ALERT

Assess data | Leverage tools | Execute changes | Redesign if needed | Tackle ongoing improvements

VENTILATOR-ASSOCIATED EVENTS (VAE) *Prevention Toolkit*

NJHA
Health Research & Educational Trust of NJ

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Ventilator-associated Events (VAE) Prevention Toolkit

This toolkit is designed to provide VAE prevention teams with a guided quality improvement approach to improving practices around VAE prevention. This toolkit includes three components designed to assist healthcare teams in their VAE prevention efforts:

- **The VAE ALERT quality improvement guide:** outlines a step-by-step approach for VAE prevention teams to identify gaps in care of the ventilated patient and develop action-oriented solutions.
- **The VAE ALERT assessment:** provides a multifaceted approach to assessing different clinical and safety culture related factors that may impact the care of ventilated patients.
- **The VAE ALERT resource guide:** includes examples of evidence-based practices, guidelines, educational materials, and other tools that healthcare teams may implement to address gaps identified in VAE prevention practices.

Addressing VAE prevention as a quality improvement program requires a thoughtful process that is based on the structured steps of analyzing data, designing and implementing tests of change, making modifications as needed and planning for sustainment. This toolkit is meant to assist VAE prevention teams in that process.

VAE Quality Improvement Guide

ASSESS DATA

Using data to drive change is a key part of any quality improvement effort. When improving bedside care practices VAE prevention teams should consider collecting different sets of data based on various metrics, that when trended over time, will provide insight into opportunities for improvements.

VAE related data can be collected from a variety of different sources, including infection surveillance data (VAE outcome), ventilator use data, and audit data (ventilator care practices). The Center for Disease Control and Prevention's (CDC) National Healthcare Safety Network (NHSN) compiles VAE comparative analysis, allowing organizations to benchmark and set goals that are in alignment with quality improvement initiatives. Data collection should be coordinated among the respiratory therapist, bedside nurse and infection preventionist.

VAE OUTCOME DATA

CDC NHSN VAE outcome data is stratified into three separate categories based on a surveillance algorithm. VAE prevention teams can monitor one or more categories. It is important to note that the VAE definitions are used for surveillance, they are not intended for use in the clinical management of patients.

- **Ventilator – Associated Conditions (VAC)** indicates there is a respiratory deterioration event occurring that has resulted in increased ventilatory support.
- **Infection – related Ventilator-Associated Complication (IVAC)** indicates that there is additional evidence that the event may be infectious vs. non-infectious.
- **Possible Ventilator – Associated Pneumonia (PVAP)** indicates that there is additional evidence the infection may be respiratory related.

VAE data can be expressed as a rate, for example: PVAP/Ventilator Days x1000, or as a standardized infection ratio (SIR). The SIR compares the actual number of infections observed to the predicted number of infections, based on the CDC prediction model.

VAE SIR = Observed Number of VAE/ Predicted Number of VAE

If the resulting SIR is greater than 1.0 that indicates that more VAEs were observed than predicted; conversely, if a SIR is less than 1.0, that indicates that fewer VAEs were observed than predicted. VAE prevention teams should monitor their VAE SIRs at both the facility and unit level, striving to continuously drive the value down, according to the latest CDC guidance.

VENTILATOR USE DATA

VAE prevention teams can monitor ventilator usage to determine effectiveness of interventions to reduce unnecessary ventilation use. Ventilator utilization data can be expressed as a device utilization ratio (DUR) or device standardized utilization ratio (SUR).

Ventilator DUR = Number of Ventilator Days/ Number of Patient Days

Ventilator SUR = Observed Device Days/ Predicted Device Days

The DUR can be useful for tracking and trending device use over short periods of time, however the measure is limited because it is not risk adjusted. Similar to the SIR, the SUR compares the actual number of ventilator device days reported to what would be predicted, based on the CDC prediction model.

If the resulting SUR is greater than 1 that indicates that more device days occurred than predicted; conversely, if a SUR is less than 1, that indicates that fewer device days occurred than predicted.

VENTILATOR CARE PRACTICES

To determine the extent to which front line staff are properly implementing ventilator care practices, teams should conduct regular audits of ventilator-related practices and processes. Process data collected from clinical audits can be trended over time along with VAE and ventilator utilization to monitor staff compliance, inform educational needs assessments and provide targeted feedback to frontline staff on VAE prevention performance.

