PREVENT HAIs Healthcare-Associated Infections

Data Measures Guide

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Introduction

What do you do with all this data you have collected? The data you have collected should be used to track your progress in improving care for your mechanically ventilated patients, as well as positive changes in your outcomes.

Quality improvement teams often share process and outcome performance measures with select individuals or improvement groups within their organization. Key stakeholders, including frontline staff and senior leadership, are often unaware of local performance. If you were to ask frontline staff and leadership what your ventilator-associated event (VAE) rates are, or the extent to which you are implementing the interventions, would they know the answer? In most cases they would not.

Conducting frequent formal and informal audits with continuous timely feedback of outcome measures to all staff involved in the quality improvement project is essential. To accomplish this, monitor and report back to your staff each month. Routinely reporting local results allows staff to track improvements in performance, serves to remind staff about the new processes and even motivates improvement. Be sure to celebrate your successes.

Give your invested stakeholders feedback by sharing your performance in the following ways:

- Post a trend line of your targeted intervention, such as head of bed (HOB) compliance or percentage of patient days mobilized, to show how this changes over time
- Post the percentage of achieving the Richmond Agitation Sedation Score (RASS) or Riker Sedation-Agitation Scale (SAS) targets
- Post the percentage of Intensive Care Delirium Screening Checklist (ICDSC) negative, Confusion Assessment Method for the ICU (CAM-ICU) negative, or Attention Screening Exam (ASE) ≤ 2 (no delirium)
- Post the percentage of meeting low tidal volume ventilation (LTVV) recommended guidelines for patients with and without acute respiratory distress syndrome

This document contains suggestions and directions on how you could analyze your data. Some of these directions and interpretations of reports are basic process compliance and outcome rates, such as what percentage of patient days is the head of the bed elevated. Others look at more difficult analyses, such as the number of patient days where the RASS or SAS score is in the range considered an optimal goal for normal patient care. Choose the analyses that are most appropriate for your site and situation.

Use this document as a guide to help you determine which analyses you are interested in and how to set up these analyses in a way to make the outcomes more useful to you, your frontline staff and your executive partners.

What's in the Guide?

The Data Measures Guide is a collection of the data collection tools used to support the AHRQ Safety Program for Mechanically Ventilated Patients. It also includes detailed definitions for the measures.

Daily Care Process Measures

It is important to track progress and to share information on your implementation of the daily care process measures with your frontline staff and other shareholders. Pick the intervention you want to track and review the analyses below. Use the descriptions of the analyses to help you decide which are the most important to your site. Data collection tools in this toolkit that utilize these formulas include the Daily Care Processes Data Collection Tool and the Daily Early Mobility Data Collection Tool. The formulas below will help you with your analysis of the data you have collected for the following interventions:

- Subglottic secretion drainage endotracheal tubes (SSD-ETT),
- Elevation of the head of the bed (HOB),
- Spontaneous awakening trials (SAT),
- Spontaneous breathing trials (SBT),
- Sedation assessment for RASS or SAS, and
- Delirium assessment for ICDSC, CAM-ICU, or ASE.

Using SSD-ETT

1. Only patients that were intubated for more than 3 days (or >72 hours) are included in the calculations of SSD-ETT compliance rate and SSD-ETT contraindication rate.
2. The first SSD-ETT value of a patient is defined as the first SSD-ETT record after the patient has been intubated for 72 hours.

Table 1. SSD-ETT Definitions

RATE	FACTOR	DETAILED DESCRIPTION
SSD-ETT Compliance Rate	Numerator	Total number of patients with first SSD-ETT value being "Y" (Yes)
	Denominator	Total number of patients with first SSD-ETT value being "Y" (Yes) or "N" (No) *Note*: the number of patients with first SSD-ETT value being "C" (Contraindication) is not included here
	Example	In a given time period, say a unit has 25 patients with first SSD-ETT value being "Y" and 75 patients with "N" SSD-ETT Compliance Rate = (Y) / (Y + N) Calculation: (25 / [25+75]) * 100% = 25% *Read as follows*: In the given time period, the SSD-ETT compliance rate was 25 percent
	Target	High SSD-ETT compliance rate
SSD-ETT Contraindication Rate	Numerator	Total number of patients with first SSD-ETT value being "C" (Contraindication)
	Denominator	Total number of patients with first SSD-ETT value being "Y" (Yes), "N" (No) or "C" (Contraindication)
	Example	In a given time period, say a unit has 2 patients with first SSD-ETT values being "C", 20 patients with "Y," and 28 patients with "N" SSD-ETT Contraindication Rate = (C) / (C + Y + N) Calculation: (2 / [2+20+28]) * 100% = 4% *Read as follows*: In the given time period, the SSD-ETT contraindication rate was 4 percent
	Target	Accurate documentation of SSD-ETT contraindications
SSD-ETT Distribution of Contraindications	Numerator	Total number of patients with first SSD-ETT value being "C" (Contraindication) AND with contraindication being "(0) Other"
	Numerator	Total number of patients with first SSD-ETT value being "C" (Contraindication) AND with contraindication being "(1) Tracheostomy"
	Denominator	Total number of patients with first SSD-ETT value being "C" (Contraindication)

RATE	FACTOR	DETAILED DESCRIPTION
SSD-ETT Distribution of Contraindications (cont)	Example	In a given time period, say a unit has 5 patient-days with first SSD-ETT value being "C," where— • 2 are "(0) Other" contraindications and • 3 are "(1) Tracheostomy" contraindications Distribution of Contraindication Calculation: 0) (2/5) * 100% = 40% 1) (3/5) * 100% = 60% *Read as follows:* In the given time period, 40 percent of contraindications were "(0) Other," 60 percent were "(1) Tracheostomy"
	Target	Accurate documentation of SSD-ETT contraindications
	Numerator	Total number of patients with first SSD-ETT value being "N" (No) AND with location of intubation as— 1) Another ICU/unit in your hospital 2) Outside hospital 3) OR 4) Rapid Response Team (RRT) 5) ED 6) Cardiovascular and Interventional Laboratory (CVDL) 7) During a code on the floor 8) Another location not listed above
	Denominator	Total number of patients with first SSD-ETT value being "N" (No)
	Example	In a given time period, say a unit has 10 patients with first SSD-ETT value being "N," where— • 5 were located in "(2) Outside hospital," • 3 were located in "(3) OR," and • 2 were located in "(8) Another location not listed above" Distribution of contraindication calculation: 0) (0/10) * 100% = 0% 1) (0/10) * 100% = 0% 2) (5/10) * 100% = 50% 3) (3/10) * 100% = 30% 4) (0/10) * 100% = 0% 5) (0/10) * 100% = 0% 6) (0/10) * 100% = 0% 7) (0/10) * 100% = 0% 8) (2/10) * 100% = 20% *Read as follows*: In the given time period, 50 percent of non-SSD-ETT placement locations were "(2) Outside hospital," 30 percent were "(3) OR," and 20 percent were "(8) Another location not listed above"

RATE	FACTOR	DETAILED DESCRIPTION
SSD-ETT Distribution of Contraindications (cont)	Example	In a given time period, say a unit has 10 patients with first SSD-ETT value being "N," where— • 5 were located in "(2) Outside hospital," • 3 were located in "(3) OR," and • 2 were located in "(8) Another location not listed above" Distribution of contraindication calculation: 9) (0/10) * 100% = 0% 10) (0/10) * 100% = 0% 11) (5/10) * 100% = 50% 12) (3/10) * 100% = 30% 13) (0/10) * 100% = 0% 14) (0/10) * 100% = 0% 15) (0/10) * 100% = 0% 16) (0/10) * 100% = 0% 17) (2/10) * 100% = 20% *Read as follows*: In the given time period, 50 percent of non-SSD-ETT placement locations were "(2) Outside hospital," 30 percent were "(3) OR," and 20 percent were "(8) Another location not listed above"
	Target	Accurate documentation of SSD-ETT locations

