New Quality Reporting Measure: Ventilator Associated Events

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Overview

Objectives

▪ Provide an Overview of the CMS Quality Reporting Measures
▪ Define the Ventilator Associated Events Reporting Measure
▪ Discuss Common Reporting Pitfalls
▪ Review Strategies for Reporting Oversight and Performance Improvement
CMS QRP: Infection Data (NHSN)

Four Quality Reporting Measures
- Catheter-Associated Urinary Tract Infection (CAUTI) Outcome Measure (NQF#0138)
- Central Line-Associated Blood Stream Infection (CLABSI) Outcome Measure (NQF#0139)
- NHSN Facility-Wide Inpatient Hospital-Onset Methicillin-resistant Staphylococcus Aureus (MRSA) Bacteremia Outcome Measure (NQF#1716)
- NHSN Facility-Wide Inpatient Hospital-Onset Clostridium Infection (CDI) Outcome Measure (NQF#1717)

Payment Determination
- Calendar year 2015 data submission
- Effects FY 17 payment (October, 2016)
Data Collection and Reporting Time Frames

<table>
<thead>
<tr>
<th>Data Collection</th>
<th>Data Submission</th>
</tr>
</thead>
<tbody>
<tr>
<td>January-March 2015</td>
<td>May 15, 2015</td>
</tr>
<tr>
<td>April-June 2015</td>
<td>August 15, 2015</td>
</tr>
<tr>
<td>July-September 2015</td>
<td>November 15, 2015</td>
</tr>
<tr>
<td>October-December 2015</td>
<td>February 15, 2015</td>
</tr>
</tbody>
</table>

FY 17 Payment Determination

- Data submission per above time frames
- 100% completion threshold
CMS Guidance on Reporting VAE

- Published in December 2015
- Outlines requirements (does not supersede state requirements) for reporting VAEs through NHSN
- LTACHs are required to report VAEs and associated denominator data (patient days and ventilator days) that occur on or after January 2016 for all adult inpatient locations.

CDC NHSN Database

- Manual Data Entry via Monthly Reporting Plan
  - Update monthly reporting plan to include VAE surveillance
- Encouraged to enter monthly day by 30 days after month-end
  - CMS QRP requirements are 4 ½ months following the end of the reporting quarter
  - CDC submits QRP measures to CMS
Device-Associated Module

- Training
- Protocols
  - VAE protocol
  - NHSN overview
  - Identifying Healthcare Associated Infections
  - Monthly reporting plan
- Forms
  - VAE form
  - Monthly reporting form
- Supporting materials
  - VAE Event Calculator
  - Guidance on use of NHSN database
- Analysis resources
- FAQs

Source: http://www.cdc.gov/nhsn/LTACH/vae/index.html
**Ventilator Definitions for VAE**

**Ventilator**- A device to assist or control respiration, inclusive of the weaning period, through a tracheostomy or by endotracheal intubation.

Intermittent positive pressure breathing (IPPB), nasal positive end-expiratory pressure (nasal PEEP), and continuous positive nasal airway pressure (CPAP) are NOT considered ventilators unless delivered via tracheostomy or endotracheal intubation.

**Episode of Mechanical Ventilation**- A period of days during which the patient is mechanically ventilated for some portion of each consecutive day.

A break of one day defines a new episode of mechanical ventilation.
Ventilator-Associated Event (VAE) Algorithm

Three tiers
- Ventilator-Associated Condition (VAC)
- Infection-Related Ventilator-Associated Complication (IVAC)
- Possible Ventilator-Associated Pneumonia (PVAP)

VAE Identification
- Deterioration in respiratory status (PEEP and FiO₂)
- Evidence of infection or inflammation
- Laboratory evidence of respiratory infection
**VAE Important Dates/Days**

- Mechanical ventilation for >2 calendar days
- Earliest date for VAE criteria to be fulfilled is on day four
- Earliest date of event (day of worsening oxygenation) is on day three
- Day one begins on date of intubation and initiation of mechanical ventilation
- VAE window period includes a five day range in which other VAE criteria must be met
  - Two days before the event date
  - Date of event (day of worsening oxygenation)
  - Two days following the event date
- VAEs are defined on a 14-day period beginning with the day of onset of worsening oxygenation
  - A new VAE cannot be reported until the 14-day period elapses
Present on Admission

- Date of event occurs on day of transfer or day after transfer
- VAE attributed to transferring facility

Transfer Rule Example

Patient intubated and mechanically ventilated for 8 days in the SICU of Hospital A is transferred for further care on day 8 to the LTACH. The patient was stable on the ventilator in Hospital A from days 3-8. On the day of transfer to the LTACH (day 1), the patient’s respiratory status deteriorates. The day after transfer (day 2), the patient meets criteria for VAC. The date of the event is day 1 in Hospital B – the first day of the period of worsening oxygenation meeting VAE PEEP or FiO2 thresholds. The infection preventionist (IP) from Hospital B calls the Hospital A IP to report that this patient was admitted to Hospital B with a VAC. This VAC should be reported to NHSN for and by Hospital A, and attributed to the Hospital A SICU. No additional ventilator days are reported by Hospital A.
Respiratory Status

**PEEP**
- Daily Minimum PEEP in the baseline period
  - Lowest value sustained for 1 hour in 1 calendar day
  - Defaults to the lowest PEEP setting during 1 calendar day
- Increase $\geq 3 \text{cmH}_2\text{O}$ for $\geq 2$ calendar days over the daily minimum in the baseline period
  - Values from 0-5cmH$_2$O are considered equivalent (must increase to 8)

