Moderate Sedation Certification Clinical Competency Assessment Program

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Contents

Introduction

Nursing personnel are involved with managing the care of patients receiving sedative or analgesic medications while undergoing invasive diagnostic or therapeutic procedures. Medication administration, patient monitoring, discharge instruction, family teaching and patient safety concerns are all critical care elements of patients undergoing sedation.

This competency manual is designed for Registered Nurses working in the ER, PACU, Operating Suite, Special Procedures, Gastroenterology, Endoscopy, Radiology, Ophthalmology, Plastic Surgery, Oral Surgery and any other surgical or procedural location where sedation is given.

This Sedation learning resource guide will provide the necessary information to administer approved drugs for Sedation. This competency includes proposed policies for your facility, standards of care, pharmacology, and complications related to the administration of medications, airway management, and age-specific patient assessment/considerations.

This competency manual teaches the position that registered nurses trained and experienced in critical care, emergency and/or peri-anesthesia specialty areas may be given the responsibility of administration and maintenance of moderate or conscious sedation in the presence, and by the order, of a physician. The registered nurse has the knowledge and experience with medications used and skills to assess, interpret and intervene in the event of complications. This registered nurse is an asset to the physician and enhances the quality of care provided to the patient.

Because of the importance assigned to the task of monitoring the patient who is receiving conscious sedation, a second nurse or associate is required to assist the physician with those procedures that are complicated either by the severity of the patient's illness and/or the complex technical requirements associated with advanced diagnostic and therapeutic procedures.

The registered nurse will be knowledgeable and familiar with their institution's guidelines as well as the Joint Commission for Accreditation of Health Care Organizations (Joint Commission), American Association of Nurse Anesthetists and the American Society of Anesthesiologists for patient monitoring, drug administration, and protocols for dealing with potential complications or emergency situations during and after sedation.

Position Statement Sedation Certification

Position Statement on the Role of the RN involved in the Management of Patients Receiving Sedation for Short-Term Therapeutic, Diagnostic or Surgical Procedures

Even though this manual was written for RNs the same responsibilities hold true for all healthcare professionals involved in the management of sedation.

Title: Responsibilities of the RN and other providers involved in giving and/or monitoring sedation.

Definition: Sedation provides a reduced level of consciousness in which the patient retains the ability to independently and continuously maintain an airway and respond appropriately to physical stimulation or verbal command.

Position: Sedation Certification teaches the position that registered nurses trained and experienced in critical care, emergency and/or peri-anesthesia specialty areas may be given the responsibility of administration and maintenance of sedation in the presence, and by the order, of a physician. The registered nurse has the knowledge and experience with medications used and skills to assess, interpret and intervene in the event of complications. The registered nurse is an asset to the physician and enhances the quality of care provided to the patient.

Because of the importance assigned to the task of monitoring the patient who is receiving sedation, a second nurse or associate is required to assist the physician with those procedures that are complicated either by the severity of the patient's illness and/or the complex technical requirements associated with advanced diagnostic and therapeutic procedures.

The registered nurse will be knowledgeable and familiar with **their** institution's guidelines as well as the guidelines of the accreditation organizations for their institution, the American Association of Nurse Anesthetists (AANA), the American Association of Moderate Sedation Nurses (AAMSN), the American Society of Anesthesiologists (ASA) for patient monitoring, drug administration, and protocols for dealing with potential complications or emergency situations during and after sedation.

Scope of Practice Registered Nurse

It is within the scope of practice of a registered nurse to manage the care of patients receiving moderate sedation during therapeutic, diagnostic, or surgical procedures provided the following criteria are met:

1. Administration of moderate sedation medications by non-anesthetist RNs is allowed by state laws and institutional policy, procedures, and protocol.

2. A qualified anesthesia provider or attending physician selects and orders the medications to achieve moderate sedation.

3. Guidelines for patient monitoring, drug administration, and protocols for dealing with potential complications or emergency situations are available and have been developed in accordance with accepted standards of anesthesia practice.

4. The registered nurse managing the care of the patient receiving moderate sedation shall have no other responsibilities that would leave the patient unattended or compromise continuous monitoring.

5. The registered nurse managing the care of patients receiving moderate sedation is able to:

   a. Demonstrate the acquired knowledge of anatomy, physiology, pharmacology, cardiac arrhythmia recognition and complications related to moderate sedation and medications.

   b. Assess total patient care requirements during moderate sedation and recovery. Physiologic measurements should include, but not be limited to, respiratory rate, oxygen saturation, blood pressure, cardiac rate and rhythm, and patient's level of consciousness.

   c. Understand the principles of oxygen delivery, respiratory physiology, transport and uptake, and demonstrate the ability to use oxygen delivery devices.

   d. Anticipate and recognize potential complications of moderate sedation in relation to the type of medication being administered.

   e. Possess the requisite knowledge and skills to assess, diagnose and intervene in the event of complications or undesired outcomes and to institute nursing interventions in compliance with orders (including standing orders) or institutional protocols or guidelines.

   f. Demonstrate skill in airway management resuscitation.

   g. Demonstrate knowledge of the legal ramifications or administering moderate sedation and/or monitoring patients receiving moderate sedation, including the RN's responsibility and liability in the event of an untoward reaction or life-threatening complication.

6. The institution or practice setting has in place an educational/competency validation mechanism that includes a process for evaluating and documenting the individual’s demonstration of the knowledge, skills, and abilities related to the management of patients receiving moderate sedation. Evaluation and documentation of competence occurs on a periodic basis according to institutional policy.

Providing Safe and Effective Sedation

Learning Objectives:

The learner will be able to:

1. Discuss the differences between minimal sedation, moderate sedation, deep sedation, and general anesthesia.
2. State four objectives/goals of sedation.
3. List guidelines for patient care during pre-procedure, intra-procedure, and post-procedure phases of sedation.
4. List the drugs, routes, and dosages for the drugs commonly used in Sedation.
5. Discuss antidotes, dosage, side effects, and indications for commonly used drugs with CS.
6. Describe signs and symptoms of partial and complete airway obstruction.
7. Demonstrate interventions to correct partial and complete airway obstruction.
8. Identify side effects and contraindications to medications that have the potential to suppress a patient's protective reflexes.
9. Explain the significance of utilizing the ASA classification during pre-procedural pediatric and adult assessment.
10. Integrate age-specific principles into care of the pediatric and geriatric patient undergoing sedation.
11. Document clearly, completely, and according to established standards, policies and instructions.
12. List safety criteria for administering safe sedation.
13. Describe how to manage complications, which might arise during sedation.

Definition of Terms

Minimal Sedation (Anxiolysis)

Minimal sedation is equivalent to anxiolysis, that is, a drug-induced relief of apprehension with minimal effect on sensorium. 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.
The following signs can be used to identify minimal sedation (anxiolysis):

- Normal response to verbal stimulation
- Airway unaffected
- Spontaneous ventilation unaffected
- Cardiovascular function unaffected

Moderate Sedation/Analgesia

Moderate sedation is 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.
The following signs are highlighted during this depth of anesthesia:

- Purposeful response to verbal or tactile stimulation
- No airway intervention required
- Spontaneous ventilation adequate
- Cardiovascular function usually maintained

Notes:
Reflex withdrawal from a painful stimulus is NOT considered a purposeful response.
Practitioners involved with moderate sedation must be prepared to "rescue" from deep sedation.

Deep Sedation/Analgesia

Deep sedation is a drug-induced depression of consciousness during which patients are not 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.

The following signs highlight deep sedation/analgesia

- Purposeful response following repeated or painful stimulation
- Airway intervention may be required
- Spontaneous ventilation may be inadequate
- Cardiovascular function usually maintained

Note:
Reflex withdrawal from a painful stimulus is NOT considered a purposeful response.
Providers of deep sedation/analgesia must be prepared to "rescue" from general anesthesia.
Deep sedation should be performed in appropriate settings *only* by providers credentialed to do so.

General Anesthesia

General anesthesia is the induction of a state of unconsciousness with the absence of pain sensation over the entire body, the administration of an ascetic drugs. It is used during certain medical and surgical procedures and may include.

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. General anesthesia will be performed by credentialed anesthesia providers under the standards of anesthesia care.

Description	*Minimal Sedation*	*Moderate Sedation/ Analgesia*	*Deep Sedation/ Analgesia*	*General Anesthesia*
Responsiveness	Normal response to verbal stimulation	Purposeful response to verbal or tactile stimulation	Purposeful response following repeated or painful stimulation	Unarousable even with painful stimulus
Airway	Unaffected	No intervention required	Intervention may be required	Intervention often required
Spontaneous Ventilation	Unaffected	Adequate	May be inadequate	Frequently inadequate
Cardiovascular Function	Unaffected	Usually maintained	Usually maintained	May be impaired

Level of Sedation/Analgesia/Anesthesia

Accreditation Organizations for Health Care Organizations

Accrediting Facilities include

- Joint Commission for Health Care Organizations
- National Intergraded Accreditation for Health Care Organizations (NIAHO) in affiliation with Det Norske Ventas (DNV)
- Health Care Accreditation Association for Ambulatory Health Care (AAAHC)
- Healthcare Facility Accreditation Program (HFAP)

Joint Commission Policy & Preparation are discussed in this competency

Joint Commission standards on sedation and anesthesia apply whenever patients receive moderate sedation, deep sedation or general anesthesia. They do not apply when patients receive anxiolysis/minimal sedation. It is important to note that the Joint Commission standards on sedation and anesthesia make no distinction between types of practitioner, type of procedure, classification of drug or route of administration. In contrast, the distinction arises only with the level of sedation the patient receives, specifically anything more than minimal sedation.

Joint Commission Guidelines

Joint Commission 2000 by Dean Smith, MD

Revisions to Anesthesia Care Standards Comprehensive Accreditation Manual for Hospitals

"Qualified individuals" conducting sedations must possess education, training and experience in:

1. **Evaluating** patients prior to moderate or deep sedation
2. **Rescuing** patients who slip into a "deeper than desired" level of sedation or anesthesia.
3. **Managing** a compromised airway during a procedure.
4. **Handling** a compromised cardiovascular system during a procedure.

Care of Patients

TX 2 Moderate or deep sedation and ANESTHESIA are provided by qualified individuals.

TX 2.1 A presedation or ANESTHESIA assessment is preferred for each patient before beginning moderate or deep sedation and before ANESTHESIA induction.

TX 2.1.1 Each patient's moderate or deep sedation and ANESTHESIA care is planned.

TX 2.2 Sedation and ANESTHESIA options and risks are discussed with the patient and family prior to administration.

TX 2.3 Each patient's physiological status is monitored during sedation or ANESTHESIA administration.

TX 2.4 The patient's post procedure status is assessed on admission to and before discharge from the postsedation or POSTANESTHESIA recovery area.

TX 2.4.1 Patients are discharged from the postsedation or POSTANESTHESIA recovery area and the organization by a qualified licensed independent practitioner or according to criteria approved by the medical staff.

Joint Commission Standard Question

Q. Does the person administering sedation have to be qualified to monitor the patient if other staff who are present are qualified?

A. Standard PC.13.20 requires a sufficient number of staff, in addition to the person performing the procedure, be present to perform the procedure, monitor and recover the patient.

Joint Commission Policy

- *The person administering the medication must be qualified to manage the patient at whatever level of sedation or anesthesia is achieved, either intentionally or unintentionally.*
- Must be able to manage one level deeper
- There may be a need for additional monitoring personnel, but the person administering the sedation must be qualified to monitor the patient.

Joint Commission Policy – Permission to Administer Moderate Sedation

Q: Are specific privileges to administer moderate sedation required?

A: The anesthesia care standards require that the individuals who are "permitted" to administer sedation are able to perform airway & cardiac rescue.

Joint Commission Policy – Permission to Administer Moderate Sedation

Each **organization** is **free** to define how it will determine that the individuals are able to perform the required types of rescue.

Acceptable examples include, but are not limited to, ACLS certification, a satisfactory score on a written examination developed in concert with the department of anesthesiology, a mock rescue exercise evaluated by an anesthesiologist.

The following proposed revision by Joint Commission could affect the above recommendation that the department of anesthesiology be involved in the development of a RN certification program. The reason would appear to be because many facilities doing sedation do not have Anesthesia LIPs on staff.

Joint Commission is proposing a revision of the Anesthesia Standard. There are 2 proposed changes. One is to remove the requirement that a licensed independent practitioner (LIP) be involved AT ALL during the performance of surgery and sedation or anesthesia [PC.13.20]. The other change is to remove the requirement for involvement of an LIP in the planning of sedation or anesthesia [EP.11].

Joint Commission Policy – Permission to Administer Moderate Sedation

With regard to non-Licensed Independent Providers (LIPs), such as nurses, who are permitted to administer the sedation, the permission could be found in the individual's job description, or other documentation in their personnel file.

Goals of Sedation

Maintenance of adequate ventilation, homeostasis and circulation

- A – B – C's
- Intravenous line is essential (except in some special cases of oral sedation)
- Supplemental oxygen is appropriate for most cases

Maintenance of appropriate level of consciousness

- Alteration of mood
- Still able to cooperate
- Some degree of amnesia is desirable

Promotion of comfort

- Elevation of pain threshold to produce satisfactory analgesia
- Increase patient cooperation

Ensuring patient safety by realizing potential for *possible* consequences of:

- Respiratory depression
- Airway obstruction
- Apnea
- Hypoxia
- Hypercapnia
- Bradycardia
- Asystole
- Brain injury/brain death

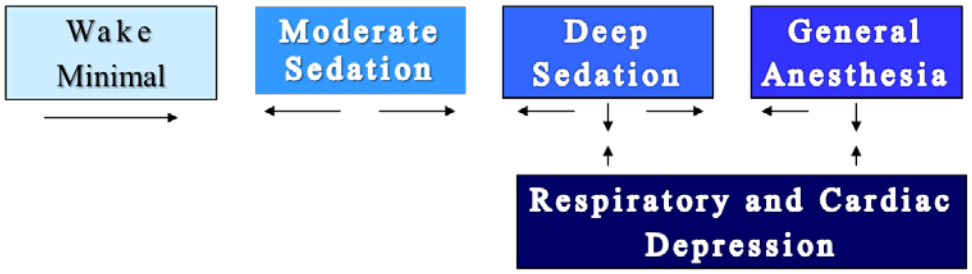
Sedation Continuum of Care

Consciousness …… minimal sedation ……. moderate sedation ……. deep sedation ……. anesthesia ……. coma ……. DEATH

The goal of the nurse and provider managing the sedation patient on this continuum is "sedation".

The person doing the sedation/monitoring must be able to rescue at any level of sedation.

Sedation Continuum of Care



Undesirable Effects of Sedation when the continuum of care goes beyond moderate sedation

Awake – If sedation is ineffective ….. The patient shouldn't have to tough it out!