Examples of ventilator care practices to audit

- Head of bed elevated greater than 30 degrees
- Oral care performed as per policy
- Spontaneous awakening trial performed
- Spontaneous breathing trial performed
- Below is an example of a ventilator care practice audit tool.

ACTION STEPS

1. **Identify VAE outcome, ventilator use and process measures to track for improvement.**
2. **Plan for data collection — who will collect the data and how often?**
3. **Plan for data reporting — how often will you enter VAE data into NHSN?**

Ventilator: Observation

Instructions: Observe patients on ventilators. For each category, record the observation. In the column on the right, sum (across) the total number of "Yes" and the total number of observations ("Yes" + "No"). Sum all categories (down) for overall performance.

	Ventilator: Observation Categories	Patient 1	Patient 2	Patient 3	Patient 4	Summary of Observations	
						Yes	Total Observed
1	Is the head of the bed elevated >30 degrees?	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No		
2	Is the ventilator tubing free of excessive condensation?	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No		
3	Are supplies needed for oral care readily available?	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No	❑ Yes ❑ No		
Total YES and TOTAL OBSERVED							

Source: https://www.cdc.gov/infectioncontrol/pdf/QUOTS/Ventilator-Observation-P.pdf

Leverage Tools

There are many tools that can help support VAE prevention teams in their quality improvement efforts. These tools include evidence-based guidelines, patient and family education materials, data analysis and display software, and examples of protocols and practices shared by other organizations. Many of these tools have been compiled in the VAE ALERT Resource Guide.

GUIDELINES

In 2014, Society for Healthcare Epidemiology of America and the Infectious Diseases Society of America led the development and publication of the Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute Care Hospitals which included the Strategies to Prevent Ventilator-associated Pneumonia in Acute Care Hospitals: 2014 Update. This document outlined an evidence-based, two-tiered approach to preventing VAP, addressing basic strategies for all settings and special approaches for those settings in which VAP rates remained high despite applying basic strategies (Klompas, et al., 2014). This guideline provides a structured model to VAE prevention based on the four E approach.

PATIENT AND FAMILY EDUCATION

VAE prevention teams may find that gaps exist around educating patients and families on VAE prevention. The Ventilator-associated Pneumonia FAQ handout is an evidence-based tool aimed at educating patients and families and is available for free download. The tool addresses many concerns that families may have, including steps that healthcare providers are taking to prevent VAE.

Pneumonia FAQ handout on following page

FAQs
(frequently asked questions)

about

"Ventilator-Associated Pneumonia"

What is a Ventilator-Associated Pneumonia (VAP)?

A "pneumonia" is an infection of the lungs. A "ventilator" is a machine that helps a patient breathe by giving oxygen through a tube. The tube can be placed in a patient's mouth, nose, or through a hole in the front of the neck. The tube is connected to a ventilator. A "ventilator-associated pneumonia" or "VAP" is a lung infection or pneumonia that develops in a person who is on a ventilator.

Why do patients need a ventilator?

A patient may need a ventilator when he or she is very ill or during and after surgery. Ventilators can be life-saving, but they can also increase a patient's chance of getting pneumonia by making it easier for germs to get into the patient's lungs.

What are some of the things that hospitals are doing to prevent ventilator-associated pneumonia?

To prevent ventilator-associated pneumonia, doctors, nurses, and other healthcare providers:

- **Keep the head of the patient's bed raised** between 30 and 45 degrees unless other medical conditions do not allow this to occur.
- **Check the patient's ability to breathe on his or her own** every day so that the patient can be taken off of the ventilator as soon as possible.
- **Clean their hands** with soap and water or an alcohol-based hand rub before and after touching the patient or the ventilator.
- **Clean the inside of the patient's mouth** on a regular basis.
- **Clean or replace equipment** between use on different patients.

Keep the head of the patient's bed raised between 30 to 45 degrees.

What can I do to help prevent VAP?

- If you smoke, quit. Patients who smoke get more infections. If you are going to have surgery and will need to be on a ventilator, talk to your doctor before your surgery about how you can quit smoking.
- Family members can ask about raising the head of the bed.
- Family members can ask when the patient will be allowed to try breathing on his or her own.
- Family members can ask doctors, nurses, and other healthcare providers to clean their hands.

