Nurse-Driven Sedation Liberation Protocol to Reduce Mechanical Ventilation Duration

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PURPOSE

The purpose of this evidence-based practice project was to promote the use of a revised evidence-based, nurse-driven, sedation reduction protocol for critically ill adult patients on mechanical ventilation (MV) for more than 48 hours to reduce MV times within Abbott Northwestern Hospital intensive care units (ICU).
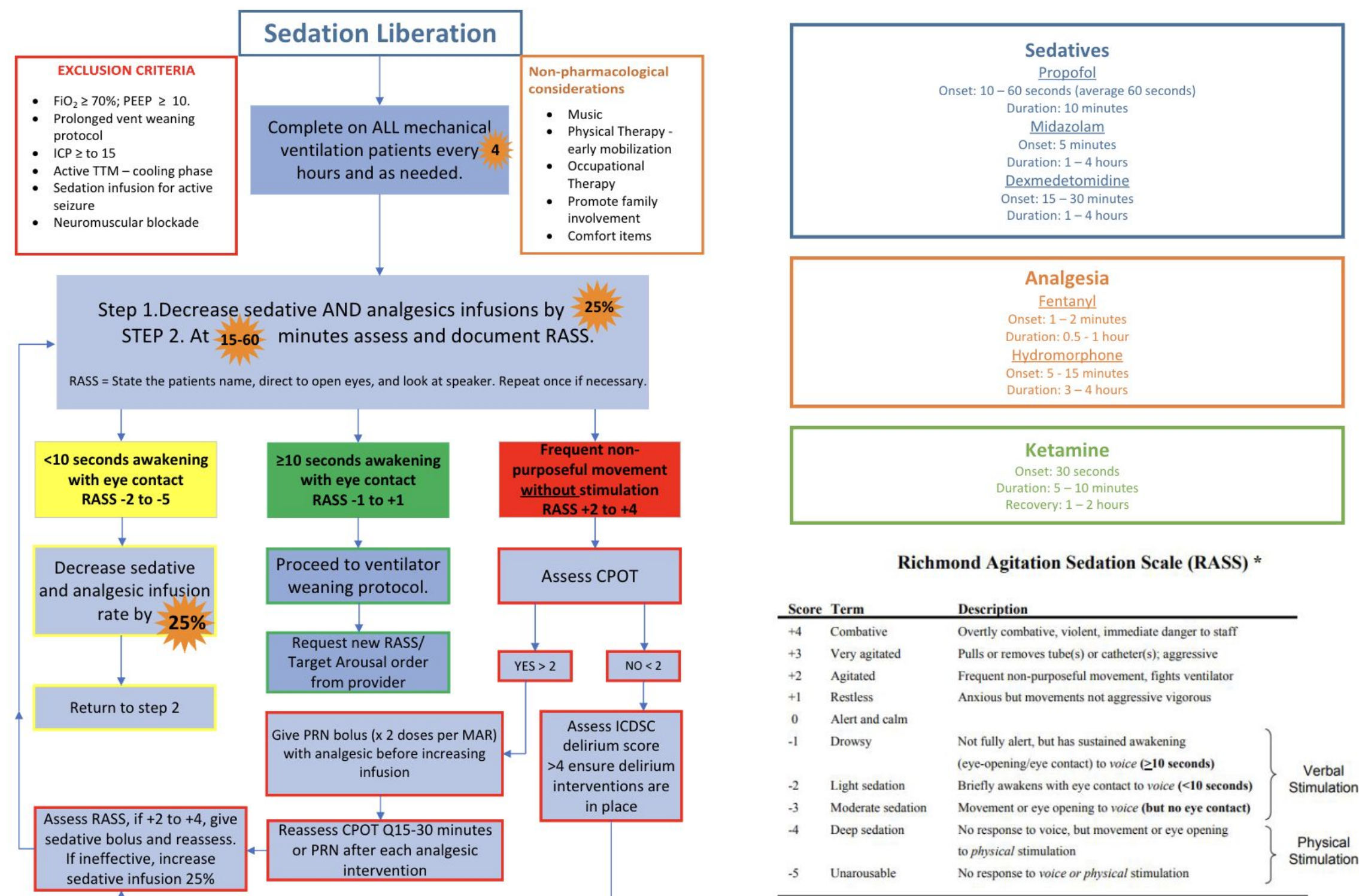
SYNTHESIS OF EVIDENCE

