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Policy Area **Pediatrics**
Applicability **OR - Hospitals**

Deep Procedural Sedation for Pediatric Patients

PURPOSE:

- A. Provide a safe and effective process for management of pediatric patients receiving deep procedural sedation (DPS), with or without analgesia, during short term therapeutic, diagnostic, surgical or dental procedures
- B. Standardize management and monitoring of patients receiving DPS by outlining responsibilities for care when administered by a non-anesthesia provider, including the clinical practice of nurses administering medications for the purpose of achieving DPS
- C. Promote patient safety through early detection of problems which may arise during and after administration of DPS
- D. Establish documentation guidelines
- E. Define a process to support continuous quality improvement

POLICY STATEMENT:

This policy outlines procedures and guidance for DPS during short term therapeutic, diagnostic, surgical or dental procedures performed on pediatric patients. The goals of sedation include:

- Guard patient's safety and welfare
- Minimize patient's physical discomfort and pain
- Control anxiety, minimize psychological trauma, and maximize potential for amnesia for patient
- Modify patient's behavior and/or movement as to allow safe completion of procedure
- Return patient to a state in which discharge from medical and/or dental supervision is safe, as determined by objective criteria

A continuum exists between minimal, moderate, and deep sedation as well as general anesthesia. One level of sedation can quickly change to a deeper level due to unique characteristics of drugs used, as well as physical status and drug sensitivities of individual patients. The patient's age and pre-existing medical conditions may significantly alter dosing requirements needed to achieve a level of deep sedation. Administration of sedating agents requires ongoing assessment and monitoring of the patient and the ability to respond **immediately** to deviations from the norm.

NOTE: If DPS unintentionally progresses to a deeper level of sedation than anticipated, appropriate measures are immediately taken to return patient to the intended level of sedation.

NOTE: Practitioners of sedation must have skills to rescue patient from a deeper level of sedation than intended for the procedure.

Whenever DPS is administered, a minimum combination of one sedation credentialed administrator of sedation [may include sedation credentialed registered nurse (SC-RN) AND/OR provider (SC-P)] **AND one** additional person whose responsibility is to monitor appropriate physiologic parameters and assist in any supportive or resuscitation measures [may include SC-RN, SC-P, or sedation-trained registered nurse (ST-RN)] **must be present at patient's bedside during administration of sedation and may not leave patient unattended:**

- Administrator's sole responsibility is to administer drugs (or direct their administration by a second qualified SC-RN/SC-P) and constantly observe the patient's vital signs, depth of sedation, airway patency, and adequacy of ventilation. At a minimum, they must be:
 - Independent of performing or assisting with the procedure;
 - Pediatric Advanced Life Support (PALS) certified;
 - Capable of managing any airway, ventilatory, or cardiovascular emergency event resulting from deep sedation and/or general anesthesia;
 - Trained and skilled to establish intravenous (IV) access and draw up and administer rescue medications;
 - Trained and skilled to rescue a non-breathing child; a child with airway obstruction; or a child with hypotension, anaphylaxis, or cardiorespiratory arrest, including the ability to open the airway, suction secretions, provide CPAP, insert supraglottic devices (oral airway, nasal trumpet, or laryngeal mask airway), and perform successful bag-mask ventilation, tracheal intubation, and cardiopulmonary resuscitation
 - **NOTE:** A SC-RN must also have several years experience in the emergency department, pediatric recovery room, or intensive care setting (ie, nurses who are experienced with assisting the individual administration or directing sedation with patient rescue during life-threatening emergencies) and has completed and remains compliant with all components outlined in the PH&S *Procedural Sedation Credentialing for RNs* policy
- Second person (monitor) may include a SC-RN, SC-P, or ST-RN who is responsible for assisting with interruptible patient-related tasks of short duration once patient's level of sedation/analgesia and vital signs have stabilized, such as holding an instrument or troubleshooting equipment, provided that adequate monitoring for patient's level of sedation is maintained. At a minimum, they must be:
 - PALS certified; and
 - Capable of providing skilled assistance to the administrator with the rescue of a child experiencing any of the adverse events described above
- At least one DPS administrator or monitor will be skilled in obtaining vascular access in children.

