Organization
Frederick Memorial Hospital

Solution Title
Knowledge is Power: Hospital's Quest to Fight Sepsis

Program/Project Description, including Goals:

The alarming truth for patients in US hospitals is that their likelihood of dying is highly correlated with their choice of hospital. Mortality rates in US hospitals vary widely when calculated in a standardized way. Systematic analysis of hospital deaths can reveal some of the reasons for this variation. When hospital deaths are categorized according to the level and type of care, patterns emerge that can highlight system defects. IHI believes that mortality can be consistently reduced through the use of a combination of evidence-based interventions. Mortality associated with Severe Sepsis ranges 30% - 50%; with Hypovolemic Shock + Sepsis is at 60%. In the United States, Sepsis discharges have doubled since 2000, and Severe Sepsis is the 10th leading cause of death. Without early recognition significant improvements in outcomes will not be seen. For each hour of delay, risk of hospital death increases by 1.6% and each hour delay after the 6th hour equals a 7.6% decrease in survival. This session will focus on multi-disciplinary strategies to improve sepsis related outcomes through teamwork and reliable utilization of standardized processes to enhance early recognition and treatment of sepsis in the emergency department, medical/surgical inpatient units and the standardization of treatment of Severe Sepsis in the critical care setting. Presenters will share a variety of strategies including screening checklists, ED to ICU transition tools and evidence-based collaborative order sets to reduce unnecessary variation. Participants will learn how to begin their journey toward excellence by understanding the necessary culture changes to secure buy-in and translate achievements to future initiatives to improve clinical outcomes.

Learning Objectives include:

1. Describe the consequences of severe sepsis and septic shock on a variety of clinical and operational issues, including patient mortality, morbidity/complications and readmissions.
2. List techniques for the early identification of patients with severe sepsis and septic shock in an inpatient and ED setting.
3. Identify strategies to create the necessary collaborative approach to appropriately combat severe sepsis and septic shock, including the necessary culture change to secure buy-in and ability to provide best practice care.

Process:

Variation in practice is the root of all evil. There was no consistency in the identification or treatment of Sepsis patients. FMH was experiencing a higher than expected mortality rate and
did not have a cohesive plan to identify Sepsis patients, in addition, not everyone recognized the importance of having standardized, bundled approach to the care of these patients. Departments were working in silos, as oppose to an integrated team. There was a critical need for a process for early recognition and then early interventions for managing sepsis patients. Staff education was critical. FMH partnered with a Premier Clinical Performance Partner to reduce mortality related to sepsis. A multi-disciplinary team that included the VPMA, Intensivists, Hospitalists, ED physicians, lab, pharmacy, ED nurses, ICU nurses, med/surg nurses, Clinical Nurse Specialists, education and performance improvement staff was pulled together to create and implement a sepsis protocol. The sepsis protocol included both ED and Inpatient assessments and physician order sets.

Solution:

Numerous processes have been implemented to ensure the success of this initiative, including the implementation of a Sepsis protocol for the ED and management guidelines. A multi-disciplinary Sepsis task force was chartered to address the gaps in care between current practice and recommended best practices. The team identified early recognition as a key component along with appropriate management for Severe Sepsis. An action plan was developed to address these keys opportunities. A nurse screening tool was developed for triaging patients in the ED. This was later developed into an inpatient screening tool patients by IT, pulling information directly from the electronic medical record. A Sepsis RRT program was also instituted. For the management of severe sepsis, a severe sepsis order set was created and implemented, beginning care in the ED. The same process for central line insertion was established in the ED as was done in the ICU, including the central line insertion kits.

Measurable Outcomes:

FMH has experience significant improvement in clinical outcomes since the implementation of the Sepsis program. The Sepsis Mortality O/E has dropped from 1.20 to 0.70, a 42% decrease; Sepsis Readmissions O/E has gone from 1.0 to 0.80, a 20% decrease; and Severe Complications Severe Complications within the Sepsis population has decreased by 40%. In addition, there has been a 40% decrease in hospital acquired sepsis and an overall increase in compliance with the Sepsis Bundle Components. We have achieved a systematic approach that has been maintained and become the routine.
Sustainability:

The multi-disciplinary continues to meet on a routine basis to review variations in the process and implement plans to adjust and correct these variations. The team reviews best practice and ensures that the process is still in alignment with those best practices. The Sepsis protocol has been hardwired into the work flow of the ED and ICU staff. Successes seen in the care of sepsis patients has been spread to other areas of patient care. Continuous staff and physician education is held to ensure top of mind awareness of sepsis.