- Five million patients are admitted to an ICU annually and 20-40% of those admissions require MV and sedation/analgesia infusions[1,13].
- There is a large variability among hospitals, providers, and nursing regarding sedation management[5,12].
- Between 32-57% of ICU patients are over sedated[2].
- The release of the pain, agitation, delirium, immobility, and sleep (PADIS) clinical practice guidelines and the ICU liberation bundle have led to a renewed focus on protocolized titration[13].
- PADIS Guidelines emphasize targeting light sedation (Richmond Agitation-Sedation Scale (RASS) -1 to +1)[6].
- Prudent management of medications leads to more patients within target arousal levels and reduces MV time[12].
- Analgesia-first strategies decreases delirium and agitation[5,11,12].
- Bolus dosing vs. continuous infusions decreases delirium and overall ICU stay[4,14].
- Nurse-led protocols with clearly defined parameters improved pain agitation and delirium management[4,14].

PRACTICE CHANGE

- ANW has nurse-driven sedation protocols that utilize pain and arousal scales to guide sedation reduction but gives limited guidance.
- Main focus was to bring the sedation scale to the forefront of nursing practice and reiterate how to perform and document correctly.
- Using RASS correctly will limit variability between nurses, leading to appropriate sedation weaning and impacting secondary infection rates, delirium and ultimately morbidity and mortality.

IMPLEMENTATION STRATEGIES

Create Awareness & Interest
- Sedation liberation buttons
- Revised protocol posters

Build Knowledge & Commitments
- Weekly Sedation Liberation Newsletter
- Badge buddies
- Interactive discussion

Promote Action & Adoption
- In-person education regarding revised protocol components
- Virtual education
- Step by step instructions on EPIC charting

Pursue Integration & Sustained Use
- Annual skills labs
- Virtual annual education
- Compliance audits to ensuring nursing adherence

Adapted from Cullens, Hanrahan, Edmonds, et al., 2022

Sedation Liberation flow diagram

EXCLUSION CRITERIA
- FiO$_2$ ≥ 70%; PEEP ≥ 10.
- Prolonged vent weaning protocol
- ICP ≥ 15
- Active TTM – cooling phase
- Sedation infusion for active seizure
- Neuromuscular blockade

Complete on ALL mechanical ventilation patients every **4** hours and as needed.

Non-pharmacological considerations
- Music
- Physical Therapy - early mobilization
- Occupational Therapy
- Promote family involvement
- Comfort items

Step 1.Decrease sedative AND analgesics infusions by **25%**
STEP 2. At **15-60** minutes assess and document RASS.

RASS = State the patients name, direct to open eyes, and look at speaker. Repeat once if necessary.

- <10 seconds awakening with eye contact RASS -2 to -5
  - Decrease sedative and analgesic infusion rate by **25%**
  - Return to step 2
- ≥10 seconds awakening with eye contact RASS -1 to +1
  - Proceed to ventilator weaning protocol.
  - Request new RASS/ Target Arousal order from provider
- Frequent non-purposeful movement without stimulation RASS +2 to +4
  - Assess CPOT
  - YES > 2 / NO < 2
  - Give PRN bolus (x 2 doses per MAR) with analgesic before increasing infusion
  - Assess ICDSC delirium score >4 ensure delirium interventions are in place
  - Assess RASS, if +2 to +4, give sedative bolus and reassess. If ineffective, increase sedative infusion 25%
  - Reassess CPOT Q15-30 minutes or PRN after each analgesic intervention

