

TBICU Guideline for Sedation Awakening Trial (SAT)/ Spontaneous Breathing Trial (SBT)

Purpose:

To safely wean and extubate critically ill patients using evidence-based spontaneous breathing trials in conjunction with sedation interruption. Ventilated patients should be weaned from mechanical support as quickly as possible once clinical and pulmonary readiness has been established. Prolonged mechanical ventilation increases mortality, length of stay, potential for infection, and costs to the patient and hospital. SAT and light level of sedation have shown to facilitate weaning from mechanical support and decrease duration of mechanical ventilation.

Definitions:

- **Sedation Awakening Trial (SAT)/Targeted Titration of Sedation (TTS) Process** is a daily process to wean the patient off continuous analgesia and sedation in preparation for SBT and extubation. Safety screen criteria must be met to proceed to SAT/TTS.
- **Spontaneous Breathing Trial (SBT) Process** is a daily process to wean the patient off the ventilator in preparation for extubation. Screen criteria must be met to proceed to the spontaneous breathing trial.
- **Vent Liberation** refers to removal from the vent by removal of the endotracheal tube (extubation) or to trach collar.

I. Sedation Awakening Trial (SAT)

- SAT is indicated for any patient on a mechanical ventilator and continuous IV analgesia and/or sedation
- **Ideally should be completed by night shift RN prior to 04:00*
- SAT is performed daily if no contraindications are identified (regardless of whether or not the patient meets criteria for spontaneous breathing trial (SBT) or extubation plans)
- SAT safety screen/SAT is contraindicated if:
 - Sedation is being used for active seizures, alcohol withdrawal, or in conjunction with neuromuscular blocking agents
 - If ICP or ventricular drain is present
 - If patient's RASS is +1 to +4 (very agitated or combative)
 - If there is documentation of myocardial ischemia in the past 24 hours
 - If patient is receiving comfort care
- If none of the above contraindications are present, the provider places an order for daily SAT screen/SAT
- RN documents SAT safety screen criteria daily
- **Criteria to pass SAT Screen**
 - No agitation (RASS < or = 1)
 - No active seizures
 - No drug/alcohol withdrawal
 - Not paralyzed
 - No Ventricular Drain/ICP Monitor
 - No TBI/Spinal Cord Injury

- No active Myocardial Ischemia
- If patient passes the SAT safety screen and RASS is NOT at the desired goal for SBT (0 to -1 or as ordered by provider), continuous infusions of sedation and/or analgesia should be decreased by ½ the current dose and RASS reassessed in 2-4 hours
 - The dose should be reduced by ½ until goal RASS is achieved while maintaining adequate analgesia
- **Patients pass the SAT if meet at least 3 of the following:**
 - Open eyes in response to verbal stimuli
 - Use eyes to follow object on request
 - Squeeze hand on request
 - Stick out tongue on request
 - Sedative interruption for at least 4 hours without exhibiting failure criteria
- **Patients fail the SAT if they develop:**
 - Sustained anxiety, agitation, or pain
 - Respiratory rate of 35 breaths per minute for ≥5 minutes
 - SpO2 < 88% for ≥5 minutes
 - Acute cardiac dysrhythmia
 - Two or more signs of respiratory distress (i.e., tachycardia, bradycardia, tachypnea)
 - Use of accessory muscles
 - Diaphoresis
 - Marked dyspnea
 - Myocardial ischemia
- Monitor RASS every 4 hours and as needed to maintain goal RASS
- Proceed with SBT readiness screen once RASS is 0 to -1 (or ordered goal RASS is met)

Documentation:

1. RN to document assessment findings and interventions in EMR
2. RN should document CPOT, RASS, and CAM-ICU scores in EMR

II. Daily SBT Readiness Assessment

**(To be completed daily by night shift RN between 04:00 – 04:30)*

1. **Verify SBT order is active in Cerner.**
2. **Assess patient for readiness to wean:**
 - Hemodynamically stable (≤ 1 vasopressor and no active titration of pressors)
 - No chemical paralysis
 - No ICP monitoring
 - No acute neurological event within 24 hrs
 - No active myocardial ischemia
 - Not on ECMO
 - Not on hypothermia protocol
 - Not chronically ventilator-dependent
 - Improvement or resolution of the condition requiring intubation
 - RASS goal achieved: **target RASS 0 to -1**
 1. RASS score should be documented by RN daily
 - Adequate cough/gag present with ability to handle secretions and manage airway
 - Patient triggered or spontaneous respirations
 - Vent criteria: FiO₂ $\leq$ 50%, PEEP $\leq$ 8 cm H₂O

