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SECTION A
POLICY

1. The Procedural Sedation and Analgesia (PSA) policy and procedure establishes guidelines for the administration of intravenous (IV) procedural sedation/analgesia within Capital Health facilities.

2. This policy represents the minimal requirements for the provision of procedural sedation at Capital Health. Individual services or areas may establish additional safeguards or requirements. Refer to Section B - Emergency Department for additional requirements in the Emergency Departments of Capital Health.

3. Form CD2560MR (Procedural Sedation and Analgesia Assessment and Monitoring) is the approved documentation record for procedural sedation at Capital Health. Individual services or areas may develop additional documentation tools to be used in conjunction with form CD2560MR.

3.1. For sites or services using electronic documentation, all elements of form CD2560MR should be captured in the electronic record.

4. Intravenous PSA is administered to provide analgesia and sedation resulting in depression of the patient’s level of consciousness so as to facilitate the performance of a diagnostic, therapeutic or invasive procedure.

5. All patients who are undergoing diagnostic, therapeutic or invasive procedures and receiving sedation/analgesia prior to and during the procedure are to be assessed and monitored according to this policy.

6. Physicians with prescribing authority at Capital Health can order procedural sedation medications.

6.1. The physician has the ultimate responsibility for the safety and welfare of the patient undergoing procedural sedation.

6.2. All patients undergoing intravenous procedural sedation require a pre-procedural evaluation by a Qualified Practitioner to assess their risk and anticipate problems related to pre-existing medical conditions. A history and focused physical examination with particular emphasis on the detection of a difficult airway, review of current medications and allergies, as well as an assessment of cardiopulmonary status at the time of the procedure are necessary to adequately provide for the safety of the patient.

7. Health Care Professionals (HCP) (e.g., Registered Nurses, anesthesia assistants, dental assistants, paramedics, etc.) who assess, monitor and/or provide immediate post-procedure care to patients receiving intravenous procedural sedation are to be competent in Basic Life Support {cardiopulmonary resuscitation (CPR)}.

7.1. Advanced Cardiovascular Life Support (ACLS) training is preferable but not required.

8. Registered Nurses may administer IV procedural sedation/analgesia if deemed competent in the Post-Entry Level Competency (PELC) MM 30-005 Direct IV Administration of Medication and Capital Health IV Drug Therapy Manual states that
direct administration is a PELC (formerly referred to as Shared Competency) and the qualified practitioner is present and ready to perform the procedure.

8.1. A Registered Nurse cannot administer a medication IV direct if the Capital Health IV Manual states the IV direct route of administration is “physician only”.

8.2. Paramedics may administer medications according to their scope of practice.

8.3. All HCPs administering drugs IV direct for procedural sedation must be prepared to administer naloxone and flumazenil IV direct.

9. The minimum number of HCPs involved in the care of a patient undergoing intravenous procedural sedation during the entire procedure is two (2):

9.1. The physician or “operator” who performs the diagnostic, therapeutic or invasive procedure.

9.2. The HCP who monitors the patient’s response to both the sedation and the procedure and who is capable of assisting with any supportive or resuscitative measures.

10. When the patient has been identified as "high risk" according to ASA classification (ASA class 3 or greater) or when the procedure to be carried out is particularly complex or in an area not familiar with procedural sedation, an Anesthetist is to be present to assist with the procedure.

Exception: In the Emergency Department the attending EP will determine necessity of Anesthetist presence for such cases.

11. Patients undergoing procedural sedation must have continuous monitoring before, during and after the administration of procedural sedation/analgesia. Monitoring may detect early signs of patient distress such as changes in pulse, oxygen saturation, blood pressure, ventilatory status, cardiac electrical activity, clinical and neurologic status before clinically significant compromise occurs.