Role of Collaboration and Leadership:

The key players included the ED staff and physicians, ICU nursing staff, Intensivists, Hospitalists, VPMA, infection control practitioners, the infectious disease physician, performance improvement department, pharmacy, laboratory, Clinical Nurse Specialists, nursing staff, IT, education. The use of QualityAdvisor and an opportunity assessment performed by the Clinical Performance Partner from Premier led to this as an area of focus, and assisted in determining exactly where the need for improvement was. Administrative and physician support was critical in the success of this initiative. The use of the Sepsis Bundle has been implemented and adhered to as intended by the multi-disciplinary team, thus reducing variation in care. Continual monitoring and data analysis allows for quick analysis of any identified issues or breaks in protocol.

Innovation:

This was a collaborative approach across the inpatient continuum. It uses EMR technology to assist with nursing assessments. The care begins at time of diagnosis, regardless of setting, ED, med/surg, ICU, and continues to ensure the best outcomes for the patients.

Related Tools and Resources
See Attached

Contact Person
Sharon Powell, MS, RN, CPHQ
Title
Patient Safety Officer & Director, Performance Improvement, Accreditation & Regulatory Compliance, Infection Prevention & Control, Medical Staff Office, & Interpreter Services
Email
spowell@fmh.org
Phone
240-566-3514
Sepsis Screening Process

July 2012

Are any three of the following present:
- A history suggestive of a new infection (lung, urine, bone, wound, etc), including:
  - An indwelling line, port, metal implant, etc.
  - On immunosuppressive drugs
  - S/p recent surgery
- Acute mental status changes
- New onset chills with rigors ("shaking chills")
- New onset headache with stiff neck
- Temp > 38.3°C (101°F) or < 36.0°C (96.8°F)
- HR > 90 bpm
- RR > 20 breaths/min
- Systolic BP < 90 (or MAP < 65)
- WBC > 12,000 or < 4,000
- Glucose > 140 in a non-diabetic
- PaCO2 < 32

NO → Screen complete - negative

YES → Patient has presumed sepsis → Nurse protocol initiated.
- Order:
  - IID/fluids (18ga)
  - CBC, PCM, UA & culture
  - Amylase, lipase, troponin
  - Protime, lactate
  - Blood cultures

Notify provider of presumed diagnosis.
- Based on history/exam, may order:
  - CXR
  - ABG
  - CT scan or MRI
  - EKG
  - Cultures of wound, sputum, etc
  - DIC panel, prealbumin

Are any of the following present and not due to a chronic condition (these would indicate new end organ dysfunction):
- Bilirubin > 3
- Creatinine > 2.0
- Urine output < 0.5 ml/kg per hr x 2 hrs
- Systolic BP decreased > 40 from baseline
- Metabolic acidosis (pH < 7.3 or lactate > 4mmol/L)
- Bilateral pulmonary infiltrates on CXR
- Platelets < 100,000
- Systolic BP < 90 or MAP < 65
- PO2 < 90

NO → Patient has sepsis. Probable ICU admission
- Intensivist consult
- Initiate severe sepsis order set

YES → Patient has presumed severe sepsis. 
- Intensivist consult
- Probable ICU admission
- Initial phase sepsis order set
Sepsis Screening Process

July 2012

Are any three of the following present:
- a history suggestive of a new infection (lung, urine, bone, wound, etc.), including:
  - an indwelling line, port, metal implant, etc.
  - on immuno-suppressive drugs
  - s/p recent surgery
- acute mental status changes
- new onset chills with rigors ("shaking chills")
- new onset headache with stiff neck
- Temp > 38.3°C (101°F) or < 36.0°C (96.8°F)
- HR > 90 bpm
- RR > 20 breaths/min
- Systolic BP < 90 (or MAP < 65)
- WBC > 12,000 or < 4,000
- glucose > 140 in a non-diabetic
- PaCO2 < 32

Screen complete - negative

Nurse protocol initiated.
Order:
- I&I/fluids (x8ga)
- CBC, PCM, UA & culture
- amylase, lipase, troponin
- Protime, lactate
- Blood cultures

Notify provider of presumed diagnosis.
Based on history/exam, may order:
- CXR
- ABG
- CT scan or MRI
- EKG
- cultures of wound, sputum, etc
- DIC panel, prealbumin