If you do not see your providers clean their hands, please ask them to do so.

- Family members can ask about how often healthcare providers clean the patient's mouth.

Can VAP be treated?

VAP can be a very serious infection. Most of the time, these infections can be treated with antibiotics. The choice of antibiotics depends on which specific germs are causing the infection. Your healthcare provider will decide which antibiotic is best.

If you have questions, please ask your doctor or nurse.

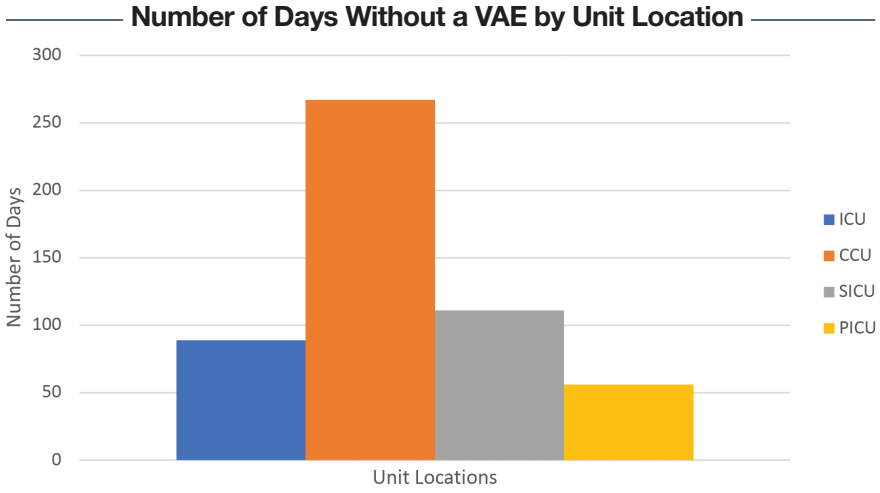
Co-sponsored by:

SHEA The Society for Healthcare Epidemiology of America · IDSA · American Hospital Association · APIC Spreading knowledge. Preventing infection. · CDC Centers for Disease Control and Prevention · The Joint Commission

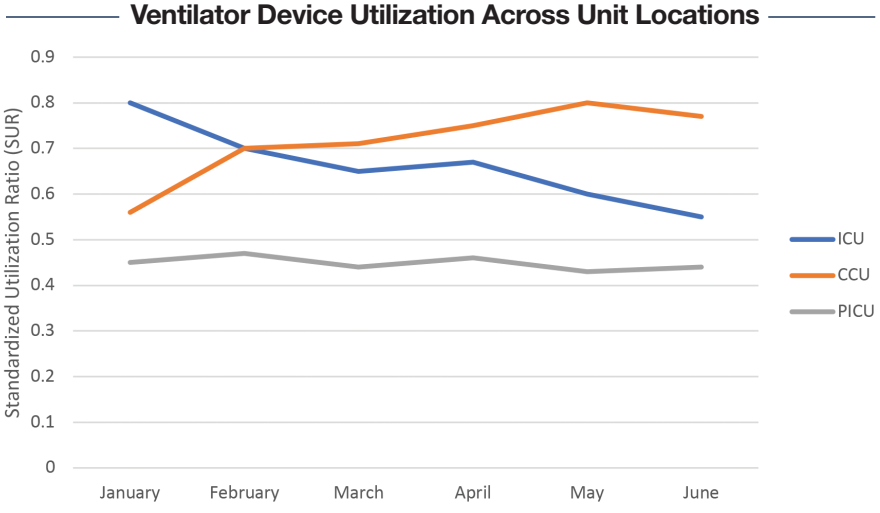
DATA TOOLS

Using graphs to display goals, trends and interventions over time is a powerful way to tell the story of a quality improvement effort. To create the maximum impact when sharing VAE related data, there needs to be consideration to how the data will be displayed. VAE prevention teams should ensure that the data they are sharing is relevant, understandable and actionable to the audience to which it is being directed.

Bar charts display data for different and discrete categories of values and are useful for showing comparison between groups and highlighting magnitude. The example bar chart below shows that all four units have gone at least 30 days without having a patient develop a VAE.