Elevating HOB ≥ 30°

Table 2. HOB Definitions

RATE	FACTOR	DETAILED DESCRIPTION
HOB Compliance Rate	Numerator	Total number of patient-days with HOB @ ≥30° being "Y" (Yes)
	Denominator	Total number of patient-days with HOB @ ≥30° being "Y" (Yes) or "N" (No) Note: the number of patient-days with HOB @ ≥30° being "C" (Contraindication) is not included here
	Example	In a given time period, say a unit has 10 patient-days with HOB @ ≥30° being "Y" and 20 patient-days with "N" HOB compliance rate = (Y) / (Y + N) Calculation: (10 / [10+20]) * 100% = 33.3% *Read as follows*: In the given time period, the HOB compliance rate was 33.3 percent
	Target	High HOB compliance rate
HOB Contraindication Rate	Numerator	Total number of patient-days with HOB @ ≥30° being "C" (Contraindication)
	Denominator	Total number of patient-days with HOB @ ≥30° being "Y" (Yes), "N" (No), or "C" (Contraindication)
	Example	In a given time period, say a unit has 5 patient-days with HOB @ ≥30° being "C", 20 patient-days with "Y" and 25 patient-days with "N" HOB contraindication rate = (C) / (C + Y + N) Calculation: (5 / [5+20+25]) * 100% = 10% *Read as follows*: In the given period, the HOB contraindication rate was 10%
	Target	Accurate documentation of HOB contraindications
HOB Distribution of Contraindications	Numerator	Total number of patient-days with contraindication being "0) Other"
	Numerator	Total number of patient-days with contraindication being "1) Hypotension"
	Numerator	Total number of patient-days with contraindication being "2) Unstable Physiological Status"

RATE	FACTOR	DETAILED DESCRIPTION
HOB Distribution of Contraindications (cont)	Numerator	Total number of patient-days with contraindication being "3) Low Cardiac Index"
	Numerator	Total number of patient-days with contraindication being "4) Cervical, thoracic, or lumbar surgery or instability"
	Numerator	Total number of patient-days with contraindication being "5) LVAD"
	Numerator	Total number of patient-days with contraindication being "6) RVAD"
	Numerator	Total number of patient-days with contraindication being "7) Intra-aortic balloon pump"
	Numerator	Total number of patient-days with contraindication being "8) Open abdomen"
	Numerator	Total number of patient-days with contraindication being "9) Patient refusal"
	Denominator	Total number of patient-days with HOB @ ≥30° being "C" (Contraindication)
	Example	In a given time period, say a unit has 10 patient-days with HOB @ ≥30° being "C", where 2 are "(1) Hypotension" contraindications, 3 are "(4) Cervical, thoracic or lumbar surgery or instability" contraindications and 5 are "(9) Patient refusal" contraindications Distribution of contraindication calculation: 0) (0/10) * 100% = 0% 1) (2/10) * 100% = 20% 2) (0/10) * 100% = 0% 3) (0/10) * 100% = 0% 4) (3/10) * 100% = 30% 5) (0/10) * 100% = 0% 6) (0/10) * 100% = 0% 7) (0/10) * 100% = 0% 8) (0/10) * 100% = 0% 9) (5/10) * 100% = 50% *Read as follows*: In the given time period, 20 percent of contraindications were "(1) Hypotension", 30 percent were "(4) Cervical, thoracic or lumbar surgery or instability" and 50 percent were "(9) Patient refusal"
	Target	Accurate documentation of HOB contraindications

Spontaneous Awakening Trials (SAT)

Table 3. SAT Definitions

RATE	FACTOR	DETAILED DESCRIPTION
SAT Compliance Rate	Numerator	Total number of patient-days with SAT being "Y" (Yes)
	Denominator	Total number of patient-days with SAT being "Y" (Yes) or "N" (No) Note: the number of patient-days with SAT being "C" (Contraindication) is not included here
	Example	In a given time period, say a unit has 12 patient-days with SAT being "Y" and 18 patient-days with "N" SAT compliance rate = (Y) / (Y + N) Calculation: (12 / [12+18]) * 100% = 40% *Read as follows*: In the given time period, the SAT compliance rate was 40 percent
	Target	High SAT compliance rate
SAT Contraindication Rate	Numerator	Total number of patient-days with SAT being "C" (Contraindication)
	Denominator	Total number of patient-days with SAT being "Y" (Yes), "N" (No) or "C" (Contraindication)
	Example	In a given time period, say a unit has 2 patient-days with SAT being "C", 20 patient-days with "Y" and 28 patient-days with "N" SAT contraindication rate = (C) / (C + Y + N) Calculation: (2 / [2+20+28]) * 100% = 4% *Read as follows*: In the given time period, the SAT contraindication rate was 4 percent
	Target	Accurate documentation of SAT contraindications
SAT Distribution of Contraindications	Numerator	Total number of patient-days with contraindication being "(0) Other"
	Numerator	Total number of patient-days with contraindication being "(1) Patient is receiving sedatives for active seizures or has objective evidence of active alcohol withdrawal"
	Numerator	Total number of patient-days with contraindication being "(2) Patient is receiving escalating sedative doses due to ongoing agitation"

RATE	FACTOR	DETAILED DESCRIPTION
SAT Distribution of Contraindications (cont)	Numerator	Total number of patient-days with contraindication being "(3) Patient is receiving neuromuscular blockers"
	Numerator	Total number of patient-days with contraindication being "(4) Patient has had evidence of active myocardial ischemia in the previous 24 hours"
	Numerator	Total number of patient-days with contraindication being "(5) Patient has had evidence of increased intracranial pressure in the previous 24 hours"
	Numerator	Total number of patient-days with contraindication being "(6) Patient is on high-frequency oscillation ventilation"
	Denominator	Total number of patient-days with SAT being "C" (Contraindication)
	Example	In a given time period, say a unit has 5 patient-days with SAT being "C," where 2 are "(0) Other" contraindications and 3 are "(5) Patient has had evidence of increased intracranial pressure in the previous 24 hours" contraindications Distribution of contraindication calculation: 0) (2/5) * 100% = 40% 1) (0/5) * 100% = 0% 2) (0/5) * 100% = 0% 3) (0/5) * 100% = 0% 4) (0/5) * 100% = 0% 5) (3/5) * 100% = 60% 6) (0/5) * 100% = 0% *Read as follows*: In the given time period, 40 percent of contraindications were "(0) Other" and 60 percent were "(5) Patient has had evidence of increased intracranial pressure in the previous 24 hours"
	Target	Accurate documentation of SAT contraindications

RATE	FACTOR	DETAILED DESCRIPTION
SAT Percentage of Ventilated Patient Days Without Sedation	Numerator	Total number of patient-days with SAT being "NS" (Not Sedated)
	Denominator	Total number of patient-days with SAT being "Y" (Yes), "N" (No), or "NS" (Not Sedated) *Note*: the number of patient-days with SAT being "C" (Contraindication) is NOT included here
	Example	In a given time period, say a unit has 12 patient-days with SAT being "Y," 13 patient-days with "N," and 5 patient-days with "NS" SAT % of vent patient days w/o sedation = (NS) / (Y + N + NS) Calculation: (5 / [12+13+5]) * 100% = 17% *Read as follows*: In the given time period, the percentage of ventilated patient days without sedation was 17 percent
	Target	High percentage of ventilated patient-days without sedation for patient days suitable for this target

Spontaneous Breathing Trials (SBT)

