### VENTILATOR-ASSOCIATED EVENT PREVENTION KEY STRATEGIES AND HOSPITAL ACTION PLAN

<table>
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<tr>
<th>PROCESS STEP</th>
<th>EXAMPLES OF KEY STRATEGIES</th>
<th>TEAM’S CURRENT STATUS OR PROCESS</th>
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<tr>
<td>Oral Care</td>
<td>Develop critical care oral care protocol and obtain approvals from relevant clinical committees (e.g., critical care committee, nursing practice, medical staff, etc.). Consider including the following key elements:</td>
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<td>- Suction toothbrush twice daily (e.g., 8 a.m. &amp; 8 p.m.) with antiseptic solution.</td>
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<td>- Use antiseptic mouth wash every 12 hours (i.e., chlorhexidine or alcohol-based).</td>
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<td>- Use suction and/or oral swabs every two hours to clean mouth and teeth.</td>
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<td>- Apply mouth moisturizer to oral mucosa.</td>
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<td>- Replace suction liner, tubing, and Yankauer every 24 hours.</td>
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<td>- Keep Yankauer covered at all times.</td>
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<td>- Other considerations:</td>
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<td>- Keep mouth moist.</td>
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<td>- Set up “shared responsibility” model involving the patient, family, and interdisciplinary team.</td>
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<td>- Use a separate suction line for endotracheal tube suctioning.</td>
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<td>- Use closed endotracheal suction catheter, in-line catheter/ventilator circuit that is continuously covered.</td>
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<td>Elevated Head-of-Bed (HOB)</td>
<td>- Keep HOB elevated 30°-45°.</td>
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<td>- Use HOB bed alarms.</td>
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<td>- Use triangle devices and install visual cues in your unit.</td>
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<td>- On bed</td>
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<td>- On wall (example: Red line where head of the bed height should be)</td>
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<td>- Empower all members of the team to be aware of bed elevation and to raise the bed or alert the nurse.</td>
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<td>- Educate patient and family as to importance of HOB elevation.</td>
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<td>- Empower patient and family to be vigilant monitors.</td>
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<td>- Include HOB assessment on routine documentation, including as part of respiratory therapy/nursing routine assessment sheets.</td>
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<td>- Consider HOB elevation during tube feeds, as appropriate per nutrition recommendation.</td>
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<td>- Take pressure ulcer precautions, such as elevation for relief to sacral areas and heels.</td>
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<td>Pain, Delirium, and Sedation Management</td>
<td><strong>SEDATION</strong> Engender culture change around the harms of sedation. Sedation predisposes patients to VAP because it:</td>
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<td>- Inhibits coughing;</td>
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<td>- Inhibits activity/mobilization;</td>
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• Decreases immune function;
• Promotes aspiration;
• Accelerates patient de-conditioning;
• Prolongs ventilator time; and
• Promotes skin breakdown.

There is also a correlation with post-intensive care unit (ICU) post-traumatic stress disorder (PTSD).

PAIN MANAGEMENT
Strive for minimal medication to achieve patient comfort while maximizing patient level of arousal.
• Use a pain scale, such as the Behavioral Pain Scale (BPS) or Critical Care Pain Observation Tool (CPOT).
• Administer pain medication intermittently.
• Assess pain, at a minimum, once every two hours.
• Use vital signs as a cue to increase frequency of pain assessment.
• Use intravenous (IV) opioids as the first-line drug class of choice.
• Consider non-opioid analgesics to decrease the amount of opioids administered.
• Consider the recommended enterally administered gabapentin or carbamazepine for treatment of neuropathic pain.

MONITOR DELIRIUM RISK AND PREVENTION
Risk factors to consider for increased level of delirium include preexisting dementia; history of hypertension and/or alcoholism; high severity of illness at admission; coma; use of benzodiazepine.

Strive to detect the level of delirium for patients who are unable to effectively communicate and supply the lightest appropriate level of delirium control. Consider using the following guidelines:
• Assess delirium at least once per shift.
• Use an assessment scale such as the Confusion Assessment Method for ICU (CAM ICU) or Intensive Care Delirium Screening Checklist (ICDSC).
• Treat with atypical antipsychotics.
• Treat with non-benzodiazepine infusions for reduction of delirium.

MONITOR SEDATION/AGITATION REQUIREMENTS
Strive to reduce sedation by incorporating spontaneous breathing trials (SBT), using intermittent as opposed to continuous sedation when possible, and progressing to weaning and discontinuation of mechanical ventilation as soon as possible. Maintain a light level of sedation—rather than a deep level of sedation—unless clinically contraindicated.

Monitor depth of sedation and brain function and consider the following guidelines:
• Ideally use light levels in ICU so that patient is able to be aroused and able to purposefully follow simple commands.
• Assess sedation and brain function at least once per shift. Use an assessment scale, such as the Richmond Agitation-Sedation Scale (RASS) or Sedation-Agitation Scale (SAS).
• Treat with non-benzodiazepine sedatives (either propofol or dexmedetomidine).
• Employ daily sedation interruption or a light target level of sedation for mechanically ventilated patients.
• Consider using analgesics for first line in sedation.
• Promote sleep.
### Sedation Vacation (for continuously sedated patients)

If continuous sedation is clinically indicated, use non-benzodiazepine medications.

Strive for sedation vacation at least once daily to assess for readiness to wean. Consider using the following guidelines:
- Strategically determine the best time for weaning trials at your hospital (e.g. 5 a.m., 8 a.m., etc.).
  - Consider increase to two sedation vacations per day, per hospital's process.
  - Consider various other low- or no-sedation options.
  - Discuss sedation and sedation vacation plan during interdisciplinary rounds to determine the best time of day.
- Possible exclusions for daily sedation vacation:
  - Open abdominal wound with fascia not closed;
  - Intracranial pressure of > 20, unless physician approves;
  - Alcohol withdrawal; and
  - Chemical coma.
- Implement standard ventilator, delirium and sedation/analgesia order set.
- Coordinate timing of sedation vacation with weaning.

