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The AHA/HRET HEN would like to acknowledge our partner, Cynosure Health, for their work in developing the Ventilator Associated Events (VAE) Change Package.
WHAT’S NEW WITH THIS VAE CHANGE PACKAGE EDITION?

The Implementation Guide to the Prevention of Ventilator Associated Events (VAE) has been expanded!

What’s New?

• The Key Resources section has been updated and expanded
• 2013 and 2014 changes have been included, including information about broader VAE monitoring and surveillance information
• The bundle elements of HOB elevation on non-ICU patients and on transported patients have been expanded.
• ABCDE Bundle elements have been expanded.
  — The secondary driver “Choice of Sedation” has been added
  — Highlights from the “Pain, Agitation, and Delirium (PAD) Guidelines” have been added
  — The section on delirium monitoring and management has been expanded.
  — The section on the benefits of early mobility has been expanded.
• Examples of SAT/SBT protocols and algorithms have been provided.
• An example of a Progressive Mobility Protocol (Early Mobility Protocol) has been provided.
• Patient and family engagement drivers have been added

OVERVIEW

Background

• Patients on mechanical ventilation are at high risk for Ventilator Associated Pneumonia (VAP), with attributable mortality rates up to 40%.
• VAP is the leading cause of death among hospital-acquired infections, exceeding the death rate due to central line infections, severe sepsis, and respiratory tract infections in the non-intubated patient.
• VAP and other Ventilator Associated Events (VAE) also prolong time spent on a ventilator, length of ICU stay, and length of hospital stay after discharge from the ICU.
• In 2011, NHSN facilities reported more than 3,525 VAPs; the incidence ranged from 0.0-4.9 per 1,000 ventilator days.
• VAP costs United States hospitals $1.03 billion to $1.50 billion/year.

Suggested AIM

• Decrease the rate of VAE by 40% by December 8, 2014.

Potential Measures

Process:  ICU Ventilator Bundle Compliance (all bundle element compliance) (EOM-VAP-90)
Compliance of Spontaneous Awakening Trials (SAT) (EOM-VAP-134)
Completion of Spontaneous Breathing Trials (SBT) (EOM-VAP-135)

Outcome:  VAP rate (number of VAPs per 1,000 ventilator days) for ICU patients. (EOM-VAP-92)
Outcome:  Ventilator-Associated Condition (VAC); including those that meet the criteria for IVAC and Possible/Probable VAP rate. (EOM-VAE-96a)
Outcome:  Infection-Related Ventilator-Associated Condition (IVAC); including those that meet the criteria for Possible/Probable VAP rate. (EOM-VAE-96b)
Outcome:  Possible/Probable VAP rate. (EOM-VAP-96c)
Outcome:  Ventilator-Associated Condition (VAC) in ICU Units; including those that meet the criteria for IVAC and Possible/Probable VAP rate. (EOM-VAP-96d)
Outcome:  Infection-Related Ventilator-Associated Condition (IVAC) in ICU Units; including those that meet the criteria for Possible/Probable VAP rate. (EOM-VAP-96e)
Outcome:  Possible/Probable VAP in ICU Units rate. (EOM-VAP-96f)
Outcome:  Days since Last VAP: Days since last VAP (Rural/CAH Data Collection Tool)
**Primary Drivers**

<table>
<thead>
<tr>
<th>Categories</th>
<th>Ideas to Test</th>
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</table>
| Elevate the Head of the Bed to Between 30-45 Degrees | • Use visual cues that make it easy to identify when the bed is in the proper position, e.g. a line on the wall that can only be seen if the bed is below a 30-degree angle.  
• Establish a process for head-of-the-bed elevation as tolerated in non-ICU areas such as the Emergency Department, during transport within the hospital, and during transport via ambulance between hospitals.  
• Include clues on order sets for the initiation of and weaning from mechanical ventilation, for delivery of tube feedings, and for provision of oral care.  
• Create an environment in which respiratory therapists work collaboratively with nurses to maintain head-of-the-bed elevation.  
• Involve patients and families with education regarding their role in VAE prevention, i.e. head of bed elevation. |
| Peptic Ulcer Disease (PUD) Prophylaxis | • Use medications: H2 blockers are preferred over sucralfate, and proton-pump inhibitors may be efficacious and an alternative to sucralfate or an H2 antagonist.  
• Include PUD prophylaxis on the ICU admission and ventilator order sets.  
• Incorporate review of PUD prophylaxis into daily multi-disciplinary rounds.  
• Engage pharmacy in daily multi-disciplinary rounds to ensure ICU patients are given appropriate PUD and VTE prophylaxis. |
| Venous Thromboembolism (VTE) Prophylaxis | • Initiate VTE prophylaxis on all mechanically-ventilated patients unless contraindicated.  
• Include VTE prophylaxis as part of the ICU admission and ventilator order sets. |
| ABCDE Bundle | • Develop protocols, order sets, and standard work for Spontaneous Awakening Trials (SAT), Spontaneous Breathing Trials (SBT), Coordination, Choice of Sedation, Delirium Monitoring and Management, and Early Progressive Mobility.  
• Perform daily assessments of readiness to wean and extubate patients.  
• Create an environment in which respiratory therapists work collaboratively with nurses to facilitate a daily “sedative interruption” and potential “weaning trial.”  
• Implement a protocol to lighten sedation daily to assess for readiness for extubation. Include precautions to prevent self-extubation such as increased monitoring during the trial. |
| Oral Care | • Perform regular oral care with an antiseptic solution, e.g. Chlorhexidine, in accordance with the manufacturer’s product guidelines.  
• Include daily oral care with Chlorhexidine as part of the ICU admission and ventilator order sets.  
• Educate the RN staff about the rationale for supporting good oral hygiene and its potential benefit in reducing ventilator-associated pneumonia.  
• Involve patients and families with education regarding their role in VAE prevention, i.e. oral care. |

**Making Changes**

- This intervention is in the Collaborative with Reducing Infections (Stay FIT Collaborative). National meetings, webinars, monthly coaching calls, change packages and other tools will augment state hospital association activities.

**Key Resources**

- CDC Guidelines for Preventing VAP. Retrieved at: http://www.cdc.gov/mmwr/preview/mmwrhtml/00045365.htm  
## AIM: Decrease the rate of VAE by 40% by December 8, 2014.

### PRIMARY DRIVERS

<table>
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<td>• Use visual cues so that it is easy to identify when the bed is in the proper position.</td>
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<td>• Designate one person to check for visual cues every 1-2 hours in the entire unit.</td>
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<tr>
<td>• Establish procedures for head-of-bed elevation as tolerated in non-ICU areas, such as the Emergency Department (ED), during transport within the hospital, and during transport via ambulance between hospitals.</td>
</tr>
<tr>
<td>• Include the cues on the order sets for initiation of and weaning from mechanical ventilation, for delivery of tube feedings, and for provision of oral care.</td>
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<tr>
<td>• Patient and family engagement in head of bed elevation.</td>
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### SECONDARY DRIVERS

<table>
<thead>
<tr>
<th>Peptic Ulcer Disease (PUD) Prophylaxis</th>
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<tr>
<td>• Use appropriate medications.</td>
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<tr>
<td>• Include PUD prophylaxis on the ICU admission and ventilator order sets.</td>
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<tr>
<td>• Engage the Pharmacy to ensure ICU patients have appropriate PUD prophylaxis (redundancy, failure remediation).</td>
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<td>• “A &amp; B” – Develop protocols, order sets, and standard work procedures for Spontaneous Awakening Trials (SAT) and Spontaneous Breathing Trials (SBT).</td>
</tr>
<tr>
<td>• “C” – Coordinate SAT and SBT to maximize weaning opportunities when patient sedation is minimal. Choice of Sedation.</td>
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<tr>
<td>• “D” – Delirium monitoring and management.</td>
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<td>• “E” – Early progressive mobilization.</td>
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### CHANGE IDEAS