12. Procedural sedation may be performed on an inpatient unit if:

12.1. the area where the patient would normally have received procedural sedation is closed

12.2. the patient cannot go to the area (patient is on isolation) or

12.3. a delay in the procedure would place the patient at increased risk/harm

13. If the procedure is to be performed on an inpatient unit, the physician who is going to perform the procedure is to consult with the Health Services Manager (HSM) or designate to evaluate the availability of resources and equipment to ensure the safety of the patient during and post-procedure. Primary care of the patient remains the responsibility of the assigned nurse; the on-call nurse is the physician’s assistant.

14. This policy DOES NOT apply to patients who:

14.1. require general anesthesia

14.2. have lost protective reflexes and are unable to maintain a patent airway independently
14.3. require only therapeutic pain management
14.4. require sedation for maintenance on a ventilator (i.e., ICU sedation)
14.5. require sedation to control seizures
14.6. undergo anesthesia care given by anesthesia providers

DEFINITIONS

American Society of Anesthesiologists (ASA) Physical Status Classification:

A five category physical status classification system for assessing a patient before invasive procedures.

Class I: A normal healthy patient
Class II: A patient with mild systemic disease without functional limitations
Class III: A patient with severe systemic disease with functional limitations
Class IV: A patient with severe systemic disease that is a constant threat to life
Class V: A patient is moribund and may not survive the procedure

Deep Sedation

Patients respond purposefully to repeated tactile/verbal or painful stimulation. The patient may experience impaired airway reflexes, inadequate spontaneous ventilation and hemodynamic instability.

General Anesthesia

A controlled state of unconsciousness accompanied by a loss of protective reflexes, including loss of ability to maintain a patent airway independently or to respond purposefully to physical stimulation or verbal command. General Anesthesia may only be performed by physicians credentialed to administer anesthesia.

Minimal Sedation

Patients respond normally to verbal commands. Cognitive function may be impaired but the patient's ventilatory and cardiovascular functions are unaffected.

Mobility:

The ability to move freely from one place to another

Moderate Sedation

Patients respond purposefully to tactile stimulation. The patient exhibits preserved airway responses with the ability to independently and continuously maintain a patent airway and adequate ventilation. Hemodynamics remain stable.
Neurological Status: Level of consciousness

Pain Scale: Refer to Policy CC 07-060 Pain Assessment and Documentation

Qualified Practitioner: An HCP who has received training in the use of procedural sedation and assessment of the airway.

RASS: The Richmond Agitation Sedation Scale (RASS) is a tool used to assess a patient’s agitation and sedation level. (Refer to Appendix A)

Sedation Continuum Awake → Minimal Sedation → Moderate Sedation → Deep Sedation → General Anesthesia

PROCEDURE

Equipment
- Supplemental oxygen (nasal cannula or face mask)
- Suction equipment
- Pulse oximeter with alarms activated
- Automated blood pressure device (non-invasive) with alarms activated
- Emergency airway kit - minimum requirements
  - bag-valve-mask apparatus with oxygen tubing capable of being connected to an oxygen source
  - a range of sizes of oral airways
  - endotracheal tubes
  - stylet and laryngoscope with assorted airway blades
- Intravenous (IV) access
- Sedatives and analgesics as ordered by physician.
  - Medications drawn up into syringes should be clearly labeled with the name of the medication(s) and concentration
- Reversal agents/drug antagonists for ordered sedatives and analgesics (does not need to be drawn up)
- Crash cart with defibrillator and standard resuscitation medications (easily accessible)
- Cardiac monitor if indicated
Professional Responsibilities

1. Physicians

1.1. Assess for the following contraindications:
   1.1.1. Hemodynamically or neurologically unstable patients requiring immediate attention
   1.1.2. Allergy to medications
   1.1.3. Airway abnormalities that might preclude tracheal intubation
   1.1.4. Risk of aspiration (e.g., pregnant, obese patients), recent medications or drug ingestion

1.2. Assess risk and manage problems related to pre-existing medical conditions for all patients.
   1.2.1. Unless contraindicated, supplemental oxygen administration is required for all patients receiving deep sedation and is strongly recommended for all patients receiving moderate sedation. Patients who have a medical history significant for heart, lung or kidney disease or who are over the age of 60 should be routinely given supplemental oxygen unless specifically contraindicated.