Table 4. SBT Definitions

RATE	FACTOR	DETAILED DESCRIPTION
SBT Compliance Rate	Numerator	Total number of patient-days with SBT being "Y" (Yes)
	Denominator	Total number of patient-days with SBT being "Y" (Yes) or "N" (No) Note: number of patient-days with SBT being "C" (Contraindication) is not included here
	Example	In a given time period, say a unit has 8 patient-days with SBT being "Y" and 22 patient-days with "N" SBT Compliance Rate = (Y) / (Y + N) Calculation: (8 / [8+22]) * 100% = 27% *Read as follows:* In the given time period, the SBT compliance rate was 27 percent
	Target	High SBT compliance rate
SBT Contraindication Rate	Numerator	Total number of patient-days with SBT being "C" (Contraindication)
	Denominator	Total number of patient-days with SBT being "Y" (Yes), "N" (No) or "C" (Contraindication)
	Example	In a given time period, say a unit has 5 patient-days with SBT being "C," 20 patient-days with "Y," and 25 patient-days with "N" SBT contraindication rate = (C) / (C + Y + N) Calculation: (5 / [5+20+25]) * 100% = 10% *Read as follows*: In the given time period, the SBT contraindication rate was 10 percent
	Target	Accurate documentation of SBT contraindications

RATE	FACTOR	DETAILED DESCRIPTION
SBT Distribution of Contraindications	Numerator	Total number of patient-days with contraindication being "0) Other"
	Numerator	Total number of patient-days with contraindication being "(1) Doesn't have adequate oxygenation (SpO_2 < 88% on an FiO_2 of ≥ 50% and a positive end-expiratory pressure [PEEP] of ≥8 cm H_2O)"
	Numerator	Total number of patient-days with contraindication being "(2) No spontaneous inspiratory effort in a 5-minute period"
	Numerator	Total number of patient-days with contraindication being "(3) Acute agitation requiring escalating sedative doses"
	Numerator	Total number of patient-days with contraindication being "(4) Significant use of vasopressors or inotropes"
	Numerator	Total number of patient-days with contraindication being "(5) Patient has had evidence of increased intracranial pressure in the previous 24 hours"
	Denominator	Total number of patient-days with SBT being "C" (Contraindication)
	Target	Accurate documentation of SBT contraindications
SBT with Sedatives Off Compliance Rate	Numerator	Total number of patient-days with SBT with sedatives off being "Y" (Yes)
	Denominator	Total number of patient-days with SBT being "Y" (Yes)
	Example	In a given time period, say a unit has 10 patient-days with SBT being "Y" and 2 patient-days with SBT with sedatives off being "Y" Calculation: (2 / 10) * 100% = 20% *Read as follows*: In the given time period, the SBT with sedatives off compliance rate was 20 percent
	Target	High SBT with sedatives off compliance rate

Sedation Scale

Table 5. Sedation Scale Definitions

RATE	FACTOR	DETAILED DESCRIPTION
Sedation Scale Percentage of RASS/SAS Actual Being {-1, 0, 1} or {4, 5}	Numerator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" (Yes) and 1) RASS actual score of {-1 or 0 or 1} **OR** 2) SAS actual score of {4 or 5}
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" and a numeric RASS or SAS actual score is recorded
	Example	In a given time period, say a unit enters the following data: • 6 patient days with Intub/Trach & Mech Vent marked "Y", where o 4 have a SAS actual score of {4} and o 2 have a SAS actual score of {5} • 15 patient days with Intub/Trach & Mech Vent marked "Y" and with numeric RASS actual scores or SAS actual scores recorded Calculation: 6 / 15 = 40% *Read as follows:* In the given time period, out of all the patient days with Intub/Trach & Mech Vent marked "Y" and with numeric SAS actual scores recorded, 40% of the time SAS scores were within the range of {4 or 5}
	Target	High percentage of RASS/SAS actual being {-1, 0, 1} or {4, 5} for patient days suitable for this target

RATE	FACTOR	DETAILED DESCRIPTION
Sedation Scale Percentage of Achieving RASS/SAS Target	Numerator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" and 1) RASS actual score = RASS target score or RASS actual score is less than or equal to +1 and is greater than the RASS target score **OR** 2) SAS actual score = SAS target score or SAS actual score is less than or equal to 5 and is greater than the SAS target score
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" and 1) A numeric RASS target score and a numeric RASS actual score **OR** 2) A numeric SAS target score and a numeric SAS actual score
	Example	In a given time period, say a unit enters the following data: • 1 patient day with Intub/Trach & Mech Vent marked "Y" and a RASS actual score of {0} and a RASS target score of {-2}. 1 patient day with Intub/Trach & Mech Vent marked "Y" and a RASS actual score of {-2} and a RASS target score of {0} • 2 patient days with Intub/Trach & Mech Vent marked "Y" and numeric RASS actual scores and numeric RASS target scores were recorded Explanation: Since the RASS actual score of {0} is less than +1 and greater than the RASS target score it follows the correct guidelines for numerator Calculation: 1 / 2 = 50% *Read as follows*: In the given time period, 50% of the total patient days with Intub/Trach & Mech Vent marked "Y" were achieving the RASS/SAS target
	Target	High percentage of achieving RASS/SAS target

RATE	FACTOR	DETAILED DESCRIPTION
Sedation Scale: Anxious/Agitated (RASS actual = {+1, +2, +3, +4} or SAS Actual = {5, 6, 7})	Numerator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" and 1) RASS actual score of {+1 or +2 or +3 or +4} **OR** 2) SAS actual score of {5 or 6 or 7}
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" and a numeric RASS/SAS actual score is recorded
	Example	In a given time period, say a unit enters the following data: • 8 patient days with Intub/Trach & Mech Vent marked "Y," where— o 4 have a RASS actual score of {+2} and o 4 have a RASS actual score of {+3} • 16 patient days with Intub/Trach & Mech Vent marked "Y" and with numeric RASS/SAS actual scores recorded Percentage Calculation: 8 / 16 = 50% *Read as follows*: In the given time period, out of all of the patient days with Intub/Trach & Mech Vent marked "Y" and with numeric RASS/SAS actual scores recorded, 50% of the time patients were in an anxious or agitated state
	Target	Accurate documentation of sedation levels
Sedation Scale: Normal Wakefulness (RASS Actual = {0, -1} or SAS Actual = {4})	Numerator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" and 1) RASS actual score of {0 or -1} **OR** 2) SAS actual score of {4}
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" and a numeric RASS or SAS actual score is recorded
	Example	In a given time period, say a unit enters the following data: • 6 patient days with Intub/Trach & Mech Vent marked "Y," where o 4 have a RASS actual score of {0} and o 2 have a RASS actual score of {-1} • 20 patient days with Intub/Trach & Mech Vent marked "Y" and with numeric RASS/SAS actual scores recorded Percentage Calculation: 6 / 20 = 30% *Read as follows*: In the given time period, out of all of the patient days with Intub/Trach & Mech Vent marked "Y" and with numeric RASS/SAS actual scores recorded, 30% of the time patients were in a state of normal wakefulness.

RATE	FACTOR	DETAILED DESCRIPTION
Sedation Scale: Normal Wakefulness (RASS Actual = {0, -1} or SAS Actual = {4}) (cont)	Target	Accurate documentation of sedation levels

	Example	In a given time period, say a unit enters the following data:
		• 6 patient days with Intub/Trach & Mech Vent marked "Y," where
		  o 4 have a RASS actual score of {0} and
		  o 2 have a RASS actual score of {-1}
		• 20 patient days (total) with Intub/Trach & Mech Vent marked "Y" and with numeric RASS/SAS actual scores recorded
		Percentage calculation: 6 / 20 = 30%
		Read as follows: In the given time period, out of all of the patient days with Intub/Trach & Mech Vent marked "Y" and with numeric RASS/SAS actual scores recorded, 30% of the time patients were in a state of normal wakefulness

	Target	Accurate documentation of sedation levels
Sedation Scale: Light to Moderate Sedation (RASS Actual = {-2, -3} or SAS Actual = {3})	Numerator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" and 1) RASS actual score of {-2 or -3} **OR** 2) SAS actual score of {3}
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" and with a numeric RASS or SAS actual scores recorded
	Example	In a given time period, say a unit enters the following data: • 3 patient days with Intub/Trach & Mech Vent marked "Y" and each of the 3 patient days have a SAS actual score of {3} • 15 patient days with Intub/Trach & Mech Vent marked "Y" and a numeric RASS/SAS actual score is recorded Percentage calculation: 3 / 15 = 20% *Read as follows*: In the given time period, out of all of the patient days with Intub/Trach & Mech Vent marked "Y" and with numeric RASS/SAS actual scores recorded, 20% of the time patients were in a state of light to moderate sedation
	Target	Accurate documentation of sedation levels

