NURSE CLINICIAN FORUM

PROCEDURE

CATEGORY: System-Level Clinical
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SUBJECT: **SEDATION – MODERATE/DEEP**

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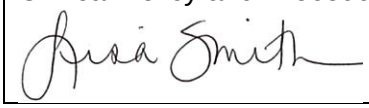
Approval: Lisa Smith, Executive Sponsor Clinical Policy and Procedure Committee 	**Date:** April 27, 2018

PURPOSE

To provide safe and effective moderate sedation and analgesia for patients during diagnostic and therapeutic procedures.

PROCEDURE

Equipment

- Crash cart
- Anesthetic cart (Endoscopy/Minor Procedures, OR, and NECC)
- Non-invasive blood pressure device
- Pulse oximeter
- Oxygen
- Suction
- Reversal medications
- **For deep sedation, use an $ETCO_2$ monitoring device (Canadian Anesthesia Standard)**

Special Instructions

- **This procedure does not apply to:**
  - Palliative Care Unit
  - Anesthesiologists providing patient care in the OR/PACU
  - Anesthesiologists providing patient care in remote anesthesia locations in the hospital that are equipped with an anesthesia cart and/or an anesthesia machine. Such locations include MRI, Radiation Bunker, Endoscopy/Minor Procedures, Birthing Centre, Critical Care Areas.

Moderate Sedation

- Medication for moderate sedation is administered by a physician or a Registered Nurse (RN) certified in this skill in the presence of a physician.
- All physicians must be familiar with sedation and be prepared to resuscitate.
- The RN/physician responsible for administering medication and monitoring the patient must be competent in administration techniques and able to monitor the patient and manage potential complications.
- The physician will be available on-site during the assessment, administration and monitoring phases of sedation, and throughout the procedure and recovery period.
- ACLS/PALS certified staff will be available on-site.
- The patient will be nursed 1:1 during the procedure.
- All patients will be scored for discharge readiness using the appropriate scoring tool:
    - PADSS **(Appendix A)**
    - Aldrete **(Appendix B)**
    - Modified Aldrete **(Appendix C)**
    - Pediatric Conscious Sedation Record **(Appendix D)**
- Sedation of children is different from the sedation of adults. Sedation in children is often administered to control behaviour to allow for the safe completion of a procedure.

Deep Sedation (with Propofol)

- Deep sedation can be performed by the following:
    - Anesthesiology (all areas of HSN)
    - Cardiologists (Critical Care areas)
    - Emergentologists (Emergency Department only)
    - Intensivists (Critical Care areas)
- Deep sedation will be performed by either two physicians/surgeons or one physician and a Registered Respiratory Therapist (RRT) or one physician and an RN to manage the patient's airway. The attending physician will ensure that the second physician or RRT, or RN is available.
- **Contraindicated in individuals with known hypersensitivity to peanuts, egg, egg components and/or soybean products.**
- The patient will be placed on a cardiac monitor.
- The patient will be nursed 1:1 during the procedure.
- ACLS/PALS certified staff will be available on-site.
- Once the procedure has been completed and the patient is fully awake (as evidenced by appropriate scoring) the patient no longer requires 1:1 nursing care. At this time, further diagnostic testing can be done as needed.

Method
PRE-PROCEDURE
Moderate Sedation
The RN/RPN will:

1. Complete the appropriate pre-operative assessment.
2. Inform the patient/substitute decision maker of restrictions related to driving and operating dangerous machinery, abstaining from making decisions requiring judgement, and abstaining from alcohol for 24 hours post-procedure.
3. Obtain the patient/substitute decision maker's signature to this effect on the appropriate form.
4. Confirm an adult/parent/guardian is available to accompany the patient after the procedure and at discharge.
5. Obtain baseline data, including blood pressure, pulse, respirations, oxygen saturation and general condition.

6. Obtain height and weight for calculation of drug dosages.
7. Confirm the time of last oral intake. For pediatric patients, confirm the patient has not had any intake (fluid or food) since midnight the day before with the following exceptions (**Appendix E**):
   A. May have breast milk up to 4 hours prior
   B. May have formula up to 6 hours prior
   C. May have a light meal (i.e. toast and clear liquids) up to 6 hours prior
   D. Routine necessary medications (i.e. anti-seizure medications) are to be taken with a sip of clear liquid or water on the day of the procedure
8. Document findings and share information with the physician.