A protocol for immediate access to back-up emergency services shall be clearly outlined prior to DPS administration.

POLICY INCLUSION:

This policy is effective in all care/service areas where administration of DPS to patients under the age of 18 is authorized within the documented departmental scope of services and is equipped to manage emergency and rescue situations, as seen in the:

- Pediatric Intensive Care Unit, including intermediate care patients (PSVMC Only)
- In-Patient Pediatric Unit (PSVMC Only)
- Emergency Departments

- Surgical Departments
- Diagnostic Imaging
- Hospital-Based Procedural Areas

POLICY EXCLUSION:

This policy does is not intended to address general anesthesia requirements. There are specific situations that are beyond the scope of this document. Specifically, guidelines for the delivery of general anesthesia and monitored anesthesia care (sedation or analgesia), outside or within the operating room by anesthesiologists or other practitioners functioning within a department of anesthesiology, are addressed by policies developed by the ASA and by individual departments of anesthesiology.

Patients and/or clinical situations outside the scope of this policy include:

- Patients cared for in Neonatal Intensive Care Units
- Patients receiving medication either by direct injection, ingestion, or patient controlled analgesia (PCA) for control of pain or anxiety, which is not related to performance of short term therapeutic, diagnostic, or surgical procedures.
- Medications administered during the pre-operative period.
- Anesthesia medications such as Methohexital (Brevital), Thiopental (Pentothal), and Propofol (Diprivan):
 - NOTE:** To use these medications for procedure related sedation, a protocol specifying patient management, documentation, and qualifications of participating staff and providers must be submitted to the Oregon Medical Executive Committee, Regional Surgery Executive Committee, Hospital Department Chair of Anesthesiology, and Regional Medical Director of Anesthesiology.
 - NOTE:** Propofol may be administered in the ED by SC-P, who will remain immediately available to respond during administration.
- Dexmedetomidine (Precedex) and Ketamine (Ketelar), unless ordering SC-P is immediately available to respond during administration or patient is already intubated and ventilated.
- Use of continuous sedation agents for non-procedure related sedation (e.g. intubated and ventilated patients, including those receiving rapid sequence intubation and not receiving anesthesia):
 - NOTE:** If a patient is receiving medication (e.g. Propofol) for non-procedure related sedation (e.g. Intubated and ventilated) and requires additional agents to be administered during a procedure, all DPS monitoring requirements apply until procedural sedation administration is complete and patient has had sufficient time to recover and return to their pre-procedural status.
- Patients receiving IV medication for treatment of seizures or alcohol withdrawal.

DEFINITIONS:

American Society of Anesthesiologists (ASA) Classifications:

- **ASA 1:** Normal healthy patient
- **ASA 2:** Patient with mild systemic disease
- **ASA 3:** Patient with severe systemic disease
- **ASA 4:** Patient with severe systemic disease that is a constant threat to life
- **ASA 5:** Moribund patient who is not expected to survive without the operation
- **ASA 6:** Declared brain-dead patient whose organs are being removed for donor purposes

Deep Procedural Sedation (DPS): A drug-induced depression of consciousness during which patients cannot be easily aroused but respond purposefully following repeated or painful stimulation. The ability to

independently maintain ventilatory function may be impaired. Patients may require assistance in maintaining a patent airway and spontaneous ventilation may be inadequate. Cardiovascular function is usually maintained.

