**Rincon Study Definition of Terms**

**Acute Physiology Age Chronic Health Evaluation (APACHE)**

Conceptual definition:Is a severity-adjusted methodology that predicts outcomes for critically ill adult patients.14 The APACHE algorithm is built into the eCareManager system. Each ICU patient in the eCareManager system will receive a severity of illness score if all required data elements for the algorithm are present. A previous study using this same data set demonstrated that approximately 80% of patients have an APACHE IVa score of ≥ 1.15

Operational definition: APACHE IVa ≥ 1scores for each patient in the data repository will be used to determine the severity of illness and risk of mortality in this study population. An APACHE IVa score of at least 1 must be present.

**Comorbid conditions**

Conceptual definition:Comorbid conditions also termed comorbidity, are additional conditions existing during the clinical course of a patient who is being treated for another condition; comorbidity is associated with increased death, complications, and costs in healthcare.16

Operational definition:For this study, a comorbid can be defined as a chronic condition present on admission to the ICU.Comorbid conditions are captured as discrete data elements in the admission note of eCareManager in the chronic health section of the history and physical. The following comorbid conditions are consistently documented for APACHE data collection in all Tele-ICUs and will be used in this study: acquired Immunodeficiency syndrome (AIDS), liver failure and/or cirrhosis, diabetes mellitus, immune suppression in the last 6 months (radiation therapy, chemotherapy, daily use of non-cytotoxic immunosuppressive drugs or high dose steroid use), leukemia/myeloma, non-Hodgkin's lymphoma, and solid tumor with metastasis.

**Body Mass Index (BMI)**

Conceptual definition: BMI is calculated by dividing a person's weight in kilograms by the square of height in meters.17 BMI is used to screen for weight categories that may contribute to the morbidity and mortality of a patient.

Operational definition: The BMI will be used to describe the population of interest. BMI is calculated for each patient and available in the data set.

**Broad-spectrum antibiotics**

Conceptual definition: Administration of broad-spectrum antibiotics is critical to decreasing mortality in severely septic patients.18 The SSC recommends broad-spectrum bacterial coverage for gram-positive and gram-negative organisms with administration timing less than three hours of identification of severe sepsis.9 The researcher will describe the timing of broad-spectrum antibiotic prescribing for severe sepsis patients with two or more SIRS versus one or less SIRS criteria.

Operational definition:Medications ordered by licensed care providers are interfaced into eCareManager from pharmacy operating systems and include date and time when ordered to start. This variable will be categorized as start order for broad-spectrum antibiotics ≤ one hour, between one and three hours, between three and six hours, between six and 12 hours, between12 and 24 hours and greater than 24 hours from time of ICU admission. Broad spectrum antibiotics include: ceftriaxone, cefotaxime, ampicillin/sulbactam, levofloxacin, moxifloxacin, piperacillin/tazobactam, cefepime, meropenem, imipenem, doripenem, gentamicin, tobramycin, and amikacin.18

**Compensatory Anti-Inflammatory Response Syndrome (CARS)**

Conceptual definition:Immunosuppression due tothe activation of anti-inflammatory mediators in an effort to achieve homeostasis by suppressing systemic inflammatory response syndrome (SIRS).19

Operational definition: To compensate for pro-inflammatory cytokine activation in SIRS, anti-inflammatory mediators such as interleukin (IL) 10, IL-13, IL-4, soluble tumor necrosis factor receptors (TNFR) I and II, and transforming growth factor-beta (TGF-β) are activated. This in turn leads to monocyte deactivation, defective phagocytosis, distorted antigen presentation, and diminished production of inflammatory cytokines (immunosuppression).20,21

**eICU® Research Institute (eRI)**

Conceptual definition:The eICU Research Institute supports critical care research and analysis using an extensive ICU-centric longitudinal data set. These data are collected and aggregated across the entire eICU Program customer base.22 Business associate agreements among the participating programs guide data use and sharing. Privacert, Inc. (Pittsburgh, Pennsylvania) has certified it as Health Insurance Portability and Accountability Act (HIPAA) compliant under safe harbor standards.15 Philips representatives have reported to this researcher that the data repository is growing at a rate of more than 400,000 ICU patient stays per year and is over 2,000,000.

Operational definition: The data for this study will be derived from patients contained in the eRI data repository who were admitted to an ICU during the study period (January 1, 2010 through December 31, 2014). Data transfer from the eRI to the researcher will occur via a secure and encrypted external hard-drive. The researcher will be provided all patient level data needed for this study.