Over Sedation, "toxicity" ….. A definite risk; when sedation becomes deep-sedation or general anesthesia and results in the following:

- Respiratory depression
  - hypoxia
  - hypercapnia
  - airway obstruction
  - brain injury
- Cardiovascular depression
  - Hypotension
  - Bradycardia
  - Asystole
  - Arrhythmias

Competency Quiz 1 (Answers in the appendix)

1. Which of the following is most often involved with managing care of patients receiving sedative or analgesic medications while undergoing invasive diagnostic or therapeutic procedures.
   a. Nursing Personnel
   b. Human Resources
   c. Pharmacy Personnel
   d. Hospital Administration

2. This competency assessment provides the necessary information to administer approved drugs to deliver an appropriate level of _____ Sedation.
    a. Deep
    b. Minimal
    c. Moderate
    d. Awake
3. A _____ _____ or associate is required to assist the physician with those procedures that are complicated.
    a. First Doctor
    b. First Nurse
    c. Second Doctor
    d. Second Nurse
4. _____ provides a minimally reduced level of consciousness in which patients retains the ability to independently and continuously maintain an airway
    a. Deep Sedation
    b. Moderate Sedation
    c. Mild Sedation
    d. Severe Sedation
5. The competency module was developed by _____ in validation of mechanism for registered nurse to assume multifaceted role
    a. Healthy Lifestyle
    b. Joint Commission
    c. Healthy Visions
    d. None of the Above
6. The scope of practice for a registered nurse includes:
    a. Airway management skills
    b. The ability to use oxygen delivery devices
    c. The ability to recognize possible complications of medications
    d. All the above
7. Which of the following is <u>not</u> a suggested prerequisite for Non-Anesthetist Administering Sedation?
    a. Institutes Medication Certificate
    b. Current ACLS Certification
    c. Initial institutions IV insertion certification IV push certification
    d. None of the Above
8. A drug-induced state during which patients respond normally to verbal commands.
    a. Moderate Sedation
    b. Minimal Sedation
    c. Deep Sedation
    d. None of the above
9. It is a drug-induced depression of consciousness during which patients cannot be easily aroused but respond purposefully repeated or painful stimulation.
    a. Moderate Sedation
    b. Minimal Sedation
    c. Deep Sedation
    d. None of the Above

10. It is a drug-induced loss of consciousness during which patients are not arousable, even by painful stimulation
    a. Moderate Sedation
    b. Minimal Sedation
    c. Deep Sedation
    d. None of the above
11. These are the goals of sedation, EXCEPT:
    a. Maintenance of adequate ventilation, homeostasis and circulation
    b. Maintenance of appropriate level of consciousness
    c. Promotion of Safety
    d. Ensuring Patient Safety
12. The goal of the nurse and provider managing the conscious sedation patient on this continuum is _____.
    a. Anesthesia
    b. Consciousness
    c. Sedation
    d. All of the above

Requirements for Quality Sedation

1. Motivated team
    - Patient
        - Psychologically suitable
        - No medical contraindications (i.e. must meet ASA Classification requirements)
        - Prepare with appropriate education
    - Skilled providers for Sedation
        - Credentialed and privileged provider
        - Registered nurse who has completed this competency program
2. Appropriate time estimate of procedure
    - Sedation most effective for procedures requiring less than two hours to complete.
    - Alternative pain management options should be discussed, if procedure is predicted to be greater than 2 hours.
3. Role of the Sedation Nurse
    - Pre-operative Assessment
    - Intra-operative Actions as defined by the procedure
    - Post-operative Monitoring
    - Patient-specific Discharge Instructions

Assignment of ASA Physical Status

Use of sedation outside the main Operating Room is intended for either healthy patients or those with minimal illness. Before undergoing sedation, all patients are assessed by the physician and nurse performing the procedure using the American Society of Anesthesiologists Physical Status Classification System. This system helps qualify relative risk to patients requiring sedative medications. The higher the level of classification, the more the health care team must be alert for possible complications of sedation.

Adult patients classified as ASA 3 *unstable* or greater require sedation to be delivered by anesthesia providers.

Pediatric patients <9 months or pediatric patients classified ASA 3 *stable* or greater should receive sedation by an anesthesia provider.

Physical Status Classification of the American Society of Anesthesiologists (ASA)

Class I — A normally healthy patient.
e.g. No chronic illness, no regular medications

Class II — A patient with mild systemic disease.
e.g. Controlled hypertension and Type II Diabetes. History of tobacco use. Obesity, Non-metastatic carcinoma. A well-controlled asthma patient with no recent exacerbations. A child with underlying cerebral palsy. A child with a well-controlled seizure disorder.

Class III — A patient with severe systemic disease.
e.g. Poorly controlled hypertension. Multiple medications for cardiac, respiratory and/or metabolic disorders. Metastatic disease with some interference with function.

This may be divided into STABLE and UNSTABLE categories:

Stable: Controlled insulin-dependent diabetic with hypertension and mild renal disease. A child with congenital heart disease stable on digoxin and Lasix.

Unstable: Frequent asthma attacks needing ER visits or intubation. Brittle, or difficult to control, insulin dependent diabetic. Severe COPD, on multiple inhalers and difficulty breathing in supine position.

Class IV — A patient with severe systemic disease that is a constant threat to life.
e.g. Metastatic disease with severe organ dysfunction. Severe hypertension with angina. Recent MI with continuing symptoms.

Class V A moribund patient who is not expected to survive.
e.g. Poorly responsive cardiogenic shock. Ruptured Abdominal Aortic Aneurysm with severe hypotension. Head trauma with increasing ICP

Class VI Declared brain-dead patient whose organs are being removed for donor purposes

Pre-Operative Nursing Assessment

AAMSN Recommended Practice
"Each patient to receive intravenous sedation/analgesia should be assessed physiologically and psychologically before the procedure", and documented in the patient's medical record.

Joint Commission Standard PE.1.8.1
Any patient for whom moderate or deep sedation or anesthesia is contemplated receives a presedation or preanesthesia assessment.

Step 1 … Chart Review

1. Past Medical Illnesses
   - Previous medical and surgical illness.
   - Allergies

2. Prior Surgical Procedures
   - Look at anesthesia and SEDATION records for information about airway management, drug reactions and intra-anesthetic complications.
   - A previous uncomplicated procedure cannot be taken as a guarantee of a problem-free course.

3. Laboratory Studies – defined by institutional policy.
   - Each patient's lab studies should be appropriate for physical status.
   - Potentially fertile females between the ages of 8 and 55 need a urine HCG prior to sedation.

4. Current Medications
   - Prescription
   - Over-the-counter (aspirin/ibuprofen)
   - Compliance of medication regimen

5. Ancillary Studies (recommended)
   12-lead ECG for females over age 50 and for males over age 40, and anytime a patient reports questionable information regarding the cardiac system: e.g. chest pain, SOB, high blood pressure, edema or murmur. The need for ECG will be determined by the provider who is performing the procedure.

Step 2 … Patient Interview

1. Location, timing, privacy, establishment of good rapport between nurse and patient is essential. Lessening of stress may even decrease the amount of medication required.

2. General Health Data:
   Patient Interview:

   a. Age – Identify any age-specific needs.

   b. Height and Weight (in kg).

   c. Vital Signs.

   d. Medications – current medications and dosage, including over the counter ones. Assess the patient to determine date and time that all medications were last taken. Present medications should be taken with a sip of water before procedures (i.e. anti-hypertensives, cardiac meds, antidepressants, inhalers and bronchodilators).

   e. Allergies – note actual allergic response and differentiate from an adverse reaction to the medication. Symptoms of allergic response include: urticaria, hypotension, airway edema, hives, wheezing, bronchospasm, circulatory collapse. Examples of adverse reactions are: nausea and vomiting, drowsiness.

   f. Cigarette smoking – number of packs smoked per day and number of years of smoking. Cigarette smoke increases airway irritability, decreases mucociliary transport and increases secretions. Smokers have higher levels of carbon monoxide in their systems, putting them at greater risk for hypoxemia.

   g. Alcohol use – assess how much alcohol consumed on a daily or weekly basis. Patients with heavy/daily use may require additional sedative and analgesic medications, unless the patient has hepatic and multisystem disease associated with chronic alcohol use, in which case less medication should be used. Recovery may take significantly longer for these patients. Assess patient on the day of the procedure for signs of acute intoxication.

   h. Other substance use/abuse – Assess for use of illicit substances such as cocaine or marijuana. Ask if patient taking over-the-counter stimulant or weight reduction medications, or if they are using narcotics and benzodiazepines on a regular basis. These patients may have a greater tolerance to the sedation medications that you administer.

   i. Psychosocial – Assess the patient's verbal and nonverbal behaviors to establish the degree of anxiety about the procedure, ability to understand instructions and communicate verbally. Identify availability of social support systems and potential cultural barriers.

j. NPO status: ASA fasting recommendations 2011

Ingested Material	Minimum Fasting Period	Ingested Material	Minimum Fasting Period
Clear liquids	2h	Nonhuman milk	6h
Breast milk	4h	Light meal	6h
Infant formula	6h	Full meal / Fat	Up to 8h

k. Check on vested responsible adult escort. The adult should be present when home care instructions are reviewed with patient.

l. Menstrual history – urine HCG for potentially fertile women (check institution policy).

m. Past facial/neck trauma or surgeries – Temporomandibular Joint (TMJ) Examination. The patient should have good TMJ mobility in case an airway is needed to be inserted orally in the event of respiratory distress. In the adult, the distance between the upper and lower central incisors is usually 4-6 cm. Reduced TMJ mobility may be indicated by a clicking sound, pain associated with opening of the mouth, or a distance less than 4 cm upon opening. This may reveal that patient is at risk for difficult intubation due to anatomical limitations.

n. Dentition – Assess patient to identify loose, chipped, cracked or capped teeth, dental anomalies, crowns, bridges, and dentures. Knowledge of any removable items in the mouth is required in case of intubation. Be certain to document any pre-existing damage of teeth to preclude later potential blame.

Step 3 … Physical Exam and Review of Systems

1. Cardiovascular System

a. History of an MI – How long ago was (were) the MI(s). Elective procedures may be postponed until at least 6 months post-MI to decrease the incidence of reinfarction.

b. Hypertension – identify method of management and degree of compliance

c. Coronary Artery Disease - Assess for angina – if positive, have them identify frequency, location, duration, radiation, methods of relief and whether their pattern of angina is stable.

d. Recent cardiac surgery.

e. Congestive heart failure – shortness of breath at rest, with exercise or activity? Paroxysmal nocturnal dyspnea, will patient be able to lie flat for the procedure?

f. Valvular heart disease – Auscultate for presence of murmur … will patient require subacute bacterial endocarditis (SBE) prophylaxis before and after procedure?

g. Cardiac dysrhythmias – type? How does the patient tolerate it?

h. Pacemaker or Automatic Internal Defibrillator – underlying rhythm? Is patient pacer dependent?

i. Cardiovascular physical assessment should include: skin color, peripheral pulses, presence of edema or jugular vein distention (JVD), baseline heart rate, blood pressure and auscultation of heart sounds.

2. Pulmonary System

Most sedative and analgesic medications interfere with spontaneous ventilation. Prevention of pulmonary complications requires thorough pre-procedure assessment and planning.

a. Sedation is riskier for patients with the following pulmonary conditions: Chronic Obstructive Pulmonary Disease (COPD), emphysema, bronchitis, asthma, tuberculosis, pneumonia, lung surgery, sleep apnea syndrome

b. Assess if patient having any of the following **current** symptoms: cough, sputum production, rhinitis, sore throat, dyspnea, hemoptysis, wheezing. Notify the physician. Acute Illness: Teach patient to notify clinic/physician if any of the above symptoms develop at any time prior to the procedure.

c. Extra precautions should be taken with asthmatic or chronic bronchitis patients. If the patient uses a metered-dose inhaler, they should bring it with them on procedure day. Presence of wheezing even with bronchodilator and steroid therapy should be referred to the anesthesia department or considered for rescheduling

d. Use of O_2 at home?

e. Identify physical characteristics which may indicate the potential for difficult airway management: significant obesity, short thick neck, limited neck ROM, deviated trachea, hypognathic (recessed) jaw, hypergnathic (protruding) jaw, small mouth opening (< 3 cm), high arched palate, macroglossia (large tongue), protruding teeth, loose teeth or dentures, non-visible uvula, tonsillar hypertrophy

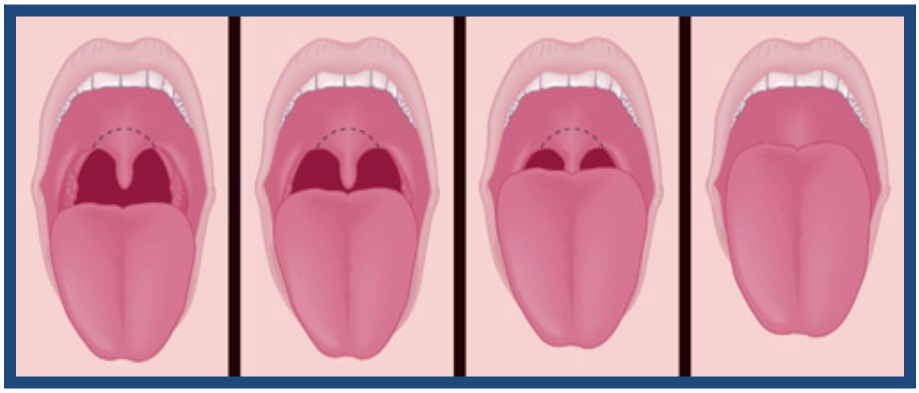
Mallampati Airway Classification System– Classify the patient's airway using this system. This system is used to predict patients who may be prone to difficult intubation. The same patients are also prone to difficult airway maintenance while sedated!

- Extremely easy-to-perform, no cost, preoperative exam
- Considered accurate predictors of subtle anatomic causes of intubation difficulty.

- Patient should sit upright with the head in a neutral position and asked to open mouth as wide as possible and to protrude the tongue as far as possible (Do not ask the patient to say “ah”). Classification can then be made as follows per visualization of the following structures in the oral cavity; uvula, faucial pillars, and soft palate. A difficult endotracheal intubation is predicted for Class III & IV patients. Class III and IV require anesthesia consultation.

Mallampati Airway Classification

Class I:	Soft palate, uvula, anterior and posterior tonsillar pillars.
Class II:	Soft palate, fauces, uvula
Class III:	Soft palate, base of uvula
Class IV:	Soft palate not visible at all



Class I Class II Class III Class IV

3. Endocrine System
   a. Assess for the presence of:
      1) **Diabetes** – Identify type of DM and how patient manages their disease, ie. Insulin, oral agents, diet. For diabetic patients:
         - Provide clear instructions regarding their p.o. medications or insulin prior to scheduled procedure.
         - Assess patient’s actual management of medications prior to procedure.
         - Make every attempt to schedule the diabetic patient as first case of the day. If they are scheduled for procedures in the afternoon, consult with Anesthesia regarding medication regime recommendations.

      2) *For patients well controlled on oral hypoglycemics who are receiving sedation for a short-term procedure (<1 hour), generally, the following instructions may be utilized:*

- Do not take normally scheduled AM dose of oral hypoglycemic secondary to the long-term effects of possibly greater than 36 hours.
- The morning of the procedure, a finger stick glucose is required to assess the patient's glucose level.
- A follow-up finger stick after the procedure should be done to assess the need for intervention.