<table>
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<td>• Use a line (red tape) on the wall that can only be seen if the bed is below a 30-degree angle.</td>
</tr>
<tr>
<td>• Assign respiratory therapy staff or a unit assistant to check visual cues every 1-2 hours.</td>
</tr>
<tr>
<td>• Work with ED staff, transport staff, and ambulance personnel to establish HOB practice.</td>
</tr>
<tr>
<td>• If using an electronic practice management system, institute computer-based pop-up reminders.</td>
</tr>
<tr>
<td>• Include the intervention on nursing flow-sheets.</td>
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<tr>
<td>• Discuss during multi-disciplinary rounds.</td>
</tr>
<tr>
<td>• Include HOB elevation in charge nurse rounds; the charge nurse can provide just-in-time training.</td>
</tr>
<tr>
<td>• Educate patients and their families on the importance of keeping the head of the bed elevated and other VAE prevention efforts.</td>
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<td>• H2 blockers are preferred over sucralfate. Proton-pump inhibitors may be an efficacious alternative to sucralfate or an H2 antagonist.</td>
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<td>• Discuss PUD prophylaxis during multi-disciplinary rounds.</td>
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<td>• Include PUD prophylaxis in charge nurse rounds; the charge nurse can provide just-in-time training and assist bedside nurses in obtaining orders for PUD prophylaxis.</td>
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<td>• Include VTE prophylaxis as part of the ICU admission and ventilator order sets.</td>
</tr>
<tr>
<td>• Include VTE prophylaxis in all ICU rounds; nurse leaders can provide just-in-time training and assist bedside nurses in obtaining orders for VTE prophylaxis.</td>
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<td>• Perform daily assessments of readiness to wean and extubate.</td>
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<tr>
<td>• Provide a daily reduction or removal of sedative support.</td>
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<tr>
<td>• Designate one time of the day for the SAT and SBT to be attempted.</td>
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<tr>
<td>• Coordinate between nursing and respiratory therapy to manage SAT and SBT. Use whiteboards, the EMR, or other communication tools to enhance coordination.</td>
</tr>
<tr>
<td>• Discuss the results of the SAT and SBT during daily multi-disciplinary rounds.</td>
</tr>
<tr>
<td>• The SAT and SBT should be included in nurse-to-nurse hand-offs, nurse-to-charge nurse reports, and charge nurse-to-charge nurse reports (if they occur).</td>
</tr>
<tr>
<td>• Administer sedation as ordered by the physician according to a scale such as a RASS or Modified Ramsay Score.</td>
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<tr>
<td>• Perform delirium assessment daily</td>
</tr>
<tr>
<td>• Modify ICU orders to default activity level to “as tolerated.”</td>
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<tr>
<td>• Implement an early progressive mobility protocol.</td>
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</tbody>
</table>
Includetooth-brushingtwiceadayinordersetsfor allventilatedpatients.
• Includeroutineoralcareevery2-4hourswithan antisepticmouthwashswabtocleantheoralcavity andteeth.
• UseChlorhexidine0.12%mouthwashatleastdaily (manystudiesciteevery12hours)aspartofordersetsforallventilatedpatients.
• Createvisualcues(e.g.emptyholdersoforalcare products)toindicatecompliancewithoralcare.
• IncludeRespiratoryTherapyinperformingoralcare, makeitajointRNandRTfunction.

FOOTNOTES

1 RichmondAgitationSedationScale(RASS)
PREVENTION OF VENTILATOR-ASSOCIATED EVENTS (VAE)
Mechanically ventilated patients are at high risk for complications such as ventilator-associated events (VAE) including ventilator-associated pneumonia (VAP), peptic ulcer disease (PUD), gastrointestinal bleeding, aspiration, venous thromboembolic events (VTE), and problems with secretion management. Evidence-based interventions can reduce the risk and incidence of these complications. For example, implementation of the ventilator bundle has been shown to reduce VAP.1

The VAP prevention bundle includes: head-of-bed elevation to 30 to 45 degrees, oral care with Chlorhexidine 0.12%, peptic ulcer prophylaxis, deep vein thrombosis (DVT) prophylaxis, and ABCDE bundle elements (i.e. spontaneous awakening trials and breathing trials, coordination of awakening and breathing trials, choice of sedatives, delirium assessment and monitoring, and early progressive mobility). This guide presents evidence-based practices to promote VAP reduction.

Ventilator-Associated Events (VAE) Surveillance
Ventilator-associated pneumonia has been problematic to identify because commonly used definitions for VAP include subjective criteria that are neither sensitive nor specific for VAP. The previous surveillance definition included: a combination of x-ray results, signs and symptoms, and laboratory criteria.

Three specific sets of PNEU criteria had been available for a PNEU to be counted as a VAP: that the endotracheal tube (ETT)/ventilator must have been in place (1) during some interval in the preceding 48 hours or (2) at the time of the PNEU onset, and (3) that there was no minimum/required amount of time for the ETT/ventilator to be in place.

Major limitations of the former VAP definitions are:
• the definitions rely on complex, multiple, and sometimes subjective pathways;
• no valid, reliable definition for VAP exists
• the criteria that do exist are neither sensitive nor specific; and
• the diagnosis requires radiographic findings of pneumonia, whereas evidence-based research suggests that chest radiographic findings are not diagnostic for VAP.

These limitations have implications for VAP prevention.

In January 2013, the Centers for Disease Control (CDC) released a new approach to surveillance for Ventilator-Associated Events (VAE) for the National Healthcare Safety Network (NHSN). Surveillance had been limited to Ventilator-Associated Pneumonia to date. This new VAE Surveillance was designed to address the limitations of the former VAP definitions including the NHSN PNEU.

The new VAE surveillance definition algorithm has been founded on objective, streamlined, and potentially automatable criteria. It is designed to objectively identify a broad range of conditions and complications that may occur in mechanically-ventilated patients.

NOTE: The VAE algorithm is for use in surveillance, not as a clinical definition algorithm, and is not intended for use in the clinical management of patients. There are three definitions/tiers in the VAE algorithm:
1. Ventilator-Associated Condition (VAC);
2. Infection-Related Ventilator-Associated Complication (IVAC); and
3. Possible and Probable VAP.

VAE ALGORITHM
This algorithm takes into account research that, to date, has suggested that most VACs are due to pneumonia, ARDS, atelectasis, and/or pulmonary edema. These significant clinical conditions may be preventable. The new definition of VAE states: “VAEs are identified by using a combination of objective criteria: deterioration in respiratory status after a period of stability or improvement on the ventilator, evidence of infection or inflammation, and laboratory evidence of respiratory infection.”2 The full document can be retrieved at: http://www.cdc.gov/nhsn/PDFs/pscManual/10-VAE_FINAL.pdf

The CDC released changes to the VAE Surveillance Protocol effective as of July 2013 to assist in the determination of VAC as it relates to PEEP changes. (From page 10-4 of the protocol
clarification at: www.cdc.gov/nhsn/PDFs/pscManual/10-VAE_FINAL.pdf.) “For the purposes of VAE surveillance, daily minimum PEEP values of 0 to 5 cm H2O will be considered equivalent when making VAC determinations.” This change may help to reduce false VAC identifications based on small PEEP changes. VACs will no longer be detected in patients whose daily minimum PEEP increases from 0 cm H2O to 3-5 cm H2O. In patients with daily minimum PEEP values 0-5 cm H2O, the daily minimum PEEP would need to increase to at least 8 cm H2O for at least 2 days for a VAC to be diagnosed.2

The VAE Calculator has been revised to reflect this change. The revised calculator, Ventilator-associated Event (VAE) Calculator – Version 2, can be accessed at www.cdc.gov/nhsn/VAE-calculator/index.html

Another change for 2014: As of January 1, VAE surveillance will become patient location-based and will no longer be patient aged-based. VAE surveillance for the purposes of NHSN surveillance and monitoring will be restricted to adult inpatient locations and not be performed in pediatric, mixed age, or neonatal patient locations. Additional information is available on page 10-1 of the protocol clarification at: www.cdc.gov/nhsn/PDFs/pscManual/10-VAE_FINAL.pdf

SUGGESTED AIM
An AIM statement for VAP reduction efforts could include one of the following:

• Decrease the rate of VAE by 40% by December 8, 2014.