**First 24 hours of ICU Stay:**

Conceptual definition:Most patients who will be treated in the ICU for severe sepsis will have met the definition within the first 24 hours of the ICU stay. This method has been used successfully in a recent severe sepsis epidemiology study using secondary analysis of a large database in Australia and New Zealand.10

Operational definition: ICU admission dates and times are present in the eRI data repository and will be used to determine the first 24 hours of the ICU stay for each patient.

**Hospital characteristics**

Conceptual definition: Describing hospital characteristics is a common approach used in studies. It assists the reader to determine how generalizable the results are to other hospitals.

Operational definition**:** The eRI data repository contains basic hospital characteristic information.15 The following characteristics will be stratified by number of licensed beds, community size, hospital size < 100 beds, 100-200 beds, 200-500 beds, > 500 beds, and hospital type (academic medical center, teaching, non-teaching, and the geographic regions that they are located in).

**Hospital discharge location**

Conceptual definition: Hospital discharge location is considered a reportable outcome measure23 and will be analyzed for the following locations: discharge to home, discharge to other acute care hospital, discharge to skilled nursing facility, and discharge to rehabilitation or chronic care facility.

Operational definition:Hospital discharge location is interfaced from admission, discharge, and transfer (ADT) systems into eCareManager.

**Hospital length of stay (LOS)**

Conceptual definition: Hospital LOS is commonly described in hospital reported data. 23 It is calculated using hospital admission and discharge dates/times.

Operational definition: Hospital admission and discharge dates/times are interfaced from ADT systems into eCareManager. Predicted and actual hospital LOS averages as well as standardized LOS ratios (actual hospital days divided by predicted hospital days) will be reported.

**Hospital Mortality**

Conceptual definition: The death of a person as their discharge disposition from the hospital.

Operational definition: Hospital mortality is interfaced from ADT systems into eCareManager as “alive” or “expired” and will be used for analyzing mortality rates as well as in predictive modeling statistical methods. Predicted and actual hospital mortality total numbers and percentages as well as standardized mortality ratios (actual deaths divided by predicted deaths) will be reported.

**Hypotension**

Conceptual definition: Low blood pressure in a person that causes symptoms related to lack of perfusion such as dizziness, confusion, weakness, fatigue, and fainting.24 According to severe sepsis consensus definitions a systolic blood pressure (SBP) < 90 mm Hg, a mean arterial pressure (MAP) < 65 mm Hg or a SBP reduction of < 40 mm Hg from baseline are considered hypotension.7,9 Ventricular dysfunction along with hypovolemia (caused by venodilatation, increases sensible loss and vascular leak) leads to hypotension and hypoperfusion in severely septic patients.25

Operational definition: For this study hypotension will be defined as SBP < 90 mm Hg, MAP < 65 mm Hg or a SBP reduction of < 40 mm Hg from baseline or on medications to support the blood pressure (vasopressors). Vital sign data and medications ordered by licensed care providers are interfaced or entered directly into eCareManager from vital sign monitoring systems, electronic health record (EHR) nursing flow sheets, and pharmacy operating systems.

**Hypoperfusion**

Conceptual definition: A condition of acute peripheral circulatory failure due to derangement of circulatory control or loss of circulating fluid. Hypoperfusion abnormalities have been described in the literature as lactic acidosis, alterations in mental status and oliguria.7,9

Operational definition: For this study, the following parameters will be considered hypoperfusion: a lactate > 2 mmol/L interfaced from laboratory systems into eCareManager; urine output < 500 ml/24h interfaced from nursing flow sheet or documented directly into eCareManager; or documentation of alterations in mental status documented diagnosis in the Active Diagnosis/Problem List or the care plan sections of eCareManager.

