**
- Place patient in semi-fowlers (45)
- Observe arterial MAP and Pulse Pressure (PP)
- Place patient in modified Trendelenberg
- If arterial MAP or PP rises during the next 60 seconds, patient will benefit from fluid
- Return patient to original position

To know if your passive leg raise is accurate, you need to see the CVP increase by at least 2 mm or use a SV monitor

**IF YOU ARE SKILLED AT ECHO—USE LEFT VENTRICULAR ASSESSMENT (LVEDD)**
- Transthoracic echo M-mode PLAX
- Hypovolemia < 2.3 cm
- Measured at the tip of the mitral leaflets at the q-wave
APPENDIX O: SEVERE SEPSIS RESUSCITATION CHECKLIST

Greater New York Hospital Association/United Hospital Fund Quality Initiatives

STOP SEPSIS COLLABORATIVE

SEVERE SEPSIS RESUSCITATION CHECKLIST

IDENTIFICATION
Time of Arrival in ED
DATE ___________ TIME ___________

Time of Triage in ED
DATE ___________ TIME ___________

Was a serum lactate sent?
☐ YES ☐ NO

Time of Recognition of Severe Sepsis
DATE ___________ TIME ___________

INITIAL RESUSCITATION
• Administer 20–30 ml/kg isotonic crystalloid bolus over 20–30 minutes
• Send cultures of all likely sources of infection
• Achieve source control (Remove infected catheters, infected tissue, infected organs, pus, etc.)
• Administer antibiotics to cover all likely sources of infection

Time of Antibiotic(s) Initiation
DATE ___________ TIME ___________

SpO2
• Consider intubating the patient if the saturation is < 90% while on high-flow oxygen (NRB)
☐ YES ☐ NO

FLUID LOADING
Administer fluids guided by IVC ultrasound or CVP. If these are not available, administer fluids empirically. Use isotonic crystalloid under pressure bag for fluid loading.
### Severe Sepsis Resuscitation Checklist cont.

**Was an IVC ultrasound done?**
- [ ] YES
- [ ] NO

**Was a central venous catheter placed?**
- [ ] YES
- [ ] NO

**Site at central line insertion:**
- [ ] IJV
- [ ] SCV
- [ ] FEM
- [ ] PICC LINE

**Was CVP measured?**
- [ ] YES
- [ ] NO

#### MAP OPTIMIZATION
- Administer vasopressors if MAP < 65 mm Hg after fluid loading, with a goal of a MAP ≥ 65
- Vasopressors should be administered through a central line, preferably a full sterile neck line

**Were vasopressors used?**
- [ ] YES
- [ ] NO

#### TISSUE OXYGENATION OPTIMIZATION
- Repeat Lactate or measure ScvO2
- If lactate has not dropped ≥ 10% OR ScvO2 < 70 %, follow tissue ox recommendations in the protocols, and then repeat the lactate and/or ScvO2

**Patient achieved central venous oxygen saturation (ScvO2 > 70%)?**
- [ ] YES
- [ ] NO
- [ ] N/A

**Oxygen saturation (ScvO2 > 70%)?**

<table>
<thead>
<tr>
<th>DATE</th>
<th>TIME</th>
</tr>
</thead>
</table>

**DISPOSITION**

**Time of Patient Leaving the ED**

<table>
<thead>
<tr>
<th>DATE</th>
<th>TIME</th>
</tr>
</thead>
</table>

**Which protocol was used?**
- [ ] INVASIVE
- [ ] NON-INVASIVE

**Achieved lactate decline of ≥ 10% of the original**

<table>
<thead>
<tr>
<th>DATE</th>
<th>TIME</th>
</tr>
</thead>
</table>

**Survival to Hospital Discharge**
- [ ] YES
- [ ] NO
APPENDIX P:
SEVERE SEPSIS DATA ELEMENTS

Greater New York Hospital Association/United Hospital Fund Quality Initiatives

STOP SEPSIS COLLABORATIVE

SEVERE SEPSIS DATA ELEMENTS

IDENTIFICATION MEASURES
Time of Arrival in ED
DATE _______ TIME _______

Time of Triage in ED
DATE _______ TIME _______

Was a serum lactate sent?
☐ YES ☐ NO

Time of Recognition of Severe Sepsis
DATE _______ TIME _______

TREATMENT MEASURES
Time of Antibiotic(s) Initiation
DATE _______ TIME _______

What means of fluid assessment was used? (Please check all that apply)
☐ IVC ULTRASOUND
☐ CENTRAL VENOUS PRESSURE (CVP)
☐ EMPIRIC FLUID LOADING
☐ OTHER (PLEASE SPECIFY) _______

Was a central venous catheter placed?
☐ YES ☐ NO

Site at central line insertion
☐ IJV
☐ SCV
☐ FEM
☐ PICC
Severe Sepsis Resuscitation Checklist cont.