3) *For longer procedures >1 hour and for well controlled insulin-dependent patients, the following guidelines are provided:*

- Consultation to anesthesia for medication recommendations is required.
- Patients usually receive their normal dose of NPH the evening prior to the procedure and half their prescribed AM dose on the morning of the procedure.
- Finger stick glucose should be obtained every 30 minutes during the procedure and every hour during recovery.

DANGER: Under deep sedation insulin dependent diabetics signs of hypoglycemia are masked and blood sugar may fall dangerously low.

b. **Hyperthyroidism or hypothyroidism** – The pharmacologic effects of sedative and analgesics may be altered in these conditions and airway management may be more difficult in both situations. The thyroid gland may be enlarged in hyperthyroidism. The tongue may be enlarged in hypothyroidism.

4. Neurologic System

Ask patient if they have a history of the following: TIA, CVA, seizure disorder or head trauma, convulsive disorders or epilepsy. Assess the following – general affect & behavior, speech pattern alterations, level of consciousness, orientation and gait. If local anesthesia is to be used, it is important to determine the presence of pre-existing numbness or weakness.

5. Hepatic System

Assess patient for medical history of hepatitis or cirrhosis. Patients with impaired liver function may exhibit altered drug metabolism and elimination, which can result in either resistance to sedation medications or increased sensitivity to the medications.

6. Gastrointestinal System

Assess the patient for the following symptoms and conditions: nausea, vomiting, diarrhea, constipation, GI bleeding, GI surgery or Gastric reflux. A histamine blocker may be ordered for the patient with gastric reflux. A non-particulate antacid, such as bicitra, may also be considered.

7. Renal System

Renal disease impairs excretion of sedation medications and their metabolites. Assess the patient for renal insufficiency or renal failure. These patients will probably require pre-procedure consultation and may not be candidates for nurse-monitored sedation. The nurse will need to collaborate with the physician to closely regulate the patient's fluid status. If the patient has an AV fistula (peripheral vascular cannulation site), avoid blood pressure measurements and IV insertions on that extremity.

Assess the patient's fluid status as indicated by the length of NPO status, urine output, skin turgor, mucous membrane appearances, blood pressure, and heart rate.

8. Musculoskeletal System
   Ask the patient if they have a history of arthritis or recent fractures. Assess level of mobility, range of motion, muscle strength and neurovascular status in affected areas.

9. Integumentary System - comprises the skin and its appendages (including hair, scales, feathers, hooves, and nails). Assess skin, color, temperature, turgor, and integrity.

10. Anesthesia and Surgical History
    Ask the patient what surgeries or procedures they have had in the past and type of anesthesia. Ask whether or not the patient had any complications associated with past anesthesia including reactions to medications, nausea and vomiting, or airway difficulties. *Any patient reporting a history of airway difficulties should be referred to Anesthesia for their recommendations*.

11. Review of Laboratory Data
    Review results of pre-laboratory data as ordered by the physician. Verify that a pregnancy test according to institution policy has been completed on all females of childbearing age. Notify the physician of any abnormalities.

Sedation in the pregnant patient requires obstetric and anesthesia consultation.

Verification of Compliance with Pre-Procedure Instructions

1. *Informed Consent*: The physician is responsible for explaining the proposed procedure, potential *complications of the procedure, use of sedation, and potential risks and alternatives to sedation. Verify that informed* **consent has been obtained before administration of any sedation.**

2. *NPO Status: Analgesics and sedatives have an inherent side effect of nausea and vomiting. Additionally, patients may enter a state of deep sedation and lose protective reflexes that protect them from aspiration of gastric contents. The goal for the pre-procedure patient undergoing sedation is to prevent vomiting and aspiration of gastric contents by ensuring minimal gastric contents.*

3. *Procedure-specific instructions:* Assess if patient completed activities specific to the procedure such as showers, enemas and medications.

4. *Escort:* Stress the necessity of identifying an adult non-medical attendant to escort *and stay* with patient at home post sedation. For some patients and types of procedures, it is recommended that the patient have home assistance for 12-24 hours after the procedure. Identify the presence of the patient's escort on the day of the procedure and document their presence and their name. Do not begin sedation if the escort did not accompany the patient.

5. *Pre-Procedure Teaching:* Teaching should include at home preparation for the procedure, NPO status, procedure specific preparation such as surgical preps, medication use, intra-procedure expectations about the procedure and the use of sedation, post-procedure expectations including immediate recovery, discharge instructions and the need for an escort.

   However, you may not meet the patient until the day of the procedure, so assess **FIRST** what the patient already knows, and address additional learning needs. The goals of pre-op teaching are to increase patient compliance during and after the procedure and decrease the patient's anxiety.

   Patient teaching should also cover the following:

   a. Intra-procedure events:
      - Length of procedure, room temperature, positioning for the procedure and safety measures.
      - Inform the patient if and they will not be able to move certain parts of their body during the procedure.
      - Infection control measures, need for IV access, types of monitoring equipment that will be used: pulse oximeter, cardiac monitor, and automatic BP cuff
      - Sedation medications that will be used and the expected effects of those medications. Tell the patient the following: They will not be asleep during the procedure, but should feel drowsy and relaxed; they may not remember the procedure later, and that you will be talking with them throughout the entire procedure.
      - Expected sensations during the procedure. If the procedure is expected to cause discomfort, let the patient know they will be given medication to lessen the pain (although it may not relieve it entirely). Identify a method they can use to let you know if they need more pain relief.

   b. Post-procedure (recovery) events:
      - Sensations, length of time and how they will be monitored
      - Discharge criteria that must be met before discharge

The pre-procedure assessment and teaching must be documented on the appropriate form before administering sedation medications.

Intra-operative Nursing Actions

1. Continuous IV access

   A continuous infusion of IV fluids using a recommended 20G catheter or larger for adults (Check institution policy, some may be different) should be used and maintained throughout the sedation and recovery period. See facility policy.

2. Oxygen delivery

   Oxygen must be readily available for administration by mask or nasal cannula, but need not be utilized if oxygen saturation remains at a satisfactory level in the judgment of the attending provider or as stated by institution policy.

3. Monitoring and documentation

Assess:

- Respiratory: Rate & depth of respirations, patency of airway – most respiratory problems associated with sedation are caused by the effect of medications, which decrease the rate and depth of ventilations or impair airway patency. These effects usually occur before pulse oximetry readings fall. Listen for equal, bilateral breath sounds and adequacy of tidal volume. The patient should have a minimal SpO_2 of 95% on room air or supplemental oxygen.

- Pulse: Periodically assess rate, skin temperature, color, and capillary refill. Most medications used during sedation have minimal effects on the heart rate and blood pressure if the patient is in the supine position. Meperidine may cause an increase in heart rate; all other narcotics tend to decrease the heart rate.

- Blood Pressure: Use the appropriate sized cuff, assess every 5 minutes throughout the procedure; more frequently if aberrations noted.

- Cardiac monitoring: The patient will be monitored continuously until discharge criteria is met. The monitoring RN will stay with the patient continuously during a procedure. According to the joint commission the art and monitoring the patient should not be engaged in tasks that would compromise continuous monitoring. Print a pre and post sedation rhythm strip and include any arrhythmia activity or events.

- Level of consciousness (LOC): It is important to assess and document baseline LOC prior to the initiation of sedation. During sedation and recovery, LOC will be documented at least every 15 minutes.

To assess:

- Ask patient to take a deep breath, this not only assesses their ability to follow a verbal command, but also causes chest expansion and helps prevent hypoventilation.

- Ask the patient a simple question that requires them to verbalize.

- The optimally sedated patient will be drowsy, close their eyes, but should be aroused easily when you call their name or gently shake them. Speech may be slightly slurred.

- Patients may momentarily react to a painful stimulus. Be aware that sedation may result in disinhibition and the patient may make purposeful movements in an attempt to remove painful stimulus.

- The following signs are indicative of deepening levels of sedation: Slurred speech, becoming less responsive, more lethargic and unarousable. Should these occur, notify the physician immediately and monitor the patient for potential respiratory depression.

Documentation:

The following scale may be used to document LOC during the sedation procedure and recovery:

1. Alert, awake, oriented
2. Occasionally drowsy, easy to arouse
3. Frequently drowsy, able to arouse
4. Sleeping, slow to arouse
5. Somnolent, unable to arouse

Other aspects to monitor: Include anxiety, pain and/or restlessness. Restlessness may indicate anxiety or pain; however, it might also be an early indicator of hypoxemia or a pre-syncopal episode. Hence, if your patient becomes restless, assess for multiple causes.

Requirements:

Assessment and documentation of vital signs (including heart rate and blood pressure), respiratory rate and SpO_2 every 5 minutes during a procedure due to the potent effects of benzodiazepines and narcotics on the circulatory system. Level of consciousness will be documented at least every 15 minutes.

4. Medication Administration
   Administer medications as ordered. Documented medications ordered by the provider.

5. Provide nursing support interventions during the procedure
   - Talk to the patient using therapeutic, positive and reassuring language. Avoid conversations in the room, which ignore the patient. Avoid conversations, which might be misinterpreted by a sedated patient.
   - Keep the patient informed of the progress of the procedure.
   - Touch the patient gently when assessing ventilations, skin temperature, LOC, or when reassuring them.
   - Attend to basic comfort needs of the patient, such as repositioning.
   - Observe the patient for nonverbal indicators of pain and anxiety.

6. Report these observations to the physician immediately
   - Restlessness: See above
   - Cyanosis: A late sign of hypoxemia
   - Pallor: Patients experiencing vasovagal symptoms are likely to become very pale.
   - Flushing: Is a possible sign of a developing allergic reaction.

- Diaphoresis: Consider the possibility of myocardial ischemia. Assess for chest pain. Check for changes in vital signs and the ECG (look for ST segment elevation, T wave depression or inversion).
- Nausea: Check for causes including: narcotics, pain, hypotension, vagal episodes, anxiety and hypoglycemia.

Treat the cause not the symptom.

Competency Quiz 2 (Answers in the appendix)

1. The use of sedation outside the operating room is intended for either healthy patients or those with _____ illness.
    a. Severe
    b. Minimal
    c. No
    d. None of the above
2. A Patient with a severe systemic disease is considered to be in which ASA class?
    a. Class I
    b. Class II
    c. Class III
    d. Class IV
3. The ASA classification of a patient with a severe systemic disease that is a constant threat to life is.
    a. Class I
    b. Class II
    c. Class III
    d. Class IV
4. All of the following are part of Step 1 of the chart review in pre-operative nursing assessment, EXCEPT.
    a. Prior Surgical Procedures
    b. Past Medications
    c. Past Medical Illnesses
    d. Ancillary Studies
5. The need for ___ will be determined by the provider who is performing the procedure.
    a. ECG
    b. EMG
    c. SOB
    d. EST
6. Step 2 of pre-operative nursing assessment is called the:
    a. Patient Interview
    b. Chart Review
    c. Physical Exam
    d. None of the Above

7. Shortness of breath and Paroxysmal nocturnal dyspnea are associated with which of the following:
    a. Valvular Heart Disease
    b. Congestive Heart Failure
    c. Hypertension
    d. Coronary Artery Disease
8. Most sedative and analgesic medications interfere with spontaneous _____.
    a. Interference
    b. Treatment
    c. Ventilation
    d. Respiration
9. The _____ classification system can be used to predict if a patient may be prone to difficult intubation.
    a. Pulmonary System
    b. Cardiovascular System
    c. Mallampati Airway
    d. Endocrine System
10. The Thyroid Gland may be enlarged in patients with _____.
    a. Hyperthyroidism
    b. Hypothyroidism
    c. Thyroid Narcosis
    d. Hypoglycemia
11. _____ impairs excretion of sedation medications and their metabolites.
    a. Renal Disease
    b. Heart Disease
    c. Endocrine Disease
    d. Skin Disease
12. Which of the following must be readily available for administration by mask or nasal cannula?
    a. Water
    b. Carbon Dioxide
    c. Oxygen
    d. None of the Above

Medications for Moderate Sedation

Introduction: There is no single medication that will meet all needs for sedation. In most cases, combinations of medications are administered.

Prescribing and ordering

Joint Commission requires organizations to institute formal procedures for limiting risk associated with prescribing and ordering medications. The standards identify 10 specific areas that health care facilities are required to address, seven are relevant to anesthesia and conscious sedation.

The seven are:

1. Distribution, administration and/or disposal of controlled medications, such as narcotics and sedatives or hypnotics, including adequate documentation and record keeping, as required by state and federal law.

2. Proper storage, distribution and control of investigational medications and those in clinical trial.

3. Situations in which all or some of patient's medication orders must be permanently or temporarily concealed and mechanisms for reinstating them.

4. (PRN) " as needed" prescriptions or orders and times of dose administration;

5. Control of sample drugs.

6. Distribution of medications to patients at discharge.

7. Procurement, storage, control, and distribution of prepackaged medications obtained from outside sources (CAMH, August 1997 update, TX-21).

The most frequently prescribed sedation/analgesia medications are listed here.

1. **Benzodiazepines** – Specific Agents: Midazolam (Versed), Diazepam (Valium)

- Most widely used drugs for Sedation

- Probably work in the limbic system and amygdala of the brain, where fear, anxiety and apprehension arise.

- Attach to receptor sites in the cerebral cortex, enhancing gamma-aminobutyric acid (GABA) and inhibiting excitatory impulses: anxiolysis…reduction of anxiety, amnesiac…reduces ability to recall events surrounding administration, anti-convulsive …stops seizures, skeletal muscle relaxation, sedative …hypnotic in large doses

- Patients who chronically take cimetidine (Tagamet) or ranitidine (Zantac) are especially susceptible to benzodiazepine overdose…these H-2 blocking drugs may dramatically increase the sedative effect of even small doses of benzodiazepines.

- Narcotics (when given in conjunction with benzodiazepines are great potentiators of respiratory depression (great synergistic effect).

a) Diazepam (Valium)

Route	Onset of Action	Peak Effect	Duration of Action
IV	2-5 minutes	3-5 minutes	15-60 minutes
Oral	30-90 minutes	60 minutes	3-8 hours

1. Adult Dose: Administer in 1-2 mg increments every 2 minutes IV until desired effect is achieved. (Slurred speech). Generally, 10 to 20 mg in 60 minutes.

2. Pediatric Dose: 0.1 – 0.3 mg/kg

3. Potential Adverse reactions: phlebitis at site of injection, bradycardia, hypotension, respiratory depression and apnea, agitation, confusion, hiccups, diplopia, rash, urticaria.