Line charts are a way to visually connect the sequence of data points and can show trends over time. By looking at a line graph, audiences can determine if data trends are improving, worsening or remaining stable. The example line chart below shows the trending of ventilator usage for several units of a series of months.



ACTION STEPS

1. **Review the gaps from the VAE Alert assessment and determine which tools from the VAE Alert resource guide your team can use to help with your VAE improvement project.**
2. **Determine how VAE data can be shared to engage stakeholders.**

Execute Changes

Data drives change, but to successfully implement change, VAE prevention teams should design tests-of-change cycles that are rooted in a quality improvement model. The Plan-Do-Study-Act (PDSA) model is a framework that allows quality improvement teams to rapidly test change on a small scale and make modifications as indicated. The Institute for Healthcare Improvement (IHI) pioneered the PDSA model as a key component of their Quality Improvement Model (IHI, 2019).

Key questions to ask:

What are we trying to accomplish?

How will we know when a change is an improvement?

What change can we make that will result in improvement?

The PDSA model supports action-oriented learning as teams implement tests on a small scale, learn from the experience, and make changes as necessary. There are four steps in the PDSA cycle:

Step 1: PLAN

VAE prevention teams should specify the question that the test is designed to answer. Teams should also make a prediction of what the outcome of the test will be. Plan how the test will be conducted including the "who, what, when and how" elements of the testing cycle. Teams should also plan for what data will be measured during the test cycle.

Step 2: DO

Teams will first need to implement the test on a small scale. This could be with a small group of staff members and patients on one unit. VAE prevention teams should conduct the test and record the observations and outcomes.

Step 3: STUDY

Once the test is completed, the team must analyze the results. A critical component of this step is to carefully review the results and determine what the key determining factors that made the test a success or a failure.

Step 4: ACT

Take the lessons learned from the test and plan for the next action. That next action could be to adopt the idea and spread on a larger scale, adapt the idea by making changes and conducting further tests of change, or abandon the idea and move on to something else.

ACTION STEPS

1. **Choose the small test of change that your VAE prevention team will implement.**
2. **Choose the unit/location that the change will be tested on.**
3. **Design the implementation plan.**
4. **Be prepared to measure the effect.**
5. **Conduct the test.**
6. **Be prepared to modify and redesign if needed.**

Redesign If Needed

When implementing a VAE prevention process change, teams will need to assess for improved performance and increased efficiency during the stages of the PDSA cycle. Step 4 of the PDSA process allows for an opportunity to redesign the change idea. Based on data and user feedback, teams will need to review the initial process change strategy, the current process and performance, and what changes can be made to achieve the ideal process and outcomes.

Considerations for Redesign

Perceived process (what we think is happening);

Reality process (what the process actually is); and

Ideal process (what the process could be).

When making redesign decisions it is crucial to include the frontline staff. Their insight and recommendations will help maximize efficiency and effectiveness of the change. Also, it will be important for the team to be able to determine the potential peripheral effects of redesigning the process. A benefit of PDSA is that VAE prevention teams can identify unanticipated effects of redesigned processes and correct them before taking them to scale. There are several key questions teams can consider when redesigning a VAE prevention process (AHRQ, 2013).

Redesign Reflection Questions

- Is there a problem with current performance? Do you need better results?
- Have you been skipping any critical steps?
- Are all steps necessary? Are there areas of unnecessary duplication or redundancy?
- How often do you have to do each step?
- Are there areas that rely on an individual to "remember" to do something? Any process that relies on memory is prone to error.
- What happens if the process breaks down? Do you need a fail-safe mechanism?
- Can some steps be done simultaneously?
- Is there a more logical way to sequence the steps?
- What skills are necessary to perform each step?
- If more skills are required, can current staff be trained, or do duties need to be shifted to more qualified staff?
- Is there any technology that would make this process more efficient or easier to do?
- Are you thinking outside the box? Is there an entirely different way to get this done?
- Who do you know that handles this task very well (an exemplar)? Can you study their workflow?