**Infection**

Conceptual definition:Infection occur when a pathogen invades and begins to multiply within a host.26Manifestations of local (e.g., cellulitis, abscess, purulent sputum or discharge, unexplained localized pain) or systemic (fever or malaise) infections as well as recent abdominal or gastrointestinal surgeries/procedures or aspiration or documented diagnosis of and/or therapies for infection such as but not limited to antimicrobial therapy (excluding prophylactic therapies) and microbiology diagnostic tests (cultures and sensitivities).27 The definition of severe sepsis is dependent on the presence of an infection and an organ failure.7

Operational definition: Diagnostic groups used to define documented “infection” will come from the APACHE admission diagnosis (updated in either the admission note or the care plan section) or active diagnoses selected from the problem list (known as Active Diagnosis/Problem List) in the eCareManager system. The eCareManager system uses the International Classification of Diseases, 9th ed. Terms are then mapped to equivalent concepts in the eRI data repository. Active infection will be defined as:

1. Non-operative group: endocarditis, pneumonia (parasitic, bacterial, or viral), gastrointestinal infections (perforation, cholangitis, abscess/cyst, peritonitis), neurologic infections, renal infection/abscess, viral myositis, septic arthritis, septic thrombophlebitis, cellulitis and localized soft tissue infections, systemic/other infections, sepsis, severe sepsis, or septic shock.
2. Post-operative group: respiratory infection, gastrointestinal tract perforation or rupture, cholecystitis or cholangitis, appendicitis, fistula or abscess surgery, peritonitis, cranial infection/abscess, cellulitis and localized soft tissue infections.
3. *More than 1 dose of* ***broad spectrum antibiotics*** *including but not limited to: ceftriaxone, cefotaxime, ampicillin/sulbactam, levofloxacin, moxifloxacin, piperacillin/tazobactam, cefepime, meropenem, imipenem, doripenem, gentamicin, tobramycin, and amikacin*
4. *Considering adding blood cultures (not sure if data available for this)*

**Intensive Care Unit (ICU) characteristics**

Conceptual definition: ICU characteristics often described in the literature are by type (medical, surgical, trauma, cardiac, neuro-critical care, or mixed) and by size.15 Describing these characteristics assist the reader in determining how generalizable the results are to other hospitals.

Operational definition: The eRI data repository contains basic hospital characteristic information.15 The following characteristics will be stratified by number of beds (< 6, 6-10, 10-15, >15) and ICU type (medical, surgical, trauma, cardiac, neuro-critical care, or mixed). This will determine how generalizable the results are to the other ICUs.

**Mechanical ventilation**

Conceptual definition: Mechanical ventilation is a therapeutic intervention used to maintain an airway or adequate oxygenation or ventilation for a person. It is also described as being either noninvasive (uses various types of face masks) or invasive (endotracheal intubation).28

Operational definition:For this study, mechanical ventilation is an instrument used in an ICU that is used to provide oxygenation and ventilation to the patient. Mechanical ventilation start and stop times are interfaced into or documented directly into the respiratory flow sheet or by updating the care plan in eCareManager. Thetotal number of severe sepsis patients on mechanical ventilation and the percent of the total population of severe sepsis patients and the central tendencies of duration on mechanical ventilation (mean and standard deviation) will be reported. Patients requiring mechanical ventilation will be stratified by invasive and non-invasive.

**Mixed Antagonist Response Syndrome (MARS):**

Conceptual definition: The presence of SIRS in a patient with CARS.19

**Operational Definition:** An acute alteration in baseline of more than one of the following: 1) temperature > 38°C or < 36°C; 2) heart rate > 90 beats/minute; 3) tachypnea (respiratory rate > 20 breaths/minute) or hyperventilation (PCO2 < 32 mm Hg); 4) white blood cell (WBC) > 12,000 or < 4,000 cu mm or 10% immature neutrophils (bands)7 with activation of anti-inflammatory mediators in an effort to achieve homeostasis.29

**Multiple organ dysfunction syndrome (MODS) also termed multiple organ failure (MOF):**

Conceptual definition: The presence of more than one organ dysfunction or failure in the acutely ill whereby homeostasis cannot be maintained without therapeutic intervention.7,21 Severe sepsis remains a chief cause of MODS and prolonged ICU stays in critically ill patients.30

Operational definition: Patients in the eRI data repository will be stratified by none, one, two, three, and more than three organ failure.

**Organ failure (acute)**

Conceptual definition: Marik describes tissue hypoperfusion and hypoxia as dominate factors in organ failure in severe sepsis. He explains that in severe sepsis systemic vasodilatation, hypovolemia, altered microvascular flow, intravascular coagulation, and myocardial depression are the precursors to tissue hypoperfusion and hypoxia.31 The definition of severe sepsis is dependent on the presence of an infection and an acute organ failure.