ELEVATE THE HEAD OF THE BED TO BETWEEN 30-45 DEGREES
Angling the head of the bed to between 30 to 45 degrees is a simple nursing measure that has resulted in VAP reduction. Keeping the head of the bed (HOB) elevated has been shown to help prevent aspiration of gastric contents and secretions8,9

• Process Measure: Daily audit of HOB elevation compliance and/or documentation of contraindications to HOB elevation.

Secondary Driver: Use visual cues.
Visual cues are important to remind staff to elevate the HOB. A visual cue can also act as a guide to show staff how steep 30 to 45 degrees should be; staff often underestimate the angle of the HOB. One research study found that HOB angle was perceived correctly by only 50 to 86% of clinicians.7

Change Ideas: Visual cues for HOB elevation to 30 to 45 degrees
Standardizing the processes of care has been shown to increase the number of patients who are placed in a semi-recumbent position.8 Engage staff nurses in collaborating and developing visual cues that are effective in their environment and which support unit workflow. (See Appendix I for an example of a VAP Bundle Visual Cue). Examples of visual cues include:

• Using a line (red tape) on the wall that can only be seen if the bed is below a 30-degree angle.
• Cutting a piece of cardboard in the shape of a slice of pizza, i.e. a 30 degree triangle.9
• Placing a red stripe on the bedframe at a 30 degree angle. When the HOB is at 30 degrees, the red stripe will appear to be parallel to the floor (See Appendix II for an example of a Red Stripe on a bed frame).
• Including the interventions on nursing flow-sheets.
• Incorporating HOB elevation into the standardized order set.

Secondary Driver: Identify one person to check for visual cues in each unit on each shift.
The environment of an intensive care unit is a busy and stressful one. Caregivers are confronted with multiple urgent demands for attention. Engagement of the entire team, including bedside nurses, intensivists, nurses’ aides, respiratory therapists, and the charge nurse, is essential to ensure that preventive measures such as elevated HOB are implemented. (See Appendix III for an example of a Best Practices Checklist).

Change Ideas: Include HOB elevation in rounding

• Assign respiratory therapy staff or a unit assistant to observe for use of visual cues every 1-2 hours.
• If using an electronic practice management system, institute computer-based pop-up reminders.
• Include interventions on nursing flow-sheets.
• Include HOB elevation in charge nurse rounds, if performed; the charge nurse can provide “just-in-time training” as needed.
• Promote an environment in which respiratory therapists work collaboratively with nursing staff to maintain head-of-the-bed elevation.
• If HOB elevation is contraindicated, communicate and document the rationale/contraindication.
Secondary Driver: Establish a process for head-of-bed elevation in non-ICU areas and during transports.

At-risk occasions for aspiration include when a patient is held in the emergency department after intubation while waiting for an ICU bed, or during transport within the hospital (as patients travel to and from locations for diagnostic testing and procedures) or between facilities (e.g. from a referring facility to an accepting facility).

Change Ideas:
- Work with the ED staff to incorporate HOB elevation into their work-flow after a patient becomes hemodynamically stable. Because ventilated patients do not routinely remain for more than a few hours in the ED, create a checklist to ensure that non-typical, but essential care interventions, such as elevated HOB, are not missed.
- Utilize respiratory therapy staff, as they round and care for patients on ventilators in the ED, to double-check and ensure HOB elevation is performed.
- Educate transport staff on the benefits of HOB elevation and how it should be performed.
- Partner with your referring hospitals to implement essential bundle elements such as HOB elevation while the patient is awaiting transport.
- Work with ambulance personnel to establish the HOB practice during transport.

Secondary Driver: Include cues/reminders on order sets

Research suggests that standardized order sets can be effective in improving compliance with evidence-based practices in areas such as VAP reduction, improved stroke care, and sepsis. Standardized order sets have been shown to increase patient safety and improve outcomes for multiple patient conditions.\(^{10,11,12,13}\)

Change Ideas: Utilize reminders
- If using an electronic practice management system, institute computer-based pop-up reminders.
- Discuss procedures during multi-disciplinary rounds to ensure that all of the bundle components have been understood and implemented.
- Allow physicians to “opt-out” if the bundle or one of its elements is contraindicated. Ask the physician to help improve the bundle by communicating and documenting the rationale for why the intervention was not appropriate for the patient.

Secondary Driver: Patient and family engagement in head of bed elevation

Families can be invited to participate in care. Education of families about the risks of VAP and how caregivers can mitigate those risks allows the family to feel involved and connected. Families can also be asked to help keep the HOB elevated to 30 to 45 degrees, by, for example, reminding staff to elevate the HOB after linen changes. Invite families to participate in care by encouraging them to ask if other prevention efforts have been completed, such as oral care. Consumer groups have become valued allies in this effort by encouraging patient's families to partner with hospital staff to keep their loved ones safe.\(^{14}\)

Change Ideas: Educate and invite participation in care
- Educate patients and their families on the importance of keeping the head of the bed elevated and other VAE prevention efforts.

“Hardwiring” HOB Elevation in Improvement Plans

Hardwiring for HOB includes implementing routine reminders to help the intervention become part of daily care, such as:
- Including HOB elevation on the daily audit checklist.
- Including the intervention on nursing and respiratory care flow-sheets.
- Incorporating HOB elevation into standardized order sets.
- If using an electronic practice management system, instituting computer-based pop-up reminders.
- Including HOB elevation in charge nurse rounds, so the charge nurse can provide just-in-time training.
- Promoting an environment where respiratory therapists work collaboratively with nursing staff to maintain HOB elevation.

PEPTIC ULCER DISEASE (PUD) PROPHYLAXIS

Critically ill patients requiring mechanical ventilation are at increased risk for stress ulcers and subsequent gastrointestinal bleeding. Additionally, bacterial colonization of the stomach can lead to infection of the respiratory tract through aspiration of stomach secretions.\(^{15}\)

- Process Measure: Daily audit of PUD prophylaxis compliance or documented contraindications to PUD prophylaxis.

Secondary Driver: Use of Medications.

To reduce PUD risk, mechanically-ventilated patients should receive PUD prophylaxis.\(^{17}\)
Change Ideas: H2 Blockers
• H2 blockers are preferred over sucralfate. Proton-pump inhibitors (PPI) may be efficacious, and serve as an alternative to sucralfate or an H2 antagonist.18
• Discuss interventions during multi-disciplinary rounds.
• Include a clinical pharmacist on the care team to guide complex cases.

Secondary Driver: Include PUD on the ICU order sets.
Requiring PUD prophylaxis on both ICU admission and ventilator order sets will standardize the treatment. However, allow physicians to “opt-out” when clinically appropriate, and ask them to communicate and document the reasons for the “opt-out” to promote learning and understanding among the healthcare team. Audit how frequently physicians “opt-out” to observe if there are any patterns (e.g. certain types of patients, specific physicians) that might suggest that a change to the order set or another intervention is necessary.

Secondary Driver: Engage pharmacy (redundancy, failure remediation).
Asking the Pharmacy to support your program will add a layer of redundancy to improve reliability and promote opportunities for earlier detection of failure patterns. A pharmacist as part of interdisciplinary rounds is a cost-effective addition, and can improve patient safety. Pharmacists can produce reports from the Pharmacy Information System that can positively affect care, and can consult with physicians as medically appropriate.