Are any of the following present and not due to a chronic condition (these would indicate new end organ dysfunction):
- bilirubin > 3
- creatinine > 2.0
- urine output < 0.5 ml/kg per hr x 2 hrs
- systolic BP decreased > 40 from baseline
- metabolic acidosis (pH<7.3 or lactate > 4mmol/L)
- bilateral pulmonary infiltrates on CXR
- platelets < 100,000
- Systolic BP < 90 or MAP < 65
- PO2 < 90

Patient has presumed severe sepsis.
Intensivist consult
Probable ICU admission
Initiate severe sepsis order set

Patient has sepsis.
Probable admit to floor
Initial phase sepsis order set
## Sepsis Screening Vital Signs

### Vital Signs

- **Temperature**: 99.1°F
- **Pulse**: 80
- **Respirations**: 16
- **BP**: 100/65 (90 mm Hg)

## Sepsis Screening

### Screening

#### History Suggestive of New Infection

- Abdominal Infection
- Bone Infection
- CNS Infection
- Invasive Line/Implanted Device
- On Immunesuppressive Drugs
- Recent Admission
- Recent Invasive Procedure
- Respiratory Infection
- Skin/Soft Tissue Infection
- Urinary Infection
- Wound Infection
- Other

#### Other Reason

- Acute Mental Status Changes
- New Onset Chills With Rigors (shaking chills)
- New Onset Headache With Stiff Neck
- Temp Less Than 35.6°C (95.9°F) or Greater Than 38.3°C (101°F)
- Pulse Greater Than 90 bpm
- Respiration Greater Than 20 breaths/min
- Systolic Blood Pressure Less Than 90 or MAP Less Than 65
- History of Diabetes
- Glucose Greater Than 140 in a Non-Diabetic
- WBC Greater Than 12.0 or Less Than 4.0
- pO2 Less Than 62.0

### Total

- Sepsis Total
  - If Total >2, Provider Notified
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<td>Respiration Greater Than 20 breaths/min</td>
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<td>BP Systolic Less Than 90 (or MAP Less Than 65)</td>
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<td>Glucose Greater Than 140 in a Non-Diabetic</td>
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<td>Order</td>
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**Triggered By**

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<td>2 Sepsis Screening</td>
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- Select Action
- Order Now
## Reflex Orders

### Sepsis Inp
- **IV/IO, Site Initiate**
- **Q1Hx1**
- **Stat**
- **Stat**, Reflex: Wed Oct 15 15:30, Tolino, Michael...
  - Per Protocol
- **Urgent**
- **Routine**
- **Q4H**
- **QSH**
- **Daily**

### CBC/PLATELET & DIFFERENTIAL
- **Stat**
- **Stat**, Reflex: Wed Oct 15 15:30, Tolino, Michael...
  - Per Protocol
- **Urgent**
- **Routine**
- **Q4H**
- **QSH**
- **Daily**

### Comprehensive Metabolic Panel
- **Stat**
- **Stat**, Reflex: Wed Oct 15 15:30, Tolino, Michael...
  - Per Protocol
- **Urgent**
- **Routine**
- **Q4H**
- **QSH**
- **Daily**

### Amylase
- **Stat**
- **Stat**, Reflex: Wed Oct 15 15:30, Tolino, Michael...
  - Per Protocol
- **Urgent**
- **Routine**
- **Q4H**
- **QSH**
- **Daily**

### Lipase
- **Stat**
- **Stat**, Reflex: Wed Oct 15 15:30, Tolino, Michael...
  - Per Protocol
- **Urgent**
- **Routine**
- **Q4H**
- **QSH**
- **Daily**

### Troponin I
- **Stat**
- **Stat**, Reflex: Wed Oct 15 15:30, Tolino, Michael...
  - Per Protocol
- **Urgent**
- **Routine**
- **Q4H**
- **QSH**
- **Daily**

### Protime PT/INR
- **Stat**
- **Stat**, Reflex: Wed Oct 15 15:30, Tolino, Michael...
  - Per Protocol
- **Urgent**
- **Routine**
- **Q4H**
- **QSH**
- **Daily**

### Lactic Acid
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• Describe the consequences of severe sepsis and septic shock on a variety of clinical and operational issues, including patient mortality, morbidity and cost of care.