Deep Sedation (with Propofol)
1. The physician will clearly indicate the type of sedation required in the space provided on the Request for Procedure.
2. The physician will ensure the availability of a second physician, RRT, or RN.
3. The RN will ensure an appropriate location for the procedure.
4. The physician will assess the patient using the appropriate form (i.e. Procedural Sedation Record, Anesthetic Record or Pediatric Conscious Sedation Record).
5. The RN/RPN will complete the pre-preparation checklist.

INTRA-PROCEDURE
Moderate Sedation
The RN/physician will:
1. Turn on monitor alarms and set at a volume high enough to be heard over ambient noise.
2. Document medications and dosage received by the patient.
3. Monitor the patient and document $ETCO_2$ levels (as indicated), blood pressure, pulse, respirations, oxygen saturation and level of consciousness at least every 3-5 minutes. The frequency of blood pressure monitoring may be adjusted to avoid disturbing the patient during crucial periods of the procedure. Document general condition and pain tolerance as appropriate.

The RN will:
1. Maintain IV access during the procedure (if appropriate). For pediatric patients being sedated with PO sedatives (i.e. chloral hydrate), assess the patient for IV access prior to sedation and have the equipment readily available should the need arise.
2. Monitor, assess and document vital signs (HR, RR, BP), level of consciousness and oxygen saturation (SaO_2) at least every 3-5 minutes.
3. Monitor the patient's sedation response to medication using the appropriate sedation scale.
4. Provide emotional support (i.e. touch, distraction, guided imagery, slow rhythmic breathing). Parent/guardian presence will be encouraged, whenever possible, as they can be the most effective in calming and reassuring a frightened child.
5. Observe for and report any changes to the physician, such as signs and symptoms related to over- or under-sedation, respiratory depression, allergic reaction, or hemodynamic disturbances.

Deep Sedation (with Propofol)
1. The physician will administer Propofol and perform related monitoring.
2. The physician/RRT/RN will be available to manage complications, from the beginning of sedation until the patient has adequately recovered from the effects of sedation.
3. The RN/physician will remain in the procedure room to assist the team and document the patient's vital signs on the appropriate form.

POST-PROCEDURE

The RN will:

1. Accompany the patient during transportation to the recovery area.
2. Confirm transfer of care is completed.
3. Recover the patient in a quiet area that has immediate access to emergency equipment and oxygen.
4. Assess vital signs, respiratory effort, level of consciousness and pulse oximetry at least every 3-5 minutes until the patient returns to pre-sedation levels of consciousness and stability.
5. Assess and document the patient's sedation score with vital signs using the appropriate scoring tool.
6. **Two nurses will be present on the unit at all times, one of which must be an RN.**
7. If a reversal agent was administered, sufficient time (up to 2 hours) as per physician orders should have elapsed after the last administration of reversal agents (i.e. naloxone, flumazenil). Ensure the patient does not become re-sedated after reversal effects have worn off.
8. The patient may eat and drink when fully awake, alert, and when protective reflexes (cough, gag) have returned to pre-sedation levels as per physician's orders.
9. Prior to discharge home:
   A. Confirm the appropriate discharge score has been met.
   B. Remove IV access (if applicable), assess the site and document findings.
   C. Assess the patient's gait according to baseline mobility.
   D. Reinforce pre-procedure teaching regarding driving and operation of dangerous equipment, making decisions requiring judgement and abstaining from alcohol for 24 hours post-procedure.
   E. Provide the patient or accompanying person with a copy of the form the patient signed before the procedure.
   F. Review all post-operative discharge instructions with the patient and his/her accompanying person.

DISCHARGE CRITERIA

All patients who receive moderate sedation will be discharged from the unit with accompaniment.