- Vital signs criteria: RR 8–30 bpm, HR <130 bpm

If all criteria are met:

→ **Notify RT** and proceed to **Sedation Wean and SBT Preparation**

III. Sedation Wean & SBT Preparation

(To be completed by night shift RN between **04:30 – 05:00)*

1. **Initiate Sedation Holiday:**
 - Hold or reduce continuous sedation and analgesia
 - Ensure patient is arousable to voice or light touch
 - **Goal RASS: 0 to -1** before trial initiation
 - Monitor closely for agitation or distress
2. **Adjust ventilator to SBT settings:**
 - Mode: PSV
 - PS $\leq$ 8
 - PEEP $\leq$ 8 cm H₂O
 - FiO₂ $\leq$ 50%
3. **At initiation:**
 - RT remains at bedside for first 5–10 minutes to assess tolerance
 - Ensure restraints are secure and patient safety is maintained
4. **Trial duration:** minimum of 30 minutes

IV. SBT Monitoring Criteria

Patient must meet all criteria to continue:

- RSBI < 70
- SaO₂ $\geq$ 92%
- Tidal Volume > 3cc/kg predicted BW
- No signs of distress, agitation, or ventilator dys-synchrony

V. SBT Failure Criteria and Sedation Re-initiation

Terminate SBT and notify provider if any of the following occur:

- RR > 35 bpm
- HR > 140 or significant increase from baseline
- SaO₂ < 88%
- MAP < 60 or > 120 mmHg
- New arrhythmia
- Acute change in mental status
- Inability to maintain RASS 0 to -1 (or patient is combative/agitated)

If any of the above failure criteria are met:

- Return patient to original ventilator settings
- **Restart sedation and analgesia at $\leq$ 50% of original rate**
- Continue to monitor
- Reassess in $\geq$ 1 hour before reattempting SBT
- Notify RT if reattempting SBT

VI. Post-SBT Assessment

If patient tolerated SBT:

1. **Obtain ABG** (if requested)
2. **Evaluate extubation criteria:**
 - RR < 30
 - Tidal volume > 5 cc/kg
 - Minute ventilation < 12 L/min
 - Negative Inspiratory Force -20 to -80
 - Vital Capacity >15 cc/kg
 - SaO₂ >92% on ≤50% FiO₂
 - Secretions: moderate or less
 - Patient alert and/or able to protect airway
 - **Cuff leak present** (*only required for patients with cervical spinal cord injuries, esophageal injuries, s/p ACDF and/or PSIF, neck trauma, inhalation injuries, multiple reintubations)
3. **If all criteria met:** Notify TBICU fellow/attending.

VII. Extubation Process

1. Ensure provider, RT, and RN are at bedside
2. **Perform Cuff Leak Test (CLT) for patients meeting criteria (see Section VI.2.)**
 - Suction airway thoroughly
 - Switch to SIMV, Tidal volume 10 cc/kg predicted BW
 - Deflate cuff and observe 5 respiratory cycles
 - CLT is adequate if ≥20% drop from VT_i to VT_e
3. **If all criteria met:**
 - Extubate
 - Provide extubation education to patient
4. **If unable to extubate:**
 - Resume prior settings
 - Continue sedation at adjusted dose
 - Monitor for next SBT window

References:

1. Morandi A, Brummel NE, Ely EW. Sedation, delirium and mechanical ventilation: the “ABCDE” approach. *Curr Opin Crit Care*. 2011;17:43-49.
2. Kress J, Pohlman A, O’Connor M, et al. Daily interruption of sedative infusions in critically ill patients undergoing mechanical ventilation. *N Engl J Med*. 2000;342:1471-7.
3. Girard TD, Kress JP, Fuchs BD, et al. Efficacy and safety of a paired sedation and ventilator weaning protocol for mechanically ventilated patients in intensive care (Awakening and Breathing Controlled trial): a randomized controlled trial. *Lancet*. 2008;371:126-34.