ACTION STEPS

1. **Create and implement your redesign plan.**
2. **Be prepared to measure the effect.**
3. **Conduct the test.**
4. **Share outcomes with the team.**
5. **If successful, plan for spread.**

Tackle Ongoing Improvements

Building a VAE prevention program that can be sustained over time is crucial to the ongoing improvement in this important area of patient safety. Initially, new quality improvement programs may be seen as a stand-alone initiatives, creating excitement and motivating staff to become involved. However, over time as the new practices become part of the daily routine, and if staff are not regularly kept informed of changes or progress towards improvement, they may become disengaged and as a result, maintaining the improvements could be challenging.

Planning for future sustainment requires having a solid awareness of what the current state of the program is, having clear and achievable future goals, and a well designed plan for implementing sustainable actions.

Planning for Future Sustainment

Step 1: *Know where you are (Current State)*

Step 2: *Know where you want to go (Unit Goals)*

Step 3: *How are you going to get there (Action Planning)*

Keys to successful sustainability include ongoing leadership commitment to improvement goals, leveraging quality improvement champions as a resource to frontline staff, maintaining a strong multidisciplinary approach to improvement and the ongoing use of data to drive change. VAE prevention teams should also think critically about their past experiences, future goals and steps on how to achieve those goals. Thinking in this framework will help teams develop an action plan for sustainment (AHRQ, 2015).

VAE NURSE AND PHYSICIAN CHAMPIONS

VAE prevention nurse and physician champions are at the core of engaging both frontline staff and leaders in implementation of evidence-based interventions to reduce the risk of VAEs. Champions are individuals that are not only knowledge experts, but have the respect of peers and the commitment to reduce VAEs in their organization. Champions play an integral role at of sustaining a VAE prevention program by continuing to educate those individuals new to the unit, identify ongoing opportunities to test new evidence-based interventions and partner with other units to help spread the success and innovations of their VAE prevention work.

ACTION STEPS

1. **Secure leadership commitment for ongoing efforts around VAE prevention.**
2. **Designate a nurse and physician champion for VAE prevention.**
3. **Plan for ongoing data measurement and sharing with staff to maintain engagement.**
4. **Plan for ongoing education and feedback strategies to keep staff up to date on VAE prevention progress and best practices**

References:

Agency for Healthcare Research and Quality (2015). A Model for Sustaining and Spreading Safety Interventions. Retrieved from https://www.ahrq.gov/professionals/quality-patient-safety/hais/cauti-tools/guides/sustainability-guide.html.

Agency for Healthcare Research and Quality. (2013). Module 5. Mapping and Redesigning Workflow. Retrieved from https://www.ahrq.gov/ncepcr/tools/pf-handbook/mod5.html.

Centers for Disease Control and Prevention (2019). Ventilator-associated Events Surveillance. Retrieved from https://www.cdc.gov/nhsn/acute-care-hospital/vae/index.html.

Institute for Healthcare Improvement (2019). PDSA Model. Retrieved from http://www.ihi.org/resources/Pages/Tools/PlanDoStudyActWorksheet.aspx.

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VENTILATOR-ASSOCIATED EVENTS (VAE)
Assessment

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High Reliability/Safety Culture

Question	Yes	No	Yes, but not consistently	NA
Does your hospital have a quality improvement team focused on VAE prevention?				
Does your hospital have a nurse champion for VAE prevention activities?				
Does your hospital have a physician champion for VAE prevention activities?				
Are interdisciplinary ICU rounds conducted on a daily basis?				
During ICU rounds, do interdisciplinary teams use a standardized checklist or template to address critical patient safety issues?				
Do staff use a standardized communication tool to convey important information (e.g. SBAR tool)?				
Do ICU staff conduct shift change handoffs at the bedside?				
Are staff encouraged to speak up for safety using tools like ARCC (Ask a question, Request a change, voice a Concern, escalate up the Chain of command) or CUS (I am Concerned! I am Uncomfortable! This is a Safety Issue)?				
Do ICU leaders participate in your organization's daily safety huddle?				