Adult Patients (over 18 years of age)

The patient must meet one of the following criteria to be discharged from the unit. Any patient not meeting these minimum standards will require extended observation:

- PADSS score of 8/10 with a required respiratory score of 2
- Aldrete score of greater than or equal to 9
- Modified Aldrete score of 10

Pediatric Patients (less than 18 years of age)

- Fully awake using the Pediatric Procedural Sedation Record
- Cardiovascular function and airway patency are satisfactory and stable
- The patient is easily rousable and protective reflexes are intact
- The patient can talk (if age/developmentally appropriate)
- For a very young or handicapped child incapable of the usually expected responses, the pre-sedation level of responsiveness, or a level as close as possible to the normal level for that child, should be achieved.
- Ability to sit up unaided (if age-appropriate) and maintain wakefulness
- Adequate hydration with management of any nausea or vomiting

Pediatric Exceptions

- 2 hours for infants less than 6.5 kg
- 4 hours for infants less than 4.5 kg
- 2 hours for infants 6-12 months corrected age
- 4 hours and overnight admission for expremature infants less than 50-52 weeks post-conceptional age

EDUCATION AND TRAINING

Definitions

1. Deep Sedation (with Propofol): Propofol is a phenol derivative that has been shown to provide effective procedural sedation and analgesia for emergent procedures. Propofol is highly lipophilic and crosses the blood-brain barrier rapidly. Propofol can induce deep sedation rapidly and must be given with careful attention to dosing and monitoring by a physician.
2. Extended Observation: Occurs immediately following the Phase 2 Recovery phase. The primary RN/RPN focuses on providing care to the peri-anesthesia patient who requires ongoing nursing care, observation or interventions after discharge from Phase 2 as the peri-anesthesia patient has yet to meet discharge criteria to home. Once the patient meets discharge criteria, the patient will be transferred to home or to another care environment. (NAPAN, 2014)
3. Moderate Sedation/Analgesia: Moderate sedation (formerly conscious sedation) "is a drug induced depression of consciousness during which patients respond purposefully to verbal commands, either alone or accompanied by tactile stimulation. No interventions are required to maintain a patient airway, and spontaneous ventilation is adequate. Cardiovascular System function is maintained." (NAPAN, 2014).
4. Phase 1 (General Anesthesia) Recovery: Occurs directly after the surgery/procedure and the administration of sedation/analgesia and anesthetic agents. This phase focuses on providing the patient with a safe transition from a totally anesthetized state (with general anesthesia) or with paresthesia (with regional anesthesia) to one requiring less acute interventions. (NAPAN, 2014)
5. Phase 2 (Moderate Sedation) Recovery: Occurs directly after Post Anesthesia Phase 1 Recovery. The peri-anesthesia patient's basic needs are met by the primary RN who continues to assess and monitor hemodynamics, respiratory and all physiological parameters. The patient is now at a level of consciousness where he/she can participate in his/her own body monitoring, reporting his/her needs and discomforts to the nurse. (NAPAN, 2014)
6. Post Anesthetic Discharge Scoring System (PADSS): Used to determine the patient's readiness for discharge home following ambulatory or day surgery and anesthesia based on findings in the categories of: vital signs (blood pressure, pulse, temperature), respiratory status, nausea and vomiting, pain and surgical bleeding. (NAPAN, 2014)
7. Staffing Patterns in Phase 2 Recovery: Two nurses, one of whom must be an RN, shall be present on the unit whenever a patient is present in this phase of recovery. "A maximum 1:5 nursing ratio may be implemented immediately for these patients (Phase 2), which will ensure that admissions to the area are not delayed." (NAPAN, 2014)

Education/Training Related Information
The RN/RPN must successfully complete the Sedation – Moderate/Deep corporate self-learning package and have knowledge of:

- Monitoring equipment required
- How to apply the monitoring equipment to the patient
- The drug's indications for usage
- Potential adverse effects of medication
- Use of reversal agents
- Appropriate action to be taken should an untoward reaction occur

References and Related Documents
Coté CJ, Wilson S, AMERICAN ACADEMY OF PEDIATRICS, AMERICAN ACADEMY OF PEDIATRIC DENTISTRY. Guidelines for Monitoring and Management of Pediatric Patients Before, During, and After Sedation for Diagnostic and Therapeutic Procedures: Update 2016. Pediatrics. 2016; 138(1):e20161212.

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Lexicomp.

National Association of PeriAnesthesia Nurses of Canada (NAPAN). Standards for Practice. Third Edition. 2014.