Were vasopressors used?

☑️ YES ☐ NO

RESUSCITATION GOALS

Patient achieved central venous oxygen saturation (Scv02 > 70%)?

☑️ YES ☐ NO ☐ N/A

Time patient achieved central venous oxygen saturation (Scv02 > 70%)?

DATE 📅 TIME ☑️

Achieved lactate decline of ≥ 10% of the original

☑️ YES ☐ NO ☐ N/A

Time patient achieved lactate decline of ≥ 10% of the original

DATE 📅 TIME ☑️

Time of patient leaving the ED

DATE 📅 TIME ☑️

Which protocol was used?

☐ INVASIVE ☐ NON-INVASIVE

DISCHARGE

Survival to Hospital Discharge

☑️ YES ☐ NO ☐ STILL IN HOSPITAL

Time of Hospital Discharge

DATE 📅 TIME ☑️
APPENDIX Q: SEVERE SEPSIS DATA DEFINITIONS

Greater New York Hospital Association/United Hospital Fund Quality Initiatives

**STOP SEPSIS COLLABORATIVE**

### DATA DEFINITIONS

<table>
<thead>
<tr>
<th>FACILITY INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REPORTING PERIOD:</strong> Enter the month and year when the data were collected.</td>
</tr>
<tr>
<td>• The most current month for which data are being accepted, as well as all past months, will be displayed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SEPSIS DATA ELEMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TIME OF ARRIVAL:</strong> Report the date and time of the patient’s arrival in the Emergency Department (ED).</td>
</tr>
<tr>
<td><strong>TIME OF TRIAGE:</strong> Report the date and time of the patient’s triage in the ED.</td>
</tr>
<tr>
<td><strong>WAS A SERUM LACTATE DRAWN:</strong> Report whether or not a serum lactate was drawn prior to the recognition of severe sepsis.</td>
</tr>
<tr>
<td><strong>TIME OF RECOGNITION OF SEVERE SEPSIS:</strong> Report the date and time that each patient was identified as septic. This would be the time lactate ≥ 4 mmol/L or MAP &lt; 65 despite 2 liters of saline (20-30 ml/kg).</td>
</tr>
<tr>
<td><strong>TIME OF ANTIBIOTIC(S) INITIATION:</strong> Report the date and time that the first antibiotic was initiated to the patient.</td>
</tr>
<tr>
<td><strong>WAS A CENTRAL VENOUS CATHETER PLACED:</strong> Report whether or not a central venous catheter was placed for each patient. (Yes or No)</td>
</tr>
<tr>
<td><strong>SITE OF CENTRAL LINE INSERTION:</strong> Report the site that the central line was inserted. For example, the left internal jugular vein (IJV), the right or left subclavian vein (SCV), the femoral artery (FEM), or peripherally inserted central catheter (PICC) line.</td>
</tr>
<tr>
<td><strong>WHAT MEANS OF FLUID ASSESSMENT WAS USED</strong> (Check all that apply of the following):</td>
</tr>
<tr>
<td>• Report whether each patient received an IVC ultrasound.</td>
</tr>
<tr>
<td>• Report whether a CVP was measured for each patient.</td>
</tr>
<tr>
<td>• Report whether empiric fluid loading was performed.</td>
</tr>
<tr>
<td>• Specify any other means of fluid assessment used (text box).</td>
</tr>
<tr>
<td><strong>VASOPRESSORS USE:</strong> Report whether or not vasopressors were used for each patient (Yes or No). Vasopressors include: norepinephrine, dopamine, vasopressin, phenylephrine, and epinephrine.</td>
</tr>
<tr>
<td><strong>ACHIEVED CENTRAL VENOUS OXYGEN SATURATION:</strong> Report whether central venous oxygen saturation was achieved for each patient (ScvO2 ≥ 70%) (Yes or No and Date/Time).</td>
</tr>
<tr>
<td><strong>ACHIEVED LACTATE CLEARANCE:</strong> Report whether lactate clearance ≥ 10% of the original was achieved for each patient (Yes or No and Date/Time).</td>
</tr>
<tr>
<td><strong>TIME PATIENT LEAVING THE ED:</strong> Report the date and time that the septic patient was discharged from the ED for a floor or ICU bed.</td>
</tr>
<tr>
<td><strong>WHICH PROTOCOL WAS USED:</strong> Report whether the non-invasive or the invasive protocol was utilized to measure whether resuscitation goals were met (i.e. whether you used Lactate (non-invasive) or ScvO2 (invasive) to determine that you reached goal).</td>
</tr>
<tr>
<td><strong>SURVIVAL TO HOSPITAL DISCHARGE:</strong> Report whether the patient is alive at hospital discharge (Yes, No, Still in Hospital, and Date).</td>
</tr>
</tbody>
</table>
IDENTIFICATION MEASURES