Comments:

VAE Prevention Bundle Components

Question	Yes	No	Yes, but not consistently	NA
Is there a process in place to ensure that the head of the bed is elevated to at least 30-45 degrees?				
Is there a process in place to ensure that oral care is performed every two hours and with an approved oral antiseptic (e.g. chlorhexidine), performed at least every 12 hours?				
Are patients intubated with sub-glottic suctioning endotracheal tubes if extended (beyond 72 hours) intubation period is expected?				
Are strategies in place to maintain tidal volume of less than 8 ml/kg to reduce the risk of lung injury?				
Are spontaneous awakening trials (SAT) and spontaneous breathing trials (SBT) performed daily in order to assess readiness to wean or extubate?				
Are SAT and SBT coordinated between nursing and respiratory therapy to maximize effectiveness?				
Is there a process in which patients are assessed and progressively mobilized from passive range of motion exercises to ambulation?				
Is the patient's level of sedation goal- oriented and adjusted based on their assessment using an evidence-based scale such as the Richmond Agitation Sedation Scale (RASS)?				
Are patients routinely assessed for delirium using an evidence-based tool like the Confusion Assessment Method for the ICU (CAM-ICU)?				

Comments:

Data Collection and Measurement

Question	Yes	No	Yes, but not consistently	NA
Does your unit/organization measure Ventilator Associated Events (VAE) using the Center for Disease Control and Prevention's (CDC) surveillance definitions?				
Does your infection prevention department collaborate with nursing and respiratory therapy to collect data components required for VAE surveillance (e.g. daily ventilatory settings)?				
Does your infection prevention department enter VAE data into the CDC data portal National Healthcare Safety Network (NHSN) on a regular and ongoing basis?				
Does your infection prevention department share VAE data with unit level staff?				
Does your infection prevention department share VAE data with hospital leadership?				
Does your infection prevention department share VAE data with patients and families?				
Does your infection prevention department share VAE data with quality improvement organizations (e.g. New Jersey Hospital Association)?				
Does your ICU perform audits to measure compliance with VAE bundle components?				
Does your ICU share audit data/results with frontline staff?				

Comments:

Patient and Family Engagement

Question	Yes	No	Yes, but not consistently	NA
Are families educated on the risk of VAE and strategies implemented to prevent VAE?				
Are families encouraged to participate in bedside shift change reports?				
Are families encouraged to participate in appropriate patient care activities (e.g., passive range of motion exercises)?				
Are families educated about the importance of hand hygiene and contact precautions (if indicated)?				
Does your unit/organization have a patient and family advisory counsel that addresses ICU safety issues?				

Comments:

Competency-based Training

Question	Yes	No	Yes, but not consistently	NA
Is training provided to all personnel who provide respiratory therapy for ventilated patients (e.g., suctioning, administration of aerosolized medications)? Personnel may include, but are not limited to, respiratory therapists and nurses.				
Is training is provided when new equipment or protocols are introduced?				
Are personnel required to demonstrate competency with respiratory therapy practices (i.e., correct technique is observed by trainer) following each training?				
Is feedback provided to clinicians regarding their performance for management of ventilated patients?				

Comments:

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VENTILATOR-ASSOCIATED EVENTS (VAE)
Resource Guide

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VAE prevention teams should use this resource guide to identify possible solutions to address the gaps identified in the VAE ALERT Assessment Tool. The resources below are organized by the format of the topics in the assessment tool.

High Reliability/Safety Culture

Implementing a program to successfully reduce VAEs requires a multipronged approach, dedicated resources and leadership support from the highest levels of an organization. High reliability principles can guide the improvement of safety culture within an organization. High reliability can be described as a condition of persistent mindfulness within an organization. High reliability organizations, or HROs, drive safety improvements by relentlessly prioritizing safety over other performance pressures.

This approach can be applied at the unit level to drive improvements in VAE performance by providing support in nurturing open communication and teamwork, addressing challenges the VAE prevention team may face, and being actively involved in developing solutions to address safety concerns.

The following tools from the Agency for Healthcare Research and Quality will assist in applying HRO practices to the prevention of VAEs.