Operational definition: Patients in the eRI data repository with an active infection and an acute organ failure will meet the definition of severe sepsis. Acute organ failure criteria:

1. Cardiovascular failure: lowest MAP < 65 mm Hg or lowest systolic pressure < 90 mm Hg or septic shock
2. Respiratory failure: acute lung injury with partial pressure of oxygen in arterial blood (PaO2)/fraction of inspired oxygen (FiO2) < 250 in the absence of pneumonia as infection source or acute lung injury with PaO2/FiO2 < 200 in the presence of pneumonia as infection source
3. Hepatic failure: Bilirubin ≥ 5.96 mg/dL (102 μmol/L)
4. Renal failure: no chronic dialysis and highest creatinine ≥ 3.39 mg/dL (300 μmol/L) or urine output < 500 ml/24h or documented diagnosis of acute renal failure
5. Coagulation system: platelet count < 100,000 and/or prothrombin time/international normalized rate (INR) > 1.5 or activated partial thromboplastin time (aPTT) > 60 seconds) interfaced from laboratory operating systems and only includes values within most recent 24 hours; exclude if the patient is on warfarin.
6. Patients with one or more of the following diagnoses documented in the Active Diagnoses/Problem Lists of eCareManager: acute lung injury, acute renal failure, acute glomerulonephritis, renal shutdown (unspecified), hemodialysis (except in chronic renal failure), acute hepatic failure or necrosis, hepatic encephalopathy (except in chronic hepatic failure), hepatitis (septic or unspecified), disseminated intravascular coagulation (DIC), purpura fulminans, coagulopathy, thrombocytopenia (primary, secondary or unspecified), acidosis (metabolic or lactic), acute respiratory failure, acute respiratory distress syndrome (ARDS), acute respiratory insufficiency, respiratory arrest, ventilator management, hypotension (postural, arterial, constitutional, transient, or specific type not elsewhere classified), shock (cardiogenic, circulatory or septic), sepsis with single organ dysfunction, sepsis with multi-organ dysfunction syndrome, transient organic psychosis, anoxic brain injury, acute encephalopathy, coma, altered consciousness (unspecified).2

**Sepsis prompt:**

Conceptual definition: An electronic alert for detection of severe sepsis that uses a deterministic algorithm based on data from biomedical devices, laboratory systems, and other clinical information systems.32,33

Operational definition: The sepsis prompt algorithm uses signs of inflammation criteria plus one or more acute organ failure criteria. Abnormal values that will trigger the sepsis prompt are listed below. It should be noted that combinations of two or more abnormal or near abnormal values coupled with an organ failure criteria can cause the prompt to fire.

*Signs of Inflammation Criteria:*

1. Temperature > 38°C or < 36°C: Data come from eCareManager nursing flow sheet (or interfaced from vital signs monitoring system when available) and only includes values within most recent 12 hours.
2. White Blood Cell (WBC) > 12,000 or < 4,000 cu mm or 10% immature neutrophils (bands) interfaced from laboratory operating system and only includes values within most recent 24 hours.
3. Tachypnea: respiratory rate > 20 breaths/minute or hyperventilation: PCO2 < 32 mm Hg: Data are derived from eCareManager respiratory flow sheet, nursing flow sheet and interfaced from vital signs monitoring system; only includes values within most recent two hours.
4. Tachycardia: heart rate > 90 beats/minute: Data come from eCareManager nursing flow sheet and interfaced from vital signs monitoring system; only includes values within most recent two hours.
5. Hypotension: systolic blood pressure (SBP) < 90 mm Hg: Data are interfaced from vital signs monitoring system; only includes values within most recent two hours.
6. Altered or decreased mental status data are derived from the eCareManager Care Plan or Active Diagnoses/Problem Lists; only active selections are used.
7. Hyperglycemia (> 120 mg/dl) in the absence of diabetes interfaced from laboratory operating system and only includes values within most recent six hours.
8. Lactate ≥ 2 mmol/L interfaced from laboratory operating system and only includes values within most recent 24 hours and excludes first six hours post cardiac surgery.
9. Coagulopathy: platelet count <100,000 and/or (INR >1.5 or aPTT > 60 secs) interfaced from laboratory operating systems and only includes values within most recent 24 hours; exclude if patient on warfarin.
10. *Organ Failure Criteria:*
11. Cardiovascular (hypotension): SBP < 90 mm Hg or mean arterial pressure (MAP) < 65 mm Hg or SBP decrease > 40 mm Hg from baseline or on vasopressors
12. Respiratory (hypoxemia): acute lung injury with PaO2/FiO2 < 250 in the absence of pneumonia as infection source or acute lung injury with PaO2/FiO2 < 200 in the presence of pneumonia as infection source where PaO2 is partial pressure of oxygen in arterial blood and FiO2 is fraction of inspired oxygen
13. Renal: creatinine > 2.0 mg/dl (176.8 mmol/L) or urine output < 0.5 ml/kg/hr for two hours excludes chronic renal failure.
14. Metabolic acidosis: potential Hydrogen (pH) < 7.35
15. Liver: bilirubin > 2 mg/dl (34.2 mmol/L) or combinations of elevated liver function studies: serum alkaline phosphatase, aspartate aminotransferase (AST), alanine aminotransferase (ALT), and albumin levels) interfaced from laboratory operating system and only includes values within most recent 24 hours and excludes chronic liver failure.
16. Hematology: platelet counts <100,000 μL and/or INR > 1.5 or aPTT > 60 interfaced from laboratory operating system and only includes values within most recent 24 hours.