4. Avoid extravasation as drug is caustic to tissue.

5. May be diluted with normal saline only. Do not mix with any other drug.

6. Midazolam is generally preferable to Diazepam due to Midazolam's decreased duration and easier titratability.

7. Reversal agent: Flumazenil (Romazicon) will reverse the respiratory effects of diazepam overdose.

b) Midazolam (Versed)

Route	Onset of Action	Peak Effect	Duration of Action
IV	1-5 minutes	3-5 minutes	2-6 hours
IM	5-15 minutes	30-60 minutes	1-4 hours
Oral	10-20 minutes	30 minutes	Up to 3 hours

1. Midazolam is a very potent short-acting drug that must be given slowly by IV administration over two minutes is recommended.

2. Dilution: May dilute to desired concentration with D5W or NS.

3. Recommend concentration of 0.25 mg/ml, with administration rate no faster than 0.5 mg over 2 minutes.

4. Dosage **recommendations for sedation**:

   Adult: Initial dose of 1-2mgs IV over 2-minutes just before beginning of procedure. Must titrate to effect (slurred speech) by giving additional IV doses over 2 minutes. In general, do not exceed total dose of 3.0 mg, however you may continue to titrate higher doses if needed to obtain effect. Wait at least 2 minutes after each administration of medication to determine effect.

Geriatric or patients with impaired pulmonary/hepatic function: Initial dose 0.25mg-0.5mg IV over 2 minutes. Maximum total dose is 2.0 mg. Titrate to effect.

Pediatric: 0.025 – 0.05 mg/kg IV over 2 minutes. Maximum total dose 0.1 mg /kg. Titrate to effect.

5. Contraindications: Do not give midazolam to persons with known hypersensitivities to the drug. Do not give to patients with acute narrow-angle glaucoma and shock. Reduce dosage for patients with alcohol intoxication, or history of COPD.

6. Adverse Reactions: Respiratory depression, apnea, cardiac arrest, coughing, bronchospasm, laryngospasm. Hypotension, PVC's, tachycardia, bradycardia, hiccups, nausea, vomiting, urticaria, pain at infusion site.

7. Reversal agent: Flumazenil (Romazicon) will reverse the respiratory effects of midazolam overdose.

Sublingual midazolam for adult sedation

Use the 5 mg/ml Versed concentration:

1.0 mg is 0.2 cc	3.0 mg is 0.6 cc
1.5 mg is 0.3 cc	3.5 mg is 0.7 cc
2.0 mg is 0.4 cc	4.0 mg is 0.8 cc
2.5 mg is 0.5 cc	4.5 mg is 0.9 cc

Use the top row to calculate dose in mgs by using the weight and age of the patient.
An 80 to 100-pound patient who is 30 to 49 years old would receive 2.5 mgs.

Weight in Pounds	Age in Years 30	50	60	70+
80-100 dose in mg	2.5 mgs	2.5 mgs	2.0 mgs	2.0 mgs
110 – 150 dose in mg	3.0 mgs	3.0 mgs	2.5 mgs	2.5 mgs
155 – 180 dose in mg	3.5 mgs	3.5 mgs	3.0 mgs	3.0 mgs
185 – 210 dose in mg	4.0 mgs	4.0 mgs	3.5 mgs	3.5 mgs
215 – 250 dose in mg	4.5 mgs	4.5 mgs	4.0 mgs	4.0 mgs
255+ dose in mg	5.0 mgs	5.0 mgs	4.5 mgs	4.5 mgs

Lorazepam

- Use(s) – Anxiolysis; Sedation
- Absorption – gastrointestinal; prompt
- Metabolism - hepatic
- Excretion - principally in urine.
- Discussion – anterograde and retrograde amnesia
- Distributed in 0.5mg, 1mg, 2mg tabs
- Dose – Children *>12 yrs. old)*: 0.05 mg/kg/dose; Adults 1-10mg
- Unlabeled use in younger than 12 yrs. Old

Route PO	Onset of Action	Peak Effect	Half Life
Adult	30-60 minutes	120 minutes	12.9 hours

Alprazolam (Xanax)

- Use(s) – Anxiolysis
- Dose – 0.25-0.5mg
- Absorption – Gastrointestinal; Prompt
- Metabolism – Hepatic
- Excretion (half-life) – Urine; 12-15 hrs.
- Distributed in 0.25, 0.5, 1, 2mg tab; Liq 1mg/ml

Route PO	Onset of Action	Peak Effect	Half Life
Adult	1-2 hours	120 minutes	12-15 hours

2. Reversal agent for Benzodiazepines: Flumazenil (Romazicon)

Flumazenil (Romazicon):

a. Specific benzodiazepine antagonist, used for complete or partial reversal of the sedative effects of benzodiazepines; management of benzodiazepine overdose

b. Administration Technique:

IV bolus:

- Phase One: Initially 0.2 mg IV over 15 seconds to one minute. If patient does not reach desired level of consciousness after 45 seconds…

- Phase Two: Repeat dose at one-minute intervals until a cumulative dose of 1 mg has been administered (includes initial dose in phase one). If no response to treatment is noted, call anesthesia for assistance.

IV infusion:
30-60 ug/minute (0.5-1 ug/kg/min). Total dose not to exceed 3 mg/hour.

Route	Onset of Action	Peak Effect	Duration of Action
IV (bolus or infusion)	1-2 minutes	6-10 minutes (but 80% of the maximum response is seen within 3 minutes.) **Call anesthesia** if there is no desired clinical response with the administration of the initial 1 mg.	45-90 minutes

c. Special considerations:
- Individualized dosage is required, manufacturer does not recommend the administration of flumazenil to patients under the age of 18.
- Flumazenil - induced seizures have been reported in patients with chronic physical dependence to benzodiazepines or patients recently undergoing multiple procedures requiring multiple large doses of benzodiazepines.
- Patients who have responded to flumazenil should be carefully monitored (up to 120 minutes) for resedation.
- To avoid pain and inflammation at the site of injection, administration of flumazenil via a large vein is recommended.
- Overdose: Excessive doses result in anxiety, agitation, increased muscle tone and possible convulsions.

d. Adverse effects:
- Respiratory – return of respiratory depression which has exceeded the therapeutic effects of flumazenil.
- Cardiovascular – cutaneous vasodilation, sweating, flushing, dysrhythmias, bradycardia, tachycardia and hypertension.
- CNS – dizziness, headache, abnormal or blurred vision, confusion and convulsions.

3. Narcotics/Opioid Agonists

Includes: Morphine Sulfate, Meperidine, and Fentanyl

Morphine Sulfate - Binds opiate receptors in CNS, altering perception of and emotional response to pain.

Route	Onset of Action	Peak Effect	Duration of Action
IV	5-10 minutes	20 minutes	4-5 hours
IM	10-30 minutes	30-60 minutes	4-5 hours
Oral	<60 Minutes	1-2 hours	6-12 hours

a. Dosage/Administration – **Adults:** Give 2 - 10 mg IV. Must give slowly and titrate to individual response. Assess patient continuously for signs and symptoms of pain and give additional doses for increasing pain levels. Decrease dosage if giving to elderly or debilitated patients and in patients with renal or hepatic disease. Dilute with 5 ml of sterile water or NS and give slowly. May repeat every 15 minutes. Total dosage 10 mg in 60 minutes.

Pediatrics: 0.05 – 0.1 mg/kg IV, titrated to effect. See appendix

b. Adverse Reactions
- Respiratory effects – respiratory depression, bronchospasm, laryngospasm.
- Cardiovascular effects – hypotension, hypertension, bradycardia, arrhythmias
- CNS effects – euphoria, dysphoria, somnolence, syncope
- GI effects – nausea, vomiting, constipation, biliary tract spasm
- GU – urinary retention
- Integumentary – pruritus/local tissue irritation, urticarial, skin wheals
- Musculoskeletal – chest wall rigidity (all narcotics can cause rigidity)

c. Reversal Agent: Naloxone (Narcan) will reverse the respiratory and cardiovascular effects of morphine sulfate overdose.

Meperidine Hydrochloride (Demerol) - Binds with opiate receptors in the CNS, altering perception of and emotional response to pain.

Route	Onset of Action	Peak Effect	Duration of Action
IV	1-5 minute	5-7 minutes	2-4 hours
IM	10 –1 5 minutes	30-50 minutes	2-4 hours
Oral	15-45 minutes	60-90 minutes	2-4 hours

a. Dosage/Administration – **Adult**: 25 mg slow IVP. Slowly titrate in 25 mg increments to individual patient response. Total dose for nursing administration, 100 mg in 60 minutes.

- Reduce dosage and rate of administration in patients who are elderly, debilitated, having renal or hepatic disease, or who have hypothyroidism.
- Contraindicated in patients on Monoamine oxidase inhibitors (MAO) inhibitors. Isocarboxazid (Marplan), Phenelzine (Nardil), Selegiline (Emsam, Eldepryl, Zelapar), Tranylcypromine (Parnate)
- Severe and even fatal reactions have been known to occur.
- Pediatric: 1 – 1.5 mg/kg. Titrate dose to individual response. Max. dose 100 mgs.

b. Adverse Reactions
- Respiratory effects – severe respiratory depression and arrest. Use with caution in patients with COPD, asthma, corpulmonale, decreased respiratory function, hypoxia or hypercapnia.
- Cardiovascular effects – orthostatic hypotension, bradycardia, tachycardia, palpitations, syncope, shock, cardiac arrest.

- CNS effects – euphoria, dysphoria, weakness, sedation, convulsions, agitation, tremors, uncoordinated muscle movements, transient hallucinations, disorientation and visual disturbances.
- GI-dry mouth, constipation, biliary spasm, nausea and vomiting.
- Integumentary – flushing, pruritus/local tissue irritation (histamine release), urticarial, skin wheals and local irritation
- GU – urinary retention
- Special considerations – this drug must be titrated to effect and administered slowly to prevent the occurrence of adverse reactions.

c. Reversal Agent: Naloxone (Narcan) will reverse the respiratory and cardiovascular effects of meperidine overdose.

Fentanyl Citrate (Sublimaze) – Binds with opiate receptors in CNS, altering perception of and emotional response to pain.

Route	Onset of Action	Peak Effect	Duration of Action
IV	3-5 minute	5-15 minutes	30-60 minutes
IM	5-8 minutes	15-20 minutes	1-2 hours
Transmucosal	5-15 minutes	1-2 hours	1-2 hours

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a. Dosage/Administration – **Adults**: 25-100mcg slow IV injection into IV infusion line over 1-2 minutes is required. Titrate 25 mcg at a time. Total recommended dose for nursing administration, 200 mcg for healthy young adult.
   - Reduce dosage and rate of administration in patients who are elderly, debilitated or have renal or hepatic disease.
   - Pediatric: 0.5 – 2 mcg/kg. Titrate to individual response.

b. Adverse Reactions
   - Respiratory effects – potent respiratory depression, apnea. Use with caution with patients with COPD or other respiratory compromise.
   - Cardiovascular effects –hypotension, bradycardia, tachycardia, palpitations, syncope, shock, cardiac arrest.
   - CNS effects – euphoria, dysphoria, weakness, sedation, agitation, tremors, seizures, and use with caution in patients with increased intracranial pressure.
   - GI effects – nausea, vomiting, delayed gastric emptying, biliary tract spasm.
   - Musculoskeletal – may cause muscular rigidity of the thorax to the point that ventilation (spontaneous or controlled) is impossible. A muscle relaxant can be used for treatment, but only by anesthesia providers; therefore, treat with Naloxone (Narcan).
   - Special considerations – Fentanyl must be titrated to effect and administered slowly to prevent the occurrence of adverse reactions. DO NOT mix with barbiturates.

c. Reversal Agent: Naloxone (Narcan) will reverse the respiratory and cardiovascular effects of Fentanyl overdose. Reversal brought on too rapidly may cause nausea, sweating, and hypertension.

4. Reversal Agent for Narcotics - Naloxone (Narcan)

Naloxone Hydrochloride (Narcan)

Route	Onset of Action	Peak Effect	Duration of Action
IV	1-2 minutes	5-15 minutes	30-45 minutes

a. Description: Naloxone is a pure opioid antagonist with no agonist activity. It reverses respiratory depression, hypotension, hypercapnia, sedation, and euphoria associated with the administration of narcotics.

b. Dosage/Administration – Naloxone injection is available as a sterile solution for intravenous, intramuscular and subcutaneous administration in three concentrations: 0.02 mg, 0.4 mg and 1 mg of naloxone hydrochloride per ml. pH is adjusted to 3.5 ± 0.5 with hydrochloric acid.

- Adult: Initial dose: 0.04 mg – 2 mg titrated in small increments. Dilute 0.4 mg amp of Narcan to 10cc total volume. This will be 0.04 mg or 40 mcg per cc. Give this reversal 1cc at a time, with at least 2-3 minutes between doses. This titration will allow one to bring the patient up to a safe respiratory rate without reversing analgesia or causing severe CV problems. If no response is observed after 2 mg has been administered, the diagnosis of narcotic induced toxicity should be questioned. Total dosage for nursing administration – 2 mg.
- Pediatric: 0.01 mg initial dose. If initial dose does not result in desired clinical reversal, administer a subsequent dose of 0.01 mg. If this does not result in desired effect, administer 0.1 mg/kg. Total dosage for nursing administration in pediatric patients is: 0.2 mg/kg.

c. Adverse Reactions
- Respiratory effects – pulmonary edema
- Cardiovascular effects – hypotension, hypertension, arrhythmias, ventricular tachycardia and ventricular fibrillation
- CNS effects – excitement, tremors, seizures, reversal of analgesia
- GI – nausea, vomiting.
- Special considerations – titrate slowly to desired effect. Complete reversal from higher doses will result in total reversal of analgesia with other effects including hypertension, excitation and tachycardia. Monitor the patient closely in the post-procedure period for re-sedation. Additional doses of Naloxone may be required.

If the initial sedative/narcotic is properly titrated to effect, reversal should not be needed. However, if it is needed, usually small doses are adequate. The larger doses

found in resources are indicated for significant overdoses as seen in obtunded/comatose patients.

5. Anesthesia Medications

Propofol (Diprivan)

Classification: sedative hypnotic. Produces rapid hypnosis with minimal excitation.

Route	Onset of Action	Peak Effect	Duration of Action
IV	40 seconds	1 minute	5-10 minutes

a. Dosage/Administration – **Adult dose**: 25 – 50mg (0.5 – 1 mg/kg) IV, administered in 10 mg increments over several minutes. Pain on injection is decreased with IV lidocaine, 0.1 mg/kg, added to the Propofol emulsion. Strict aseptic technique must be maintained in handling, as propofol is preservative free and will support bacterial growth. Diprivan injection should be prepared for single patient use only, just prior to the initiation of each procedure. Discard after opened for 6 hours.