Q: Which patients should be included in the STOP Sepsis Collaborative data set?

A: The STOP Sepsis Collaborative is tracking patients with severe sepsis that come into the hospital through the emergency department (ED). This means that only those patients who are hypotensive after being given 2L of fluids or that have an elevated lactate (>4 mmol/L) should be entered in the data portal for this Collaborative.

Q: Should the data being entered focus only on cases coming through the ED and being transferred to the ICU? (i.e., should patients that are coming in through the ED and going to med/surg, step down units, etc. also be included?)

A: Data should be submitted on patients with severe sepsis coming in through the ED and followed through to the point of meeting the resuscitation goals (and hospital discharge). As the focus of the Collaborative is on tracking processes of care to improve patient outcomes, we are interested in receiving data on wherever the patient is during the treatment process, so med/surg, step down units, and other “specialty care units” would all qualify.

Q: My team is having trouble identifying and tracking the targeted patients in our very busy ED. We are dependent on a paper record as our electronic health record is being implemented. Any suggestions?

A: Since reviewing cases retrospectively may not capture all of the severe sepsis cases that occurred, GNYHA and UHF encourage hospitals to track and submit data concurrently throughout the month. STOP Sepsis Collaborative Co-Chair Scott Weingart, M.D., created an educational video that provides an overview of the process for screening and data collection at Elmhurst Hospital Center and summarizes the flow of information and communication from the emergency department to the ICU and other areas. We encourage you to access the video by clicking on the following link: www.gnyha.org/sepsis/media/videos.

Q: How is the time of triage determined for the purposes of the data collection form?

A: GNYHA and UHF recognize that the time of arrival and time of triage data elements may vary from hospital to hospital in this Collaborative. Ideally, participants should submit the date and time of the patient’s arrival in the ED, as well as the date and time of the patient’s triage in the ED as two separate data points. This information will ultimately help us to reduce the time between patient arrival and recognition of severe sepsis, as well as the time between patient triage and recognition of severe sepsis.

Q: Should patients with severe sepsis whose goals of care are anything other than curative be included in the data collection for the STOP Sepsis Collaborative?
Severe Sepsis Data and Measures Frequently Asked Questions cont.

A: If the patients’ goals are documented as supportive care only, then those cases should not be included in the database. In other words, include all patients except those whose goals of care are primarily palliative (i.e., comfort measures only).

Q: How should patients with severe sepsis be identified and tracked? We are looking retrospectively and identifying patients with a lactate >4, but may be missing patients with a severe sepsis diagnosis that may not have had a lactate drawn and received appropriate therapy.

A: The recommended method for effectively identifying and tracking patients for the Collaborative is to do so concurrently throughout the month rather than retrospectively to ensure that you are not missing patients that should be included. Hospital participants may share their best practices and experiences with one another on the STOP Sepsis Collaborative online forum at www.gnyha.org/sepsis/media.

TREATMENT MEASURES
Q: In our ED, we do not have the ability to measure CVP. Sometimes CVP is measured in the CU, but this is nearly always outside the 6 hour window, and after the initial resuscitation of the patient has been completed. Therefore, I am always answering “no” with regard to whether a CVP was measured. Is this alright?

A: If a hospital ED does not have the capability to measure CVP and is not using CVP measurements during the resuscitation of severe sepsis patients, then answering “no” for the data element asking whether CVP was measured is absolutely correct. The STOP Sepsis Collaborative data collection is focusing only on the activities related to identification and resuscitation of the severe sepsis patient. The data collection does not include any further management of a patient once the resuscitation goals have been met.

RESUSCITATION GOALS
Q: Please clarify the data element “time of patient leaving the ED”? We have patients who remain in the ED after in-house admission due to lack of a bed, but the transfer of service has occurred. What is the element trying to capture? Time of service transfer or time of physically leaving the ED?