ECG: Electrocardiogram

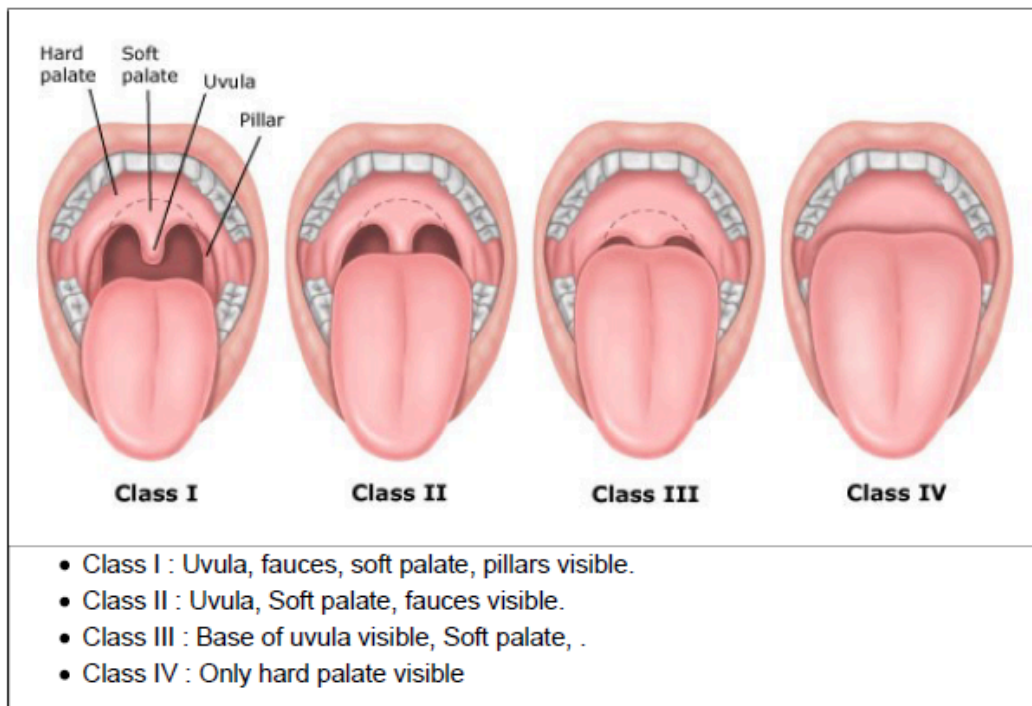
EHR: Electronic Health Record

ETCO₂: End Tidal Carbon Dioxide Level

General Anesthesia: General anesthesia is a drug-induced loss of consciousness during which patients are not arousable, even by painful stimulation. The ability to independently maintain ventilatory function is often impaired. Patients often require assistance in maintaining a patent airway and positive pressure ventilation may be required because of depressed spontaneous ventilation or drug-induced depression of neuromuscular function. Cardiovascular function may be impaired.

IV: Intravenous

Mallampati Classification:



Minimal Sedation (Anxiolysis): A drug-induced state during which patients respond normally to verbal commands. Although cognitive function and coordination may be impaired, ventilatory and cardiovascular functions are unaffected.

Moderate Sedation: A drug-induced depression of consciousness during which patients respond purposefully to verbal commands, either alone or accompanied by light tactile stimulation. No interventions are required to maintain a patent airway, and spontaneous ventilation is adequate. Cardiovascular function is usually maintained.

NPO: Nil Per Os/Nothing by Mouth

PALS: Pediatric Advance Life Support

PARQ: Procedure, Alternatives, Risk, and Questions

PCA: Patient Controlled Analgesia

SOAPME: Acronym used to summarize appropriate equipment and supplies to have available to safely perform procedural sedation and analgesia which includes Suction, Oxygen, Airway, Pharmacy, Monitors, & Equipment

SC-P: Sedation Credentialed Provider must be a licensed independent practitioner with sedation training, PALS [or Advanced Pediatric Life Support (APLS)] certified, and have advanced airway skills, such as, but not limited to a:

- Physician Anesthesiologist
- Oral Surgeon
- Dental Anesthesiologist
- Other medical specialist with the requisite licensure, training, and competencies
- Certified Registered Nurse Anesthetist or Certified Anesthesiology Assistant

SC-RN: Sedation Credentialed Registered Nurse must be a nurse with advanced emergency management skills, such as several years in the emergency department, pediatric recovery room, or intensive care setting (ie, nurses who are experienced with assisting the individual administering or directing sedation with patient rescue during life-threatening emergencies) who is PALS (or APLS) certified and has completed all components outlined in the PH&S *Procedural Sedation Credentialing for RNs* policy

ST-RN: Sedation Trained Registered Nurse has all the qualifications of a SC-RN including all components outlined in the PH&S *Procedural Sedation Credentialing for RNs* policy while actively pursuing the opportunity to demonstrate competency in procedural sedation in at least two separate experiences to become fully certified