Pediatric dose: 0.5 – 1.0 mg/kg infused slowly and titrated to desired effect.

b. Adverse Reactions
- Respiratory effects – respiratory depression, apnea, hiccup, bronchospasm, laryngospasm
- Cardiovascular effects –hypotension, arrhythmia, tachycardia, bradycardia, hypertension
- CNS effects – headache, dizziness, euphoria, myoclonic/clonic movement, seizures, and sexual illusions.
- GI effects - nausea, vomiting, abdominal cramps
- Special considerations – Propofol must be titrated to effect and administered slowly to prevent the occurrence of adverse reactions. Reduce dose in elderly, hypovolemic, and high-risk patients. Potentiation occurs when combined with narcotic analgesics and CNS depressants. There is no pharmacologic reversal agent for propofol.

c. Propofol has anxiolytic properties, which may be related to several neuromodulator systems. Moreover, it has antioxidant, immunomodulatory, analgesic, antiemetic and neuroprotective effects.[13]

Ketamine (Ketalar)

Ketamine hydrochloride (Ketalar) – Medication used especially for deep sedation in pediatric patients. Not a primary use drug. Administer drug only with previous experience or under the direction of a provider familiar with its use. Package insert “Ketamine should be used by or under the direction of physicians experienced in administering general anesthesia and in maintenance of an airway and in the control of respiration.

Mechanism of Action – Selectively interrupts cerebral pathways, causing dissociative anesthesia.

Route	Onset of Action	Peak Effect	Duration
IV	<60 seconds	5-10 minutes	5- 15 minutes
IM	3-8 minutes	5-20 minutes	12-25 minutes

a. Dosage and Administration - usually 0.25 to 1.0 mg/kg. Dose is based on patient response to medication. Rate of infusion should not exceed 50 mcg/kg/min.

b. Adverse Reactions
- Respiratory effects – bradypnea, dyspnea, respiratory depression, apnea, bronchial smooth muscle relaxation, increased tracheo-bronchial tree secretions
- Cardiovascular effects – bradycardia, tachycardia, hypertension, hypotension, arrhythmias
- Musculoskeletal – enhanced skeletal tone
- CNS - uncontrolled muscle movements, visual illusions
- GI – vomiting, increased salivary secretions
- Special considerations – monitor patient for emergent reactions including vivid dreams, or hallucinations. Consider premedication (midazolam) to reduce potential for adverse responses.

6. Other Sedating Medications

Etomidate (Amidate)

Etomidate is a nonbarbiturate sedative/hypnotic, and is a useful agent for carefully conducted procedural sedation because it provides effective, brief, deep sedation with little hemodynamic compromise. Its safety may be jeopardized by the occurrence of respiratory depression in older patients receiving higher doses. Patients report a high degree of satisfaction with etomidate. Pubmed.gov

Route	Dose	Onset of Action	Peak Effect	Duration
IV	0.1 mg/kg IV bolus x1-3 doses;	30-60 seconds	1 minute	3-5 minutes

Diphenhydramine Hydrochloride (Benadryl)

Diphenhydramine hydrochloride is an anti-histamine H1-receptor drug with anticholinergic and sedative properties. It is usually given as a premedication prior to endoscopic procedures to achieve a synergistic effect with the combination of a narcotic and benzodiazepine which allows for lower doses of these drugs.

Route	Onset of Action	Peak Effect	Duration
IV	2-3 minutes	60-90 minutes	240 minutes

Administer intravenously at a rate generally not exceeding 25 mg/minute, or deep intramuscularly

Alpha-2 Receptors Agonists

Clonidine (Catapres)

Preoperatively, Clonidine (Catapres) an alpha-2 adrenergic receptor agonist, causes sedation and reduces autonomic nervous system reflects responses. These responses may include those secondary to catecholamine release in general and hypertension and tachycardia in particular. Clonidine is FDA approved for Critical Care Sedation.

Route	Dose	Onset of Action	Duration of Action
Oral	3-5 ug/kg	30-45 minutes	90 minutes

Dexmedetomidine (Precedex)

When Precedex is infused for more than 6 hours, patients should be informed to report nervousness, agitation, and headaches that may occur for up to 48 hours. Additionally, patients should be informed to report symptoms that may occur within 48 hours after the administration of dexmedetomidine such as: weakness, confusion, excessive sweating, abdominal pain, salt cravings, diarrhea, constipation, dizziness or light-headedness.

Route	Loading Dose	Onset of Action	Maintenance Dose	Duration of Action
IV	1 mcq/kg Over 10 min	10-15 min	0.2-1 mcq/hr titrated	Half-life 2 hrs

Competency Quiz 3 (Answers in the appendix)

1. Alpha-2 Receptors discussed in this competency include:
    a. Meperidine and Morphine
    b. Midazolam and Diazepam
    c. Clonidine and Dexmedetomidine
    d. Flumazenil and Naloxone

2. The most common class of medications used for moderate sedation are:
    a. H1-receptor drugs
    b. H2-receptor drugs
    c. Benzodiazepines
    d. Flumazenil
3. Which of the following is not an agent used for sedation?
    a. Benadryl
    b. Midazolam
    c. Flumazenil
    d. Benzodiazepines
4. The Initial dose of this drug is 1-2 mgs IV over 2-minutes just before beginning the procedure
    a. Midazolam
    b. Fentanyl
    c. Flumazenil
    d. Clonidine
5. It is a sedating drug that is most often used for allergies.
    a. Diazepam
    b. Benadryl
    c. Flumazenil
    d. None of the above
6. _____ is the reversal agent for benzodiazepines.
    a. Diazepam
    b. Midazolam
    c. Flumazenil
    d. Naloxone
7. Binds opiate receptors in CNS, altering perception of and emotional response to pain.
    a. Morphine
    b. Demerol
    c. Fentanyl
    d. All the Above
8. The reversal agent for narcotics is?
    a. Midazolam
    b. Flumazenil
    c. Naloxone
    d. Meperidine
9. The adult dosage for this narcotic is 2-10 mg IV.
    a. Morphine
    b. Demerol
    c. Fentanyl
    d. None of the Above

10. The pediatric dosage for this medicine is 0.5-2 mcg/k.
    a. Morphine
    b. Demerol
    c. Fentanyl
    d. None of the Above

11. Adverse reaction/s caused by opioids may be.
    a. Causes severe acute pain on injection
    b. Respiratory Depression /Respiratory Arrest
    c. Short term pain relief
    d. Amnesia/Respiratory Depression /Respiratory Arrest
12. A sedative hypnotic with no analgesic properties.
    a. Ketamine
    b. Morphine
    c. Midazolam
    d. Propofol

Potential Complications and Interventions During Sedation

1. Nausea and Vomiting

Nausea is a very subjective occurrence. Vomiting is a complex reflex occurrence that involves the skeletal muscles and autonomic nervous system. The vomiting center can be stimulated by the chemoreceptor trigger zone (CTZ) of the brain and via three primary afferent nerve pathways. The 3 pathways are the corticoid, visceral, and vestibular afferent pathways in which the causative reflexes may originate in the pharynx, GI tract, cerebral centers, or vestibular center, which controls the sense of balance. Circulating drugs, or decreased cerebral blood flow can affect the CTZ and the vomiting center directly, resulting in a situation called "Central Vomiting". Culprit drugs include many inhalation and intravenous anesthetic agents and narcotics. With etiologic diversity, no single approach to prevention or treatment of nausea and vomiting will be effective from one person to another.

Factors contributing to nausea and vomiting should be assessed and eliminated whenever possible. Interventions that may diminish potential nausea and vomiting include:

- Provide positive reinforcement to reduce anxiety
- Avoid sights, smells, and/or conversations
- Move the patient slowly
- Allow the patient fully alert slowly without aggressive stimulation
- Provide adequate analgesia
- Provide IV access and adequate hydration

If vomiting occurs and the patient is obtunded or unable to protect their own airway, place the patient on their side and make sure the airway is clear of vomitus; suction as necessary. Placing the table in Trendelenburg position will allow gravity to drain the emesis away from the obtunded patient's trachea. If the patient is responsive and shows ability to protect his own airway, the patient can be placed in a sitting position and given a basin.

Zofran (Ondansetron hydrochloride) is the least sedating of the antiemetic drug choices. Information on common antiemetics is listed below:

Ondansetron Hydrochloride (Zofran)

- Dose: 4 mg IV over 2-5 minutes
- Onset: 20 minutes
- Peak Action: 3.5 hours
- Duration: up to 8 hours
- Potential Adverse Reactions: minimal side effects

2. Respiratory Depression

Respiratory depression can occur because of an airway obstruction, or simply due to the central effects of a medication.

Capnography and Pulse Oximetry are mechanical means for identifying early signs of respiratory depression, obstruction and apnea. Capnography monitors ventilation, while pulse oximetry monitors oxygenation. Therefore, capnography provides breath-to-breath feedback, and changes in breathing, like apnea, are reflected immediately. Pulse oximetry measures the concentration of oxygen in the hemoglobin. However, be aware that O_2 saturation changes can lag behind breathing changes due to the effects of supplemental oxygen.

Immediate ventilatory support should be instituted for the patient with shallow or absent breaths. Intervention may simply be administration of oxygen and a reminder, or encouragement to deep breath until the effects of sedation have lifted. Elevating the patient's head and shoulders slightly may help encourage chest movement, particularly for the patient who is obese, or has preexisting respiratory compromise.

Proper positioning of the patient and suctioning the upper airway are the primary deterrents to obstruction. Until the patient can maintain an airway, constant attention must be given to the position of the patient's head and neck.

Airway obstruction maybe partial or complete. Partial obstruction includes any degree of the following signs:

- Decreased tidal volume
- Sternal retractions
- Increased respiratory effort, use of accessory neck and intercostal muscles
- Abdominal breathing movements
- Decreased oxygen saturation and cyanosis (hypoxemia & hypercapnia)
- Inspiratory stridor, snoring or gasping breath sounds

Complete obstruction results in silent, exaggerated attempts at inspiration. If not corrected, cyanosis, progressing to respiratory and cardiac arrest and death, follows.

Upper airway obstruction – A simple chin-lift/jaw-thrust can solve the problem. Other interventions: auditory/tactile stimulation, head tilt and nasal or oral airway.

In addition to proper positioning, a nasal airway may be effective in correcting the problem. A nasal airway tends to be better tolerated by the partially awake patient. Oxygen therapy should be administered until respiratory inadequacy has been corrected.

Auscultation is an important part of the assessment for a sedated patient, both on initial assessment and after attempting to arouse or reposition them. When lung sounds are difficult to hear, another helpful assessment parameter is auscultation over the trachea to check for clear and easy airflow.

3. Laryngospasm

Laryngospasm is a form of airway obstruction that can be a transient, self-limiting problem or may progress to total obstruction that results in respiratory arrest. Intervention is usually successful in reversing the condition if it's detected and managed in its early stages.

Predisposing Factors:

- Stimulation of the vocal cords due to mechanical irritation by an endotracheal tube, suction catheter, or secretions may cause partial or complete laryngospasm.
- Blood or mucus from the upper respiratory tract may be a causative agent or a foreign object may be implicated.

Symptoms:

- Dyspnea and inspiratory crowing
- Diminished breath sounds with minimal evidence of airflow at nose or mouth
- Awake patients who experience laryngospasm are usually extremely frightened.
- Observation of the patient's chest is an unreliable assessment in this situation because the patient may be making vigorous, yet ineffective, attempts at ventilating. Vigorous attempts to inspire in the face of closed vocal cords can cause significant sternal retractions. In fact, the patient can create enough negative intra pulmonary pressure to draw in intravascular fluid causing "negative pressure pulmonary edema".

Treatment:

- Immediately initiate mechanical airway maintenance and oxygen administration
- Maintain a calm demeanor, especially if patient is awake
- A soothing voice, airway maintenance and humidified oxygen may be effective in breaking the spasm
- If respiratory distress continues to progress, oxygen under positive pressure by bag and mask along with gentle suctioning of the pharynx are indicated. Positive pressure should be applied in a prolonged, gentle, continuous manner when trying to break laryngospasm rather than trying to ventilate the patient by repeatedly squeezing and releasing the bag. Intubation may be required if respiratory deterioration continues.

4. Bronchospasm

This is a narrowing of the lower airways due to increased tone in the circular smooth muscle in the bronchi or bronchioles. This is a reversible event!!!

Predisposing Factors:

- Asthma
- Cigarette Smoking
- Emphysema
- Respiratory Tract Infection
- Cardiac Failure

- Allergic Reaction

Prevention:

- Obtain an accurate history and identify those at risk
- Pre-treatment with bronchodilating agents
- Avoid interventions that cause irritation to the tracheobronchial tree
- Decrease anxiety and stress as a prophylactic measure

Symptoms:

- High pitched wheezing and coarse crackles
- Flaring nostrils
- Increased respiratory rate and restlessness

Treatment:

- Positioning and calm environment
- Have the patient cough deeply with oxygen administration
- Both inhaled and parenteral bronchodilating drugs can be used.

5. Emergence Reaction/Delirium/CNS Changes

Occurs during the period of arousal from general anesthesia (especially when Ketamine is used). It manifests itself with behaviors such as restlessness, thrashing of extremities, combativeness, crying, moaning, screaming, irrational talking and disorientation

Predisposing Factors:

- Barbiturates and scopolamine given preoperatively are implicated as triggers.
- Presence of pain
- A full bladder
- Feelings of suffocation and possibly cerebral hypoxia

Prevention:

- Comprehensive preoperative preparation to establish a rapport between the patient and caregivers.
- This helps to reduce anxiety, encourage trust, and reduce fears that surround surgery.

CNS Changes:

- Over sedation or untoward reactions to the procedure or medication may occur at any time, so the patient's quality of respirations, pulse, heart rate and rhythm, blood pressure, and oxygen saturation must be assessed and documented continuously. Should untoward reactions or complications occur, initiate the appropriate supportive measures.
- Agitation and Combativeness – may be an undesirable effect of IV sedation, but be aware that they may also be due to hypoxemia.

6. Drug Reactions

Always note allergies, be safe when administering any drugs and titrate to effect. Have an IV access always when administering IV sedation and have Benadryl and Epinephrine available at the bedside.

7. Hypotension

Hypotension may be a result of fluid deficit from a prolonged NPO period, inadequate intravenous replacement, medications, or blood loss. Some intravenous agents cause cardiovascular depression and decrease peripheral vascular resistance, which can allow blood to pool in the extremities with a resulting drop in the mean arterial blood pressure. Investigate possible causes.

During sedation, the BP may fluctuate by up to 10% from baseline. *A drop of 20% to 30% below patient's normal pressure that's sustained for more than a few minutes should raise a red flag.*

Treatment depends on the cause but a combination of some or all of the following interventions may help:

- Continued oxygen therapy
- Gentle movement of the patient
- Supine positioning, elevation of the legs
- Infusion of intravenous fluids
- Pharmacological interventions to include a vasopressor such as ephedrine or anticholinergic drugs such as Atropine.

8. Bradycardia

Sinus bradycardia is a heart rate < 60 bpm, with a P wave for every QRS.

Predisposing Factors:

- Athletic persons
- Patients on Beta-Blocker therapy
- If not one of the above reasons, the rhythm is abnormal due to hypothermia, hypothyroidism, or sedative agents (narcotics)

Symptoms:

- Faintness
- Dizziness
- Decreased HR may allow for PVC's
- Hypotension

9. Hypertension

Pain or stress of the procedure can cause hypertension. Additional sedation or analgesia may resolve this problem. Other causes: "arousal", full bladder, hypoxemia, hypercarbia, volume overload, medications, tourniquet usage, and pre-existing hypertension.