1.3. Be aware of complications associated with procedural sedation, the recognition and management of these complications including the ability to recognize an obstructed airway.

1.4. If cardiac monitoring is necessary due to the patient’s condition or co-morbidities or level of sedation, arrange to have the procedure performed in a setting where cardiac monitoring is available.
   1.4.1. If the patient has been classified ASA III or greater or has a history of cardio-pulmonary disease or is undergoing deep sedation, the heart rate and rhythm must be displayed continuously by a cardiac monitor. Use of a cardiac monitor is strongly recommended for moderate sedation.

1.5. When the patient has been identified as "high risk" according to ASA classification (ASA class 3 or greater) or when the procedure to be carried out is particularly complex or in an area not familiar with procedural sedation, arrange to have an Anesthetist present to assist with the procedure.

1.6. Be familiar with the pharmacology, dosing and adverse reactions associated with drugs being administered and reversal agents/drug antagonists (Appendix B).

1.7. Ensure that there is at least one (1) HCP immediately available with the skills required to manage airway obstruction (may be the operator or the health care professional monitoring the patient).
   1.7.1. If the history and physical findings suggest the possibility of a difficult airway, only proceed with the procedure if there is a HCP with advanced airway skills in the immediate proximity; this HCP cannot be the operator or the HCP monitoring the patient.
2. **Health Care Professionals (HCPs)**

   2.1. Be familiar with the drugs the patient is receiving by completing appropriate practice references (learning modules) and reviewing specific drug monographs in the Capital Health IV Drug Therapy Manual.

   2.2. Continuously monitor patients undergoing procedural sedation before, during and after the administration of sedatives.

      2.2.1. Monitoring may detect early signs of patient distress, such as changes in oxygen saturation, pulse, blood pressure, ventilatory status, cardiac electrical activity, clinical and neurologic status, before clinically significant compromise occurs.

3. **Division/Department Head**

   3.1. Ensure that all physicians administering/supervising procedural sedation are competent in this skill, maintain this competence and are competent in airway management. This can be achieved a variety of ways including the use of simulation exercises and practice in the operating room environment.

**Pre-Procedure**

1. The physician or other qualified practitioner assesses and documents on the Capital Health *Procedural Sedation and Analgesia Assessment and Monitoring* Form (CD2560MR) the patient’s:

   1.1. physical status (e.g. ASA physical status category)

   1.2. respiratory and cardiac status

   1.3. general neurologic status (e.g. assessing mental status; presence or absence of stroke deficits) and RASS

   1.4. oxygen requirements

   1.5. airway in anticipation of possible intubation (e.g., checking condition of teeth, range of neck motion, ability to open mouth, jaw thrust, etc.)

   1.6. pertinent medical history, including current drug regimen, medication allergy or sensitivity and any history of analgesia or sedation complications

   **Note:** For sites or services using electronic documentation, all elements of form CD2560 MR should be captured in the electronic record.

2. Following patient assessment, the physician obtains patient consent and provides medication orders if procedural sedation has been deemed safe for the patient.

3. A Health Care Professional:

   3.1. conducts a pre-procedural assessment which includes the patient’s:

   3.1.1. estimated weight

   3.1.2. vital signs (baseline blood pressure; heart rate; respiratory rate, pattern and quality) and pain score

   3.1.3. baseline oxygen saturation
3.1.4. baseline RASS score

3.1.5. last oral/nasogastric intake

**Note:** Depending on the urgency of the procedure and in the absence of gastrointestinal pathology, patients may receive clear liquids by mouth up to 2 hours prior to the procedure. Patients may receive solids up to 6 hours prior to the procedure.

3.1.6. arrangements for an accompanying adult available on discharge

3.2. establishes IV access

3.3. instructs the patient to report any problems associated with the procedure or the sedation (e.g., pain, difficulty in breathing) to the HCP responsible for monitoring the patient

3.4. documents on the Capital Health *Procedural Sedation and Analgesia Assessment and Monitoring* Form (CD2560MR).

