

## Medication Conservation Guidance for UVMCC – COVID-19 Response

[Critical Care Recommendations](#)

Pages 1-2

[Emergency Department Recommendations](#)

Pages 3-6

[Anesthesiology Recommendations](#)

Page 7

### Overall Considerations

**Objective:** Manage use and conserve, where possible, the use of medications anticipated to be in high demand due to COVID-19 (i.e. propofol).

**Note well:** *The recommendations in this guide are meant to serve as treatment guidelines for use at the UVM Medical Center. Other UVM Health Network facilities should consider adopting to the extent possible, based on local policies and practice standards. These guidelines should not replace a provider's professional medical advice based on clinical judgement.*

### Critical Care Recommendations

*\* Proposed patient population is adult critical care; exceptions should be made for pediatric critical care at the discretion of the PICU attending.\**

#### **Primary: Analgesia-first Sedation**

**Propofol\* PLUS Primary Adjuncts** (one or more)

##### **1. Opioids<sup>^</sup>**

- a. **Fentanyl** infusion (50-200mcg/hr) PLUS 50-100mcg q1hr IV PRN
- b. **Hydromorphone** infusion (0.5-2mg/hr) PLUS 0.25-1mg q1hr PRN

##### **2. Antipsychotics**

- a. **Quetiapine** 25-50mg via NGT q8hr (max: 400mg/day)  
Alternative: Olanzapine 10mg via NGT daily (max: 30mg/day)

- b. **Haloperidol** 2mg IV x1, escalate to 5mg if needed

*For breakthrough sedation, start with scheduled antipsychotic and up titrate antipsychotics*

\*Due to shortages, limit maximum propofol maintenance dose to 50mcg/kg/min. Higher doses may be utilized for up to 2 hours to allow for adjunct sedation to take effect.

<sup>^</sup> If concern for IV opioid shortage **or** high daily requirement: Start enteral opioid (i.e. oxycodone) to supplement IV opioid requirements. Transdermal patch is an alternative if enteral route not clinically indicated. Consult with pharmacy to determine the dose.



### Second Line Adjunct

Reserve for patient with sedation/ventilator synchrony requirements refractory to **propofol AND opioid infusion AND scheduled anti-psychotics.**

1. **Phenobarbital** 10mg/kg IV q24 hours  
Check level at 24 hours (goal: 15-20mcg/mL)
2. **Dexmedetomidine:** 0.1 to 1.2 mcg/kg/hr  
***Use is prioritized to Pediatric ICU only (due to limited reserves)***  
Restricted use in adult critical care requires attending intensivist approval
3. **Clonidine:** 0.2-0.4 mg PO q 8hrs  
Alternative to dexmedetomidine for adult patients
4. **Ketamine:** Start at 10-20mg/hr (approximately 0.15mg/kg/hr)  
*Dose adjustments are made by the provider*  
Benzodiazepines are not required to reduce psychomimetic-side effects if propofol or dexmedetomidine infusion is used concomitantly.  
Note: Clinicians will not be able titrate sedation to EEG/BIS if using ketamine



### Third Line Adjunct

Reserve for patient with sedation/ventilator synchrony requirements refractory to **propofol AND opioid infusion AND scheduled anti-psychotics AND a secondary adjunct**

1. **Benzodiazepines**
  - a. **Midazolam** 2 mg IV x1 and start 1-5mg/hr IV infusion
  - b. **Lorazepam** 2 mg IV x1 and start 1-5mg/hr IV infusion

### Dexmedetomidine Conservation

**Use of is prioritized to the Pediatric ICU due to limited reserves**

Reserve use for adult ICU patients who meet the following criteria:

1. Non-intubated patients with active agitation and/or delirium
2. Intubated patients with agitation and/or delirium as a bridge to extubation

*Reassess ongoing need for dexmedetomidine every 12 hours. Consider adding oral clonidine to decrease dexmedetomidine requirements.*

### Neuromuscular Blocking Agent (NMBA) Conservation

**Ensure deep sedation before starting neuromuscular blockade**

1. If NMBA is indicated, start with intermittent bolus regimen first before starting NMBA infusions
2. If NMBA infusion is required, consider lower doses and titrating to a Train-Of-Four (TOF) of 3-4.