10. Cardiac dysrhythmias

The 2 most common cardiac arrhythmias that occur during sedation are *bradycardia* and *tachycardia*. More serious arrhythmias include premature ventricular contractions or atrial arrhythmias and may be caused by any of the reasons listed above under HTN. If the patient develops new shortness of breath or chest pain, consider obtaining a 12-lead ECG immediately to determine if cardiac ischemia is present.

11. Cardiopulmonary arrest

Emergency equipment must be immediately available to the procedure room: defibrillator, code cart to include other airway devices such as laryngoscope and blades, standard

resuscitation medications, age-appropriate supplies, reversal medications (Caution: most references recommend that you have your reversal medications readily available in the procedure room itself), and back up personnel who are experts in airway management, CPR and ACLS (Anesthesia).

12. Inadequate Pain Management

Provide general comfort measures, positioning, padding, and support to the body parts. Medicate if general comfort measures do not alleviate. A soothing voice or cool cloth may be the only intervention needed to alleviate discomfort. Communication is key when interacting with the sedated patient.

Competency Quiz 4 (Some answers found in the appendix)

1. It is a complex reflex occurrence that involves the skeletal muscles and autonomic nervous system
    a. Nausea
    b. Vomiting
    c. Depression
    d. Laryngospasm
2. The vomiting center can be stimulated by the _____
    a. ITZ
    b. PTZ
    c. HTZ
    d. CTZ
3. Ondansetron is an effective antiemetic agent. The antiemetic effect appears to be exerted through
    a. A peripheral vagal blocking within the gastrointestinal tract, as well as an inhibitory effect within the chemoreceptor trigger zone (**CTZ**).
    b. Increased oxygen saturation and hypercapnia of the intestinal tract.
    c. It's ability to prevent motion sickness.
    d. Synthetization from 1-benzyl-3-carbethoxypiperidin-4-one.
4. The two most common cardiac arrhythmias that occur during sedation are:
    a. Bradycardia and Fibrillation
    b. Bradycardia and tachycardia.
    c. First Degree Heart Block and Tachycardia
    d. Third degree heart block and Bradycardia
5. _____ can occur because of an airway obstruction or simply due to the central effects of a medication
    a. Nausea
    b. Vomiting
    c. Respiratory Depression

   d. Laryngospasm
6. A simple chin-lift/jaw-thrust should be the first reaction to which of the following?
   a. Muscle rigidity
   b. Vomiting
   c. Upper Airway Obstruction
   d. None of the Above
7. Which of the following is an assessment tool, when included during the initial assessment gives a baseline which helps identify changes in the patient's respiratory integrity during the procedure.
   a. Auscultation
   b. Patient's weight
   c. Patient's Medications
   d. MRI
8. Which of the following is a form of airway obstruction that can be transient, self-limiting problem, or may progress to total obstruction that results in respiratory arrest.
   a. Nausea
   b. Vomiting
   c. Respiratory Depression
   d. Laryngospasm
9. _____ is usually successful in reversing a laryngospasm if it is detected and managed in its early stage
   a. Auscultation
   b. Sedation
   c. Cardio Pulmonary Resuscitation
   d. Immediately initiate mechanical airway maintenance and oxygen administration
10. This is a narrowing of the lower airways due to increased tone in the circular smooth muscle in the bronchi or bronchioles.
   a. Emergence Reaction
   b. Hypotension
   c. Bronchospasm
   d. Drug Reaction
11. What are the symptoms of a bronchospasm, a narrowing of the lower airways due to increased tone in the circular smooth muscle in the bronchi or bronchioles:
   a. High pitched wheezing, coarse crackles and Flaring nostrils
   b. PVCs
   c. Atrial and Ventral Fibrillation
   d. Atrial Flutter
12. The symptoms of sinus bradycardia, which is a heart rate < 60 bpm, with a P wave for every QRS are.
   a. Faintness/dizziness
   b. Pain and anxiety
   c. Hypotension
   d. Both a and c

Documentation Requirements During the Recovery Phase

Documentation includes the following:

Vital Signs

- Every 5 minutes during procedure
- Every 5 minutes times three (15 minutes), then every 15 minutes until discharge criteria are met.

Airway

- Position patient for airway observation and maintenance of clear airway.
- If patient's face must be under drapes, be sure there is a flow of fresh air to prevent buildup of CO_2

Breathing

- Assess and document rate, depth and character of respirations.
- Monitor and document oxygen saturation. SpO2 should remain at a constant of 95% or greater regardless of oxygen delivery status.
- Record administered oxygen flow and its delivery device (by face mask or nasal prongs)

Supplemental oxygen can be delivered utilizing 4 devices:

- Nasal cannula is a low-flow system. Volume delivered via this mode is 1-6L/minute, or 24-44% concentration of O2.
- Face mask is recommended for a flow of 8-10L/minute, or 40-60% concentration of O2.
- Face mask with O2 reservoir or non-rebreather mask is a high-flow delivery device. A flow of 6L/min will allow for O2 concentrations of 60%. A flow of 10L/minute will allow for close to 100%.
- Bag-valve device is the recommended high delivery system for acute and emergent situations.

Circulation

- Monitor pulse rate from oximeter and ECG. Good to get baseline pulse character by palpating pulse prior to procedure and PRN during procedure.
- Monitor ECG for rate and rhythm. Print a pre-procedure strip, and print a strip for any abnormal rhythms. If change is noted in ST segments, obtain a 12-lead ECG.
- Assess BP with vital signs. Alert physician for sustained drop of 20% to 30% below patient's baseline.

Consciousness

- Level of consciousness is documented every 15 minutes during procedure and in the recovery phase until patient meets discharge criteria.
- Use the Aldrete Post-Anesthesia Scoring System to document patient LOC. Additional descriptive information can be charted to further define patient status:
    1. Alert, awake, oriented

2. Occasionally drowsy, easy to arouse
3. Frequently drowsy, able to arouse
4. Sleeping, slow to arouse
5. Somnolent, unable to arouse

- Discharge documentation should compare the patient's discharge LOC with pre-procedure LOC.

Preparation for Discharge

Increase level of activity and assess the following prior to discharge:

- Patient should be weaned to room air prior to increasing level of activity.
- Patient should progress through the phases of ambulation: elevate HOB, sit upright with legs dangling, standing upright and ambulate with a steady gait.
- Assess blood pressure prior to discharge and be aware that a lying blood pressure may give you a false sense of security. For patient safety you may also want to consider doing a sitting and standing blood pressure. Tilts should be negative (no change in blood pressure) prior to discharge…If patient is symptomatic (i.e. dizziness when standing), but tilt negative, assist patient back to bed and notify physician.

Vital Signs	Normal	2	Stable	1	Unstable	0
Respirations	Normal	2	Shallow	1	Apnea	0
Circulation	BP +/- 20 mm Hg	2	BP +/- 20-50 mm Hg	1	BP +/- 50 mm Hg	0
Consciousness	Alert	2	Arousable	1	Blunted verbal / physical	0
O_2 Saturation	94-100%	2	88-94%	1	Less that 88%	0
Ambulation	Stand	2	Vertigo when erect	1	Dizziness when supine	0
Activity	Normal	2	Altered	1	No movement	0
Pain	Pain free	2	Minimal	1	Requires meds	0
Dressing	Dry	2	Wet stationary	1	Wet growing	0

Discharge Criteria

Discharge Score

- Total score greater than or equal to 8
- No category with a score of 0
- Discharge policies may vary by facility
- Data suggest the importance of discharge criteria being timed based, (e.g. patients must maintain wakefulness for > 20 minutes
- **The patient must have a score of eight (8) without a zero (0) before the patient can be discharged**

Modified Adult Aldrete Discharge Criteria Score[1]

1. Alert & oriented to person, place, & time
2. Stable vital signs and stable SaO_2 without supplemental O_2 for at least 30 minutes after last narcotic, sedation or hypnotic medication.
3. Pain is well controlled & easily managed with oral medications
4. No protracted nausea/vomiting
5. Written and verbal release instructions given to the patient No IV sedation in the past 30 minutes.
6. Patient released in the company of a responsible adult
7. Provide 24-hour emergency contact phone number
8. Return inpatients to their room when considered stable and acceptable for routine ward monitoring
9. Documentation of release criteria on flow sheet

Geriatric Age-Specific Considerations

Overview

- Beginning of late adulthood/geriatrics is 65 years
- Functional age is more important than his or her chronological age
- Decline in organ function is responsible for the physiologic aging process
- Careful titration and reduced doses of medications are required to avoid the development of deep sedation states, prolonged recovery, and cardiovascular depression

Cardiovascular System Changes:

⇓ Tissue elasticity, which results in increased BP
⇑ Systolic BP secondary to ventricular hypertrophy and decreased arterial wall compliance
⇓ Cardiac output by 1% for each year after 30
⇑ Cardiac dysrhythmias secondary to degenerative changes of the cardiac conduction system.
⇓ Baroreceptor activity
Careful monitoring of urine output, fluid and electrolyte imbalances, BP, and heart rate are essential.
Caution should be taken during IV fluid infusions to avoid fluid overload with resultant CHF

Pulmonary System Changes:

⇓ Total lung capacity
⇓ Vital capacity
⇓ PaO_2
Altered ventilation response to hypercapnia and hypoxia
⇑ Residual volume
⇑ Dead space
Laryngeal and pharyngeal reflexes are diminished

Renal System Changes:

⇓ Glomerular filtration rate
⇓ Creatinine clearance
⇓ Tubular function (excretion)
⇓ Renal clearance of drugs and metabolites more prone to dehydration & electrolyte imbalance

Hepatic System Changes:

⇓ Hepatic blood flow, due to decrease cardiac output
⇓ Microsomal enzyme activity
⇓ Ability to metabolize drug, prolonged effect; as much as 30% from middle adult to late adult age.

Gastrointestinal System Changes:

⇑ Gastric emptying time (slower passage, ⇑ incidence of reflux)

Central Nervous System:

⇓ Peripheral, motor, sensory, and autonomic nerve fibers, which results in a decreased rate of signal processing within the brain stem and spinal cord.

- Impaired transport of amino acids and neuropeptides, which causes neurogenic atrophy.
- Higher activation thresholds needed for special senses such as vision, hearing, touch, smell, pain, and temperature.

⇓ Cerebral blood flow
⇓ Cerebral oxygen uptake
⇑ Sensitivity to central nervous system depressant drugs
⇓ Response to and recovery from stress, decreased functional reserve.

Psychological:

- Many geriatric patients are used to daily routines.
- Administration of sedation for a diagnostic procedure or minor surgical procedure removes the patient from this specific pattern of behavior.
- Lack of autonomy may lead to increased levels of frustration and feelings of confusion.
- Most geriatric patients do not respond well to fast-paced, disorganized practice settings.

- Through identification of specific patient needs, a thorough pre-procedure assessment, and timely explanation of the planned procedure, many geriatric patients experience the administration of sedation positively.

Competency Quiz 5 (Answers in the appendix)

1. Vital Signs should be taken every __ minutes during procedures.
    a. 4
    b. 5
    c. 6
    d. 7
2. Which of the following should remain constant at 95% or greater?
    a. CO_2
    b. ECG
    c. SpO_2
    d. None of the Above
3. Which of the devices listed below offers high flow delivery?
    a. Nasal Cannula
    b. Fresh Air
    c. Face mask
    d. Face mask with O_2 reservoir
4. The person giving sedation should alert the physician for sustained Blood Pressure drop _____ below patient's baseline.
    a. 10% to 20%
    b. 20% to 25%
    c. 20% to 30%
    d. 10% to 15%
5. Level of consciousness (LOC) should be documented every _____.
    a. 15 minutes
    b. 20 minutes
    c. 25 minutes
    d. 30 minutes
6. Which of the following is NOT a criterion for discharging patients?
    a. Alert and oriented to person, place and time
    b. Pain is well controlled and manageable with oral medication
    c. Vital Signs stable for at least 30 minutes
    d. Stable SaO_2 on supplemental O_2
7. Late Adulthood begins at what age.
    a. 60 years old
    b. 65 years old
    c. 70 years old
    d. 75 years old
8. The_____ age is more important than the patient's chronological age.
    a. Functional
    b. Adulthood
    c. Childhood
    d. Emotional

9. The following changes take place in the Renal System when we age, EXCEPT:
    a. Decrease glomerular filtration rate
    b. Decrease Creatinine Clearance
    c. Decrease Microsomal enzyme activity
    d. Decrease Tubular Function
10. the following changes take place in the pulmonary system as we age, EXCEPT:
    a. Decrease Total Lung Capacity
    b. Decrease Vital Capacity
    c. Increase Dead Space
    d. Decrease Residual Volume
11. Lack of _____ may lead to increased levels of frustration and feelings of confusion in the age.
    a. Security
    b. Autonomy
    c. Safety
    d. None of the Above
12. As we get older the following changes start to occur in the Central Nervous System, EXCEPT:
    a. Decrease Sensitivity
    b. Decrease Peripheral, motor, sensory
    c. Decrease Cerebral Blood Flow
    d. Decrease Cerebral Oxygen Uptake

Pediatric Age Specific Considerations

Pediatric Patients: It is suggested that patients through 18 years of age be considered pediatric patients. Intravenous sedation may be performed on pediatric patients greater than 9 months of age who are assessed Class I or Class II using the Physical Status Classification of the American Society of Anesthesiologists (ASA) System.

1. Cardiovascular System:

- IV cannulation of pediatric veins can be difficult. The saphenous vein at the ankle is consistent in location and serves as a viable option even when it cannot be seen or felt.
- All air bubbles are removed from pediatric IVs, since paradoxical air embolism may occur through a patent foramen ovale in pediatric patients.
- Deep sedation, respiratory obstruction, or painful procedures may result in rapid respiratory and cardiovascular decompensation in the pediatric patient.

2. Respiratory System:

- Neonates and infants have several anatomic differences from adult patients that make them vulnerable to airway obstruction: proportionately larger head and tongue, larynx positioned more anterior and cephalad, short neck and trachea, long, u-shaped, stiffer epiglottis, small mandible, redundant upper airway lymphoid tissue, small nares, and a prominent occiput puts head in a flexed position during airway management (corrected by slightly elevating shoulders with towels and placing head on donut shaped pillow).

- Posterior displacement of the tongue may result in severe airway obstruction. A small amount of edema may greatly decrease the diameter of the pediatric airway.
- The presence of small alveoli through early childhood result in decreased lung compliance. The neonate has very limited oxygen reserves during apneic periods, and hypoxia develops quickly.
- Airway assessment is of paramount importance when evaluating the pediatric patient prior to sedation. Patients having any of the following factors that may be associated with difficulty in airway management should be referred to Anesthesia:
  - History: previous problem with anesthesia or sedation, stridor, snoring or sleep apnea, dysmorphic facial features (e.g. Pierre-Robin syndrome, trisomy 21), advanced rheumatoid arthritis
  - Physical exam: significant obesity (especially involving the neck and facial structures), short neck, limited neck extension, neck mass, cervical spine disease or trauma, tracheal deviation
  - Mouth: small opening (<3 cm), edentulous, protruding incisors, loose or capped teeth, high arched palate, macroglossia, tonsillar hypertrophy, nonvisible uvula
  - Jaw: micrognathia, retrognathia, trismus, significant malocclusion.