SBS: State Behavioral Scale

VS: Vital Signs include:

- Temperature
- Respiratory Rate (RR)
- Heart Rate (HR)
- Blood Pressure (BP)
- Oxygen Saturation (SpO₂)

PROCEDURE:

Pre-Procedure/Preparation/Assessment Includes:

- A. SC-P orders and informs patient, parent/guardian, or staff caring for patient of all fluid and food restrictions, nothing by mouth(NPO) prior to procedure when applicable
- B. Sedation team verifies a protocol for immediate access to back-up emergency services is clearly outlined.
- C. Sedation team verifies equipment required and/or immediately available using the "SOAPME" acronym include:
 1. **S** = Suction - functioning suction and appropriately sized suction catheters
 2. **O** = Oxygen - supplemental oxygen and appropriate delivery system (tubing, face mask, bag-valve mask, & nasal cannulas)
 3. **A** = Airway - airway equipment including oral airways, nasopharyngeal and oropharyngeal airways, laryngeal mask airways, laryngoscopy blades, endotracheal tubes, & stylets

4. **P** = Pharmacy - all the basic drugs needed to support life during an emergency. Reversal agents are to be immediately available prior to beginning the procedure.
 5. **M** = Monitors - pulse oximeter with appropriate sized probes, end-tidal carbon dioxide monitor, blood pressure cuffs, electrocardiogram (ECG), and other monitors as appropriate for the procedure.
 6. **E** = Equipment - equipment to dispense medications, including IV supplies, and any special equipment or drugs for a particular case
 7. **NOTE:** Emergency Life Support Cart (Broselow Cart) with defibrillator and intubation supplies is immediately available
- D. The SC-P responsible for overseeing sedation will document in the electronic health record (EHR) pre-sedation/procedure assessment, including:
1. History, including:
 - a. Age
 - b. Past medical history including:
 - i. Comorbidities/abnormalities of major organ systems
 - ii. Prematurity
 - iii. Obstructive sleep apnea
 - iv. Anatomical airway problems
 - v. Congenital syndromes
 - vi. Respiratory disease
 - c. Past surgical history
 - d. Recent illnesses
 2. Physical exam, including:
 - a. Vital signs (VS) taken with 30 minutes prior to the beginning administration of MMPS
 - b. Weight in kilograms
 - c. Mental status
 - d. Pulmonary examination
 - e. Cardiovascular examination
 - f. Airway assessment, including Mallampati Classification
 - g. American Society of Anesthesiologists (ASA) Classifications
 - h. **NOTE:** Patients with an ASA score of ≥ 3 , special needs, anatomic airway abnormalities, or moderate to severe tonsillar hypertrophy present issues requiring additional and individual consideration (particularly for moderate and deep sedation). The SC-P is encouraged to consult with appropriate sub-specialist and/or an anesthesiologist prior to administration of PS.
 3. Previous patient anesthesia experience
 4. Problems pertaining to cooperation and pain tolerance
 5. Family anesthesia experience
 6. Medications
 7. Allergies
 8. Any pertinent diagnostic data

9. Pregnancy status, when applicable
 10. **NOTE:** Children with developmental disabilities; younger than 6 years of age; with relevant diseases, physical abnormalities (including genetic syndromes), neurological impairments; with obesity and/or a history of snoring or obstructive sleep apnea; history of seizures; and history of prematurity are at greatest risk maintaining a patent airway or experiencing apnea during or following the sedated procedure.
 11. **NOTE:** Prescription medications intended to accomplish procedural sedation must be administered with safety net of direct supervision by trained medical/dental personnel in a setting equipped to manage pediatric emergencies. Patients and their parents are instructed to refrain from premedicating for a procedure while at home or in route to procedure.
- E. Informed consent and Procedure, Alternatives, Risk, and Questions (PARQ) for both procedure and sedation will be obtained by the SC-P overseeing sedation.
 - F. NPO status will be confirmed and documented when sedation is given. If recommended NPO status is not met, the goal of sedation must be carefully assessed and balanced with the urgency of the procedure. Clinical situation permitting, the following should apply:

Fasting Recommendations for Sedation and Anesthesia

Food Type	Minimum Fasting Period (hours)
Clear Liquids	2
Breast Milk	4
Nonhuman milk, formula	6
Solids	8

- G. The SC-P enters orders in the EHR specifying dose and administration of sedation agents to be administered, including incremental doses needed during procedure to obtain and/or maintain optimal level of sedation required to perform procedure:
 1. **NOTE:** Special attention must be paid to calculation of drug dosage (ex: mg/kg) for obese patients, as most medications should likely be adjusted to ideal body weight rather than actual weight. Medications should not exceed adult maximum doses.
 2. **NOTE:** Ideally orders are entered into the EHR prior to administration, but may need to be a verbal SC-P order (with verbal confirmation from the sedation administrator) to avoid disruption to clinical care and monitoring of the patient. Written orders will be placed in the EHR by the SC-P when there is no longer a risk of altering clinical outcomes.
- H. When applicable, the SC-P orders supplemental oxygen during DPS unless specifically contraindicated for a particular patient or procedure.
- I. The SC-RN or ST-RN will:
 1. Verify a parent or authorized individual is present to escort patient home (outpatient/short stay setting only):
 - a. If post-procedure care and safe transportation home cannot be arranged, the procedure may be canceled except for urgent/emergent procedures according to established definitions for such procedures.
 - b. **NOTE:** Special consideration for infants and toddlers in car seats should include having two adults present during transport so one may continuously observe child's head position to avoid airway obstruction from occurring.
 - c. **NOTE:** Special consideration for infants with a history of prematurity should include having two adults present during transport so one may continuously observe for episodes of apnea.
 2. The SC-RN or ST-RN, in conjunction with SC-P, will document a Plan of Care

3. Establish IV access (following *Comfort Promise* principles) as ordered by SC-P, prior to administration of DPS
 4. Before administration of sedative medications, a baseline determination of VS, end tidal CO₂ (ETCO₂), and sedation level are obtained, evaluated, documented, and communicated to SC-P immediately prior to initiation of sedation:
 - a. Attachment A: *Ramsey Sedation Scale* is used for the general population
 - b. Attachment B: *State Behavioral Scale (SBS)* is used for intubated infants and children supported on mechanical ventilation
- J. Before initiation of sedation begins, a "time-out" should be performed to confirm:
1. Patient's name
 2. Procedure being performed
 3. Laterality and site of the procedure

Intra-Procedure Monitoring Includes:

- A. Continuous monitoring, which must be plainly visible to person responsible for monitoring patient, includes:
 1. Oxygen saturation
 2. Heart rate
 3. Ventilatory function by observation of qualitative clinical signs
 4. Blood pressure every 5 minutes during DPS (unless this interferes with procedure)
 5. ETCO₂ is required in all deeply sedated children due to the increased risk of airway/ventilation compromise (unless precluded or invalidated by nature of patient, procedure, or equipment as determined clinically appropriate by SC-P)
 6. ECG lead monitoring is required during the procedure
- B. Assessment and documentation of intra-procedure monitoring, including VS, ETCO₂, and sedation level using appropriate assessment scale (Ramsey or SBS) will occur prior to the administration of sedation and at a minimum of every 5 minutes thereafter in EHR:
 1. **NOTE:** Stimulation of blood pressure cuff inflation may cause arousal or agitation, which may be counterproductive and may need to be performed every 15 minutes if patient is otherwise stable, well oxygenated, and well perfused.
- C. Medication dosages and rates of administration must be individualized based upon patient's condition, and observed response to previous dose. Administration is to be performed incrementally, by SC-P or SC-RN, with adequate time between doses to assess full pharmacologic effects and documented in EHR:
 1. **NOTE:** Combinations of sedation and analgesic drugs may be administered but should be administered as individual components to achieve desired effects.
 2. **NOTE:** IV sedative/analgesic drugs should be administered in small, incremental doses, or by titrating to desired endpoint - allowing sufficient time to elapse between doses so peak effect of each dose can be assessed before subsequent drug administration.
 3. **NOTE:** When drugs are administered by non-IV routes, allow sufficient time for absorption and peak effects of previous dose before supplementation is considered.