**Note:** For sites or services using electronic documentation, all elements of form CD2560 MR should be captured in the electronic record.

### During the Procedure

1. In cases of emergencies, where the patient has not been NPO, administer procedural sedation judiciously to avoid unconsciousness or suppression of protective airway reflexes.

2. The HCP monitoring the patient ascertains and documents the following on the *Procedural Sedation and Analgesia Assessment and Monitoring* Form:

   2.1. all IV fluid and medication administered (route, site, time, drug, dose)

   2.2. the amount and means of oxygen administered

   2.3. vital signs (blood pressure, respiratory rate and quality, pulse rate) every 5-10 minutes

   2.4. the patient's oxygen saturation as displayed continuously by pulse oximeter every 5-10 minutes

   **Note:** End tidal carbon dioxide monitoring (capnography) is strongly recommended for procedures where deep sedation is employed (RASS -4 or -5) but is not mandatory.

   2.5. the Richmond Agitation Sedation Scale (RASS) every 5-10 minutes ([Appendix A](#))

   2.6. if cardiac monitoring is required, heart rate and rhythm as displayed by cardiac monitor every 5-10 minutes

3. The HCP checks the patient's head position frequently to ensure a patent airway.

   3.1. If the patient becomes unstable during the procedure, inform the physician performing the procedure. Seek appropriate anesthesia consultation immediately if the responsible physician is unable to manage the airway.

4. Assess and treat for complications according to [Table 1](#).
Table 1

<table>
<thead>
<tr>
<th>Complication</th>
<th>Treatment/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory depression/arrest or hypoxia:</td>
<td>• Attempt to verbally or physically stimulate the patient</td>
</tr>
<tr>
<td></td>
<td>• Assist ventilation with an oral airway and bag-valve-mask</td>
</tr>
<tr>
<td></td>
<td>• Administer the appropriate reversal agent</td>
</tr>
<tr>
<td></td>
<td>• Be prepared to intubate the patient if necessary</td>
</tr>
<tr>
<td><strong>Note:</strong> Do not routinely administer naloxone at the end of the procedure as it will abruptly reverse analgesia</td>
<td></td>
</tr>
<tr>
<td>Deep sedation:</td>
<td>• Follow the steps outlined for respiratory depression</td>
</tr>
<tr>
<td>Hypotension:</td>
<td>• Pre-existing hypovolemia contributes to this complication</td>
</tr>
<tr>
<td></td>
<td>• Administer IV fluid bolus of normal saline or lactated Ringer's (adult dose: 500-1000 mL; pediatric dose: 20 mL/kg)</td>
</tr>
<tr>
<td></td>
<td>• Assess for etiology</td>
</tr>
<tr>
<td></td>
<td>• If medications are believed to be the cause and there is no response to fluid bolus consider epHEDrine 5-10 mg slow IV direct; may repeat q 5-10 minutes as required. Use with caution if there is a history of coronary artery disease.</td>
</tr>
</tbody>
</table>

Post-Procedure

1. The HCP monitoring the patient ascertains and records the same parameters as detailed in the section ‘During the Procedure’ – Statement # 2 as well as pain score every 10-15 minutes until the patient returns to his/her pre-procedure baseline plus or minus 20%, then every 30-60 minutes until discharge.

   1.1. If the patient received reversal agents (e.g., naloxone, flumazenil) continue monitoring for a minimum of two (2) hours after administration of the reversal agent.

2. Complete follow-up procedures (e.g., post-reduction films) only when recovery is achieved.

3. Evaluate the patient’s readiness for discharge using the following criteria:
   3.1. airway is patent and stable
   3.2. swallow, cough and gag reflexes are present, or appropriate to baseline
   3.3. patient is awake and oriented x 3
   3.4. vital signs are within 20% of baseline values
   3.5. oxygen saturation levels are stable and returned to baseline
   3.6. pain management plan discussed and verbalized understanding
3.7. responsible adult is available to accompany patient home  
3.8. patient is able to mobilize  
3.9. able to tolerate oral fluids  
3.10. able to sit and talk (age appropriate) as per baseline  
3.11. dressing/procedure site has been checked if applicable  
3.12. discharge order has been written by physician  