Operating Room Nurses Association of Canada (ORNAC) April 2013, The ORNAC Standards for Perioperative Registered Nursing Practice, 11th edition. Pages 150-157

APPENDIX A

Post-Anesthetic Discharge Scoring System (PADSS)
as used by Chung et al. 1995

Category	Description of Stats	Score
Vital Signs	Within 20% range of pre-op value	2
	20-40% range of pre-op value	1
	Less than 40% range of pre-op value	0
Ambulation	Steady gait/no dizziness	2
	Ambulates with assistance	1
	Not ambulating/dizziness	0
Respiratory	Deep breath and cough freely O_2 Sat greater than or equal to 94%	2
	Deep breath and cough limited O_2 Sat greater than or equal to 94% with nasal prongs (NP)	1
	Unable to deep breath and cough O_2 Sat less than 94% on 10 Lpm face mask	0
Nausea and Vomiting	Minimal, treated with PO medications	2
	Moderate, treated with parenteral medications	1
	Continues after repeated treatment	0
Pain	Acceptable to patient, PO medications	2
	Acceptable to patient, parenteral medications	1
	Pain not acceptable to patient/uncontrolled	0
Surgical Bleeding	Minimal, no dressing changes	2
	Moderate bleeding	1
	Severe bleeding	0

(NAPAN, 2014)

APPENDIX B

Aldrete Scoring Tool

Category	Description of Stats	Score
Respirations	Breathes deeply	2
	Dyspnea	1
	Apnea	0
Colour	Well perfused, mucous membrane appears pink	2
	Pale, mucous membrane pale	1
	Circumoro cyanosis, nailbed cyanosis	0
Circulation	BP +/- 20% pre-op value	2
	BP +/- 20-50% pre-op value	1
	BP +/- 50% pre-op value	0
LOC	Awake and oriented	2
	Wakens with stimulation	1
	Non-responsive	0
Movement	Moves four limbs spontaneously	2
	Moves two limbs spontaneously	1
	Moves zero limbs spontaneously	0

APPENDIX C

Modified Aldrete Scoring Tool

Category	Description of Stats	Score
Consciousness	Fully awake	2
	Rousable on calling	1
	Not responding	0
Circulation	BP +/- 20% baseline	2
	BP +/- 20-49% baseline	1
	BP +/- 50% baseline	0
Respiration	Breathes deeply, coughs freely	2
	Dyspneic or limited breathing	1
	Apneic	0
SpO_2	SpO_2 greater than 90% on room air	2
	SpO_2 greater than 90% with O_2	1
	SpO_2 less than 90% with O_2	0
Activity	Able to move four extremities	2
	Able to move two extremities	1
	Able to move zero extremities	0

APPENDIX D

Pediatric Conscious Sedation Record

Time	HR	RR	SpO_2	BP	Pain	Level of Consciousness
						❐ fully awake ❐ rousable ❐ unresponsive
						❐ fully awake ❐ rousable ❐ unresponsive
						❐ fully awake ❐ rousable ❐ unresponsive
						❐ fully awake ❐ rousable ❐ unresponsive
						❐ fully awake ❐ rousable ❐ unresponsive
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						❐ fully awake ❐ rousable ❐ unresponsive

APPENDIX E

Pediatric Procedural Sedation Medication Chart

Registered Nurses administering any of the medications pre-procedure must read the accompanying procedure. This chart is not applicable to anesthesiologists providing general anesthesia sedation.

Ketamine, lorazepam, midazolam and pentobarbital may affect EEG results. **USE CAUTION WHEN USING A COMBINATION OF ANY OF THE MEDICATIONS BELOW.**