Post-Procedure Monitoring Includes:

- A. During recovery, there is a minimum of:
 1. One SC-RN, SC-P, or ST-RN whose only responsibility is to constantly observe patient's vital signs, airway patency, and adequacy of ventilation and to either administer drugs or direct their administration; **AND**

2. A second SC-RN, SC-P, ST-RN, or Post-Anesthesia Care Unit RN is immediately available who is trained in and capable of providing advanced pediatric life support who is skilled to rescue a child with apnea, laryngospasm, and/or airway obstruction.
- B. Patients must have a score of ≥ 8 using the *Aldrete Scoring System* (Attachment C) to determine the end of sedation phase. If score is < 8 at end of sedation phase, the monitoring nurse should contact the SC-P and document the exception in narrative notes.
- C. Documented monitoring includes:
1. VS at least every 5 minutes for for a minimum of 30 minutes from administration of last dose of sedation medication **AND**
 2. An *Aldrete* score of ≥ 8 is reached. Once the child begins to waken, the recording interval may be increased to every 10 to 15 minutes
- D. Oxygen saturation and heart rate monitoring will be continuously monitored until patient is fully alert and discharge criteria is met.
- E. Following pharmacological reversal, patients should be observed long enough (may require up to 2 hours after last dose of reversal agent) to ensure that sedation and cardio-respiratory depression does not recur once the effect of the antagonist dissipates because duration of the medications administered for sedation may exceed the duration of the antagonist. Patients must have an *Aldrete* score of ≥ 8 or an SBS score consistent with their pre-procedure state.
- F. Discharge criteria includes:
1. Cardiovascular function and airway patency are satisfactory and stable, as vital signs are stable and similar to pre-procedure baseline measurements with no signs of respiratory distress.
 2. Patient is easily arousable, and protective airway reflexes are intact.
 3. Patient can talk (if age and developmentally appropriate).
 4. Patient can sit up unaided (if age and developmentally appropriate).
 5. For a very young child or a child with a disability who is incapable of usually expected responses, the pre-sedation level of responsiveness or a level as close as possible to normal level for that child should be achieved.
 6. State of hydration is adequate.
 7. No complications related to sedation or to specific procedure - for example, no excessive bleeding from the wound and minimal nausea, vomiting, and dizziness.
 8. Pain is well controlled
 9. Patient has ingested and retained fluid after drinking, when clinically appropriate and ordered by the SC-P.
 10. Patient has voided, if required.
 11. Parents or guardians understand patient's postoperative care needs, signs and symptoms of complications, reasons and how to contact the SC-P or proceduralist, ensuring that parents or guardians can meet child's home care needs (as appropriate).
 12. Parents or guardians have received written instructions and prescriptions, reinforcing information and training provided and allowing continuation of medications at home (as appropriate).
- G. All post-DPS outpatients must be:
1. Provided written post-sedation/procedure instructions, including signs and symptoms to monitor for and contact information of their care team if they have questions or concerns they need addressed prior to any follow-up appointment.
 2. Discharged to care of a parent or authorized individual, who is able to escort patient through

post-discharge transportation (e.g. drive patient or travel with patient in taxi), and be available for recommended post-procedure care.

3. **NOTE:** Special consideration for infants and toddlers in car seats and infants with a history of prematurity should include having two adults present during transport so one may continuously observe the child while the other is driving the vehicle.
4. **NOTE:** A longer period of observation should be considered for patients with anatomic airway problems, former preterm infants, underlying medical conditions such as obstructive sleep apnea, and sedation medications with known half-lives as there is increased risk to maintain a patent airway or experience apnea.