A: The “time of patient leaving the ED” measure is intended to capture the time when a patient physically leaves the ED. For the purposes of this data element, respondents should not document the time that service was transferred to another department, but rather the time when the patient was wheeled out of the ED and bound for another unit.

Q: If the patient has achieved central venous oxygen saturation or a lactate decline of at least 10% outside of the 6-hour window, i.e. 8 hours later, should a ‘no’ response be entered into the data collection form?

A: One of the objectives of the STOP Sepsis Collaborative is to reduce the time between identifying a severe sepsis case to the time that the resuscitation goals were met. In order to track Collaborative participants’ progress in achieving this objective, GNYHA/UHF is asking hospitals to indicate whether the resuscitation goals were met for each severe sepsis case, and if so, the time that they were met. Hospitals should report “yes” if the resuscitation goals were met, regardless of whether this occurred outside of the 6-hour window.

Q: Can you clarify if the invasive protocol is differentiated from the non-invasive protocol by whether a central line was placed and a CVP was performed, or if it should be based on tracking ScvO2?

A: The invasive protocol refers to checking ScvO2, and the non-invasive protocol is checking lactates, even if a central line was placed. If CVPs were used to check fluid resuscitation, then please indicate that in the fluid resuscitation section where it asks, “what means of fluid assessment was used?”
Severe Sepsis Data and Measures Frequently Asked Questions cont.

DISCHARGE DATA
Q: Should patients who are identified as a severe sepsis case in the ED but expire within 2–3 hours after arrival, prior to reaching the resuscitation goals, be included in the data collection for the STOP Sepsis Collaborative?

A: Yes, all patients who are identified as a severe sepsis case in the ED should be included in the data collection for the STOP Sepsis Collaborative. If a patient expires in the ED before the sepsis resuscitation goals have been met, then please indicate the patient did not survive to hospital discharge in the data submission.

GENERAL DATA QUESTIONS
Q: What if a case is presented, the patient is discharged, and then is readmitted at a later date with severe sepsis both times? Should this patient be entered into the database as two separate cases?

A: Yes, the unit of measurement for the STOP Sepsis Collaborative is the severe sepsis episode and not the patient. A patient who comes in with severe sepsis, is treated successfully, discharged from the hospital, but then presents once again in the ED should be counted as a second severe sepsis case, for the purposes of the Collaborative data collection. However, if the patient met the resuscitation goals is moved to a different unit and then shows signs of deterioration once again, then this patient would not be entered into the STOP Sepsis Collaborative database as a second case.
This is a training video on conducting concurrent data collection and submission on severe sepsis data elements.

Developed by Scott Weingart, M.D., STOP Sepsis Collaborative Co-Chair and Director, ED Critical Care, Elmhurst Hospital Center, Mount Sinai School of Medicine.
## Appendix T: Sample Hospital Performance Report

**STOP Sepsis Collaborative**

**Example Hospital Overall Performance Report**

Data Collected from January 2011 through September 2012

### The STOP Sepsis Collaborative Goals:

1. To reduce mortality in patients with severe sepsis and septic shock by implementing a protocol-based approach to case identification and resuscitation; and
2. To enhance communication and patient flow between the emergency department and other areas of the hospital, in particular, the intensive care units.

### Collaborative Objectives Related to Monthly Data Collection:

1. Reduce the time of antibiotic initiation to within one hour of recognition of severe sepsis in the ED.
2. Limit time to meeting sepsis resuscitation goals to six hours or less.

### Total Cases

<table>
<thead>
<tr>
<th></th>
<th>Total Cases</th>
<th>Example Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total Cases</strong></td>
<td>9,613</td>
<td>656</td>
</tr>
</tbody>
</table>

### Time from Recognition to Achievement of Resuscitation Goals

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collaborative</td>
<td>11.79</td>
<td>6.42</td>
<td>3,475</td>
<td></td>
</tr>
<tr>
<td>Example Hospital</td>
<td>11.06</td>
<td>6.10</td>
<td>245</td>
<td></td>
</tr>
</tbody>
</table>