Change Ideas: Multidisciplinary approach
• Discuss procedures and interventions during multidisciplinary rounds
• Consider producing a pharmacy exception report for PUD prophylaxis
• Include a pharmacist on ICU multidisciplinary rounds

Secondary Driver: Include PUD Rx on daily checklist

Change Ideas: Make it a part of daily rounds
• Include PUD prophylaxis in charge nurse rounds, if charge nurses are utilized. A charge nurse can provide just-in-time training and assist bedside nurses in obtaining orders for PUD prophylaxis.

“Hardwiring” PUD Prophylaxis into the Improvement Plan
To hardwire PUD prophylaxis, make the process of ordering PUD prophylactic medications as routine as possible. If such orders are contraindicated, then the rationale should be communicated and documented. Methods for hardwiring include:
• Including PUD prophylaxis in order sets.
• Including PUD prophylaxis on the daily audit checklist.
• Reviewing the need for PUD prophylaxis during multi-disciplinary rounds.
• Including as a standing item in nurse-to-nurse hand-off reports.

VENOUS THROMBOEMBOLISM (VTE) PROPHYLAXIS
Mechanically-ventilated patients are at high risk for VTE. Risk factors include immobility and a stress inflammatory response resulting in hyper-coagulation. Although there is no evidence to suggest VTE prophylaxis reduces VAP risk, it is appropriate to include VTE prophylaxis in a bundle that promotes improved care of mechanically-ventilated patients due to their high risk for VTE.19

• Process Measure: Daily audit of VTE prophylaxis compliance or documentation of contraindications.

Secondary Driver: Initiate VTE prophylaxis unless contraindicated.
All high risk patients should have pharmacological VTE prophylaxis unless it is contraindicated due to bleeding risk. For patients with severe bleeding risk, mechanical prophylaxis is recommended unless contraindicated due to the patient’s condition. Intermittent pneumatic compression (IPC) is preferred for mechanical prophylaxis.20 The addition of mechanical prophylaxis to pharmacological prophylaxis has shown some benefits in VTE reduction.21

Change Ideas: Standardize with ICU Order Sets
• Include VTE prophylaxis in the ICU admission order set and the ventilator order set.
• Allow physicians to “opt-out” with appropriate patients, and ask that the rationale for the “opt-out” be communicated and documented.

Secondary Driver: Interdisciplinary support.
Engage pharmacists to ensure ICU patients have been given appropriate VTE prophylaxis and to review pharmacotherapy on interdisciplinary rounds.
ABCD Bundle components include:
A – Awakening trials for ventilated patients
B – Spontaneous Breathing trials
C – RN and respiratory therapist Coordination to perform spontaneous breathing trials by reducing or stopping sedation so as to awaken the patient
D – Standard Delirium assessment program, including treatment and prevention options
E – Early mobilization and ambulation of critically ill patients

Secondary Driver: “A” & “B” — Spontaneous Awakening Trial (SAT) and Spontaneous Breathing Trial (SBT) Protocols.

Sedation in the mechanically ventilated patient may be necessary to control anxiety, reduce pain, and manage oxygenation needs. However, the use of sedation can prolong the duration of mechanical ventilation. Patients receiving sedation should have a neurological assessment daily in which the patient’s sedation is withheld until the patient is able to follow commands, or until the patient becomes agitated. Daily screening of respiratory function using trials of daily awakening and spontaneous breathing has been shown to reduce the duration of mechanical ventilation and the risk of VAP.

• Process Measure: Daily audit of SAT/SBT compliance, and documentation of rationale for non-compliance (e.g. contraindications).

The use of non-physician staff-driven protocols has been found to be very effective in assessing readiness to wean from the ventilator—and has demonstrated a reduction in VAP. By developing staff-driven protocols and incorporating SAT and SBT into the daily care of the ventilator patient, patients will experience fewer days on the ventilator and a shorter ICU stay. (See Appendix IV for a link to a sample protocol and algorithm).

Change Ideas: Assess Daily for Readiness and Success with SAT/SBT
• Determine if a patient meets the SAT criteria with no contraindications.
• Decrease or stop sedation per the SAT protocol (nurse).
• Determine if patient meets SBT criteria with no contraindications.
• Perform an SBT per the protocol (respiratory therapist).
• Perform daily assessments of readiness to wean and extubate based on the SAT/SBT results.

THE ABCDE BUNDLE

The ABCDE Bundle extends the original VAP Bundle and its HOB, PUD prophylaxis, VTE prophylaxis, and oral care interventions. The ABCDE Bundle was developed to improve the health of ventilated patients by reducing their risk of oversedation, immobility, and mental status changes.

The bundle approach provides a means to incorporate evidence-based interventions into patient care. Bundles are not meant to be rigid recipes for the care of ventilated patients; providers should assess which components of a bundle would be appropriate for each individual patient. “The ABCDE bundle includes spontaneous awakening and breathing trial coordination, careful sedation choice, delirium monitoring, and early progressive mobility and exercise. The intent of combining and coordinating these individual strategies is to (1) improve collaboration among clinical team members, (2) standardize care processes, and (3) break the cycle of oversedation and prolonged ventilation, which appear causative to delirium and weakness.”

Change Ideas: Team approach
• Include VTE prophylaxis in ICU rounds; nurse leaders can provide just-in-time training and assist bedside nurses in obtaining orders for VTE prophylaxis.
• Consider creation of a pharmacy exception report to determine if appropriate VTE prophylaxis is being provided.

Secondary Driver: Include VTE Rx on daily checklist

“Hardwiring” Standardize Interventions for Patients at Risk for Falling in Improvement Plans

Hardwiring strategies for VTE prophylaxis are similar to those for PUD prophylaxis. Making the process as routine as possible will assure that VTE prevention is addressed for every mechanically-ventilated patient.

• Include VTE prophylaxis in the ICU admission and ventilator order sets.
• Include VTE prophylaxis on the daily audit checklist.
• Include VTE prophylaxis in multi-disciplinary rounds.
• Utilize the pharmacy to review all patients or to produce exception reports to ensure adequate and appropriate prophylaxis.
• Include VTE prophylaxis as a standing item in nurse-to-nurse hand-off reports.

Hardwiring strategies for VTE prophylaxis are similar to those for PUD prophylaxis. Making the process as routine as possible will assure that VTE prevention is addressed for every mechanically-ventilated patient.

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• Include VTE prophylaxis on the daily audit checklist.
• Include VTE prophylaxis in multi-disciplinary rounds.
• Utilize the pharmacy to review all patients or to produce exception reports to ensure adequate and appropriate prophylaxis.
• Include VTE prophylaxis as a standing item in nurse-to-nurse hand-off reports.
Secondary Driver: “C” — Coordinate SAT and SBT, and Choice of Sedation.

Coordinate SAT and SBT to maximize weaning opportunities when patient sedation is minimal. Nursing and Respiratory Therapy should work as a team to ensure patient safety and to address the selected VAP prevention bundle interventions. SBTs will fail if the patient has had too much sedation to allow for “spontaneous” awakening or breathing.

Choice of sedation has emerged in the literature to be key in ventilator weaning, length of ventilation, ICU length of stay, and the development of delirium. In January 2013, new practice guidelines for Pain, Agitation, and Delirium (PAD) were published, updating the 2002 guidelines. The goal of the guidelines is to improve the comfort and outcomes of adult critically ill patients using a patient-centered, evidence-based approach.

Highlights of the 54 recommendations include:

- **Pain:**
  - Pain should be routinely monitored in all adult ICU patients
  - Vital signs alone should not be used for pain assessment but as a cue to further assess pain.
  - Intravenous opioids may be the first-line choice to treat non-neuropathic pain in critically ill patients.