AGE RELATED CHANGES IN VITAL SIGNS FOR CHILDREN

Age	Respiratory Rate	Heart Rate	Arterial BP	Arterial BP
			Systolic	Diastolic
Neonates	40	140	65	40
12 months	30	120	95	65
3 years	25	100	100	70
12 years	20	80	110	60

(Source: Morgan, GE, Jr. and Mikhail, MS. (1996). Clinical anesthesiology. Stamford, Connecticut. Appleton and Lange, p. 727.

3. Developmental Considerations

The nursing and medical staff administering sedation to the pediatric patient face the challenge of obtaining the trust and cooperation of the patient. An understanding of developmental stages and coping behaviors is essential in caring for pediatric patients. The following table on the next page provides basic information on developmental considerations for pediatric patients.

DEVELOPMENTAL MECHANISMS OF PEDIATRIC PATIENT RAPPORT

Age	Developmental Stage	Mechanism of Pain Control	Characteristics of Pain Response
Infant (1-12 mos.)	Trust vs. mistrust	Cuddling, sucking, parental presence	Generalized body response (tensing, stiffening); crying; facial tension; cannot anticipate impending pain
Toddler (1-3 yrs)	Autonomy vs. Shame and doubt	Parental presence; allow objects of security (Blanket or toys); clearly delineate end of procedure (all done, no more, etc.)	Crying; physical resistance to stimulus
Preschool (2-5 yrs)	Initiative vs. Guilt	Teach and explain prior to procedure; positive reinforcement; parental presence; use of storytelling, books	
School age (5-12 yrs)	Industry vs. Inferiority	Teach and explain prior to procedure; positive reinforcement; parental presence	
Adolescent (13-19 yrs)	Identity vs. Role Diffusion	Teach and explain prior to procedure; specific information related to all aspects of procedure and recovery; use of music	

(Source: Kost, M. (1998). Manual of sedation. Philadelphia. W.B. Saunders, p. 158.

4. Pre-Operative Assessment

- All pediatric patients scheduled to undergo sedation must have a health history and brief physical examination completed prior to the initiation of sedation.
- This assessment should include: history of allergies, history of exposure and/or adverse reactions to parenteral sedative/analgesic medications or IV contrast material, medical history to include pertinent cardiac, pulmonary, hepatic and renal review of systems, and review of any preliminary lab tests. The ASA physical status is assigned to the patient at this point. In the pediatric patient population, the parent will usually provide significant health history information on the patient, especially with younger patient populations.
- The interview time provides the opportunity to establish rapport with the child and parent and begin to initiate pre-procedure teaching.

5. Pre-procedure Assessment:

- Past Medical History
  - Review by Organ Systems
    - CNS: neurologic diseases, increased ICP, presence of VP shunt,
    - neuromuscular diseases associated with weakness
    - Pulmonary: asthma, reactive airway disease, recent or current URI
    - Cardiac: congenital heart disease, patent foramen ovale
    - GI: esophageal reflux (risk of aspiration), dentition or oral anomalies
    - GU: pregnancy status
    - Renal
    - Hepatic
  - Age and weight
  - Allergies and previous adverse drug reactions or sensitivities
  - Current drug use – include OTC, recreational and/or herbal drug use
  - Recent exposure to communicable diseases
  - Summary of previous hospitalizations
- Past Surgical History
- Summary of previous anesthetics or history of sedation and any adverse reactions
- Family History
- Any family history of adverse reaction to anesthesia or sedative drugs
- Physical Exam
  - Vital signs: TPR, BP, SpO2
  - Weight, if not provided by history
  - Congenital malformations, especially involving head, neck and oral cavity
  - Airway exam
  - Heart and lung sounds
  - Physical development
- ASA Classification
- Name, address, phone number of the child's or family's physician

6. Pre-Procedure NPO Guidelines for Pediatric Patients

A documented history of oral intake will be obtained prior to procedural sedation. What follows are recommended guidelines:

Oral Intake Guidelines for Elective Sedation: Society for Pediatric Sedation 2010

Food	Hours of Fasting Required
Clear Liquids	2h
Breast Milk	2 or 4 depending on mother's diet
Formula or Light Meal (no fat)	6h
Full Meal with fat	8h

7. For the Emergency Patient

Evaluate food and fluid intake prior to the use of sedation. When protective airway reflexes are lost, gastric contents may be regurgitated into the airway. Therefore, patients with a history of recent oral intake or with other known risk factors, such as trauma, decreased LOC, extreme obesity, pregnancy, or bowel motility dysfunction should have the procedure delayed for the appropriate period of time or should be referred to Anesthesia. Some of these patients may benefit from meds that reduce gastric volume and acidity.

8. Monitoring Guidelines for Pediatric Sedation

- TPR, BP, O2 Saturation will be monitored and documented before the administration of medication and at least every 5 minutes during procedure.
- Oxygen must be available for administration by face mask or nasal cannula, but need not be used if oxygen saturation remains >95%.
- Patient cardiac monitoring will be continued into the recovery period and until discharge criteria are met.
- Restraining devices should be checked to prevent airway obstruction or chest restriction. If a restraint device is used, a hand or foot should be kept exposed.
- The child's head position should be checked frequently to ensure airway patency.
- If IV fluids are to be administered secondary to a prolonged NPO period, hourly fluid maintenance is accomplished with a balanced salt solution (Lactated Ringers or 0.45% normal saline solution). Hourly maintenance fluid requirements are calculated utilizing the 4-2-1 rule. (Morgan & Mikhail, 1996, p. 728)
  - 4 ml/kg/hour for the first 10 kg of weight
  - 2 ml/kg/hour for the second 10 kg of weight
  - 1 mg/kg/hour for each remaining kg of weight

Example: 25 kg child

- 4 ml x 10 kg x 1 hour = 40 ml/hour
- 2 ml x 10 kg x 1 hour = 20 ml/hour
- 1 ml x 5 kg x 1 hour = 5 ml/hour

Total = 65 ml/hour (hourly maintenance fluid rate)

- Preprocedure volume deficits are also often replaced. Example: A 25 kg child has a maintenance fluid requirement of 65 ml/hour (see above). If NPO period for this child was 4 hours, then the volume deficit is: 65 ml/hr X 4 hrs NPO = 260 ml

9. Pharmacologic Differences of the Pediatric Patient

Pediatric patients have different absorption, metabolic, and elimination rates; that are both age-related and individual for each patient. Effects of a drug are related to each patient's developmental, physical and chemical makeup. Some special rules apply when administering drugs to pediatric patients:

- Look each drug up in a reliable pediatric resource for dose confirmation.
- Check and have someone else recheck your dose calculations.
- Always titrate **dose of drug to individual patient response**.

10. Post –Procedure Monitoring

- Effects of medications will last beyond the end of the procedure. Therefore, appropriate monitoring and, if necessary, emergency treatment must be utilized in the post procedure period.
- Patients who have received antagonist agents (i.e. Naloxone, or Flumazenil) must be monitored for an extended period because the reversal effect is always shorter than the effect of the drugs being reversed.
- Documentation criteria for vital signs and LOC are the same as for adults.

11. Discharge Criteria

For the young or handicapped patient, the following criteria must be based upon the patient's pre-sedation level of function. Patient status at the time of discharge will be documented in the medical record:

- Cardiovascular function and airway patency are satisfactory and stable
- Patient is easily arousable and protective reflexes are intact
- Patient can talk (if age and developmental stage appropriate)
- Patient can sit up unaided (if age appropriate)
- For the very young or handicapped individual, the pre-sedation level of consciousness or one as close as possible to the normal level for that individual should be achieved.
- State of hydration is adequate
- Scores 9-10 on the Aldrete Post-Anesthesia Score for discharge.

12. Post Procedure Discharge Instructions

- Should be provided to the responsible adult.
- Instructions should include: any limitation of activity, dietary modifications, medications, and instructions for follow-up
- A telephone/pager number should be provided to call in the event of complications

Competency Quiz 6 (Answers in the appendix)

1. The upper age for the pediatric patient is?
    a. 15
    b. 16
    c. 18
    d. 21
2. Intravenous conscious sedation may be performed on pediatric patients greater than____ months of age who are assessed Class I or Class II
    a. 9
    b. 10
    c. 11
    d. 12
3. Which of the following may result in rapid respiratory and cardiovascular decompensation in the pediatric patient?
    a. Deep Sedation
    b. Respiratory Obstruction
    c. Painful Procedures
    d. All of the Above
4. Neonates and _____ have several anatomic differences from adult patients that make them vulnerable to airway obstruction.
    a. Adults
    b. Teenagers
    c. Infants
    d. None of the Above
5. _____ of the tongue may result in severe airway obstruction.
    a. Wrong Larynx position
    b. Posterior Displacement
    c. Larger Head and Tongue
    d. Small Mandible
6. The presence of small _____ in early childhood results in decreased lung compliance.
    a. Bronchi
    b. Mandible
    c. Alveoli
    d. None of the above
7. It is the paramount importance when evaluating the pediatric patient prior to conscious sedation.
    a. Airway Obstruction
    b. Airway passages
    c. Airway Assessment
    d. Airway Procedures
8. The normal heart rate for a 3-year-old child is_____ beats per minute.
    a. 140
    b. 120
    c. 100
    d. 80

9. Developmental Stage for Toddler is:
    a. Trust vs. mistrust
    b. Autonomy vs. Shame and Doubt
    c. Initiative vs. Guilt
    d. Industry vs. Inferiority
10. Oral Intake for Breast Milk for Elective Conscious Sedation is:
    a. No breast milk for 4 hours before scheduled procedures
    b. No breast milk for 5 hours before scheduled procedures
    c. No breast milk for 6 hours before scheduled procedures
    d. No breast milk for 7 hours before scheduled procedures
11. Oral Intake for Clear Liquids for Elective Conscious Sedation is:
    a. 4 hours prior to the scheduled procedure
    b. 5 hours prior to the scheduled procedure
    c. 6 hours prior to the scheduled procedure
    d. 2 hours prior to the scheduled procedure
12. Oxygen is not needed if the oxygen saturation remains _____.
    a. =95%
    b. <95%
    c. >95%
    d. None of the above

The Power of Suggestion: The Language of Nursing

The difference between the right word and the almost right word is the difference between lightning and the lightning bug. —Mark Twain

The language of nursing was first mentioned by Florence Nightingale in her book *notes on nursing* when she stated that, “words are great tools” (Nightingale, 1859).

Nursing is the most trusted of all professions. Unfortunately, as many nurses and nurse anesthetists talk to their patients, they are not aware of how the use of language impacts that trust. Language creates perceptions and those perceptions are truth to the patient. Biological research done by Bruce Lipton Ph.D. describes how changing thinking changes the brain, which in turn changes a behavior or a physiological response. His research demonstrates that words have the ability to change pain and the healing process (Lipton, 2006). The brain responds equally to both negative (toxic) suggestions and positive reassuring (therapeutic) suggestions. Every suggestion creates a physiological or biochemical response, as we know when people blush from an embarrassment or we ourselves wake up in a cold sweat from a nightmare.

A person in pain, fear or panic is considered to be in an altered state of consciousness. At such times, healing suggestions can be spoken to the body and accepted as truth by the brain.

Words may affect the following functions:

✓ Pain	✓ Bowel motility
✓ Heart Rate &	✓ Smooth muscle
✓ Contractions	✓ Sweating
✓ Blood pressure	✓ Allergic responses
✓ Bleeding	✓ Asthma
✓ Inflammatory	✓ Immune response
✓ Itching	✓ Allergic responses

Very simply, negative or toxic language can create negative perceptions and negative emotional and/or physical responses.

Examples of Toxic Language:

- This may burn...
- You may feel an electric shock down your spine.
- It's really noisy in the operating room.
- This will feel like a bee sting.
- That equipment is broken again?!
- How much pain are you having on a scale of 0-10?
- Do you feel sick?
- We're going to put you to sleep.

Words can paint mental pictures, change behaviors, and alter symptoms or sensations. The subconscious mind does not think or reason; it only responds to thoughts created by the words we speak and hear.

Suggestions should be positive and affirming, clear and specific, firm, believable, rich in imagery, and beneficial. Suggestions should avoid anger or blame. In other words, don't say, "Boy, you really broke yourself up," or "How could you do something so stupid?" Also avoid any negative words like *pain* and *hurt*.

I recently went for blood work and the phlebotomist said, "Sit down and roll up your sleeve. I am going to be your worst enemy today." I asked why. She said, "Because I am going to hurt you." She could have said: "Relax, this won't take long. You may not even feel it."

I use the following language in the holding area for surgery, but it could be used anywhere to reframe the patient's thinking. I ask, "Is there some place you would rather be than here?" When they say, "Yes," I ask, "Where would you rather be?" When they tell me, I simply say, "Go there and create that place in your imagination."

Anesthetic medications such as Propofol and Versed are classified as hypnotic drugs and these medications may magnify comments made during sedation and anesthesia. So, I often use these phrases to help my patients.

- "I will be with you during the entire procedure, doing everything needed to keep you

safe and comfortable."

- "I will give you medications during your procedure to keep you comfortable and to create good feelings in your stomach."
- "You should wake up feeling comfortable and pleasantly hungry."
- "Think of a happy place and imagine you are there."
- "You may feel some warmth in your IV as this medicine goes in. That feeling will help you relax."

Also remember that environmental and background noises affect patient outcomes, especially in critical care areas. We often carry on our personal conversations, forgetting that the hospital is more than just a workplace and that patients are sensitive to noise and can eavesdrop on our conversations.

I recommend we listen without being judgmental, avoid unnecessary noise, keep areas quiet and professional, and use softer tones. Avoid jargon; keep it simple without talking down to patients or families. We as nurses can change and enhance patient outcomes simply by the language we use and the way we listen to our patients.

DON'T SAY	**DO SAY**
This isn't going to hurt.	You might feel a slightly cool pressure as I…
Don't give up.	Focus on what feeling good would feel like.
Don't be afraid.	What are your concerns?
A little bee sting. (There is no such thing) as little bee sting.)	Some people feel this; some people don't.
This is going to hurt.	Some people feel this and some people don't.
Do you feel like vomiting?	You may have a warm hungry feeling in your stomach.
We're going to put you to sleep.	I am giving you some medication that will let you gently go to sleep.
Don't worry, you won't wake up!	I will be with you the entire time to make sure you stay sedated during your surgery.
Are you feeling better?	You look/sound like you are feeling better
See if this nitroglycerin tablet will help.	Take this. It will make you feel more comfortable.
Has the oxygen helped your breathing?	I see that the oxygen is making it easier for you to breath.