- Forming a Comprehensive Unit-based Safety Program (CUSP) Team: Facilitator Guide, AHRQ Safety Program for Mechanically Ventilated Patients
  https://www.ahrq.gov/professionals/quality-patient-safety/hais/tools/mvp/modules/cusp/forming-cuspteam-facguide.html
- Physician Champion Checklist: AHRQ Safety Program for Mechanically Ventilated Patients
  https://www.ahrq.gov/professionals/quality-patient-safety/hais/tools/mvp/modules/cusp/physician-checklist.html
- Resident Physicians as Champions in Preventing Device-Associated Infections
  https://www.ahrq.gov/sites/default/files/publications/files/resphys-champions_1.pdf
- CUSP Toolkit: The Role of the Nurse Manager
  https://www.ahrq.gov/professionals/education/curriculum-tools/cusptoolkit/modules/nursing/nursingnotes.html
- Daily Goals During Interdisciplinary Rounds: Facilitator Guide: AHRQ Safety Program for Mechanically Ventilated Patients
  https://www.ahrq.gov/professionals/quality-patient-safety/hais/tools/mvp/modules/cusp/dailygoals-rounds-facguide.html
- CUSP Guide for Reducing Ventilator-Associated Events in Mechanically Ventilated Patients: Daily Goals
  http://www.ahrq.gov/sites/default/files/wysiwyg/professionals/education/curriculum-tools/cusptoolkit/toolkit/dailygoals.docx
- Guide to Patient and Family Engagement in Hospital Quality and Safety- Nurse Bedside Shift Report (Implementation Handbook)
  https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/systems/hospital/engagingfamilies/strategy3/Strat3_Implement_Hndbook_508.pdf

- CUSP Guide for Reducing Ventilator Associated Events in Mechanically Ventilated Patients: Morning Briefings
  http://www.ahrq.gov/sites/default/files/wysiwyg/professionals/education/curriculum-tools/cusptoolkit/toolkit/morningbriefing.doc
- TeamSTEPPS Communication and Mutual Support Tools:
  SBAR video https://www.ahrq.gov/teamstepps/instructor/videos/ts_SBAR_NurseToPhysician/SBAR_NurseToPhysician-400-300.html
  CUS "I am Concerned, I am Uncomfortable, This is a Safety Issue" video https://www.ahrq.gov/teamstepps/instructor/videos/ts_CUS_LandD/CUS_LandD.html
- Practice Facilitation Handbook, Module 14. Creating Quality Improvement Teams and QI Plans
  https://www.ahrq.gov/professionals/prevention-chronic-care/improve/system/pfhandbook/mod14.html

Other High Reliability/Safety Culture resources

For VAE prevention teams that may wish to conduct a deeper dive into their organization's safety culture the following resources are available for organizations to use:

- American College of Healthcare Executives – Leading a Culture of Safety: A Blue Print for Success
  http://safety.ache.org/blueprint/
- The Joint Commission (TJC) Center for Transforming Healthcare Oro 2.0® Assessment
  https://www.centerfortransforminghealthcare.org/oro.aspx
- National Patient Safety Foundation (NPSF) Organization Self-Assessment
  https://www.npsf.org/page/LLIassessment
- Press Ganey Safety Diagnostic Assessment
  https://www.pressganey.com/solutions/safety/assess-and-diagnose-your-safety-culture
- AHRQ Survey on Patient Safety Culture
  https://www.ahrq.gov/sops/surveys/hospital/index.html
- Safety, Communication, Operational Reliability and Engagement
  https://www.safeandreliablecare.com/surveys/

VAE Prevention Bundle Components

There are several different VAE prevention bundle guidelines and resources available to clinicians and VAE prevention teams. Within each of these resources, a multitude of recommendations exist and it can be overwhelming to figure out how best to implement them. VAE prevention teams should review the material relevant to the issues that are the focus of their quality improvement efforts and implement the best practices using a small test of change approach.

- Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute Care Hospitals: VAE Prevention
  https://www.cambridge.org/core/journals/infection-control-and-hospital-epidemiology/article/strategies-to-prevent-ventilatorassociated-pneumonia-in-acute-care-hospitals-2014-update/2D8A9D3BFD8BC8A68E04906B5C2CEF66
- Society of Critical Care Medicine ABCDEF Bundle
  https://www.icudelirium.org/medical-professionals/overview