4. Once the patient is deemed ready for discharge as per above criteria:  
4.1. Give a verbal report (Transfer of Accountability) to the accepting HCP if patient is returning or being admitted to an inpatient/outpatient unit. {Refer to CH 30-060 Transfer of Health Information (Transfer of Accountability)}  
4.2. Ensure the patient is discharged with a responsible adult, who accompanies the patient home and is able to report any post-procedure complications.  
4.3. Instruct the patient not to do anything that requires clear judgment and fast physical response for 24 hours following the procedure. Counsel patient:  
4.3.1. Not to drive or operate heavy machinery for 24 hours  
4.3.2. Not to sign any legal documents or important papers for 24 hours  
4.3.3. Not to ingest alcohol for 24 hours or while taking analgesics  
4.3.4. Not to provide primary care to dependents for 24 hours  
4.4. Provide patient and/or caregiver with verbal and written discharge instructions including:  
4.4.1. time when oral intake can be resumed  
4.4.2. medications  
4.4.3. activities  
4.4.4. follow-up instructions  
4.4.5. phone number to call in case of emergency  
4.5. Provide patient education as necessary and a copy of the Capital Health pamphlet Care after Sedation (WA85-0121).  
4.6. Document the patient's discharge disposition and discharge instructions given to the patient and/or guardian.  

Pediatric Procedural Sedation and Analgesia  
Providing sedation and analgesia to pediatric patients can reduce the physiological pain and psychological stress of clinical procedures. The principles of analgesia and sedation in children do not differ significantly from adults.  

1. Consider the following specific points in the provision of pediatric procedural sedation and analgesia:  
1.1. Informed consent from the caregiver is required after the risks, benefits and objectives of the procedure are thoroughly discussed
1.2. Children may exhibit a paradoxical response to sedation (i.e., hyperexcitability)
1.3. Carefully calculate dose (weight-based dosing)
1.4. IV access may be problematic or inappropriate. Intramuscular (IM), rectal or oral ketamine may be an alternative
1.5. The attending physician should be competent in managing a compromised pediatric airway
1.6. Medications may have variable time of onset in children. Additional time may be required to assess effect
1.7. Routine monitoring in children is more challenging than in adults and side effects less predictable. Close clinical observation is required

2. Age appropriate sedation should be provided according to Table 2.

<table>
<thead>
<tr>
<th>Age</th>
<th>Sedation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 year</td>
<td>Not recommended</td>
</tr>
<tr>
<td>1-2 years</td>
<td>Mild/light sedation; dissociative with caution; fentanyl and midazolam in combination will not be used</td>
</tr>
<tr>
<td>More than 2 years</td>
<td>Mild/light, moderate or dissociative sedation</td>
</tr>
</tbody>
</table>

3. Prior to discharge of a pediatric patient, review the patient pamphlet HC85-1389 After Sedation and Your Child with the caregiver, and provide a copy to the caregiver.

**SECTION B - Emergency Department (ED) Additional Requirements for Procedural Sedation and Analgesia (PSA)**

**POLICY**

1. Procedural sedation and analgesia must be supervised by an emergency physician (EP) or other HCP appropriately trained in the delivery of PSA (e.g., advanced care paramedic, anesthesiologist).
2. Procedural sedation at the Halifax Infirmary site Emergency Department (HI ED) by non-ED services (e.g., orthopedics, surgery) requires that one attending emergency physician be informed of the proposed procedural sedation prior to administration of any medications.
   2.1. Normally the advanced care paramedic (ACP) provides this communication but it may also be provided by the attending registered nurse or service resident and documented in the patient’s health record.
   2.2. Procedural sedation may only be performed by non-ED services if there are two (2) certified emergency sedationists (staff EP, Senior Emergency or Anesthesia Resident [PGY3 or higher] or ACP) present in the HI ED.
3. The patient must be placed in an appropriate clinical area that permits adequate monitoring and provision of care should the patient require resuscitation. Assemble the required equipment at the bedside.