• List techniques for the early identification of patients with severe sepsis and septic shock.

• Identify strategies to create the necessary collaborative approach to appropriately combat severe sepsis and septic shock.

This session will focus on strategies to unite key stakeholders to improve sepsis-related outcomes. Through the use of interdisciplinary teamwork and reliable deployment of standardized processes, two organizations will share their journey to achieve significant reductions in sepsis mortality and ICU length of stay. Presenters will share a variety of strategies including screening checklists, ED to ICU transition tools and evidence-based collaborative order sets to reduce unnecessary variation. Participants will learn how to begin their journey toward excellence by understanding the necessary culture changes to secure buy-in and translate achievements to future initiatives to improve quality and decrease cost.

دير People die each day from Sepsis

Mortality associated with Severe Sepsis ranges 30% - 50%; with Hypovolemic Shock + Sepsis 60%

In the United States

• Sepsis discharges have doubled since 2000

• Severe Sepsis is the 10th leading cause of death

• Healthcare is estimated at $17 billion annually in treating sepsis

• On average cost for sepsis patients is 3.6 times higher / episode

An aging population and more aggressive therapies leading to immunosuppression drive this sepsis trend

Without early recognition significant improvements in outcomes will not be seen.

• For each hour of delay, risk of hospital death increases by 1.6%.

• Each hour delay after the 6th hour equals a 7.6% decrease in survival

• Inconsistency in the early recognition/diagnosis

• Failure to recognize severity of illness and initiate intensive care services

• Inadequate volume resuscitation without defined endpoints

• Late or inadequate use of antibiotics

• Reluctance to initiate vasopressors
Quality Improvement Team Charter Request

<table>
<thead>
<tr>
<th>Project Name:</th>
<th>Executive Sponsor:</th>
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<tr>
<td>FMH Mortality Improvement Team: Sepsis</td>
<td>Dr. Manuel Casiano</td>
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<tr>
<th>Team Leader:</th>
<th>Facilitator:</th>
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<tr>
<td>Sharon Powell</td>
<td>Alexa Lee</td>
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**Project Justification:**

The mission of Frederick Regional Health System is to contribute to the health and well-being of area residents by providing quality healthcare in a caring, cost efficient, safe and convenient manner through a coordinated program of prevention, diagnosis and treatment, rehabilitation, and support.

FMH is committed to a goal of excellence as part of the mission and values of the organization. In order to achieve excellence, it is the responsibility of FMH to pursue any and all best practices related to clinical outcomes as well as patient experience.

The goal of this initiative is to improve the diagnosis, survival and management of sepsis by addressing challenges associated with it through targeted initiatives. The aim will be to reduce mortality associated with sepsis by 25% within the next two years.

In order to ensure that we have identified and considered all best practices for patient care, a hospital wide throughput committee is necessary. This committee will provide a dedicated, systematic approach to review all processes and procedures for improving patient care and to reduce the overall mortality rate at FMH.

**Specific Project Objectives:**

1. Develop an accurate description of current state of palliative care at FMH
2. Improve the continuum of care and quality of life for patients
3. Develop select metrics to measure progress and success
4. Promote a collaborative, interdisciplinary team that will affect process change and improve select metrics
5. Develop education materials appropriate for patients and families, staff and physicians on palliative care and hospice programs
6. Improve patient, staff and physician satisfaction

**Issues outside the scope of this team:**

Non applicable
Proposed Measures:
Suggested metrics to be included but are not limited to:

- ALOS
- ALOS in ICU
- Percent of Mortalities
- Mortality Observed/Expected ratio
- Percent of Mortalities in the ICU
- Percent of patients classified as Hospice patient type
- Percent of cases with Palliative Care code V66.7
- Percent of Mortalities with Palliative Care code V66.7
- Percent of Readmissions with Palliative Care code V66.7
- Total cost per day for patients with Palliative Care code V66.7 vs patients with same diagnosis without palliative care code V66.7

Primary Stake Holders (by job title or function):

Vice President Patient Care Services
VPMA
Chief Financial Officer
Director of Hospice
Palliative Care Program/Hospice Medical Director
Director of Quality
Director of Case Management
Others to be decided upon first meeting

Proposed Team Members (by name):

Dr. M. Casiano
Sharon Powell
Barbara Mosser
Alexa Lee

Reporting Relationship:
Quality Improvement Council
Senior Operations Team

Projected Completion Date:

Submitted by: Department: Phone:

For use by Quality Steering Committee:

Approved: ☐ Yes ☐ No Date:
Rationale or Comments:
Quality Improvement Team Charter

Definitions

1. **Executive Sponsor**: The sponsor has responsibility for ensuring necessary resources are available to the team and works to remove any barriers that may hinder the progress of the team.