**FiO$_2$**
- Daily Minimum FiO$_2$
  - Lowest value sustained for 1 hour in 1 calendar day
  - Defaults to the lowest FiO$_2$ during 1 calendar day
- Increase $\geq .20$ (20 points) over the daily minimum in the baseline period sustained for $\geq 2$ calendar days
Daily Minimum Values: Example

<table>
<thead>
<tr>
<th>TIME</th>
<th>PEEP</th>
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<tbody>
<tr>
<td>12:00pm</td>
<td>10</td>
</tr>
<tr>
<td>1:00pm</td>
<td>8</td>
</tr>
<tr>
<td>2:00pm</td>
<td>6</td>
</tr>
<tr>
<td>3:00pm</td>
<td>5</td>
</tr>
<tr>
<td>4:00pm</td>
<td>5</td>
</tr>
<tr>
<td>5:00pm</td>
<td>6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TIME</th>
<th>FiO₂</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:00pm</td>
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</tr>
<tr>
<td>1:00pm</td>
<td>0.8</td>
</tr>
<tr>
<td>2:00pm</td>
<td>0.5</td>
</tr>
<tr>
<td>3:00pm</td>
<td>0.5</td>
</tr>
<tr>
<td>4:00pm</td>
<td>0.6</td>
</tr>
<tr>
<td>5:00pm</td>
<td>0.8</td>
</tr>
</tbody>
</table>
### Examples

<table>
<thead>
<tr>
<th>Ventilator Day</th>
<th>Daily minimum PEEP</th>
<th>Daily minimum FiO₂</th>
<th>VAE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>1.00 (100%)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>0.50 (50%)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>0.50 (50%)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>5</td>
<td>0.50 (50%)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>0.50 (50%)</td>
<td>VAC</td>
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<tr>
<td>6</td>
<td>8</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>0.50 (50%)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>0.40 (50%)</td>
<td></td>
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<td>5</td>
<td>0.40 (50%)</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>0.70 (50%)</td>
<td>VAC</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>0.70 (50%)</td>
<td></td>
</tr>
</tbody>
</table>
Must meet both of the following

- Temperature $>38^\circ$ C or $<36^\circ$ C OR WBC $\geq 12,000$ cells/mm$^3$ or $\leq 4,000$ cells/mm$^3$
- New antimicrobial agent(s) started and continued for $\geq 4$ calendar days
Evidence of Infection or Inflammation:
Antimicrobial Criterion

New Antimicrobial Agent

- Any agent listed in the VAE protocol appendix that is initiated on or after the third calendar day of mechanical ventilation AND in the VAE window period (2 days before, date of event, 2 days following)
- Considered new if it was not given on either of the 2 days preceding the medication start date
- Must be administered by one of the following routes:
  - Intravenous
  - Intramuscular
  - Digestive tract
  - Respiratory tract
- Four Qualifying Antimicrobial Days (QADs) must be met
  - QAD is a day in which an antimicrobial agent that is considered “new” within the VAE window period is administered
  - Four consecutive days must be met to meet the IVAC antimicrobial criterion
Possible Ventilator-Associated Pneumonia

Three Criterion

- Positive culture meeting specific quantitative or semi-quantitative threshold
- Purulent respiratory secretions and identification of organisms NOT meeting the quantitative or semi-quantitative thresholds
  - Secretions from the lungs, bronchi, or trachea that contain >25 neutrophils and ≤10 squamous epithelial cells
- Organisms identified by pleural fluid specimen, positive lung histopathology, and positive diagnostic tests for *Legionella* species or selected respiratory viruses
VAE Algorithm

- **VAC**
  - Must meet VAC criteria AND....

- **IVAC**
  - Must meet VAC and IVAC criteria AND.....

- **PVAP**
**VAE Reporting**

**Numerator**
- Ventilator-Associated Events
- When NO VAEs for the month you MUST check the “report no events” box on the denominator summary screen

**Denominator**
- Patient Days
- Ventilator Days
  - Counted/collected at the same time each day
  - Electronic data collection is sufficient as long as there is <5% difference from manual counts (pre-validated by a minimum 3 months)
  - Month sum submitted on the form
  - All ventilator days are counted (<3 days on mechanical ventilation) and those excluded from VAE surveillance
VAE Data Analysis

**VAE Rates & Vent Utilization Ratios**

- Ventilator-Associated Events per 1,000 ventilator patient days
  - # of VAEs/monthly ventilator days $\times$ 1,000

- Rate per 100 episodes of mechanical ventilation
  - # of VAEs divided by the number of episodes $\times$ 100

- Vent Utilization Ratio
  - # of ventilator days/patient days
The Who, the What, and the When

- Who is involved in reporting your data?
  - Training
  - Competencies
  - Back-up

- Data collection process
  - Ventilator patients
  - PEEP and FiO₂
  - Ventilator days

- When is the data reported?
  - Identification, confirmation, reporting process
  - Monthly or quarterly NHSN submissions
    - Monthly plan MUST be reported for each month
Data Validation

- Process
  - Monthly verification of reporting
    - Completion threshold is met
  - Supporting documentation in the medical record
    - Consistency with admission date and lab specimen date

Utilization

- NHSN reports
  - Output/Report Options
- Comparative data
  - Annual summary (2012 is the most recent available)
- Internal analysis
  - Comparison by location
  - Comparison across hospitals
  - Historical data for trend analysis