## Emergency Department Recommendations

### General Principles:

- Use alternative routes to IV for medication administration when available (oral, intranasal, sublingual/buccal, rectal)
- Consider use of ultrasound-guided nerve blocks when able
- An analgesic-first, sedation-second approach should be utilized
- Indication specific recommendations are made below [rapid sequence intubation (RSI), post-intubation sedation, procedural sedation, etc]

### Rapid Sequence Intubation:

<u>First Line Sedation</u>			
Drug	Dose	ADE	Contraindications
Ketamine	1 - 2 mg/kg IV Onset: 30-45 sec Duration: 5-15 min	Hypertension Tachycardia Hypersalivation Emergence reactions Laryngospasm Increased intraocular pressure	Schizophrenia Elevated intraocular pressure
Etomidate	<b>0.3 mg/kg IV</b> Onset: 15-45 sec Duration: 5-10 min	Myoclonus Adrenal suppression	
<u>Second Line Sedation (Induction)</u>			
Fentanyl +	<b>1 - 2 mcg/kg IV</b> Onset: < 30 sec Duration: 30 – 60 min	Hypotension	
Midazolam	<b>0.2 mg/kg IV</b> <b>(usual dose 10 mg)</b> Onset: 60 – 90 sec Duration: 30 – 90 min		
Propofol	<b>1.5 - 2 mg/kg IV</b> Onset: 15 – 45 sec Duration: 5 – 10 min	Hypotension Bradycardia	Allergy to egg or soy based products (low risk)

<b>First Line Paralytics</b>			
Drug	Dose / Duration	ADE	Contraindications
Succinylcholine	1.5 mg/kg IV (total body weight) Onset: < 60 sec Duration: 5 – 10 min	Fasciculations Increased ICP	Malignant hyperthermia history Hemiparesis/paralysis > 72 h old Burns/trauma > 72 h old Neuromuscular disorders Risk of hyperkalemia (ESRD, rhabdo, crush injury etc.) Severe TBI/Elevated ICP Guillain-Barre
Rocuronium	1 - 1.2 mg/kg IV (ideal body weight)  Onset: < 60 sec Duration: 45 – 60 min		History of Hypersensitivity
<b>2nd Line Paralytic</b>			
Vecuronium	0.1 mg/kg IV Onset: 2-3 min Duration: 45-75 min		

### **Post-Intubation Sedation**

- An analgesia-first, sedation-second approach should be utilized
  - After high-dose rocuronium, a sedative (i.e. midazolam or ketamine bolus) is required while the patient is still paralyzed to avoid awareness during neuromuscular blockade
- Intermittent IV bolus sedation plus continuous infusions of opioids is ideal
  - Continuous infusions of sedatives may be considered in high nurse-to-patient ratios, difficult to sedate patients, and to reduce nursing exposure/PPE waste
  - Target a Richmond Agitation-Sedation Scale (RASS) of 0 to -1 (i.e. calm and alert to drowsy but easily awakened)
- Consider intermittent sedation in patients comatose or low GCS who are intubated only for airway protection
- ***Do not open/prime propofol or bring into patient room until sedation plan is decided***
  - Other sedatives (e.g. barbiturates, phenobarbital) or antipsychotics (e.g. quetiapine, olanzapine) may be considered for additional sedation or specific indications (i.e. status epilepticus, severe alcohol withdrawal) to conserve propofol

**Analgesia First**

Fentanyl IV Infusion 50-200mcg/hr  
 AND  
 Fentanyl IV 0.5 - 1 mcg/kg q30 - 60 min prn  
*(if unavailable or contraindicated)*  
 ↓  
 Hydromorphone IV Infusion 0.5-2mg/hr  
 AND  
 Hydromorphone IV 0.005 - 0.01 mg/kg q30 - 60 min prn  
*(if unavailable or contraindicated)*  
 ↓  
 Morphine IV 0.05 - 0.1 mg/kg q30 - 60 min prn  
 +/-  
 One of the above options +/- acetaminophen (PO/PR), gabapentin, low-dose ketamine infusion