**Sepsis**

*Conceptual Definition: A whole-body inflammation caused by an infection. Sepsis is a disease that has been characterized by a systemic response to an infection that often causes fever, increased heart rate, increased breathing rate, and confusion. Large epidemiology studies have defined severe sepsis as infection and organ failure using International Classification of Diseases (ICD-9) codes. The consensus definitions of sepsis have changed over the years:*

***Sepsis 1*** *refers to the Bone et al. consensus sepsis definition (1992) that included ≥ 2 Systemic Inflammatory Response (SIRS) criteria**with suspected or confirmed infection.*

***Sepsis 2*** *refers to the Levy et al. consensus sepsis definition (2001) that included ≥ 2 SIRS expanded criteria**with suspected or confirmed infection.*

***Sepsis 3*** *refers to the Singer et al.(2016) consensus sepsis definition :**a**life-threatening organ dysfunction caused by a dysregulated host response to infection that leads to tissue injury and organ failure.*

*Both sepsis 1 and 2 included a**definition of severe sepsis* ***=*** *≥ 2 SIRS criteria with suspected or confirmed infection and organ failure. The Sepsis 3 definition eliminated the term “severe sepsis”. The term sepsis now replaces the term severe sepsis.*

*Operational Definition: A patient who is in the eRI data repository that has a documented infection and an acute organ failure in the first 24 hours of their ICU stay.*

**Sepsis-induced hypotension**

Conceptual definition:Sepsis withhypotension in the absence of other causes.7

Hypotension is a principal feature in septic shock with improving blood pressure as a therapeutic goal.9

Operational Definition: For this study, sepsis induced hypotension will be a systolic blood pressure (SBP) < 90 mm Hg, mean arterial blood pressure (MAP) < 65 mm Hg, or a reduction of SBP ≥ 40 mm Hg from baseline in the absence of other causes.7,9

**Septic shock***:*

*Conceptual definition: Persisting hypotension requiring vasopressors to maintain MAP ≥ 65 mm Hg and a serum lactate level > 2 mmol/L (18 mg/dL) despite adequate volume resuscitation. Septic shock is characterized by underlying circulatory and cellular/metabolic abnormalities are profound enough to substantially increase mortality (hospital mortality > 40%).*

*Operational Definition: Patients in the ICU that have hypotension or abnormal perfusion indicators such as lactic acidosis (lactate > 2 mmol/L); oliguria (urine output < 0.5 ml/kg/hour for 2 hours), decreased capillary fill or mottling, or acute alteration in mental status despite administration of fluids. These patients require a fluid resuscitation bolus of 30 mL/kg of a crystalloid solution for hypotension or they have a lactate value of > 2 mmol/L.*

***Sequential Organ Failure Assessment******(new)***

*Conceptual Definition: Organ dysfunction leads to worse outcome in sepsis. The Sequential Organ Failure Assessment (SOFA) score is used to numerically quantify the number and severity of acute organ dysfunction. The new consensus definition (Sepsis 3) recommends the use of SOFA to screen for sepsis in ICU patients.*

*Operational definition: Patients in the eRI data repository with an acute alteration in baseline of more than one of the following (Table 1) will indicate a positive identification of sepsis for testing of the Sepsis 3 definition.*