### Cases Using Lactate Improvement Goal (≥10% decrease)(hrs)

<table>
<thead>
<tr>
<th></th>
<th>Example Hospital</th>
<th>Collaborative</th>
<th>% of Collaborative Patients Below Hospital Median</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Median</td>
<td>N</td>
</tr>
<tr>
<td>Arrival to Recognition</td>
<td>3.95</td>
<td>1.20</td>
<td>201</td>
</tr>
<tr>
<td>Recognition to First Antibiotic</td>
<td>0.67</td>
<td>0.72</td>
<td>227</td>
</tr>
<tr>
<td>Recognition to Resuscitation</td>
<td>11.09</td>
<td>6.38</td>
<td>237</td>
</tr>
<tr>
<td>Arrival to Resuscitation</td>
<td>14.60</td>
<td>8.22</td>
<td>201</td>
</tr>
</tbody>
</table>

### Cases Using ScvO₂ Saturation Goal (>70%)(hrs)

<table>
<thead>
<tr>
<th></th>
<th>Example Hospital</th>
<th>Collaborative</th>
<th>% of Collaborative Patients Below Hospital Median</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Median</td>
<td>N</td>
</tr>
<tr>
<td>Arrival to Recognition</td>
<td>0.64</td>
<td>0.64</td>
<td>6</td>
</tr>
<tr>
<td>Recognition to First Antibiotic</td>
<td>6.84</td>
<td>1.03</td>
<td>8</td>
</tr>
<tr>
<td>Recognition to Resuscitation</td>
<td>10.27</td>
<td>2.63</td>
<td>8</td>
</tr>
<tr>
<td>Arrival to Resuscitation</td>
<td>2.65</td>
<td>2.40</td>
<td>6</td>
</tr>
</tbody>
</table>
Appendix T: Sample Hospital Performance Report cont.

Overall Performance Report cont.

Average Time from Recognition to Achievement of Resuscitation Goals

The following chart plots a 45-day moving average of the time from recognition to achievement of resuscitation goals. The blue line indicates the collaborative average and the green line indicates your hospital average. The red line indicates the 6 hour resuscitation goal.

Sepsis Interventions

<table>
<thead>
<tr>
<th>Means of Resuscitation</th>
<th>Example Hospital</th>
<th>Collaborative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum Lactate Drawn</td>
<td>569 87%</td>
<td>8,146 85%</td>
</tr>
<tr>
<td>Central Line Inserted</td>
<td>214 33%</td>
<td>3,077 32%</td>
</tr>
</tbody>
</table>

Protocol Use

<table>
<thead>
<tr>
<th></th>
<th>Example Hospital</th>
<th>Collaborative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Invasive</td>
<td>176 27%</td>
<td>2,523 26%</td>
</tr>
<tr>
<td>Non-Invasive</td>
<td>436 66%</td>
<td>6,424 67%</td>
</tr>
<tr>
<td>No Response</td>
<td>44 7%</td>
<td>666 7%</td>
</tr>
</tbody>
</table>

Means of Fluid Assessment

<table>
<thead>
<tr>
<th></th>
<th>Example Hospital</th>
<th>Collaborative</th>
</tr>
</thead>
<tbody>
<tr>
<td>IVC Ultrasound</td>
<td>15 2%</td>
<td>187 2%</td>
</tr>
<tr>
<td>Central Venous Pressure (CVP)</td>
<td>85 13%</td>
<td>1,234 13%</td>
</tr>
<tr>
<td>Empiric Fluid Loading</td>
<td>249 38%</td>
<td>3,644 38%</td>
</tr>
<tr>
<td>Other</td>
<td>32 5%</td>
<td>315 3%</td>
</tr>
<tr>
<td>No Response</td>
<td>298 45%</td>
<td>4,519 47%</td>
</tr>
</tbody>
</table>

* cases over 50 hours excluded
7 cases excluded.
237 cases included.
### Patient Outcomes

<table>
<thead>
<tr>
<th></th>
<th>Example Hospital</th>
<th>Collaborative</th>
<th>Collaborative Hospitals' %</th>
</tr>
</thead>
<tbody>
<tr>
<td>#</td>
<td>#</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Patient Survival to Discharge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>483</td>
<td>74%</td>
<td>6,806</td>
</tr>
<tr>
<td>No</td>
<td>158</td>
<td>24%</td>
<td>2,581</td>
</tr>
<tr>
<td>Still in Hospital</td>
<td>10</td>
<td>2%</td>
<td>134</td>
</tr>
<tr>
<td>No Response</td>
<td>5</td>
<td>1%</td>
<td>92</td>
</tr>
</tbody>
</table>

### Mortality Trend

The following chart plots a 45-day moving average of the mortality rate. The blue line indicates the collaborative average and the green line indicates your hospital average.

![Mortality Trend Chart]

- Example Hospital
- Collaborative

* cases still in hospital excluded
10 cases excluded.
636 cases included.