- **Agitation:**
  - Recommended tools for agitation assessment include the Richmond Agitation-Sedation Scale (RASS) and the Sedation-Agitation Scale (SAS).
  - Analgesia-first sedation should be used in mechanically ventilated adult ICU patients.
  - Daily sedation interruption or a light target level of sedation should be routinely used in adult ICU patients on mechanical ventilation.

- **Delirium:**
  - Delirium should be routinely monitored in all adult ICU patients.
  - Tools recommended for delirium assessment include the Confusion Assessment Method for the ICU (CAM-ICU) and the Intensive Care Delirium Screening Checklist (ICDSC).
  - Promote early mobilization of adult ICU patients whenever feasible to reduce the incidence and duration of delirium.
  - Use non-benzodiazepine sedation whenever possible. Benzodiazepines have been reported to be an independent risk factor for delirium.

Change Ideas: Coordinate and communicate

- Provide a daily reduction in or removal of sedative support.
- Designate a time of day for the SAT and SBT to be attempted that will not disrupt patient rest. (See Appendix V for a sample of Communication of Rest Period).
- Determine how often SBTs have failed due to high levels of sedation.
- Coordinate between nursing and respiratory therapy to manage the SAT and SBT.
- Use whiteboards, the EMR, or other communication tools to enhance coordination.
- Discuss the results of a patient’s SAT and SBT during daily multi-disciplinary rounds. The SAT and SBT results should also be included in nurse-to-nurse hand-offs, nurse-to-charge nurse reports, and charge nurse-to-charge nurse reports.

Change Ideas: Aim for optimal sedation

- Consider strategies to decrease benzodiazepine usage, such as
  - Goal-directed sedation with titration of medications using sedation protocols and a sedation scale,
  - Coordination of daily awakening trials
  - Consider use of an alternative sedative to benzodiazepines (e.g. dexmedetomidine or propofol).


Delirium, an acute form of brain dysfunction, remains undetected by both nurses and doctors in more than 65% of ICU patients. Up to 81% of mechanically ventilated patients experience delirium. Delirium is associated with a longer duration of mechanical ventilation, a longer length of stay in the ICU and the hospital, as well as with excess morbidity, mortality, and long term cognitive impairment. The FDA has not yet approved any drug to treat delirium, nor is there any evidence that the use of phenothiazines such as haloperidol treats delirium.

Patients, however, should have their pain and agitation addressed. Sedation typically assists in the pulmonary recovery of patients, and should be goal-oriented. Too little sedation can lead to increased anxiety, increased work of breathing, a drop in blood and tissue oxygenation, and self-extubation. Too much sedation can lead to decreased respiratory muscle function, prolonged neurological depression, and the inability to wean from mechanical ventilation. The use of a sedation algorithm or scale, such as the RASS, to monitor the level of sedation will help to reduce over-sedation, deliver the most effective sedative dose, and reduce...
the duration of mechanical-ventilation.47,48 (See Appendix VI for a sample Delirium Prevention protocol and Appendix VII for a VAE Sedation protocol).

**Change Ideas: Implement a sedation protocol**
- Assess patients at least daily for confusion/delirium. (See Appendix IX for an assessment algorithm).
- Administer sedation, as ordered by the physician, according to a scale such as a RASS, SAS or Modified Ramsey Score. These scores are more accurate, and more specific than qualitative descriptions of the level of sedation, and can allow for standardized communications. (See Appendix X for a sample RASS worksheet).
- Assess the patient at least daily to determine if the target RASS/Modified Ramsey/SAS goal is met. If not, audit and analyze the reasons for missing the target.

**Secondary Driver: “E” — Early progressive mobilization and ambulation.**
Many research studies have sought to find the etiology of ICU-acquired weakness, the acute onset of neuromuscular/functional impairment in the critically ill for which there is no plausible cause other than critical illness.93,51 This weakness impairs ventilator weaning and functional mobility and can persist well after hospital discharge. Early progressive mobility can mitigate this neuromuscular/functional impairment and reduce the inherent risks of immobility such as VAP, hospital-acquired pneumonia, prolonged length-of-stay, skin breakdown, delirium incidence, and decreased cardiovascular function.52,53 The new PAD Guidelines recommend early mobilization of adult ICU patients whenever feasible to reduce the incidence and duration of delirium.55 Some studies suggest that early mobilization can decrease delirium duration by 50%, can decrease ICU length of stay by 25%, and can increase the likelihood of return to independence by the time of discharge by nearly 75%.52,55,56 “Progressive mobility is defined as a series of planned movements in a sequential manner, beginning at a patient’s current mobility status/level with a goal of returning to his/her baseline.”58 (See Appendix XI for a sample Mobility protocol).

**Change Ideas: Early implementation of a progressive mobility protocol**
- Modify standardized ICU admission orders to change the default activity level from “bed rest” to “as tolerated.”
- Establish and disseminate guidelines for timely physical and occupational therapy consultations.

- Incorporate the ABCDE bundle into standing orders as a default order, making its elements a daily part of care; provide “opt-outs” for patients for whom the bundle or its individual elements are contraindicated.

**“Hardwiring” ABCDE as part of improvement plan**
To hardwire SAT/SBT, incorporate the intervention into the daily workflow by:
- Implementing protocols for non-physician staff for daily SAT/SBT.
- Including SAT and SBT protocols on order sets.
- Including SAT and SBT protocols on daily audit checklists.
- Including SAT and SBT protocols on nursing and respiratory care flow-sheets.
- Including SAT and SBT protocols as a standing item in nurse-to-nurse hand-off reports.

- Managing protocol implementation in smaller steps and anticipating staff fears about patient self-extubation. Research literature suggests that self-extubation is slightly higher with SAT/SBTs, but re-intubation rate is lower in the SBT/SAT group; indicating that many patients were ready for extubation.59,60

**ORAL CARE**
Oral care may seem to be a simple task, but can be challenging to implement. Swabbing a patient’s mouth with an antiseptic mouthwash has been recommended for comfort, but recent studies have demonstrated that oral care with an antiseptic has also reduced the risk for VAP.

**Process Measure:** Daily audit of oral care compliance.

**Secondary Driver: Perform regular oral care with an antiseptic solution, brush teeth, and perform oral and pharyngeal suctioning.**
Oral care is a basic task that can positively impact VAP prevention.61

**Change Ideas: Routine Oral Care Standardized**
- Brush teeth twice a day as per order sets in all ventilated patients.62,63
- Include routine oral care (at least every 2-4 hours) with an antiseptic mouthwash swab to clean the oral cavity and teeth.64
- Order Chlorhexidine 0.12% mouthwash at least daily (many studies suggest using mouthwash every 12 hours) for all ventilated patients.64,65,66,67
• Create visual cues to demonstrate compliance with oral care. Examples include keeping empty holders of oral care products by the bedside or dating and timing oral care products used.
• Engage Respiratory Therapy in the performance of oral care; make it a joint RN and RT function.
• Use a whiteboard to document the delivery of oral care; omissions will make missed interventions more obvious.

Secondary Driver: Educate the RN staff about the benefits of good oral hygiene and its role in reducing ventilator-associated pneumonia

Institution of the ventilator bundle does not by itself guarantee a decrease in VAP. A decrease in VAP is more likely to occur when compliance with the bundle is audited and staff are provided with routine feedback and coaching to maximize performance.68,69

“Hardwiring” Oral Care in Improvement Plans

Multi-focal options for “hardwiring” include:
• Incorporating oral care in order sets.
• Including oral care on nursing care flow-sheets.
• Visibly documenting that oral care has been provided.
• Involving the patient’s family, as appropriate.