Sedatives
Propofol
Onset: 10 – 60 seconds (average 60 seconds)
Duration: 10 minutes
Midazolam
Onset: 5 minutes
Duration: 1 – 4 hours
Dexmedetomidine
Onset: 15 – 30 minutes
Duration: 1 – 4 hours

Analgesia
Fentanyl
Onset: 1 – 2 minutes
Duration: 0.5 - 1 hour
Hydromorphone
Onset: 5 - 15 minutes
Duration: 3 – 4 hours

Ketamine
Onset: 30 seconds
Duration: 5 – 10 minutes
Recovery: 1 – 2 hours

Richmond Agitation Sedation Scale (RASS) *

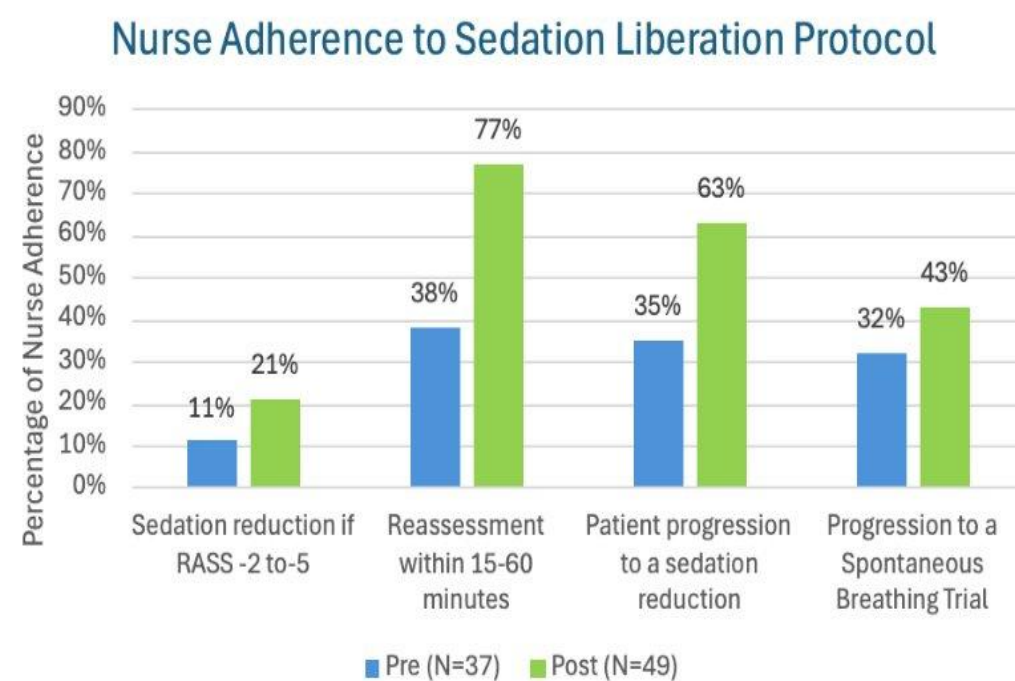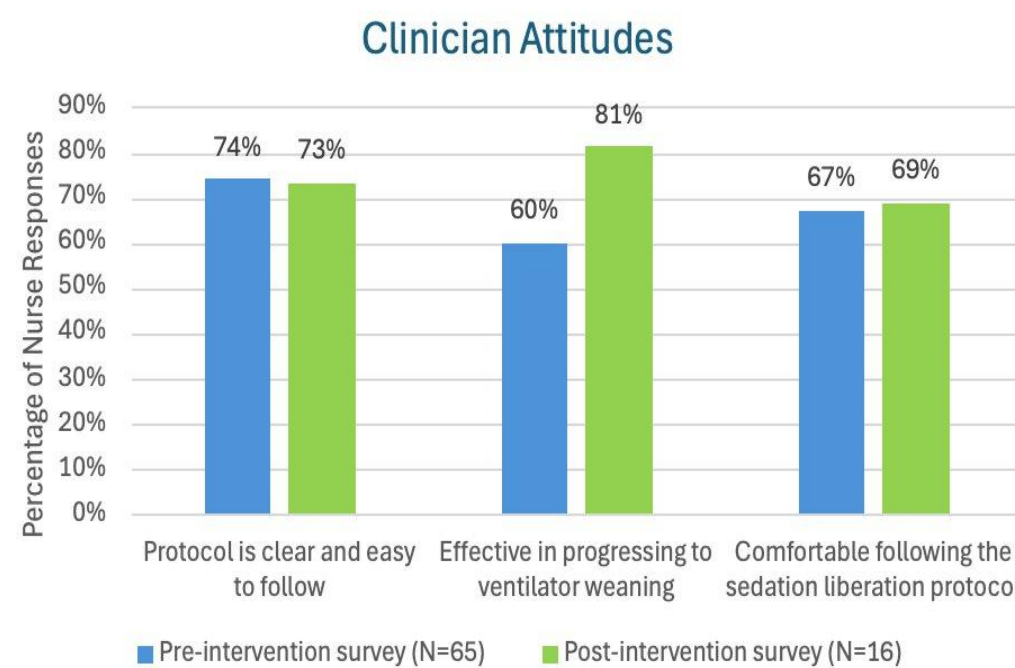| Score	Term	Description	
+4	Combative	Overtly combative, violent, immediate danger to staff	
+3	Very agitated	Pulls or removes tube(s) or catheter(s); aggressive	
+2	Agitated	Frequent non-purposeful movement, fights ventilator	
+1	Restless	Anxious but movements not aggressive vigorous	
0	Alert and calm		
-1	Drowsy	Not fully alert, but has sustained awakening (eye-opening/eye contact) to *voice* (≥10 seconds)	Verbal Stimulation
-2	Light sedation	Briefly awakens with eye contact to *voice* (<10 seconds)	
-3	Moderate sedation	Movement or eye opening to *voice* (but no eye contact)	
-4	Deep sedation	No response to *voice*, but movement or eye opening to *physical* stimulation	Physical Stimulation
-5	Unarousable	No response to *voice or physical* stimulation	