**Sedation Second**

Ketamine IV 0.5 - 1 mg/kg q30 - 60 min prn  
*(if unavailable or contraindicated)*  
 OR  
 Midazolam IV 0.02 - 0.1 mg/kg q 30 - 60 min prn  
*(if unavailable or contraindicated)*  
 ↓  
 Propofol IV 5 - 50 mcg/kg/min continuous infusion  
 Lower maximum dose - maximize alternative analgesic/sedation methods, conserve supply

**Procedural Sedation (Adult)**

- Agent selection will depend on type of procedure, length (time) of procedure, patient comorbidities and medication allergies, hemodynamic stability, concomitant analgesics/sedation used, staff availability

<b><u>First Line Agents</u></b>			
Drug	Dose	ADE	Contraindications
Etomidate	Initial: 0.1 mg/kg IV Repeat: 0.05 mg/kg IV q5 min prn	Myoclonus Adrenal suppression	
Ketamine	Initial: 1 mg/kg IV  Repeat: 0.5 - 1 mg/kg IV q5-10 min prn  Initial IM: 4 - 5 mg/kg IM x 1 dose	Hypertension Tachycardia Hypersalivation Emergence reactions Apnea w/ rapid admin Laryngospasm Increased intraocular pressure	Schizophrenia Elevated intraocular pressure

<b>Second Line Agents</b>			
Fentanyl	Initial: 1 - 1.5 mcg/kg IV Duration: 30 - 60 min Repeat: 0.5 - 1.5 mcg/kg IV q5-10 min prn		History of Hypersensitivity
Midazolam	Initial: 1 - 2 mg IV Onset: 60 - 90 sec Duration: 30-60 min  Repeat: 1 - 2 mg IV q2-3 min prn until desired sedation achieved	Hypotension	
Propofol	Initial: 0.5 - 1 mg/kg IV  Repeat: 0.2 - 0.5 mg/kg IV prn	Hypotension Bradycardia Apnea	Allergy to egg or soy based products (low risk)

**Intranasal (IN) Sedation/Anxiolysis/Analgesia:**

*NOTE: Optimal IN volume is 0.2 - 0.3 ml per nostril with a maximum of 1 ml per nostril*

Drug	Dose	ADE	Contraindications
Fentanyl (Analgesia)	Initial: 1 – 2 mcg/kg IN Onset: 5 – 10 min		
Midazolam <b>5 mg/mL</b> (Anxiolysis, sedation)	Initial: 0.2 - 0.3 mg/kg IN Onset: ~5 min Duration: 20-30 min		
Ketamine <b>100 mg/mL</b> (Analgesia)	Initial: 0.5 - 1 mg/kg IN Onset: 5-10 min Repeat: 0.25 - 0.5 mg/kg IN q15 - 30 min		

## Anesthesiology Recommendations

1. At this point we are most concerned about supplies of **Dexmedetomidine** and **Propofol**
2. **Dexmedetomidine:** limit use to cases where there is significant benefit.
3. Continue to use **propofol** (20 mL vials) for induction of general anesthesia (GA) as you normally would.
4. Continue using **propofol** for MAC cases as needed.
  - a. Use 20 mL vials via syringe pump to reduce waste in priming lines.
  - b. Consider strategies to reduce propofol requirements during MAC (i.e. adding synergistic agents)
6. Limit TIVA or propofol “background” infusions to cases where there will be significant benefit. As above, use propofol 20 mL vials when possible.
7. A limited supply of propofol 50mL bottles will be maintained at the OR pharmacy/Pyxis Stations for certain circumstances:
  - a. Sedation for patients who will go to ICU intubated following OR; please try to prime the line with a propofol 20cc vial if possible before spiking a 50mL vial.
  - b. COVID+ and PUI patients who come to OR intubated and will remain on transport ventilator throughout case and for return to ICU (require TIVA due to transport vent use and will likely arrive with propofol on Alaris pump). Could use 20 mL bottles on syringe pump during case but would not discard primed Alaris pump tubing in order to do so.
  - c. We expect there may be other circumstances where it makes sense. Use your clinical judgement.

## Bronchodilator Recommendations

- Albuterol MDI therapy will be restricted to the following clinical situations:
  - o Patient has received a trial (at least 1 dose) of albuterol via nebulizer to ensure responsiveness to bronchodilator therapy.
  - o Continuation of prior to admission albuterol therapy regimen
  - o Pediatric patients