POTENTIAL BARRIERS

Clinicians may believe that they are complying with these activities, especially if the VAP rate is low, but documentation of bundle compliance is critical to ensure the reliability of these interventions. Monitoring to confirm compliance includes:
• Checking 5 ventilated patients to determine the extent of bundle compliance for each element and asking:
  — Was the sedative infusion truly turned off and, if so, for how long?
  — Was the infusion restarted at the same dose or was the dose lowered if possible?
  — If an intermittent pneumatic compression device was used for mechanical VTE prophylaxis, was it actually operating/functioning?
  — Was staff documentation of ordering and administering medications for PUD and VTE prophylaxis adequate?
• Recognize that many physicians will perceive these interventions as a change in their practice.
  — Traditionally, ventilation weaning and sedation were under a physician’s sole purview, not duties implemented by multi-disciplinary, non-physician staff. To discuss the impact of these changes and promote acceptance and implementation, select respected lead physicians to serve on the improvement team and advocate as champions for these changes as “best practices” with physician colleagues.
  — Order sets and protocols are seen by some physicians as “cookbook” medicine. Reframe these interventions as “best recipe” medicine that uses research findings to suggest improved and individualized patient care options to reduce the risk of VAP.
• Providers may define tasks as “ours” and “theirs.” Examples include: oral care is a nursing task, medications are the responsibility of the physician, and ventilators are managed by the respiratory therapist. Include key stakeholders such as physicians, bedside nurses, and respiratory therapists on improvement teams to collaborate in the development of protocols, work-flows, and peer education programs.70,71
  — These processes may be new territory for many physicians, nurses, respiratory therapists, and pharmacists. Nurses and respiratory therapists, for example, may be concerned that they may make an error and that patients may self-extubate during a SAT/SBT trial. Or they may fear potential conflicts with or resistance from the medical staff. To mitigate these concerns:
    • Educate all healthcare providers about the proven methodologies to reduce the risks and incidence of VAP.
    • Share evidence and experience from comparable hospitals which demonstrate successful implementation of these processes without complications such as self-extubations.
Use administrative leadership and sponsorship to help remove or mitigate barriers

- Begin implementation with an early-adopter physician who can lead and recruit other early-adopter champions from among specialty groups and intensivists.
- Enlist an executive sponsor who recognizes the value to the organization and its patients of preventing VAP, and who can provide solutions and resources to address concerns about the burdens of new processes for hospital staff. An executive sponsor can help to staff see the “big picture” on how these changes may benefit the entire organization, as well as advocate for necessary funding, staffing, and supplies, mitigate implementation barriers, and educate the governing board and the local community.
- Utilize a respected senior physician as an “opinion leader” to trial these changes in his or her local unit, and then advocate for organization-wide adoption of the successful best practices.

Don’t just change the practice, change the culture

- Instituting the VAP bundle will require a change in culture, particularly among physicians. Physicians will be asked to trade their traditional approach of individualizing mechanical ventilation management for each patient for a standardized and more effective approach. Physicians may be concerned about the perceived loss of control and the risks of shared responsibility. Physician champions can encourage their peers to actively monitor the effectiveness of therapy and the benefits to the patient, and thereby promote increased bundle acceptance.
- Many physicians prefer to learn from peers rather than to follow impersonal “expert advice.” Use lead physicians as peer educators to advocate for the adoption of improvements such as order sets.
- Nurses and respiratory therapists may be uncomfortable implementing a staff-driven protocol independent of physicians, and may have little experience collaborating with other health professionals. Educate staff about the expertise and roles of their colleagues and provide opportunities for collaboration on the development of new protocols.
- Begin the trial with a small test of change in one unit or area and then disseminate successful results more widely across the organizations. The ideal outcome is the development of team-based care wherein each member of the team (physician, nurse, respiratory therapist) contributes to improved patient quality of care.

TIPS ON USING THE MODEL FOR IMPROVEMENT

- Implement the VAP Bundle one element at a time.
  - Begin with a bundle element that will be easy to trial, will likely be successful, and have a significant positive impact. For example, implementing HOB elevation is less complicated than implementing SAT/SBT protocols yet greatly reduces VAP risk.
- Testing SAT/SBT protocols
  - Step One: Plan –
    • Do not reinvent the wheel. Use a protocol that has been successful at another hospital and adapt it your facility.
    • Test one step at a time. For example, do not plan to implement all of the ABCDE recommendations at once. Concentrate first on the ABC, and then add the D and E.
  - Step Two: Do –
    • Ask a receptive, early-adopter physician on your improvement committee to trial these changes with his or her next few patients on ventilation.
    • Ask a receptive nurse and respiratory therapist on your committee to trial the protocols as well.
    • Test “small”: Coordinate with the physician champion to trial the protocol on one patient, assisted by one nurse and one respiratory therapist.
  - Step Three: Study –
    • Debrief as soon as possible after the test with those involved, asking:
      • What happened?
      • What went well?
      • What didn’t go well?
      • What do we need to revise for next time?
  - Step Four: Act –
    • Do not wait for the next committee meeting to make changes. Revise and re-test the revisions with the same physician, the same nurse, and the same respiratory therapist.
ICU BEST PRACTICE for VENTILATED PATIENTS

H ead of bed up to 30-45 degrees
E nteral feeding and q 2 hour oral care
A ir mattress and turn q 2 hour
D VT prophylaxis
S edation vacation
U lcer prophylaxis
P ain control
Appendix II: Example of a Bright-Colored Stripe on Bed Frame
## Appendix III: Example of a Best Practice Checklist

### ICU BEST PRACTICE AUDIT/REPORT

**Date:**

<table>
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<th>BED NOT ICU Status</th>
<th>Patient MR #</th>
<th># Central Lines (include PICCs)</th>
<th>Pediatrician Notified &amp; Documented</th>
<th>Hypothermia Temperature goal reached within 30 minutes and maintained</th>
<th>BGM over 200 write note below for follow up</th>
<th>Sepsis Meets CVS Goal &lt;8</th>
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<td>Y N</td>
</tr>
</tbody>
</table>
Appendix IV: Sample SBT/SAT Protocol

Kansas University Hospital Daily “Wake-up and Breathe” Algorithm

SAT Safety Screen
Excluded from SAT if:
- Sedative infusion for active seizures or delirium tremens
- Neuromuscular blockade
- Active MI in previous 24 hours
- Malignant intracranial hypertension (ICP > 20)
- Hypothermia protocol
- Terminal care
- Intubated for airway protection
- Provider orders to hold interruption

**AT LEAST EVERY 24 HOURS**

FAIL
- Discuss in multi-disciplinary rounds. Formulate Plan.

PASS
- Do SAT Interruption sedation. Do not discontinue analgesics needed for pain control; except as indicated to assess neuro status.

FAIL
- Sustained anxiety, agitation
- SpO2 < 90% for 5 minutes or longer
- Acute Cardiac dysrhythmia, HTN
- Signs of respiratory distress such as RR > 35 for 5 minute or longer, use of accessory muscles, abdominal paradox, diaphoresis

PASS
- If appropriate, proceed to ICU Weaning Protocol. Perform SBT safety screen and weaning trial.

FAIL
- Assess and manage pain and delirium.
- Restart sedative prn at ½ dose and titrate to MAAS 3-4.
- If appropriate, proceed to ICU Weaning Protocol.

PASS
- Patient remains intubated.

The “Wake Up and Breathe” protocol pioneered by Vanderbilt University can be found at: http://www.mc.vanderbilt.edu/icudelirium/docs/WakeUpAndBreathe.pdf
I am getting my ZZZZZZZZZZZZZZ

Sleep cycle in progress

Do not disturb

Please check with nurse before entering
DAYTIME

a. Provide visual and hearing aids during daytime.

b. Encourage communication and reorient the patient frequently.
   i. Ensure the room calendar is up-to-date.
   ii. Introduce oneself with each encounter, providing the current date and time and explaining what will be done, and giving the patient choices regarding his or her care whenever possible.

c. Have the family bring in a few familiar objects from home to display in the patient’s room.

d. Ask the patient/family if they watch television, and, if so, what shows they prefer. Provide the patient with these choices, as well as with daily news on TV or radio.

e. Provide non-verbal music or opt for the patient’s preference.

f. Open shades and keep lights on during the day.

g. Provide an uninterrupted rest period in the afternoons between 1-3pm.

h. Minimize use of physical restraints (including lines and tubes).

i. Provide early and progressive mobility.