RATE	FACTOR	DETAILED DESCRIPTION
Sedation Scale: Deep Sedation or Coma (RASS Actual = {-4, -5} or SAS Actual = {1, 2})	Numerator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" and 1) RASS actual score of {-4 or -5} **OR** 2) SAS actual score of {1 or 2}
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" and a numeric RASS or SAS actual score is recorded
	Example	In a given time period, say a unit enters the following data: • 4 patient days with Intub/Trach & Mech Vent marked "Y," where— o 3 have a RASS actual score of {- 4} and o 1 has a RASS actual score of {- 5} • 10 patient days with Intub/Trach & Mech Vent marked "Y" and with numeric RASS/SAS actual scores recorded Percentage calculation: 4 / 10 = 40% *Read as follows*: In the given time period, out of all of the patient days with Intub/Trach & Mech Vent marked "Y" and with numeric RASS/SAS actual scores recorded, 40% of the time patients were in a state of deep sedation or coma
	Target	Accurate documentation of sedation levels

Delirium Assessment

Table 6. Delirium Assessment Definitions

RATE	FACTOR	DETAILED DESCRIPTION
Delirium Assessment Utilization Rate	Numerator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" (Yes) and 1) Confusion Assessment Method for the ICU (CAM-ICU) is marked "P" (Positive) or "N" (Negative) **OR** 2) A numeric Intensive Care Delirium Screening Checklist (ICDSC) score is recorded **OR** 3) A numeric Attention Screening Exam (ASE) value is recorded
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" and 1) CAM-ICU is marked "P" or "N" or "X" (Not Completed) or "NK" (Not Known) **OR** 2) ICDSC is marked "P" or "N" or "X" or "NK" **OR** A numeric ASE value or ASE is marked "X" or "NK"
	Example	In a given time period, say a unit enters the following data: • 6 patient days with Intub/Trach & Mech Vent marked "Y," where— o 4 have CAM-ICU marked "P" and o 2 have CAM-ICU marked "N" • 15 patient days with Intub/Trach & Mech Vent marked "Y" and CAM-ICU is marked either "P" or "N" or "X" or "NK" Percentage Calculation: 6/15 = 40% *Read as follows*: In the given time period, out of all patient days with Intub/Trach & Mech Vent marked "Y," 40% of the time delirium assessment was utilized
	Target	High delirium assessment utilization rate

RATE	FACTOR	DETAILED DESCRIPTION
Delirium Percentage of Incorrectly Reporting CAM-ICU/ICDSC/ASE UTA	Numerator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" and 1) CAM-ICU, ICDSC, or ASE is marked "UTA" (Unable to Assess) **AND** 2) RASS is not {-4 or -5} or SAS is not {1 or 2}
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" and 1) CAM-ICU, ICDSC, or ASE is marked "UTA"
	Example	In a given time period, say a unit enters the following data: • Total of 4 patient days with Intub/Trach & Mech Vent marked "Y" and CAM-ICU is marked "UTA" where— o 2 have RASS actual scores of {-4} and o 2 have RASS actual scores of {+3} Percentage Calculation: 2 / 4 = 50% *Read as follows:* In the given time period, 50% of the CAM-ICU UTA data were incorrectly reported
	Target	Low percentage of incorrectly reporting CAM-ICU/ICDSC/ASE UTA
Delirium Percentage of CAM-ICU Negative, ICDSC <4 or ASE ≤2 (No Delirium)	Numerator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" and 1) CAM-ICU is marked "N" **OR** 2) ICDSC is less than 4 **OR** 3) ASE is less than or equal to 2
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" and 1) CAM-ICU is marked either "P" or "N" **OR** 2) A numeric ICDSC value is recorded **OR** 3) A numeric ASE value is recorded

RATE	FACTOR	DETAILED DESCRIPTION
Delirium Percentage of CAM-ICU Negative, ICDSC <4 or ASE ≤2 (No Delirium) (cont)	Example	In a given time period, say a unit enters the following data: • 8 patient days with Intub/Trach & Mech Vent marked "Y" and CAM-ICU is marked "N" • Total of 20 patient days with Intub/Trach & Mech Vent marked "Y" and CAM-ICU marked either "P" or "N" Percentage Calculation: 8 / 20 = 40% *Read as follows:* In the given time period, 40% of the patient days with Intub/Trach & Mech Vent marked "Y," had negative CAM-ICU results (i.e., no delirium)
	Target	High percentage of CAM-ICU negative, ICDSC less than 4, or ASE less than or equal to 2 (no delirium)

DAILY EARLY MOBILITY MEASURES

It is important to track progress and to share this information on your implementation of the Early Mobility Program with your frontline staff and other shareholders. Pick the aspect of early mobility you want to track, and review the analyses below. Use the descriptions of the analyses to help you decide which are the most important to your site. In the early mobility portion of this program, you can gather data for and track the progress of both mechanically ventilated patients and those patients who are not on mechanical ventilation. The formulas below will help you with your analysis of the data you have collected for the following interventions:

- Mobility – intubated patient days
- Distribution of highest level of mobility
- Distribution of perceived barriers
- Rates and distribution for adverse events which occur during the course of mobilization
- Utilization rates for physical and occupational therapists

The Daily Early Mobility Data Collection Tool utilizes these formulas. Some measures collected in this tool apply to both VAP Daily Care Process Measures and Daily Early Mobility Measures.

- **Sedation Scale** can be found on page 15
- **Delirium Assessment** can be found on page 20

Mobility – Intubated Patient Days

The following calculations are for patient days with Intub/Trach & Mech Vent marked "Y" (Yes).

Table 8. Mobility – Intubated Patient Days Definitions

RATE	FACTOR	DETAILED DESCRIPTION
Mobility Intubated: Percentage of Patients Days Mobilized Out of Bed	Numerator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" and with highest level of mobility marked (4 or 5 or 6 or 7)
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked "Y"

RATE	FACTOR	DETAILED DESCRIPTION
Mobility Intubated: Percentage of Patients Days Mobilized Out of Bed (cont)	Example	In a given time period, say a unit enters the following data: • For the range (4, 5, 6, or 7), there are 6 patient days with Intub/Trach & Mech Vent marked "Y," where— o 1 has a highest mobility of (4) o 1 has a highest mobility of (5) o 2 have a highest mobility of (6) o 2 have a highest mobility of (7) • 20 patient days with Intub/Trach & Mech Vent marked "Y" Percentage Calculation: 6 / 20 = 30% *Read as follows:* In the given time period, out of all patient days with Intub/Trach & Mech Vent marked "Y," 30% of the time, patients were mobilized out of bed
	Target	Accurate documentation of patient days mobilized out of bed
Mobility Intubated: Distribution of Highest Level of Mobility	Numerator	Total number of patient days with Highest Level of Mobility (X, where X is between 0 and 8)
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked "Y"
	Example	In a given time period, say a unit enters the following data: • A total of 10 patient days with Intub/Trach & Mech Vent marked "Y," where— o 3 have a highest mobility of (3), o 2 have a highest mobility of (5), and o 5 have a highest mobility of (7) Percentage Distribution: (0): 0/10 = 0% (3): 3/10 = 30% (6): 0/10 = 0% (1): 0/10 = 0% (4): 0/10 = 0% (7): 5/10 = 50% (2): 0/10 = 0% (5): 2/10 = 20% (8): 0/10 = 0% *Read as follows*: In the given time period, 30% of the patient days had a mobility level of (3), 20% of the patient days had a mobility level of (5), and 50% of the patient days had a mobility level of (7)
	Target	Accurate documentation of highest level of mobility
Mobility Intubated: Distribution of Perceived Barriers	Numerator	Total number of patient days with perceived barrier being (X, where X is between 0 and 15)
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked "Y"