Medication	Type of Procedure	Dosage	Onset/Duration	Additional Information
Chloral Hydrate Sedative/hypnotic ***primary efficacy in children less than 3 years of age**	Non-painful, therapeutic or diagnostic procedure (EEG, CT, MRI)	Hypnotic **PO/PR:** 50 mg/kg/dose **MAX:** 1 g/dose Sedation **PO/PR:** 80-100 mg/kg/dose (may repeat with 40 mg/kg 1 hr after initial dose if needed) **MAX:** 2 g/dose	20-45 min / 1-8 hrs	May cause paradoxical excitement, rash, urticaria, gastric irritation, nausea, vomiting, diarrhea, leucopenia, eosinophilia. Respiratory depression if combined with other sedatives or narcotics. **rarely may cause junctional rhythm**
Diphenhydramine (Benadryl) Antihistamine, hypnotic/anxiolytic, antiemetic	Pre-sedation, adjunct to sedation and/or for endoscopy. *Do not use in neonates or premature infants	**PO:** 1.25 mg/kg/dose **IV:** 1.25 mg/kg/dose **MAX:** 50 mg/dose	15-30 min / 4-6 hrs 5-10 min / 4-6 hrs	May cause dry mouth and throat, increased heart rate, pupil dilation, urinary retention, constipation, paradoxical excitement. At high doses, may cause hallucinations or delirium.
Ketamine NMDA receptor antagonist	For moderate sedation for diagnostic and minor therapeutic procedures or minor surgical procedures in which muscle relaxation is not required (lumbar puncture, sutures, chest tubes, central lines, wound debridement)	Pre-Procedural Anxiolysis **PO:** 2-5 mg/kg/dose **MAX:** 250 mg PO **IM:** 4 mg/kg/dose **IV:** 0.5-1.5 mg/kg/dose **MAX:** 100 mg IV/IM Anesthesiologists may use up to 5-7 mg/kg IM as a full anesthesia dose Emergency Procedures **IM:** 4 mg/kg/dose May repeat with half the dose in 10 minutes	20-45 min / 1-2 hrs 5-15 min / 30-90 min 1-5 min / 10-15 min	May cause emergence phenomenon, hypertension, tonic-clonic movements, elevated intracranial pressure, hallucinations, apnea with rapid infusion, increased secretions, laryngospasm. Consider Atropine to combat excessive secretions at 0.05 mg/kg IV (MAX dose 2 mg).

CATEGORY: System-Level Clinical
SUBJECT: **SEDATION - MODERATE/DEEP**

Medication	Type of Procedure	Dosage	Onset/Duration	Additional Information
Lorazepam (Ativan) Benzodiazepine (long acting)	Provides sedation, amnesia and anxiolysis. For painful procedures, consider use in combination with an analgesic agent (i.e. Ketamine).	**SL/PO:** 0.05 mg/kg/dose **IV:** 0.03-0.05 mg/kg/dose **MAX:** 4 mg/dose; 12 mg/12 hours or 0.3 mg/kg/12 hours *whichever is less*	30-60 min / 3-6 hrs 1-5 min / 3-4 hrs	May cause respiratory depression, apnea, dizziness, mild ataxia, mood change, rash, GI symptoms. Injectable product may be given rectally, although absorption may not be optimal.
Melatonin Neurohormone	Alternative for EEG and MRI sedation. Reduces pre-procedure anxiety and separation anxiety without affecting recovery time. Reduces post-procedure excitement.	Less than 20 kg **PO:** 3 mg x 1 dose Greater than or equal to 20 kg **PO:** 6 mg x 1 dose, with a further top up of 3 mg if ineffective within 30 minutes **MAX:** 9 mg per procedure	30 min / 3-6 hrs	May cause headaches, nausea, depression, nightmares and vivid dreams, irritability, abdominal cramps, dizziness.
Midazolam (Versed) Benzodiazepine (short acting)	Provides sedation, amnesia and anxiolysis. For painful procedures, consider use in combination with an analgesic agent (i.e. Ketamine).	Less than 20 kg **PO:** 0.5-0.75 mg/kg/dose Greater than or equal to 20 kg **PO:** 0.3-0.5 mg/kg/dose **MAX:** 20 mg PO **IV:** 0.05 mg/kg/dose. Dose may be repeated x1 PRN. **MAX**: 0.15 mg/kg IV	10-30 min / 1-2 hrs 1-3 min / 1-2 hrs	May cause respiratory depression, hypotension, bradycardia. Use lower doses in patients with respiratory compromise.
Pentobarbital (Nembutal) Barbiturate	Moderate sedation. May be used for MRI in children when Chloral Hydrate has failed in previous attempts.	Children greater than or equal to 8 years old **PO:** 2-4 mg/kg/dose Less than 15 kg **IM:** 6 mg/kg/dose Greater than or equal to 15 kg **IM:** 5 mg/kg/dose **IV:** 2.5mg/kg/dose over 1 minute. Wait 1 minute, then 1.25 mg/kg/dose over 30 seconds. Wait 1 minute, then repeat x1 dose. If required, give additional 1 mg/kg to a total dose of 4-6 mg/kg IV, titrated to effect. **MAX:** 200 mg/dose (all routes)	15-60 min / 2-4 hrs 5-15 min / 2-4 hrs 1-10 min / 1-4 hrs	***Special access drug.*** May cause drug-related isoelectric EEG. Hypotension, arrhythmias, hypothermia, respiratory depression, dependence.