2. **Team Leader**: The person who is recognized as the *owner* of the work process under study. The leader coordinates and directs the work of the team as it studies the process and implements improvements. The leader often meets individually with the facilitator to plan for the work of the team. The leader is also a member and contributes ideas, interprets data, and participates with other members in making team decisions.

3. **Facilitator**: The facilitator focuses on how the team gets its work done, the work process and is not necessarily a content expert of the team’s work. The work facilitators do can include: helping the team deal with conflict, coaching the team leader or team members on team skills, helping the group use basic problem-solving principles and tools. The facilitator serves as expert resource in QI principles, methods and tools.

4. **Project justification**: What are the drivers for this improvement?, What brought this to light?, Why should this be a priority?

5. **Specific Project Objectives**: What will the group accomplish?

6. **Issues outside the scope of the team**: Is there anything that may be associated with this issue but that the team will not be addressing?

7. **Proposed measures**: How will we know that an improvement has occurred, that the objectives have been met?

8. **Primary stakeholders**: Who owns this process?, who has responsibility for the outcomes of this process?, Who does the work, is at the front line of this process?

9. **Proposed membership**: List actual names and / or job function(s).

10. **Reporting relationship**: Primarily to the Department or QIC. Note any matrix reporting relationships.
Sepsis Screening Score

Current Heart Rate: ________

Temperature Minimum (prior 24 hours): ____________ Who is patient’s primary service?

Temperature Maximum (prior 24 hours): ____________

Current Respiratory Rate: ________

WBC (most recent): ____________

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<th>2</th>
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<td>Heart Rate</td>
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<td></td>
<td>55 – 69</td>
<td>40 – 54</td>
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<td>110 – 139</td>
<td>140 – 179</td>
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<tr>
<td>Temp (C)</td>
<td>36 – 38.4</td>
<td>34 – 35.9</td>
<td>32 – 33.9</td>
<td>30 – 31.9</td>
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<td>38.5 – 38.9</td>
<td>39 – 40.9</td>
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<td>101.2 – 102.0</td>
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</tr>
<tr>
<td>Acute Change in Mental Status</td>
<td>No</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SIRS Score (total points)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If the SIRS Score is ≥ 4 please notify the mid level provider or resident physician to complete the assessment for infection.

Does the patients have bands present?   __ Yes   __ No

If yes, how many? ____________

Completed By: ________________________________ Date/Time: ____________________________

**this is performance improvement data is NOT part of the patient’s medical record.**
Midlevel/ Physician Sepsis Screening
Assessment for Source of Infection

1. Vascular Access?
   Yes  No

<table>
<thead>
<tr>
<th>Type</th>
<th>Dialysis</th>
<th>Triple/quad</th>
<th>PICC</th>
<th>Port</th>
<th>Tunneled</th>
<th>Other (IV, art)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date placed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Local finding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood culture finding</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. Clinical pulmonary infection score (CPIS)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Points</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature (˚C) time (hhmm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36.5 – 38.4</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>38.5 – 38.9</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>&gt;39 - &lt;36</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Blood leukocyte count time (hhmm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4,000 – 12,000</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>&lt;4,000 or &gt;12,000</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Tracheal secretions time (hhmm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>moderate</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Large</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Purulent (add 1 point if purulent)</td>
<td>+1</td>
<td></td>
</tr>
<tr>
<td>Oxygenation (Pa02/Fi02)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;240 or presence of ARDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;240 and absence of ARDS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chest radiograph</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No infiltration</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Patchy or diffuse infiltrate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Localized infiltration</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

3. Abdomen
   Recent abdominal surgery? Yes  No
   Abdominal pain? Yes  No
   Abdominal distention? Yes  No
   Purulent drainage from surgical drains? Yes  No
   Intolerance to enteral nutrition? Yes  No

4. Skin / Soft Tissue
   Erythema/ drainage from other surgical site? Yes  No
   Cellulitis/ soft tissue infection? Yes  No

5. Urinary tract
   Urinary catheter Yes  No
   UTI? Yes  No