RATE	FACTOR	DETAILED DESCRIPTION
Mobility Intubated: Distribution of Perceived Barriers (cont)	Example	In a given time period, say a unit enters the following data: • 10 patient days with Intub/Trach & Mech Vent marked "Y," where— o 3 have a perceived barrier of (1), o 3 have a perceived barrier of (8) and o 4 have a perceived barrier of (11) Percentage distribution: (0): 0/10 = 0% (1): 3/10 = 30% (6): 0/10 = 0% (11): 4/10 = 40% (2): 0/10 = 0% (7): 0/10 = 0% (12): 0/10 = 0% (3): 0/10 = 0% (8): 3/10 = 30% (13): 0/10 = 0% (4): 0/10 = 0% (9): 0/10 = 0% (14): 0/10 = 0% (5): 0/10 = 0% (10): 0/10 = 0% (15): 0/10 = 0% *Read as follows:* In the given time period, 30% of the patient days had a perceived barrier of (1), 30% of the patient days had a perceived barrier (8) and 40% of the patient days had a perceived barrier of (11)
	Target	Accurate documentation of perceived barriers to achieving higher levels of mobility
Mobility Intubated: PT Utilization Rate (patient-day level)	Numerator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" and with PT marked "Y"
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked "Y"
	Example	In a given time period, say a unit enters the following data: • 3 patient days with Intub/Trach & Mech Vent marked "Y" and PT marked "Y" • 4 patient days with Intub/Trach & Mech Vent marked "Y" Percentage calculation: 3 / 4 = 75% *Read as follows*: In the given time period, out of all patient days with Intub/Trach & Mech Vent marked "Y", 75% of the time PT was utilized
	Target	High physical therapy (PT) utilization rate

RATE	FACTOR	DETAILED DESCRIPTION
Mobility Intubated: OT Utilization Rate (patient-day level)	Numerator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" and with OT marked "Y"
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked "Y"
	Example	In a given time period, say a unit enters the following data: • 5 patient days with Intub/Trach & Mech Vent marked "Y" and OT marked "Y" • Total of 10 patient days with Intub/Trach & Mech Vent marked "Y" Percentage calculation: 5 / 10 = 50% *Read as follows*: In the given time period, out of all patient days with Intub/Trach & Mech Vent marked "Y", 50% of the time OT was utilized
	Target	High occupational therapy (OT) utilization rate
Mobility Intubated: PT or OT Utilization Rate (patient-day level)	Numerator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" and 1) PT marked "Y" **OR** 2) OT marked "Y"
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked "Y"
	Example	In a given time period, say a unit enters the following data: • Total of 4 patient days with Intub/Trach & Mech Vent marked "Y" have PT or OT being "Y", where— o 2 have PT marked "Y" and o 2 have OT marked "Y" • Total of 5 patient days with Intub/Trach & Mech Vent marked "Y" Percentage calculation: 4 / 5 = 80 % *Read as follows*: In the given time period, out of all patient days with Intub/Trach & Mech Vent marked "Y," 80% of the time PT or OT was utilized
	Target	High physical or occupational therapy (PT or OT) utilization rate

RATE	FACTOR	DETAILED DESCRIPTION
Mobility Intubated: Adverse Event Incidence Rate	Numerator	Total number of adverse events which occurred during mobilization (excluding category 0: None) on patient days with Intub/Trach & Mech Vent marked "Y"
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked "Y"
	Example	In a given time period, say a unit enters the following data: • Adverse events (4) and (7) occurred on patient days with Intub/Trach & Mech Vent marked "Y" • Total of 5 patient days with Intub/Trach & Mech Vent marked "Y" Incidence rate calculation: 2 / 5 = 0.4 *Read as follows*: In the given time period, the adverse event incidence rate was 0.4 per patient day
	Target	Low adverse event incidence rate
Mobility Intubated: Adverse Event Rate (patient-day level)	Numerator	Total number of patient days with Intub/Trach & Mech Vent marked "Y" on which any adverse event(s) (excluding category 0: None) which occurred during mobilization
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked "Y"
	Example	In a given time period, say a unit enters the following data: • 6 patient days with Intub/Trach & Mech Vent marked "Y" and any adverse event(s) occurred (excluding category 0: None) • 10 patient days with Intub/Trach & Mech Vent marked "Y" Percentage calculation: 6 / 10 = 60% *Read as follows*: In the given time period, 60% of the patient days with Intub/Trach & Mech Vent marked "Y" had at least one adverse event occur
	Target	Low adverse event rate

RATE	FACTOR	DETAILED DESCRIPTION
Mobility Intubated: Distribution of Adverse Events	Numerator	Total number of adverse events in each of the 25 categories which occurred during mobilization (excluding category 0: None)
	Denominator	Total number of adverse events where Intub/Trach & Mech Vent were marked "Y"
	Example	Display top 10 adverse events. If there are ties, rank the adverse event with a larger code higher, with the exception that category 25: Other. This category will always be ranked lowest if involved in ties. In a given time period, say a unit enters the following data: • 10 patient days with Intub/Trach & Mech Vent marked "Y", where— o 2 have adverse event (5) occur, o 3 have adverse event (9) occur, o 2 have adverse event (18) occur, and o 3 have adverse event (20) occur. Percentage distribution: (0): 0/10 = 0% (7): 0/10 = 0% (14): 0/10 = 0% (21): 0/10 = 0% (1): 0/10 = 0% (8): 0/10 = 0% (15): 0/10 = 0% (22): 0/10 = 0% (2): 0/10 = 0% (9): 3/10 = 30% (16): 0/10 = 0% (23): 0/10 = 0% (3): 0/10 = 0% (10): 0/10 = 0% (17): 0/10 = 0% (24): 0/10 = 0% (4): 0/10 = 0% (11): 0/10 = 0% (18): 2/10 = 20% (25): 0/10 = 0% (5): 2/10 = 20% (12): 0/10 = 0% (19): 0/10 = 0% (6): 0/10 = 0% (13): 0/10 = 0% (20): 3/10 = 30% *Read as follows*: In the given time period, 20% of the patient days had adverse event (5) occur, 30% of the patient days had adverse event (9) occur, 20% of the patient days had adverse event (18) occur and 30% of the patient days had adverse event (20) occur
	Target	Accurate documentation of adverse events

Mobility – Not Intubated Patient Days

The following calculations are for patient days with Intub/Trach & Mech Vent marked "N" (No) and data were collected. While this safety program is designed for the care of mechanically ventilated patients, gathering early mobility data for nonintubated patients can provide important information that can also be used to improve care for ventilated and nonventilated patients alike.

Table 9. Mobility – Not Intubated Patient Days

RATE	FACTOR	DETAILED DESCRIPTION
Mobility NOT intubated: Percentage of Patient Days Mobilized Out of Bed	Numerator	Total number of patient days with Intub/Trach & Mech Vent marked "N" and with highest level of mobility marked (4 or 5 or 6 or 7)
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked "N", and if patient is not intubated, was data collected marked "Y"
	Example	In a given time period, say a unit enters the following data: • For the range (4, 5, 6, or 7), there are 6 patient days with Intub/Trach & Mech Vent marked "N," where o 1 has a highest mobility of (4) o 1 has a highest mobility of (5) o 2 have a highest mobility of (6) o 2 have a highest mobility of (7) • Total of 20 patient days with Intub/Trach & Mech Vent marked "N" and with data collected Percentage Calculation: 6 / 20 = 30% *Read as follows:* In the given period, out of all patient days with Intub/Trach & Mech Vent marked "N" and with data, 30% of the time, patients were mobilized out of bed
	Target	High Percentage of patient days mobilized out of bed
Mobility NOT Intubated: Distribution of Highest Level of Mobility	Numerator	Total number of patient days with highest level of mobility being (X, where X is between 0 and 8)
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked "N", and If patient is not intubated, was data collected marked "Y"