Table 1. The Sequential Organ Failure Assessment (SOFA) score

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **SOFA score** | **1** | **2** | **3** | **4** |
| **Respiration** |  |  |  |  |
| PaO2/FIO2 (mm Hg) | < 400 | < 300 | < 220 | < 100 |
| SaO2/FIO2 | 221-301 | 142-220 | 67-141 | < 67 |
| **Coagulation** |  |  |  |  |
| Platelets ×103/mm3 | < 150 | < 100 | < 50 | < 20 |
| **Liver** |  |  |  |  |
| Bilirubin (mg/dL) | 1.2-1.9 | 2.0-5.9 | 6.0-11.9 | > 12.0 |
| **Cardiovascular** |  |  |  |  |
| Hypotension | MAP < 70 | Dopamine <5 μmg/kg/min or dobutamine (any) | Dopamine > 5 μmg/kg/min or norepinephrine ≤0.1 μmg/kg/min | Dopamine >15 μmg/kg/min or norepinephrine > 0.1 μmg/kg/min |
| **CNS** |  |  |  |  |
| Glasgow Coma Score | 13-14 | 10-12 | 6-9 | < 6 |
| **Renal** |  |  |  |  |
| Creatinine (mg/dL) or urine output (mL/d) | 1.2-1.9 | 2.0-3.4 | 3.5-4.9 or < 500 | > 5.0 or < 200 |

PaO2, partial pressure of oxygen in arterial blood; FiO2, fraction of inspired oxygen; SaO2, peripheral arterial oxygen saturation.

PaO2/FIO2 ratio was used preferentially. If not available, the SaO2/FIO2 ratio was used

MAP, mean arterial pressure; CNS, central nervous system;

Dopamine, dobutamine, or norepinephrine mediations administered for at least 1 hr

**Systemic Inflammatory Response Syndrome (SIRS):**

Conceptual definition: A pro-inflammatory response to an insult (e.g., fever, tachycardia, tachypnea, and leukocytosis).1

Operational Definition: An acute alteration in baseline of more than one of the following: 1) temperature > 38°C or < 36°C; 2) heart rate > 90 beats/minute; 3) tachypnea (respiratory rate > 20 breaths/minute) or hyperventilation (PCO2 < 32 mm Hg); 4) white blood cell (WBC) > 12,000 or < 4,000 cu mm or 10% immature neutrophils (bands).7 **SIRS positive sepsis** refers to two or more SIRS criteria plus organ failure with infection present in the first 24 hours of ICU admission. **SIRS negative sepsis** refers to one or less SIRS criteria plus organ failure with infection present in the first 24 hours of ICU admission.

**TeleHealth Intensive Care Unit (Tele-ICU)**

Conceptual definition: According to the American Telemedicine Association Tele-ICU Guidelines Workgroup, Tele-ICU is the application of critical care using a network of audio-visual communication and computer systems. The authors describe Tele-ICU teams as comprised of clinical experts (intensivists, advanced practice providers, and critical care nurses) whose knowledge and expertise is leveraged across a diverse spectrum of critically ill patients in a variety of clinical and geographically dispersed settings.34

Operational Definition: eICU® is a trade name that refers to Tele-ICUs that use a common vendor (Philips) as their Telehealth platform. eICUs from around the US participate in the eRI.

**Total fluid volume administered**

Conceptual definition: Total fluid volume amount administered in the first 24 hours of ICU admission is an important therapeutic intervention in severe sepsis. The SSC recommends 30 ml/kg of crystalloids be used as an initial fluid bolus in the resuscitation of severe sepsis and septic shock. New revised guidelines include fluid boluses continue until vital signs, cardiopulmonary, capillary refill, pulse, and skin findings indicate adequate circulating volume has been restored.9,35

Operational definition:Intake and output data are interfaced from EHRs or directly entered into eCareManager nursing flow sheet. The total number of liters will be classified as: ≤ one liter, between > one and ≤ three liters, > three and ≤ six liters, > six to ≤ 10 liters, > 10 liters.

**Vasopressors**

Conceptual definition: Vasopressors are potent medications that increase vascular constriction and are required to sustain life and maintain perfusion in the face of life-threatening hypotension.9 Adequate fluid resuscitation should be attempted before but should not delay the use of vasopressors in patients with septic shock.9

Operational definition:Vasopressor infusions start and stop times are interfaced from pharmacy operating systems into the medication section of eCareManager or interfaced or documented directly into the nursing flow sheet in eCareManager. Thetotal number of severe sepsis patients on vasopressors (none to > three) and the percent of the total population of severe sepsis patients as well as the central tendencies for duration on one or more vasopressors (mean and standard deviation) will be reported. Vasopressors use and duration stratified by none, one, two, three, and more than three.