Continuous Quality Improvement:

Adverse events may be examined with the intent to support ongoing continuous quality improvement. This may include:

- Desaturations
- Apnea
- Laryngospasms
- Need for airway interventions, including the need for placement of subglottic devices such as an oral airway, nasal trumpet, or LMA
- Positive-pressure ventilation
- Prolonged sedation
- Unanticipated use of reversal agents
- Unplanned or prolonged hospital admission
- Sedation failures
- Inability to complete the procedure
- Unsatisfactory sedation, analgesia, or anxiolysis

Pediatric Standard Dose Reference for Deep Procedural Sedation:

DRUG	DOSE	ONSET (minutes)	PEAK (minutes)	DURATION* (minutes)	ADVERSE EVENTS	REVERSAL AGENT	COMMENTS
Dexmedetomidine	IN: 1-4 mcg/kg IV: 0.5-2 mcg/kg Administer over 10 minutes	IN: 20-45 IV: 5-10	IN: 45-90 IV: 15-30	IN: 60-120 IV: 30-70	Bradycardia Hypotension Hypertension	None	Provides sedation and mild analgesia Use with caution in hypovolemia or reduced cardiac function
Etomidate	IV: 0.2-0.4 mg/kg Administer over 30-60 seconds	0.5-1	0.5-1	5-10	Myoclonus Nausea Vomiting Adrenal suppression-use with caution in sepsis	None	Provides sedation without analgesia Not to be given to patients with adrenal insufficiency Reduces intracranial pressure

							Lowers seizure threshold
Fentanyl	<p>IN: 0.5-2 mcg/kg (max: 100 mcg/dose)</p> <p>IV: 0.5-1 mcg/kg (max: 50 mcg/dose) Administer over 3-5 minutes</p> <p>IM: 1-2 mcg/kg (max: 50 mcg/dose)</p>	<p>IN: 5-10</p> <p>IV: 1-2</p> <p>IM: 7-8</p>	<p>IN: ~20</p> <p>IV: 10</p> <p>IM: 15</p>	<p>IN: ~50</p> <p>IV: 30-60</p> <p>IM: 60-120</p>	<p>Respiratory depression</p> <p>Hypotension</p> <p>Chest wall rigidity (associated with rapid administration)</p>	Naloxone	<p>Provides analgesia</p> <p>Can produce profound sedation when used in combination with benzodiazepines and other CNS depressants</p> <p>Avoid in patient with gastrointestinal obstruction</p>
Ketamine	<p>IN: 3-6 mg/kg Use 50 mg/mL or 100 mg/mL concentration</p> <p>IV: 1-2 mg/kg Administer over 1-3 minutes Use 10 mg/mL or 50 mg/mL concentration</p> <p>IM: 2-5 mg/kg Use 50 mg/mL or 100 mg/mL concentration</p>	<p>IN: 4-10</p> <p>IV: 1-2</p> <p>IM: 3-4</p>	<p>IN: 10-20</p> <p>IV: 5</p> <p>IM: 10</p>	<p>IN: 40</p> <p>IV: 30-60</p> <p>IM: 60-120</p>	<p>Hypotension, Dysphoria</p> <p>Hypersalivation</p> <p>Vomiting</p> <p>Tachycardia</p> <p>Hypertension</p>	None	<p>Provides sedation and analgesia</p> <p>Provides profound amnestic effect</p> <p>When given with propofol, reduce initial dose</p> <p>Seizures and agitation should be treated with benzodiazepines</p> <p>Ketamine-induced dystonia can be treated with diphenhydramine</p> <p>*Not to be given to patients with known or suspected psychosis</p> <p>Do not give in infants <3 months</p> <p>*Consider co-administration with midazolam for older children to manage</p>

							potential Emergency Reactions
Midazolam	IN: 0.2-0.5 mg/kg (max: 10 mg/dose) IV: 0.05-0.1 mg/kg (max: 10 mg/dose) Administer over 2-5 minutes IM: 0.05-0.15 mg/kg (max: 10 mg/dose) PO: 0.25-0.5 mg/kg (max: 20 mg/dose)	IN: 5-10 IV: 1-3 IM: 5 PO: 10-20	IN: 20-30 IV: 5 IM: 15-30 PO: 20-30	IN: 60-90 IV: 60-120 IM: 120-360 PO: 60-90	Respiratory depression Apnea Hypotension	Flumazenil	Provides sedation with no analgesia Avoid in patients with acute narrow-angle glaucoma Is associated with paradoxical reactions in pediatric patients such as aggressive behavior or hyperactivity
Propofol	IV: 0.5-2 mg/kg Administer over 20-30 seconds	0.5-1	6-7	5-10	Respiratory depression Apnea Hypotension	None	Provides sedation with no analgesia Can rapidly transition to deeper levels of sedation, especially with multiple bolus doses or in combination with other agents Reduces intracranial pressure

IN: intranasal; IV: intravenous; IM: intramuscular

*Duration is dose-dependent

~If using atomizer for IN medications, please account for loss of up to 0.1 mL of volume of medication.