RATE	FACTOR	DETAILED DESCRIPTION
Mobility NOT Intubated: Distribution of Highest Level of Mobility (cont)	Example	In a given time period, say a unit enters the following data: • 10 patient days with Intub/Trach & Mech Vent marked "N," where o 3 have a highest mobility of (3), o 2 have a highest mobility of (5), and o 5 have a highest mobility of (7) Percentage distribution: (0): 0/10 = 0% (3): 3/10 = 30% (6): 0/10 = 0% (1): 0/10 = 0% (4): 0/10 = 0% (7): 5/10 = 50% (2): 0/10 = 0% (5): 2/10 = 20% (8): 0/10 = 0% *Read as follows:* In the given time period, 30% of the patient days had a mobility level of (3), 20% of the patient days had a mobility level of (5) and 50% of the patient days had a mobility level of (7)
	Target	Accurate documentation of highest level of mobility
Mobility NOT Intubated: Distribution of Perceived Barriers	Numerator	Total number of patient days with perceived barrier being (X, where X is between 0 and 15)
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked N, and if patient is not intubated, was data collected marked "Y"
	Example	In a given time period, say a unit enters the following data: • 10 patient days with Intub/Trach & Mech Vent marked "N," where— o 3 have a perceived barrier of (1), o 3 have a perceived barrier of (8), and o 4 have a perceived barrier of (11) Percentage distribution: (0): 0/10 = 0% (5): 0/10 = 0% (10): 0/10 = 0% (1): 3/10 = 30% (6): 0/10 = 0% (11): 4/10 = 40% (2): 0/10 = 0% (7): 0/10 = 0% (12): 0/10 = 0% (3): 0/10 = 0% (8): 3/10 = 30% (13): 0/10 = 0% (4): 0/10 = 0% (9): 0/10 = 0% (14): 0/10 = 0% (15): 0/10 = 0% *Read as follows:* In the given time period, 30% of the patient days had a perceived barrier of (1), 30% of the patient days had a perceived barrier (8) and 40% of the patient days had a perceived barrier of (11)

RATE	FACTOR	DETAILED DESCRIPTION
Mobility NOT Intubated: Distribution of Perceived Barriers (cont)	Target	Accurate documentation of perceived barriers to achieving higher levels of mobility
Mobility NOT Intubated: PT Utilization Rate (patient-day level)	Numerator	Total number of patient days with Intub/Trach & Mech Vent marked "N" and with PT marked "Y"
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked N, and if patient is not intubated, was data collected marked "Y"
	Example	In a given time period, say a unit enters the following data: • 3 patient days with Intub/Trach & Mech Vent marked "N" and PT marked "Y" • Total of 4 patient days with Intub/Trach & Mech Vent marked "N" Percentage Calculation: 3 / 4 = 75% *Read as follows:* In the given time period, PT was utilized for 75% of the patient days with Intub/Trach & Mech Vent marked "N" and with data
	Target	High physical therapy (PT) utilization rate
Mobility NOT Intubated: OT Utilization Rate (patient-day level)	Numerator	Total number of patient days with Intub/Trach & Mech Vent marked "N" and with OT marked "Y"
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked N, and If patient is not intubated, was data collected marked "Y"

RATE	FACTOR	DETAILED DESCRIPTION
Mobility NOT Intubated: OT Utilization Rate (patient-day level) (cont)	Example	In a given time period, say a unit enters the following data: • 5 patient days with Intub/Trach & Mech Vent marked "N" and PT marked "Y" • Total of 10 patient days with Intub/Trach & Mech Vent marked "N", and data were collected Percentage calculation: 5 / 10 = 50% *Read as follows:* In the given time period, OT was utilized for 50% of the patient days with Intub/Trach & Mech Vent marked "N" and with data
	Target	High occupational therapy (OT) utilization rate
Mobility NOT Intubated: PT or OT Utilization Rate (patient-day level)	Numerator	Total number of patient days with Intub/Trach & Mech Vent marked "N" and 1) PT marked "Y" **OR** 2) OT marked "Y"
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked N, and If patient is not intubated, was data collected marked "Y"
	Example	In a given time period, say a unit enters the following data: • 4 patient days with Intub/Trach & Mech Vent marked "N", where— o 2 have PT marked "Y" and o 2 have OT marked "Y" • Total of 5 patient days with Intub/Trach & Mech Vent marked "N", and data were collected Percentage calculation: 4 / 5 = 80 % *Read as follows*: In the given time period, PT or OT was utilized for 80% of the patient days with Intub/Trach & Mech Vent marked "N" and with data
	Target	High physical or occupational therapy (PT or OT) utilization rate

RATE	FACTOR	DETAILED DESCRIPTION
Mobility NOT Intubated: Adverse Event Incidence Rate	Numerator	Total number of adverse events which occurred during mobilization (excluding category 0: None) on patient days with Intub/Trach & Mech Vent marked "N"
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked N, and if patient is not intubated, was data collected marked "Y"
	Example	In a given time period, say a unit enters the following data: • Adverse events (4) and (7) occurred on patient days with Intub/Trach & Mech Vent marked "N" • Total of 5 patient days with Intub/Trach & Mech Vent marked "N" Incidence rate calculation: 2 / 5 = 0.4 *Read as follows*: In the given time period, the adverse event incidence rate was 0.4 per patient day
	Target	Low adverse event incidence rate
Mobility NOT Intubated: Adverse Event Rate (patient-day level)	Numerator	Total number of patient days with Intub/Trach & Mech Vent marked "N" on which any adverse event(s) occurred during mobilization (excluding category 0: None)
	Denominator	Total number of patient days with Intub/Trach & Mech Vent marked N, and if patient is not intubated, was data collected marked "Y"
	Example	In a given time period, say a unit enters the following data: • 6 patient days with Intub/Trach & Mech Vent marked "N" and any adverse event(s) occurred (excluding category 0: None) • Total of 10 patient days with Intub/Trach & Mech Vent marked "N" Percentage calculation: 6 / 10 = 60% *Read as follows*: In the given time period, 60% of the patient days had at least one adverse event occur
	Target	Low adverse event rate
Mobility NOT Intubated: Distribution of Adverse Events	Numerator	Total number of adverse events which occurred during mobilization in each of the 25 categories (excluding category 0: None)
	Denominator	Total number of adverse events where Intub/Trach & Mech Vent were marked "N" and with data

RATE	FACTOR	DETAILED DESCRIPTION
Mobility NOT Intubated: Distribution of Adverse Events (cont)	Example	Display top 10 adverse events. If there are ties, rank the adverse event with a larger code higher, with the exception that category 25: Other will always be ranked lowest if involved in ties. In a given time period, say a unit enters the following data: • 10 patient days with Intub/Trach & Mech Vent marked "N", where— o 2 have adverse event (5) occur, o 3 have adverse event (9) occur, o 2 have adverse event (18) occur, and o 3 have adverse event (20) occur. Percentage Distribution: (0): 0/10 = 0% (7): 0/10 = 0% (14): 0/10 = 0% (21): 0/10 = 0% (1): 0/10 = 0% (8): 0/10 = 0% (15): 0/10 = 0% (22): 0/10 = 0% (2): 0/10 = 0% (9): 3/10 = 30% (16): 0/10 = 0% (23): 0/10 = 0% (3): 0/10 = 0% (10): 0/10 = 0% (17): 0/10 = 0% (24): 0/10 = 0% (4): 0/10 = 0% (11): 0/10 = 0% (18): 0/10 = 0% (25): 0/10 = 0% (5): 2/10 = 20% (12): 0/10 = 0% (19): 0/10 = 0% (6): 0/10 = 0% (13): 0/10 = 0% (20): 3/10 = 30% *Read as follows*: In the given time period, 20% of the patient days had adverse event (5) occur, 30% of the patient days had adverse event (9) occur, 20% of the patient days had adverse event (18) occur and 30% of the patient days had adverse event (20) occur
	Target	Accurate documentation of adverse events

LOW TIDAL VOLUME VENTILATION (LTVV)

It is important to track progress and to share information on your implementation of the Low Tidal Volume Ventilation Program with your frontline staff and other shareholders. Pick the aspect of low tidal volume ventilation you want to track and review the analyses below. Use the descriptions of the analyses to help you decide which are the most important to your site. The formulas below will help you with your analysis of the data you have collected for the following interventions:

- LTVV compliance rate overall
- LTVV compliance rate for patients with and without acute respiratory distress syndrome (ARDS)
- PEEP compliance rate for patients with and without ARDS

The Daily Low Tidal Volume Ventilation Data Collection Tool utilizes these formulas.