- AHRQ Safety Program for Mechanically Ventilated Patients: Daily Care Practices for VAE Prevention
  https://www.ahrq.gov/professionals/quality-patient-safety/hais/tools/mvp/modules/technical/intro-dailycare-facguide.html
- AHRQ Safety Program for Mechanically Ventilated Patients: Low Tidal Volume
  https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/quality-patient-safety/hais/tools/mvp/modules/technical/ltvv-mvpguide.pdf
- AHRQ Safety Program for Mechanically Ventilated Patients: Benefits of Subglottic Secretion Drainage Endotracheal Tubes: Facilitator Guide
  https://www.ahrq.gov/professionals/quality-patient-safety/hais/tools/mvp/modules/technical/subglottic-facguide.html
- AHRQ Safety Program for Mechanically Ventilated Patients: Evidence Behind Spontaneous Awakening Trials, Spontaneous Breathing Trials, and Head of Bed Elevation: Facilitator Guide
  https://www.ahrq.gov/professionals/quality-patient-safety/hais/tools/mvp/modules/technical/subglottic-facguide.html
- AHRQ Safety Program for Mechanically Ventilated Patients: Evidence Behind Pain, Agitation, and Delirium: Assessments and Sedation Management: Facilitator Guide
  https://www.ahrq.gov/professionals/quality-patient-safety/hais/tools/mvp/modules/technical/painmgmt-facguide.html
- CentraState Health Protocol for Spontaneous Awakening and Breathing Trials
  https://www.mnhospitals.org/Portals/0/Documents/patientsafety/VAE/CentraCare_SedVacProtocol.pdf
- Society of Critical Care Medicine Early Mobility Tools and Videos
  https://www.icudelirium.org/medical-professionals/early-mobility-and-exercise

Data Collection and Measurement

Using data to drive change is a key part of any quality improvement effort. When improving VAE prevention practices, teams should consider collecting different sets of data based on various metrics that, when trended over time, will provide insight into opportunities for improvements. Teams can then share and display that data in a variety of different ways depending on the intended audience.

- NHSN training and material for surveillance
  https://www.cdc.gov/nhsn/acute-care-hospital/vae/index.html
- NHSN VAE data collection worksheet
  https://www.cdc.gov/nhsn/pdfs/vae/VAE_DataCollectionWorksheet_FINAL.pdf
- AHRQ VAE data collection tools
  https://www.ahrq.gov/professionals/quality-patient-safety/hais/tools/mvp/modules/vae/vae-tool.html
- Centers for Disease Control and Prevention/APIC: Quick Observation Tool for Ventilators
  https://www.cdc.gov/infectioncontrol/pdf/QUOTS/Ventilator-Observation-P.pdf

Patient and Family Engagement

Engaging with patients and their families is critical. VAE prevention teams should consider various strategies designed to improve the way that healthcare providers support, involve and communicate with patients and families during their healthcare encounter and during transitions of care. For families of patients requiring mechanical ventilation, it is important to maintain open communication about the plan of care and to educate them on what to expect while their loved one is receiving care.

- ICU Liberation Bundle for Family Engagement and Empowerment
  https://www.sccm.org/ICULiberation/ABCDEF-Bundles/Family-Engagement
- The Joint Commission Speak Up Campaign: Speak up to Prevent Infections
  https://www.jointcommission.org/topics/speak_up_infection_control.aspx
- AHRQ: Guide to Patient and Family Engagement in Hospital Quality and Safety: Working With Patients and Families as Advisors
  https://www.ahrq.gov/professionals/systems/hospital/engagingfamilies/strategy1/index.html
- Patient education handout from SHEA/IDSA/AHA/APIC/CDC/TJC
  https://www.shea-online.org/images/patients/NNL_VAP.pdf
- Vanderbilt Family Engagement and Empowerment Strategies
  https://www.icudelirium.org/medical-professionals/family-engagement-and-empowerment

Competency-based Training

Training healthcare workers on basic principles of infection prevention is essential to creating better awareness and understanding of overall HAI prevention. When addressing specific device-related infections, including VAE, teams should review evidence-based guidelines as these recommendations can further promote the implementation of training programs.

- AHRQ Educational Tools for How To Apply CUSP for Mechanically Ventilated Patients
  https://www.ahrq.gov/hai/tools/mvp/cusp.html
- Partnering to Heal: Teaming up Against Healthcare Associate Infections
  https://www.mnhospitals.org/Portals/0/Documents/patientsafety/VAE/CentraCare_SedVacProtocol.pdf
- CDC Hand Hygiene Training
  https://www.cdc.gov/handhygiene/training/interactiveEducation/