NIGHTTIME

PM Care — begin between 2100-2200

a. Ask the patient if toileting is needed (bedpan, bathroom, bedside commode, etc.).

b. Perform oral care (e.g. tooth-brushing, mouth moisture, with assistance or independently); assist the patient in washing his face and hands; perform back care or massage with warmed lotion; offer earplugs.

c. Ask “Do you take or do anything at home to help you sleep? Do you sleep with white noise (e.g. fan, TV, music)?”

d. Ensure the call light is within reach and the bed is in the low position; close the shades, dim the lights, close the door (except in the MICU), put the bedside charts outside of the room, and put the “sleep cycle in progress” sign on the door.

e. Minimize noise inside and outside of the room.

f. Allow for minimum of 2 hours of uninterrupted sleep, allowing for a full 90-minute sleep cycle; remove the automatic BP cuff; enter the room with a flashlight or low lighting to perform necessary activities.

i. If patient has been hemodynamically stable in the previous 24 hours, explore extending the uninterrupted sleep period to 4 hours (but only for patients who are unrestrained and can turn themselves)
Appendix VII: VAE Sedation Protocol

The VAE Sedation Protocol can be found at:
http://www.icudelirium.org/docs/Sedation_protocol.pdf
Used with permission.
Appendix VIII: Riker Sedation Agitation Scale (SAS)

<table>
<thead>
<tr>
<th>SCORE</th>
<th>TERM</th>
<th>DESCRIPTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Dangerous</td>
<td>Agitation Pulling at ET tube, trying to remove catheters, climbing over bedrail, striking at staff, thrashing side-to-side</td>
</tr>
<tr>
<td>6</td>
<td>Very Agitated</td>
<td>Requiring restraint and frequent verbal reminding of limits, biting ETT</td>
</tr>
<tr>
<td>5</td>
<td>Agitated</td>
<td>Anxious or physically agitated, calms to verbal instructions</td>
</tr>
<tr>
<td>4</td>
<td>Calm and Cooperative</td>
<td>Calm, easily arousable, follows commands</td>
</tr>
<tr>
<td>3</td>
<td>Sedated</td>
<td>Difficult to arouse but awakens to verbal stimuli or gentle shaking, follows simple commands but drifts off again</td>
</tr>
<tr>
<td>2</td>
<td>Very Sedated</td>
<td>Aroused to physical stimuli but does not communicate or follow commands, may move spontaneously</td>
</tr>
<tr>
<td>1</td>
<td>Unarousable</td>
<td>Minimal or no response to noxious stimuli, does not communicate or follow commands</td>
</tr>
</tbody>
</table>

Guidelines for SAS Assessment

1. Agitated patients are scored by their most severe degree of agitation as described.
2. If patient is awake or awakens easily to voice (“awaken” means responds with voice or head shaking to a question or follows commands), that’s a SAS 4 (same as calm and appropriate – might even be napping).
3. If more stimuli such as shaking is required but patient eventually does awaken, that’s SAS 3.
4. If patient arouses to stronger physical stimuli (may be noxious) but never awakens to the point of responding yes/no or following commands, that’s a SAS 2.
5. Little or no response to noxious physical stimuli represents a SAS 1.

This helps separate sedated patients into those you can eventually wake up (SAS 3), those you can’t awaken but can arouse (SAS 2), and those you can’t arouse (SAS 1).

4. Validating the Sedation-Agitation Scale with the bispectral index and visual analog scale in adult ICU patients after cardiac surgery. Intensive Care Med 2001; 27:853-858.

The Riker Sedation Agitation Scale (SAS) can be found at:
http://www.icudelirium.org/docs/SAS.pdf
Used with permission.
CONFUSION ASSESSMENT METHOD IN THE ICU

Confusion Assessment Method for the ICU (CAM-ICU) Flowsheet

1. Acute Change or Fluctuating Course of Mental Status:
   - Is there an acute change from mental status baseline?  **OR**
   - Has the patient’s mental status fluctuated during the past 24 hours?
   - NO
     - CAM-ICU negative
     - NO DELIRIUM
   - YES

2. Inattention:
   - “Squeeze my hand when I say the letter ‘A’.”
   - Read the following sequence of letters:
     S A V E A H A A R T  or  C A S A B L A N C A  or  A B A D B A D A A Y
   - ERRORS: No squeeze with ‘A’ & Squeeze on letter other than ‘A’
   - If unable to complete Letters → Pictures
   - 0 - 2 Errors
     - CAM-ICU negative
     - NO DELIRIUM
   - > 2 Errors
     - CAM-ICU positive
     - DELIRIUM Present

3. Altered Level of Consciousness
   - Current RASS level
   - RASS = zero
     - CAM-ICU negative
     - NO DELIRIUM
     - > 1 Error
   
4. Disorganized Thinking:
   - 1. Will a stone float on water?
   - 2. Are there fish in the sea?
   - 3. Does one pound weigh more than two?
   - 4. Can you use a hammer to pound a nail?
   - Command: “Hold up this many fingers” (Hold up 2 fingers)
   - “Now do the same thing with the other hand” (Do not demonstrate)
   - OR “Add one more finger” (If patient unable to move both arms)
   - 0 - 1 Error
     - CAM-ICU negative
     - NO DELIRIUM

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The Confusion Assessment Method in the ICU tool can be found at:
http://www.icudelirium.org/docs/CAM_ICU_flowsheet.pdf
Used with permission.
Appendix X: Sample RASS Worksheet

RASS WORKSHEET

THE RICHMOND AGITATION AND SEDATION SCALE: THE RASS SCORE TERM DESCRIPTION

<table>
<thead>
<tr>
<th>Score</th>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>+4</td>
<td>Combative</td>
<td>Combative, violent, immediate danger to self</td>
</tr>
<tr>
<td>+3</td>
<td>Very agitated</td>
<td>Pulls or removes tube(s) or catheter(s); aggressive</td>
</tr>
<tr>
<td>+2</td>
<td>Agitated</td>
<td>Frequent non-purposeful movement, fights ventilator</td>
</tr>
<tr>
<td>+1</td>
<td>Restless</td>
<td>Anxious and/or apprehensive but movements are not aggressive or vigorous</td>
</tr>
<tr>
<td>0</td>
<td>Alert and calm</td>
<td></td>
</tr>
<tr>
<td>-1</td>
<td>Drowsy</td>
<td>Not fully alert, but has sustained awakening to voice (eye opening &amp; contact &lt; 10 sec)</td>
</tr>
<tr>
<td>-2</td>
<td>Light sedation</td>
<td>Briefly awakens to voice (eye opening and contact &lt;10 sec)</td>
</tr>
<tr>
<td>-3</td>
<td>Moderate sedation</td>
<td>Movement or eye opening to voice (but no eye contact)</td>
</tr>
<tr>
<td>-4</td>
<td>Deep sedation</td>
<td>No response to voice, but movement or eye opening to physical stimulation</td>
</tr>
<tr>
<td>-5</td>
<td>Un-arousable</td>
<td>No response to voice or physical stimulation</td>
</tr>
</tbody>
</table>

Procedure for RASS Assessment:
1. Observe patient
   a. Patient is alert, restless, or agitated (score 0 to +4)
2. If the patient is not alert, state the patient’s name and ask him or her to open eyes and look at speaker.
   a. Patient awakens with sustained eye opening and contact (score -1)
   b. Patient awakens with eye opening and eye contact, but not sustained (score -2)
   c. Patient has any movement in response to voice but no eye contact (score -3)
3. When no response to verbal stimulation, physically stimulate the patient by shaking the shoulder and/or rubbing the sternum.
   a. Patient has any movement to physical stimulation (score -4)
   b. Patient has no response to any stimulation (score -5)
Appendix XI: Sample Early Progressive Mobility Protocol

EARLY PROGRESSIVE MOBILITY PROTOCOL

Step 1 – Safety Screening

Evaluate Daily

(Patient must meet all criteria)

M – Myocardial stability
  - No evidence of active myocardial ischemia x 24 hrs.
  - No dysrhythmia requiring new antidysrhythmic agent x 24 hrs.