Tidal Volume

1. Predicted body weight (PBW) calculation:
   - Use inches: Male PBW = 50.0 + 2.3 * (height in inches - 60)
     Female PBW = 45.5 + 2.3 * (height in inches - 60)
   - Use cm: Male PBW= 50.0 + 0.91 * (height in cm - 152.4)
     Female PBW =45.5 + 0.91 * (height in cm - 152.4)
2. Tidal volume calculation:
   - Tidal volume (mL/kg of PBW) = tidal volume (mL) / PBW

Table 10. Low Tidal Volume Ventilation Definitions

RATE	FACTOR	DETAILED DESCRIPTION
Target LTVV Compliance Rate (≥4 and ≤8 mL/PBW) (All Patients)	Numerator	Total number of ventilator-days where Vent Mode is "1" or "2," patient has ARDS, and target tidal volume is ≥4 and ≤6 (mL/kg of PBW) **+** Total number of ventilator-days where Vent Mode is "1" or "2", patient does not have ARDS, and target tidal volume is ≥6 and ≤8 (mL/kg of PBW)
	Denominator	Total number of ventilator-days where Vent Mode is "1" or "2"

RATE	FACTOR	DETAILED DESCRIPTION
Target LTVV Compliance Rate (≥4 and ≤8 mL/PBW) (All Patients) (cont)	Example	In a given time period, say a unit has 30 ventilator-days with Vent Mode being "1" or "2," where 12 ventilator-days with target tidal volume ≥4 and ≤8 (mL/kg of PBW) Compliance rate calculation: (12 / 30) * 100% = 40% *Read as follows*: In the given time period, the target LTVV Compliance Rate (≥4 and ≤8 mL/kg of PBW) for all patients was 40 percent
	Target	High target LTVV compliance rate
Target LTVV Compliance Rate (≥4 and ≤6 mL/PBW (With ARDS)	Numerator	Total number of ventilator-days where Vent Mode is "1" or "2," patient has ARDS, and target tidal volume is ≥4 and ≤6 (mL/kg of PBW)
	Denominator	Total number of ventilator-days where Vent Mode is "1" or "2," and patient has ARDS
	Example	In a given time period, say a unit has 40 ventilator-days where Vent Mode is "1" or "2," and patient has ARDS, where 20 ventilator-days with target tidal volume ≥4 and ≤6 (mL/kg of PBW) Calculation: (20 / 40) * 100% = 50% *Read as follows*: In the given period, the target Low Tidal Volume Compliance Rate (≥4 and ≤6 mL/kg of PBW) for patients with ARDS was 50 percent
	Target	High target LTVV compliance rate
Target LTVV Compliance Rate (≥6 and ≤8mL/PBW) (Without ARDS)	Numerator	Total number of ventilator-days where Vent Mode is "1" or "2," patient does not have ARDS, and target tidal volume is ≥6 and ≤8 (mL/kg of PBW)
	Denominator	Total number of ventilator-days where Vent Mode is "1" or "2," patient does not have ARDS

RATE	FACTOR	DETAILED DESCRIPTION
Target LTVV Compliance Rate (≥6 and ≤8mL/PBW) (Without ARDS) (cont)	Example	In a given time period, say a unit has 45 ventilator-days where Vent Mode is "1" or "2," and patient does not have ARDS, where 15 ventilator-days with target tidal volume ≥6 and ≤8 (mL/kg of PBW) Calculation: (15 / 45) * 100% = 33.3% *Read as follows*: In the given period, the target Low Tidal Volume Compliance Rate (≥6 and ≤8 mL/kg of PBW) for patients without ARDS was 33.3 percent
	Target	High target LTVV compliance rate
Actual LTVV Compliance Rate (≥4 and ≤8 mL/PBW) (All Patients)	Numerator	Total number of ventilator-days where Vent Mode is "1" or "2," patient has ARDS, and tidal volume is ≥4 and ≤6 (mL/kg of PBW) **+** Total number of ventilator-days where Vent Mode is "1" or "2," patient does not have ARDS, and tidal volume is ≥6 and ≤8 (mL/kg of PBW)
	Denominator	Total number of ventilator-days where Vent Mode is "1" or "2"
	Example	In a given time period, say a unit has 30 ventilator-days with Vent Mode being "1" or "2," where 12 ventilator-days with tidal volume ≥4 and ≤8 (mL/kg of PBW) Compliance rate calculation: (12 / 30) * 100% = 40% *Read as follows:* In the given time period, the LTVV Compliance Rate (≥4 and ≤8 mL/kg of PBW) for all patients was 40 percent
	Target	High LTVV compliance rate
Actual Target LTVV Compliance Rate (≥4 and ≤6 mL/PBW) (With ARDS)	Numerator	Total number of ventilator-days where Vent Mode is "1" or "2", patient has ARDS, and tidal volume is ≥4 and ≤6 (mL/kg of PBW)
	Denominator	Total number of ventilator-days where Vent Mode is "1" or "2," and patient has ARDS

RATE	FACTOR	DETAILED DESCRIPTION
Actual Target LTVV Compliance Rate (≥4 and ≤6 mL/PBW) (With ARDS) (cont)	Example	In a given time period, say a unit has 40 ventilator-days where Vent Mode is "1" or "2," and patient has ARDS, where 20 ventilator-days with tidal volume ≥4 and ≤6 (mL/kg of PBW) Calculation: (20 / 40) * 100% = 50% *Read as follows*: In the given period, the Low Tidal Volume Compliance Rate (≥4 and ≤6 mL/kg of PBW) for patients with ARDS was 50 percent
	Target	High LTVV compliance rate
Actual LTVV Compliance Rate (≥6 and ≤8mL/PBW) (Without ARDS)	Numerator	Total number of ventilator-days where Vent Mode is "1" or "2," patient does not have ARDS, and tidal volume is ≥6 and ≤8 (mL/kg of PBW)
	Denominator	Total number of ventilator-days where Vent Mode is "1" or "2," patient has no ARDS
	Example	In a given time period, say a unit has 45 ventilator-days where Vent Mode is "1" or "2," and patient does not have ARDS, where 15 ventilator-days with tidal volume ≥6 and ≤8 (mL/kg of PBW) Calculation: (15 / 45) * 100% = 33.3% *Read as follows:* In the given period, the Low Tidal Volume Compliance Rate (≥6 and ≤8 mL/kg of PBW) for patients without ARDS was 33.3 percent
	Target	High LTVV compliance rate

Table 11. Positive End-Expiratory Pressure (PEEP) Definitions

RATE	FACTOR	DETAILED DESCRIPTION
PEEP Compliance Rate (≥5 cm H_2O) (All patients)	Numerator	Total number of ventilator-days where Vent Mode is "1" or "2," and PEEP ≥5 cm H_2O
	Denominator	Total number of ventilator-days where Vent Mode is "1" or "2"
	Example	In a given time period, say a unit has 10 ventilator-days where Vent Mode is "1" or "2", where 3 ventilator-days with PEEP ≥5 cm H_2O Calculation: (3 / 10) * 100% = 30% *Read as follows*: In the given time period, the PEEP Compliance Rate (≥5 cm H_2O) for all patients was 30 percent
	Target	High PEEP compliance rate

VAE MEASURES

Along with all the process measures above, it is important to let staff know how the work they are doing is effecting the bottom line – with all this work, are our VAE rates improving? The analyses for each of the tiers of the VAE analyses are explained below.