~For IM injections, maximum volume is 1 mL. If dose is greater than 1 mL, it should be divided into multiple syringes.

Reversal Agents:

DRUG	DOSE	ONSET (minutes)	PEAK (minutes)	DURATION (minutes)	COMMENTS
Flumazenil	IV: 0.01 mg/kg (max: 0.2 mg/dose) Maximum cumulative dose: 0.05 mg/kg or 1 mg (whichever is lower) *may repeat dose every 1 minute until total cumulative dose is met	1-2	6-10	19-50	Duration can be shorter than some benzodiazepines, so may need repeat doses Should be avoided in patients with seizure disorders or patients who take chronic benzodiazepines
Naloxone	IN: 2-4 mg IV: 0.1 mg/kg (max: 2 mg/dose) IM: 0.1 mg/kg (max: 2 mg/dose)	IN: 8-13 IV: 2 IM: 2-5	IN: 20 IV: 10 IM: 15	IN: 30-120 IV: 30-81 IM: 30-120	Duration is shorter than most opioids, so will likely need repeat doses (every 20-30 minutes) May titrate dose to reverse hypoventilation without reversing analgesic effect.

IN: intranasal; IV: intravenous; IM: intramuscular

REVIEWED & APPROVED BY:

Oregon Emergency Department Regional Clinical Collaborative

Oregon Regional Children's Services Operations Council

Oregon Regional Children's Services Quality Assurance Committee

Oregon Regional Medical Director of Pediatric Anesthesia

Oregon Regional Senior Surgical Director of Pediatrics

CROSS REFERENCES:

Lippincott Procedures - *Postanesthesia care, pediatrics*

PH&S Oregon Region *Comfort Promise* policy

PH&S Oregon Region *ED Deep Sedation Practice Guideline: Deep Sedation* policy

PH&S Oregon Region *Moderate Procedural Sedation for Pediatric Patients* policy

PH&S Oregon Region *Procedural Sedation Credentialing for RNs* policy

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Attachments

[Attachment A: Ramsay Sedation Scale.pdf](#)

[Attachment B: State Behavior Scale.pdf](#)

[Attachment C: Aldrete Scoring System.pdf](#)

[Mallampati Classification Image.png](#)

Approval Signatures

Step Description	Approver	Date
Regional CNO	Jennifer Gentry: Chief Clinical & Nursing Ofcr	01/2022
ONLC/Nurse Executives	Camilla Collins: Dir-Nursing	01/2022
ONLC/Nurse Executives	Jason Plamondon: Chief Nursing Officer	01/2022
ONLC/Nurse Executives	Tina Mammone: Chief Nursing Officer Pstvc	01/2022
ONLC/Nurse Executives	Melissa Burns: Coo/Cne	12/2021
ONLC/Nurse Executives	Michael Dahlen: Chief Nursing Officer PMH	12/2021

ONLC/Nurse Executives	Katherine Kitchell: Chief Nsg Exec-Nsg Admin	12/2021
ONLC/Nurse Executives	Lisa Halvorsen: Chief Nursing Officer PWF	12/2021
ONLC/Nurse Executives	Rebecca Kopecky: Chief Nursing Officer	12/2021
Regional Director Nursing Practice Quality	Mary Waldo: Reg-Nsg Practice/Qual Dir	12/2021
Regional Children's Executive Quality Council	Lynne Frost: Reg Prog Mgr-Clin Stand Childr	12/2021
Regional Children's Services Clinical Operations Council	Lynne Frost: Reg Prog Mgr-Clin Stand Childr	12/2021

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