### Daily Assessment of Readiness to Wean and Weaning Protocols

- Weaning protocols should be established and should be part of the ventilator order set.
- Weaning readiness must be assessed based on accepted clinical criteria.
- Coordinate weaning attempts with sedation reduction or no sedation. Develop weaning protocols that call for weaning attempts at least once every 24 hours.
- Interdisciplinary team should determine best time of day for weaning attempts and determine who on the team may perform the weaning attempt.

### Activity & Mobility

Progressive mobility of patients improves respiratory, psychological, immune, and circulatory status, and muscle strength. Patients can be ambulated with low to moderate dose vasopressors.

Be aware and minimize adverse events, including:
- Falls to knee;
- Dizziness;
- Blood pressure systolic changes (increases or decreases);
- Knee buckling;
- Desaturation; and
- Self or mechanical extubation (control tubing/IV/leads/catheters etc.).

**Level I Interventions:**
- Use a chair in bed position or a cardiac chair.
- Use range of motion activities for upper and lower extremities.
- Have patient participate in passive-active or assistive-active movements.

**Level II Interventions (include Level I Interventions)**
- Elevate HOB from 45°–65° if hemodynamically stable; place legs in dependent position.
- Sit on edge of bed (EOB) with legs dangling.
- Out-of-bed to chair with assistive device twice daily for one hour or less.
### Activity & Mobility (continued)

**Level III Interventions (include Level I & II Interventions):**
- Advance to standing position. Initiate pivot/stand to bedside chair at least twice daily.
- Patient should be able to follow 100% of staff commands.
- Patients at level III require staff assistance, a hand-held assist, or a machine assist.

**Level IV Interventions (include Level I, II, & III Interventions):**
- Stand at EOB with staff or mechanical assistance.
- Sway and shift weight.
- Perform mini-squats.
- Single leg march with knee block as needed.
- Alternate marches in place.
- Takes lateral steps along length of bed.

**Level V Interventions (include Level I, II, III, IV Interventions):**
- Ambulate approximately five feet.

**Level VI Interventions (include Level I, II, III, IV, V Interventions):**
- Continue activities Levels I-V.
- Ambulate with ambu-bag or portable ventilator.
- Have a chair nearby for rest breaks.
- Patients at level VI require vital sign monitors.

### Promote sleep:
- Increase activity and mobility to twice a day.
- Keep patient awake during the day.
- Minimize bright lighting.
- Consider relaxation techniques, including back rubs.
- Use sleep and anti-anxiety agents, instead of sedation.
- Strive for increased uninterrupted sleep (more than six hours of sleep has been associated with a 36% decrease in CAM scores).
- Maximize mobility.
- Standardize sleep protocols.

### Common challenge:
- Provider reluctance to ambulate patients.

### Peptic Ulcer Disease (PUD) Prophylaxis
- Include PUD prophylaxis as part of the ICU order admission set and ventilator order set.
- Make application of prophylaxis the default value on the form.
- Include PUD prophylaxis as an item for discussion on daily interdisciplinary rounds.
- If no other indication remains following extubation, have a process in place to discontinue PUD Prophylaxis.
- Empower pharmacy to review and assess PUD prophylaxis.
### Deep Vein Thrombosis (DVT) Prophylaxis
- Develop/adopt a hospital or critical care DVT prophylaxis screening protocol.
- Use a standard order set (pre-printed or automated) for critical care admission orders.
- Include DVT prophylaxis as part of your ICU order admission set and ventilator order set.
- Make application of prophylaxis the default value on the admission and on ongoing orders.
- Include on admission and daily nursing risk assessment, with follow-up for physician orders.
- Develop risk scale and corresponding interventions and document exclusions.
- Include DVT prophylaxis as an item for discussion on daily interdisciplinary rounds.
- Empower pharmacy to review orders for patients in the ICU to ensure that some form of DVT prophylaxis is in place at all times on ICU patients (e.g., a pharmacy alert system or pharmacy-driven anticoagulation management).

### Hand Hygiene
- Perform appropriate hand hygiene before any patient/equipment contact.

### Environment of Care
- Ensure appropriate cleaning of all equipment, including rooms and all surfaces.

### Equipment
- Do not routinely change circuitry; instead, change when visibly soiled or malfunctioning. Circuitry does not need to be changed more often than once per week, unless recommended by manufacturer, or for infection control.
- Use closed in-line humidity collection and closed system endotracheal suction tubing.
- If other interventions are unsuccessful, consider the following:
  - Use silver-impregnated endotracheal tube.
  - Use subglottic suctioning/endotracheal tube with subglottic suctioning port.

### VAE Surveillance and Tracking
- Surveillance and tracking of adherence to the bundle can help reduce VAEs.
- Hospitals are encouraged to submit data on VAE through NSHN.
- Hospitals are encouraged to track consistent adherence with the traditional VAP bundle elements through the NYSPFP data portal.

### Culture and Communication
- Implement daily goal-directed interdisciplinary team rounding.
- Use comprehensive daily goals worksheets.
- Consider training and/or implementing Crew Resource Management /TeamSTEPPS techniques.
- Ensure comprehensive documentation on assessments and rounding sheets.
- Audit compliance with protocols and collect data on all elements.
- Share results of compliance audits with team/staff.
- Display compliance results in a location visible to team members.