APPLICATION TO PRACTICE

- Focus on CPOT and RASS assessment and subsequent pain treatment.
  - Two bolus doses within 60 minutes to meet prescribed RASS goal followed by delirium assessment if persistent elevated RASS scores.
  - Bolus dosing, compared to continuous sedative infusion, reduces incidences of delirium and length of ICU stay[9].
- Change from 50% to 25% sedation and analgesia reduction facilitate smoother MV weaning.
  - Focus on pharmacologic half life to guide reduction of medications.
- Education and resources on cultural changes increases nursing knowledge and sustainability, with nurses providing positive feedback on the protocol[7].
- Empower nurses with effective pharmacologic and behavioral management strategies improves adherence and health outcomes[6].
- Engage champions who will interact and support nursing staff.

EVALUATION

- No difference in adherence to target RASS scores pre/post intervention (49% vs. 47%).
- Nursing adherence to sedation liberation protocol increased.
- No reduction in total number of hours on ventilator (127 hours vs. 131 hours).

Clinician Attitudes

	Pre-intervention survey (N=65)	Post-intervention survey (N=16)
Protocol is clear and easy to follow	74%	73%
Effective in progressing to ventilator weaning	60%	81%
Comfortable following the sedation liberation protocol	67%	69%

Nurse Adherence to Sedation Liberation Protocol

	Pre (N=37)	Post (N=49)
Sedation reduction if RASS -2 to-5	11%	21%
Reassessment within 15-60 minutes	38%	77%
Patient progression to a sedation reduction	35%	63%
Progression to a Spontaneous Breathing Trial	32%	43%

REFERENCES