Appendix: Variable Definitions

Independent variables:

Demographic variables, such as age, gender, race, BMI, and other important variables (smoking, diabetes mellitus, alcohol use) will be collected for all patients through the ICU Datamart.[16](#_ENREF_16)

Apache IV score and Unit of Admission (type, medical, mixed or surgical ICU) will be collected for all the patients who were admitted to the ICU through the METRIC Datamart.[16](#_ENREF_16)

Primary exposure of interest: Ventilator bundle compliance

-Individual component compliance on each calendar day:

-Appropriate DVT prophylaxis defined as medication administration record (MAR) documentation of either (i) chemical prophylaxis (subcutaneous heparin enoxaparin), (ii) mechanical prophylaxis (e.g. with venodyne boots) or (iii) therapeutic anticoagulation with IV unfractionated heparin OR having INR >2.0 while on coumadin

-Appropriate stress ulcer prophylaxis defined as MAR documented use of (i) aproton pump inhibitor (esomeprazole, omeprazole, pantoprazole, lansoprazole or rabeprazole), (ii) H2 blockers (cimetidine, ranitidine) or (iii) sulfacrate

-Daily sedation holiday defined as nursing documentation of having performed this in the patient care flow sheet, or appropriate documentation of contraindication

-Daily weaning trial defined as respiratory care documentation of use of a spontaneous mode of ventilation for any duration during the day or appropriate documentation of contraindication

-Chlorhexidine mouthwash defined as MAR documentation of use of chlorhexidine oral care or appropriate documentation of contraindication

-Head of bed elevation of at least 30 degrees consistently documented in the nursing chart or appropriate documentation of contraindication

4. Potential bundle elements: # of calendar days with

-Violations of low tidal volume ventilation strategy (<10 ml/kg PBW) for patients not on spontaneous breathing modes while in ICU. Tidal volumes during spontaneous breathing trials and while not in ICU (i.e. in operating room) will be excluded

-Optimal glucose control strategy with all blood sugars <180

-Use of Dialysis/CRRT

-Mobilization, defined as having an activity level of at least sitting up to chair. For this analysis, no contraindications to mobilization will be considered.

-Use of benzodiazepine infusion in MAR

6. Other exposures of interest

-Fluid balance defined as checking volume status, positive balance (positive net volume more than 100 mL), neutral (within +/- 100 mL), negative balance (>100 mL net volume loss)

-Use of blood products, including fresh frozen plasma, packed red blood cells, cell saver, whole blood, cryoprecipitate and platelets.

-Appropriately restrictive use of blood products based on hemoglobin, INR and platelet counts and documented reasons for transfusion

-Nutrition strategy

-Use of enteral or parenteral nutrition

-Total estimated Kcal/Day delivered via enteral/parenteral nutrition sources

-Degree of under/overfeeding as compared to predicted metabolic requirements from Harris-Benedict equation

-Use of noninvasive ventilation

-Antecedent to intubation, measured in number of hours

-Intubation factors

-Elective vs. emergent as documented in the procedure note

-Whether patient was known to be NPO prior to intubation

Compliance definitions

Full Compliance- Presence of all bundle elements on every day that patient is eligible for each intervention. Documented contraindications to specific bundle elements will be considered “compliant” for that day.

Partial compliance- Between 80%-100% compliance of bundle elements over the duration that they are eligible for the bundle (based on current data on median bundle compliance rates).

Noncompliance-<80% bundle compliance overall.

Dependent variable definitions

Hospital length of stay defined as the average length of stay among all patients discharged from the hospital who were admitted or transferred to this ICU during the specified timeframe.

ICU length of stay, defined as similar to #1, but pertaining to total time spent in ICU during hospitalization

Ventilator days, defined as time with invasive mechanical ventilation in place during hospitalization

Antibiotic resource utilization defined as the number of days of administered antimicrobials after hospital admission –measured as a ratio of days of antibiotics to patient days, excluding surgical prophylaxis (i.e. Ancef)

Central line resource utilization, defined as ratio of central line days to patient days.

Unit readmission rates defined as readmissions to the ICU within 24 hours of ICU discharge or within the same hospitalization

Hospital readmission rates defined as readmission to hospital within 30 days

ICU mortality defined as mortality rate based on death rate among all patients discharged from the ICU during the specified timeframe

Hospital mortality defined as basing on the mortality rate among all patients discharged from the hospital who were admitted or transferred to this ICU during the specified timeframe

30-day mortality defined as basing on the mortality rate among all patients discharged alive from the hospital who were admitted or transferred to this ICU during the specified timeframe