Note: All VAE measures are per 1,000 ventilator days

The following formulas for determining VAE rates can be used to complete the VAE Data Collection Tool.

Table 12. VAE Incidence Rate Definitions

RATE	FACTOR	DETAILED DESCRIPTION
VAE Incidence Rate	Numerator	Total number of VAC, IVAC, **and** PVAP events
	Denominator	Total number of ventilator days in the selected month
	Example	In a given month, say a unit enters 2 VAC, 1 IVAC, 1 PVAP, and 200 ventilator days VAE Rate = ([# of VAC events] + [# of IVAC events] + [# of PVAP events] / [Total vent days]) * 1,000 Calculation: ([2 + 1 + 1]/200) * 1,000 = (4/200) * 1000 = 20 VAE /1,000 vent days *Read as follows*: In the given month, there were 20 VAE per 1,000 ventilator days
	Target	Low VAE rate

Table 13. VAC Rate Definitions

RATE	FACTOR	DETAILED DESCRIPTION
VAC Rate	Numerator	Total number of VAC events
	Denominator	Total number of ventilator days in the selected month
	Example	In a given month, say a unit enters 3 VACs and 200 ventilator days VAC Rate = (# of VAC events / Total vent days) * 1,000 Calculation: (3/200) * 1000 = 15 VAC /1000 vent days *Read as follows*: In the given month, there were 15 VAC events per 1,000 ventilator days
	Target	Low VAC rate

Table 14. Total IVAC Rate Definitions*

RATE	FACTOR	DETAILED DESCRIPTION
Total IVAC Rate	Numerator	Total number of IVAC **and** PVAP events
	Denominator	Total number of ventilator days in the selected month
	Example	In a given month, say a unit enters 1 IVAC, 1 PVAP and 200 ventilator days Total IVAC Rate = ([# of IVAC events] + [# of PVAP] / [Total vent days]) * 1000 Calculation: ([1 + 1]/200) * 1,000 = (2/200) * 1,000 = 10 Total IVAC /1,000 vent days *Read as follows*: In the given month, there were 10 Total IVAC events per 1,000 ventilator days
	Target	Low total IVAC rate

(*note: Total IVAC Rate is the NHSN-reported IVAC rate)

Table 15. IVAC Rate Definitions

RATE	FACTOR	DETAILED DESCRIPTION
IVAC Rate	Numerator	Total number of IVAC events
	Denominator	Total number of ventilator days in the selected month
	Example	In a given month, say a unit enters 2 IVACs and 200 ventilator days IVAC Rate = (# of IVAC events / Total vent days) * 1,000 Calculation: (2 / 200) * 1,000 = 10 IVAC /1,000 vent days *Read as follows*: In the given month, there were 10 IVAC events per 1,000 ventilator days
	Target	Low IVAC rate

Table 16. PVAP Rate Definitions

RATE	FACTOR	DETAILED DESCRIPTION
PVAP Rate	Numerator	Total number of PVAP events
	Denominator	Total number of ventilator days in the selected month
	Example	In a given month, say a unit enters 1 PVAP and 200 ventilator days PVAP Rate = ([# of PVAP events] / [Total vent days]) * 1,000 Calculation: (1 / 200) * 1000 = 5 Total IVAC /1000 vent days *Read as follows*: In the given month, there were 5 total PVAP events per 1,000 ventilator days
	Target	Low PVAP rate

OBJECTIVE OUTCOME MEASURES

Collecting data for the Objective Outcome Measures will give you another way to assess the program's effect on mechanically ventilated patients in your unit. Again, it is important to let staff know how the work they are doing is effecting the bottom line – with all this work, are our patients' outcomes improving? There are several aspects you can explore:

- Average episodes of mechanical ventilation per patient
- Mortality rates
- Average duration of mechanical ventilation per episode
- Average duration of mechanical ventilation per patient
- Average length of hospital stay

Note: All Objective Outcome Measures apply only to mechanically ventilated patients housed within the unit.

Please refer to the Objective Outcomes Data Collection Tool for more detailed descriptions of the parameters.

Table 17. Average Episodes of Mechanical Ventilation per Patient Definitions

RATE	FACTOR	DETAILED DESCRIPTION
Average Number of Episodes per Patient	Numerator	Total number of episodes of mechanical ventilation
	Denominator	Total number of patients on mechanical ventilation
	Example	In a given time period, say the total number of episodes is 100, and the total number of patients on mechanical ventilation is 50 Average number of episodes per patient: 100 / 50 = 2 episodes per patient *Read as follows*: In the given time period, the average number of episodes was 2 per patient
	Target	Low average number of episodes per patient

Table 18. Mortality Rate Definitions

RATE	FACTOR	DETAILED DESCRIPTION
Mortality Rate	Numerator	Total number of deaths among patients on mechanical ventilation
	Denominator	Total number of patients on mechanical ventilation
	Example	In a given time period, say the total number of deaths among the mechanically ventilated patients is 2, and the total number of patients on mechanical ventilation is 50 Mortality rate: (2 / 50) * 100% = 4% *Read as follows*: In the given time period, the mortality rate was 4 percent
	Target	Low mortality rate

Table 19. Average Duration per Episode Definitions

RATE	FACTOR	DETAILED DESCRIPTION
Average Duration of Mechanical Ventilation per Episode	Numerator	Total number of ventilator days
	Denominator	Total number of episodes of mechanical ventilation
	Example	In a given time period, say the total number of ventilator days is 30, and the total number of episodes is 10 Average duration of mechanical ventilation per episode: 30 / 10 = 3 vent days per episode *Read as follows*: In the given time period, the average duration of mechanical ventilation was 3 days per episode
	Target	Low average duration of mechanical ventilation per episode

Table 20. Average Duration per Patient Definitions

RATE	FACTOR	DETAILED DESCRIPTION
Average Duration of Mechanical Ventilation Per Patient	Numerator	Total number of ventilator days
	Denominator	Total number of patients on mechanical ventilation
	Example	In a given time period, say the total number of ventilator days is 30, and the total number of patients on mechanical ventilation is 7 Average duration of mechanical ventilation per patient: 30 / 7 = 4 vent days per patient *Read as follows*: In the given time period, the average duration of mechanical ventilation was 4 days per patient
	Target	Low average duration of mechanical ventilation per patient

Table 21. Average Hospital Length of Stay per Patient Definitions

RATE	FACTOR	DETAILED DESCRIPTION
Average Hospital Length of Stay per Patient	Numerator	Total number of hospital days for patients on mechanical ventilation
	Denominator	Total number of patients on mechanical ventilation
	Example	In a given time period, say the total number of hospital days for patients on mechanical ventilation is 50 days, and the total number of patients on mechanical ventilation is 10 Average hospital length of stay: 50 / 10 = 5 days per patient *Read as follows*: In the given time period, the average hospital length of stay was 5 days per patient
	Target	Low average hospital length of stay per patient

Acronym Glossary

AC	Assist Control
CMV	Continuous Mandatory Ventilation
ASE	Attention Screening Exam
CAM-ICU	Confusion Assessment Method for the ICU
DVT	Deep Vein Thrombosis
EM	Early Mobility
ICDSC	Intensive Care Delirium Screening Checklist
ICU	Intensive Care Unit
LTVV	Low Tidal Volume Ventilation
MAP	Mean Arterial Pressure
NK	Not Known
NU	Not Used in This Unit
OT	Occupational Therapy/Therapist
PAD	Pain, Agitation, and Delirium
PRVC	Pressure Regulated Volume Controlled
PT	Physical Therapy/Therapist
PVC	Premature Ventricular Contractions
RASS	Richmond Agitation Sedation Scale
SAS	Riker Sedation-Agitation Scale
SIMV	Synchronized Intermittent Mandatory Ventilation
VS	Volume Support

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