O – Oxygenation adequate on:
  - FiO2 < 0.6
  - PEEP < 10 cm H2O

V – Vasopressor(s) minimal
  - No increase of any vasopressor x 2 hrs.

E – Engages to voice
  - Patient responds to verbal stimulation

Fails
Re-evaluate in 24 hours

Passes

Step 2 – Progressive Mobility

Level 1
Passive ROM TID
Turn Q 2 hrs.
Active resistance PT
Sitting position 20 mins. TID
Sitting on edge of bed
Able to move arm against gravity

Level 2
Passive ROM TID
Turn Q 2 hrs.
Active resistance PT
Sitting position 20 mins. TID
Sitting on edge of bed
Able to move leg against gravity

Level 3
Passive ROM TID
Turn Q 2 hrs.
Active resistance PT
Sitting position 20 mins. TID
Sitting on edge of bed
Active transfer to chair 20 mins./day
Ambulation (marching in place, walking in halls)

Level 4
Passive ROM TID
Turn Q 2 hrs.
Active resistance PT
Sitting position 20 mins. TID
Sitting on edge of bed
Active transfer to chair 20 mins./day
Ambulation (marching in place, walking in halls)

American Association of Critical-Care Nurses. AACNPearl: Early Progressive Mobility Protocol.
Accessed April 15, 2014. Used with permission.
Appendix XI: Sample Early Progressive Mobility Protocol

The University of Kansas Hospital/Department of Nursing—Adult Critical Care

SECTION: Standard of Practice and Procedures  Effective: 2/20/07
TITLE: Progressive Upright Mobility (PUM)

PATIENT OUTCOMES:
1. Patient will experience improved physical conditioning.
2. Patient will demonstrate hemodynamic stability (no orthostasis) with upright mobility.

STANDARDS OF PRACTICE:
In the care of all patients the RN will:

Assessment for PUM
a. Assess the patient for Progressive Upright Mobility (PUM) upon admission achieve or maintain an upright position?
2. Assess the patient for contraindications to PUM such as activity restrictions due to:
   a. Diagnosis or condition, e.g. spinal cord injury, unstable intracranial pressure, etc.
   b. Devices, e.g. femoral sheaths, traction, ventriculostomy while draining, etc.
   c. Therapies, e.g. during CRRT, hemodialysis, etc.
   d. Comfort Care
3. Apply PUM in conjunction with Continuous Lateral Rotation Therapy SOP and Progressive Mobility Algorithm for Critically Ill Patients (attached).

Initiation and Management of Patient Undergoing PUM
4. Advance patient through the following PUM steps 1-6:

<table>
<thead>
<tr>
<th>PROGRESSIVE UPRIGHT MOBILITY (PUM) STEPS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
</tr>
<tr>
<td>Step 2</td>
</tr>
<tr>
<td>Step 3</td>
</tr>
<tr>
<td>Step 4</td>
</tr>
<tr>
<td>Step 5</td>
</tr>
<tr>
<td>Step 6</td>
</tr>
</tbody>
</table>

5. Ensure that a PUM step is implemented at least three times/day, and more frequently as tolerated.
6. Evaluate cardiopulmonary tolerance to each position change by assessing vital signs, ECG, and SpO2. Allow a 5-minute equilibration period after the position change before determining cardiopulmonary stability.
7. Progress each step to 30 to 60 minutes duration as per patient tolerance.
8. Repeat each step until patient demonstrates hemodynamic and physical tolerance to stated activity/position for 60 minutes, then advance to next step at the next activity period.
9. Initiate orthostatic training TID using a reverse Trendelenburg position if the patient demonstrates cardiopulmonary intolerance or contraindications to PUM. Continue to assess for PUM (re)initiation when the patient demonstrates stability (no orthostasis) with upright mobility.
10. Adjust the plan of care to manage intolerance as follows:
   a. Educate and reassure patient
   b. Decrease interval times to 15-30 minutes
11. Document with each activity period under the “Activity/Position” column on the flow sheet:
   a. Step(s) number completed
   b. Duration in minutes
12. Document, when appropriate, in the nursing notes:
   a. Patient response to therapy
   b. Adjustments to therapy/interventions

Discontinuation of PUM
13. Discontinue PUM when the patient is successfully ambulating.

REFERENCES
# Ventilator-Associated Events (VAE) Top Ten Checklist

## TOP TEN EVIDENCE BASED INTERVENTIONS

<table>
<thead>
<tr>
<th>PROCESS CHANGE</th>
<th>IN PLACE</th>
<th>NOT DONE</th>
<th>WILL ADOPT</th>
<th>NOTES (RESPONSIBLE AND BY WHEN?)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Include all elements of the bundle in charge nurse rounds and nurse to charge nurse reports.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Multi-disciplinary approach is key - nurses, physicians, and respiratory therapy staff can work together to ensure bundle items such as head of bed, spontaneous awakening trials (SAT), spontaneous breathing trials (SBT), and oral care are done according to recommendations.</td>
<td>☐</td>
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<td></td>
</tr>
<tr>
<td>Elevate Head of the Bed to between 30-45 degrees (use visual cues, designate one person to check for HOB every one to two hours). Involve family and loved ones by educating on the risk of VAE, preventive measures in place, and what they can do to help, e.g. remind staff to raise head of bed.</td>
<td>☐</td>
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</tr>
<tr>
<td>Oral Care — routine oral care every 2 hours with antiseptic mouthwash and Chlorhexidine 0.12% every 12 hours (create visual cues, partner with Respiratory Therapy in performing oral care by making in a join the nurse and respiratory therapy function). Make the above oral care part of the ventilator order set as an automatic order that requires the physician to actively exclude it.</td>
<td>☐</td>
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<tr>
<td>Peptic ulcer disease prophylaxis — include on ICU admission and ventilator order sets as an automatic order that requires the physician to actively exclude it.</td>
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</tr>
<tr>
<td>Venous Thromboembolism (VTE) prophylaxis — Include on ICU admission and ventilator order sets as an automatic order that would require the physician to actively exclude it.</td>
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</tr>
<tr>
<td>Spontaneous awakening and breathing trials (SAT/SBT) — designate one time of day for the SAT and SBT to be attempted.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Coordinate SAT and SBT to maximize weaning opportunities when patient sedation is minimal — coordinate between nursing and respiratory therapy to manage SAT and SBT, perform daily assessments of readiness to wean and extubate.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>SAT and SBT should be included in the nurse to nurse handoffs, nurse to charge nurse reports, and charge nurse to charge nurse reports.</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
<tr>
<td>Delirium management — assess for delirium at least daily. Sedation should be goal oriented — administer sedation as ordered by the physician according to a scale such as a Richmond Agitation Sedation Scale (RASS).</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td></td>
</tr>
</tbody>
</table>
REFERENCES


71 Brody, AA. Barnes K, Ruble C, Sakowski J. Evidence-based practice councils: Potential path to staff empowermod and leadership growth. JONA. 2012;42(1)