4. The HCP responsible for monitoring procedural sedation and analgesia (e.g., registered nurse, advanced care paramedic, anesthesiologist) should not assist with the procedure being performed by the physician.

PROCEDURE
The following procedures are additional requirements for the Emergency Department. Refer to Procedures in Section A as outlined.

Professional Responsibilities
1. Refer to Section A – Professional Responsibilities

Pre-Procedure
1. For non-emergent procedures, limit ED procedural sedation to ASA Class I and II patients.
2. Refer to Section A – Pre-Procedure

During the Procedure
1 Refer to Section A – During the Procedure

Post - Procedure
1. Refer to Section A – Post-Procedure.
2. At the Halifax Infirmary site Emergency Department, when procedural sedation by a non-ED service (e.g., orthopedics, surgery) is complete and the patient is ready for discharge, the non-ED service physician or resident informs the attending emergency physician (as per Policy Statement # 2 – ED Additional Requirements) of its completion and impending patient discharge prior to discharging the patient; the non-ED service physician or resident documents this communication in the health record.

   2.1. Non-ED nursing staff - if responsible for the care of the patient during procedural sedation - transfer this responsibility to the assigned ED nurse once the patient is awake/recovered with a stable airway.

3. Discharge the patient with a responsible adult after a minimum of one (1) hour of observation. Two (2) hours of observation are required if reversal agents were administered.

REFERENCES


RELATED DOCUMENTS

Policies
CC 07-060  Pain Assessment and Documentation
CH 07-060  Transfer of Health Information (Transfer of Accountability)
CH 30-045  Consent to Treatment
MM 30-005  Direct IV Administration of Medication PELC
MM 30-006  IV Direct (Push) Administration of Medication DMF

Forms
CD2560MR  Procedural Sedation and Analgesia Assessment and Monitoring Form

Brochures
WA85-012  Care after Sedation patient pamphlet (2007)
HC85-1389  After Sedation and Your Child patient pamphlet (2011)

Appendices
Appendix A  Richmond Agitation Sedation Scale (RASS)
Appendix B  Agents for Procedural Sedation and Analgesia; Reversal and Supportive Agents
Appendix A

Richmond Agitation Sedation Scale (RASS)

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

Procedure for RASS Assessment
1. Observe patient
   a. Patient is alert, restless, or agitated. (score 0 to +4)
2. If not alert, state patient’s name and say to open eyes and look at speaker.
   b. Patient awakens with sustained eye opening and eye contact. (score –1)
   c. Patient awakens with eye opening and eye contact, but not sustained. (score –2)
   d. Patient has any movement in response to voice but no eye contact. (score –3)
3. When no response to verbal stimulation, physically stimulate patient by shaking shoulder and/or rubbing sternum.
   e. Patient has any movement to physical stimulation. (score –4)
   f. Patient has no response to any stimulation. (score –5)

References
## Appendix B
### Agents for Procedural Sedation and Analgesia

<table>
<thead>
<tr>
<th>Drug</th>
<th>Actions</th>
<th>Adult dosing</th>
<th>Pediatric dosing</th>
<th>Contraindication (other than hypersensitivity)/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphine</td>
<td>Analgesia</td>
<td>1-4 mg IV q 2-15 minutes to desired effect</td>
<td>0.05-0.2 mg/kg/dose IV Max: 15 mg/dose</td>
<td>Hemodynamic instability Bronchospasm</td>
</tr>
<tr>
<td></td>
<td>Sedation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fentanyl</td>
<td>Analgesia</td>
<td>25-100 mcg IV, repeat 25-50 mcg q 1-2 minutes to desired effect</td>
<td>1-3 mcg/kg IV</td>
<td>Head injury Hypertension Coronary artery disease Active upper respiratory tract infection History of psychosis</td>
</tr>
<tr>
<td></td>
<td>Sedation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ketamine</td>
<td>Dissociative</td>
<td>0.2-1 mg/kg IV</td>
<td>0.5-2 mg/kg IV</td>
<td>Head injury Hypertension Coronary artery disease Active upper respiratory tract infection History of psychosis</td>
</tr>
<tr>
<td></td>
<td>anesthesia</td>
<td>2-4 mg/kg IM</td>
<td>2-5 mg/kg IM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Analgesia</td>
<td></td>
<td>5-10 mg/kg po¹</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sedation</td>
<td></td>
<td>Often used with atropine²</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Amnesia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Midazolam</td>
<td>Anxiolysis</td>
<td>Initial dose: 0.5-2.5 mg IV. Small increments of initial dose may be administered q 2-5 minutes until desired effect reached. Use lower doses in the elderly. Lower doses should be considered in patients receiving opioids (reduce dose by 30%).</td>
<td><strong>Intravenous:</strong> Greater than or equal to 1 year to less than 6 years 0.05-0.1 mg/kg/dose up to a total dose of 0.6 mg/kg Max: 6 mg total dose 6-12 years 0.025-0.05 mg/kg/dose up to a total dose of 0.4 mg/kg Max: 10 mg total dose Greater than or equal to 12 years 0.5-2 mg/dose, may repeat prn Max: 10 mg total dose <strong>Intramuscular (use 1 mg/mL concentration):</strong> Greater than or equal to 1 year 0.1-0.15 mg/kg/dose (up to 0.5 mg/kg has been used) Max: 10 mg total dose <strong>Oral:</strong> Greater than or equal to 1 year 0.25-0.5 mg/kg single dose Max: 20 mg/dose</td>
<td>CNS depression Caution in patients with hepatic or renal impairment Lower doses should be considered in patients receiving opioids</td>
</tr>
<tr>
<td></td>
<td>Sedation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Amnesia</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Appendix B (Continued)

**Agents for Procedural Sedation and Analgesia**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Actions</th>
<th>Adult dosing</th>
<th>Pediatric dosing</th>
<th>Contraindication (other than hypersensitivity)/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Propofol</td>
<td>Sedation</td>
<td>Initial dose: 0.5-1 mg/kg IV</td>
<td>Initial dose: 0.5-1 mg/kg IV</td>
<td>Hemodynamic instability</td>
</tr>
<tr>
<td></td>
<td>Amnesia</td>
<td>Administer additional 10-20 mg/minute to desired effect. Use lower doses in elderly</td>
<td>Administer additional 10-20 mg/minute to desired effect. Use lower doses in elderly</td>
<td>Critically ill</td>
</tr>
</tbody>
</table>

1. Mix in cola or other beverage to mask taste. Administer 30 minutes before procedure.
2. Atropine 0.01-0.02 mg/kg IM/IV. Minimum dose: 0.1 mg. Maximum dose: 0.4 mg.

### Reversal and Supportive Agents

<table>
<thead>
<tr>
<th>Indication</th>
<th>Drug</th>
<th>Adult Dose</th>
<th>Pediatric dose</th>
<th>Adverse effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opiate reversal</td>
<td>Naloxone</td>
<td>0.4-2 mg IV q 2-3 minutes Maximum: 10 mg total dose</td>
<td>0.01-0.1 mg/kg IV q 2-3 minutes Maximum: 2 mg/dose Maximum: 10 mg total dose</td>
<td>Nausea, anxiety, opioid withdrawal</td>
</tr>
<tr>
<td>Benzodiazepine reversal</td>
<td>Flumazenil</td>
<td>0.1-0.2 mg IV q 1 minute to a maximum of 1 mg</td>
<td>0.01 mg/kg IV q 1 minute Maximum: 0.2 mg/dose Maximum cumulative dose: 0.05 mg/kg or 1 mg total dose; whichever is lower</td>
<td>Seizures, anxiety, hyperactivity</td>
</tr>
<tr>
<td>Hypotension</td>
<td>ePHEDdrine</td>
<td>5-10 mg IV</td>
<td></td>
<td>Tachycardia, hypertension, aggravation of myocardial ischemia</td>
</tr>
</tbody>
</table>