Conclusion

Every thought we have affects some organ or gland in our body. Imagine you are eating a lemon and you experience the salivation and the tart tanginess in your parotid gland. In the same way negative thoughts (worry) can make us sick and positive thoughts can make us well. Florence Nightingale directed nurses to use words to help patients to change their thoughts. Words are still the most powerful tool a nurse has.

Words are, of course, the most powerful drug used by mankind."

- Rudyard Kipling

Competency Quiz 7 (Answers in the appendix)

1. Who said, "The difference between the right word and the almost right word is the difference between lightning and the lightning bug"?
    a. Mark Twain
    b. Florence Nightingale
    c. Bruce Lipton Ph.D.
    d. Rudyard Kipling
2. _____ stated that "words are great tools" and changing a patient's thoughts will change their outcome.
    a. Mark Twain
    b. Florence Nightingale
    c. Bruce Lipton Ph.D.
    d. Rudyard Kipling
3. _____ are considered positive suggestions and can enhance a patient's outcome.
    a. Therapeutic Suggestions
    b. Toxic Suggestions
    c. Reassuring Suggestions
    d. a and c
4. _____ is a biological researcher who described how changing thinking, changes the brain, which in turn changes a behavior or a physiological response:
    a. Albert Einstein
    b. Candace Pert, Ph.D.
    c. Bruce Lipton Ph.D.
    d. Rudyard Kipling
5. Which following statement is an example of toxic language:
    a. This will feel like a little Bee Sting.
    b. Take this. It will make you feel more comfortable.
    c. You look/sound like you are feeling better.
    d. You should; be comfortable. If not let us know.
6. Suggestions should be:
    a. Positive and affirming
    b. Clear and specific
    c. Firm and believable
    d. All of the above
7. A sedation medication that is classified as a hypnotic which may magnify comments made during sedation and anesthesia is:
    a. Midazolam
    b. Ketamine
    c. Fentanyl
    d. Morphine

8. Which statement is true? (1) Environmental and background noises affect patient outcomes, especially in critical care areas. (2) Nurses can change and enhance patient outcomes simply by the language they use and the way they listen to patients.
    a. Neither
    b. (1) only
    c. Both
    d. (2) only
9. _____; keep it simple without talking down to patients or families.
    a. avoid unnecessary noise
    b. avoid jargon
    c. keep areas quiet and professional
    d. use softer tones
10. Instead of saying “Don’t be afraid”, a nurse could say:
    a. Focus all your energy on healing.
    b. What are your concerns? Then address the concern/s.
    c. Some people feel this; some people don’t.
    d. I will be with you the entire time during your procedure.
11. Instead of saying “Don’t give up”, a nurse could say:
    a. Take an abdominal breath and focus on what feeling good would feel like.
    b. We are well trained in how to take care of you.
    c. you look/sound like you are feeling better
    d. Some people feel this; some people don’t.
12. Instead of saying “This is going to hurt.”, a nurse should say:
    a. We are well trained in how to take care of you.
    b. Some people feel this and some people don’t.
    c. You may have a warm hungry feeling in your stomach.
    d. This never hurts.

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Appendix

1. Suggested Competency Model
2. Suggested Prerequisites for Non-Anesthetists Administering Sedation
3. Sample of Informed Consent and Authorization For Sedation
4. ASA Classification
5. Sedation Monitoring Record
6. Sedation Pre / Post-Procedure Summary
7. Sample Recommendations for Patients Receiving Sedation and Analgesia
8. Propofol Sedation: Issues and Recommendations
9. Dilaudid®
10. Precedex
11. Scope of Practice
12. Sample Procedural Policy for Sedation
13. Pediatric Sedative Drugs
14. Answers to Competency Quiz

1

Suggested Competency Model

This competency is a Sedation Certification validation mechanism for registered nurses to assume the multifaceted role of the Sedation Nurse.

The competency module is a self-paced program designed to accommodate the various clinical experiences each nurse may possess with sedation. Successful achievement of this entire module is necessary to be considered competent in administration and management of the sedated patient.

Phase I

- Review and acknowledge your position statement as the nurse in the management of patients receiving sedation.
- Review current institution's policy on sedation. If no policy, use provided policy go by to develop a policy.

Phase II

- Complete the Sedation Certification Seminar on Sedation prior to clinical practicum.
- Concentrate on acquiring knowledge in the field of physiology and pharmacology related to sedation.

Phase III

- When possible spend time in Surgery, Out Patient Surgery, Endoscopy and/or Oral Surgery Clinic to observe and become familiar with the role of the sedation nurse during the pre-procedure assessment, intra-procedure monitoring and post-procedure recovery period.
- Accompany an anesthesia provider to the Operating Room to experience at least 2 airway management procedures to become familiar with airway techniques.

Phase IV

- Completion of at least five (5) sedation procedures with preceptor (physician, nurse anesthetists, or qualified nurse) in order to obtain skills necessary to perform independent demonstration of competency.

Phase V

- Complete "post-test" with score of at least 80% and turn in course evaluation form.

2

Suggested Prerequisites for Non-Anesthetists Administering Sedation

1. *Current license as RN, MD, PA, DDS or Podiatrists (See facility policy for others qualified)
2. *Current ACLS or PALS Certification.
3. *Successful completion of a sedation course with a posttest passing grade of 80% or better.
4. IV Insertion certificate or a part of job description from facility recommended
5. IV Push certificate or listed in job description by facility recommended
6. Institutes Medication Certification recommended
7. Five Sedation cases supervised by CSRN, CRNA or Physician recommended
8. Completion of 2 airway management experiences with anesthesia personnel in the operating room if available. If not available documentation of completion of an airway hands on class, simulator or a comprehensive airway education video.

* Required

3

Sample of Informed Consent and Authorization for Sedation

1. I_____(Patient's name), acknowledge that I am scheduled to undergo a procedure and request that I be given sedation medication to relieve anxiety and pain.

2. Sedation for my procedure has been explained to me by_____, and I have had all my questions concerning sedation explained to my satisfaction.

3. I understand that in addition to the risks of the procedure, sedation carries its own risks. Complications that arise include, but are not limited to, the following:

a. Nausea/vomiting
b. Damage to blood vessels
c. Respiratory problems
d. Drug reactions
e. Infection
f. Heart injury
g. Death
h. Damage to fetus if pregnant

4. I understand that during sedation, conditions may arise which require invasive actions. I therefore authorize hospital personnel to act on my behalf.

5. I understand that my sedation will be monitored by an individual that has completed the Sedation training as per hospital policy and under the supervision of a Naval Hospital Beaufort credentialed Physician.

6. I have been given an explanation of the proposed sedation plan, and have been given the opportunity to ask questions about it as well as alternatives. The risks and hazards have been explained to me, and I feel that I have sufficient information to give this informed consent.

7. I certify that this form has been fully explained to me, that I have read it, or have had it read to me, and that I understand its contents.

_____ _____
Signature (Patient or person authorized to consent) Date/time

_____ _____
Witness signature Date/time

_____ _____
Signature and stamped name (sedation nurse) Date/time

4

ASA Classifications

ASA Classification	Description	Examples
1	A normal, healthy patient, without organic, Physiologic, or psychiatric disturbance	Healthy with good exercise tolerance
2	A patient with controlled medical conditions without significant systemic effects	Controlled hypertension, controlled diabetes mellitus without systemic effects, cigarette smoking without evidence of COPD, anemia, mild obesity, age less than 12 months to greater than 70 years, pregnancy, chronic bronchitis, heart disease that only slightly limits physical activity
3	A patient having medical conditions with significant systemic effects intermittently associated with significant functional compromise	Controlled CHF, stable angina, old MI, poorly controlled hypertension, morbid obesity, bronchospastic disease with intermittent symptoms, chronic renal failure, heart disease that limits activity, diabetes mellitus with vascular complications, immunosuppressed, asthma under treatment
4	A patient with a medical condition that is poorly controlled, associated with significant dysfunction and is a potential threat to life	Unstable persistent angina, symptomatic COPD, symptomatic CHF, active myocarditis, hepatorenal failure, organic heart disease showing marked signs of cardiac insufficiency, advanced pulmonary or endocrine insufficiency.
5	A patient with a critical medical condition that is associated with little chance of survival with or without the surgical procedure, moribund patient not expected to survive 24 hours	Multiorgan failure, sepsis syndrome with hemodynamic instability, hypothermia, poorly controlled coagulopathy, cerebral, trauma, pulmonary embolus, uncontrolled hemorrhage as from a ruptured abdominal aneurysm.

5

Sample Sedation Monitoring Record

SAMPLE SEDATION MONITORING RECORD

Procedure:

Date:	Start Time:	Stop Time:	Surgeon:	Allergies:	Weight:

Time

Remarks:

● =Pulse
○ = Spont Resp
∨ = Sys
∧ =Dia

180
160
140
120
100
80
60
40

Pre-Procedure VS
Pulse –
BP –
HR –
SaO_2 –

SaO_2
Verbal
Cardiac Rhythm
O_2L/M
Meds:

Total dose_____
Total dose_____
Total dose_____

Post Procedure Record

Medications Used	Route	Total	Fluids		Discharge vital signs:
			Type	Amount	Pulse:
					Heart Rate:
					Blood Pressure:
			EBL		Pulse Ox:
			Urine		

Time	Notes:

Discharge Criteria: Normal Color, Fully Awake, Breathes freely and deeply, Able to move all unrestricted extremities, Blood pressure within 20% of pre-procedure level

Identification:

Post Procedure Documentation
☐ Meets all discharge criteria
☐ Written instructions given
☐ Discharged to care of responsible adult
☐ UNABLE TO MEET DISHARGE CRITERIA (Patient care turned over to PACU)
Sedation Provider Signature: Date/Time:

6

Sample Conscious Sedation Pre / Post-Procedure Summary

Proposed Procedure	Age	Weight (kg)	Height (in)	Physical Status 1 2 3 4 5 E	Allergies

Chemistries	Hematology	Coags	Urinalysis / HCG	Airway assessment:
	H / H - Platelets - WBCs -	PT - INR - PTT -		

Respiratory	CV	CNS / Skeletal	Other
Tobacco: Cough: Sputum: Asthma: COPD: Recent URI: TB: CXR: Lung Exam:	HTN: CAD: MI: CHF: VHD: Arrhythmias: Exercise Tolerance: ECG: Cardiac Exam:	Seizure: CVA: LOC: Neuro: Muscle: Skeletal: Misc BP: HR:	Hepatic: Renal: GI: Esophageal Dz.: Thyroid: Diabetes: Heme: EtOH:

Previous Anesthetics/Complications:	Current Medications:
Family Hx:	Day of Procedure: ☐ Chart Reviewed / Patient examined ☐ Risks / benefits / options discussed with patient ☐ Patient questions answered ☐ Patient / parent / guardian understands and accepts risks ☐ NPO after _____ liq., _____ clears, _____ solids Sedation nurse signature Date & Time
Preoperative Diagnoses 1. 2. 3. 4. 5.	Comments:

Patient identification

Post-procedure note
☐ No apparent complications from sedation.

Signature Date/Time

7

RECOMMENDATIONS FOR PATIENTS RECEIVING SEDATION AND ANALGESIA

1. Arrangements must be made for a responsible adult to drive you home after your sedation.
2. No solid food 6-hours prior to procedure. Light meal up to 6-hours
3. May provide formula up to 6-hours and breast milk up to 4-hours before procedure.
4. May drink clear liquid, (water, apple juice) up to 2-hours before procedure.
5. Patient may take medications with sips of water as recommended by their physician.
6. Any regular daily medications can be taken the day of your procedure, with a sip of water.
7. If you are taking medications that affect blood clotting, ask your doctor if you should stop taking them prior to your appointment.
8. You will be released to return home after your procedure, when the effects of the sedation have worn off (usually in 1-2 hours). Remember, a responsible adult (18-years-old or older) must accompany you home.
9. An adult should be with you for 24 hours and check on you frequently for the first 6-8 hours.
10. Certain sedative medications can cause difficulty with urination, which may (rarely) require catheterization of the bladder.
11. Occasionally, patients experience allergic reactions to sedative medications, including itching, rash, breathing difficulty, or other symptoms. Be sure you let your physician know your allergies.
12. You must not drive a motor vehicle, operate heavy equipment, or drink alcohol for at least 24 hours after your sedation.
13. You may experience some nausea and vomiting, but most people do not.
14. If you experience any problems or complications, notify your doctor by the number on your discharge information.
15. You may call or report to a hospital Emergency Department if needed.

8

PROPOFOL SEDATION: ISSUES AND RECOMMENDATIONS

Propofol

Using propofol (Diprivan) to sedate patients during endoscopic and other diagnostic procedures is gaining momentum in a growing number of hospitals, outpatient surgery centers, and physician offices. In trained hands, propofol offers many advantages over other drugs used for sedation because it:

- Has a rapid onset (about 40 seconds) and a short duration of action.
- Allows patients to wake up, recover, and return to baseline activities and diet sooner than some other sedation agents
- Reduces the need for opioids, thus resulting in less nausea and vomiting

Trained nurses in most critical care settings often administer propofol safely to patients who are intubated and ventilated. However, some practitioners have been lulled into a false sense of security, allowing the drug's good safety profile to influence their beliefs that propofol is safer than it really is. In untrained hands, propofol can be dangerous, even deadly; administration to a nonventilated patient by a practitioner who is not trained in the use of drugs that can cause deep sedation and general anesthesia is not safe, even if the drug is given under the direct supervision of the physician performing the procedure. [2] After all, how much supervision can the physician provide if he or she is focused on the procedure itself? Not enough, as the following events show.

Believing that propofol was "used all the time in ICU," a gastroenterologist asked a nurse to prepare "10 mL" (10 mg/mL) of the drug for a patient undergoing endoscopy in his room. The nurse obtained the drug from an automated dispensing cabinet via override before she transcribed the order to the patient's record. Another nurse who was trained in the use of moderate sedation, but not deep sedation or anesthesia, assisted the gastroenterologist. After questioning the physician about the dose (100 mg is a high dose), she began administering the propofol via an infusion pump. The patient suddenly experienced respiratory arrest. Fortunately, ICU staff were able to help with the emergency and quickly intubated and ventilated the patient.

Another case involved a physician who thought he could safely administer propofol himself while performing a breast augmentation. Unfortunately, his patient, a young woman, died of hypoxic encephalopathy because he failed to notice the patient's rapidly declining respiratory status, as had his surgical assistant, who was not qualified to monitor patients under deep sedation or anesthesia.[3]

Nurses have also been asked to administer "a little more" propofol if the patient moved after the anesthesiologist left the room. In these cases, the anesthesiologist would leave the propofol syringe and needle in the IV port after placing the block and leave the nurses in the room to monitor the patient alone. Initially, the nurses reluctantly complied. Later, they brought the issue to the attention of hospital leaders, citing that they were worried about the safety of this practice. [2]

There are several compelling reasons why all healthcare providers should be worried about nurse-administered propofol.

Strict Product Labeling

AstraZeneca, the manufacturer of Diprivan, states in its product labeling that the drug is intended for general anesthesia or monitored anesthesia care sedation, and that the drug should be administered only by persons trained in the administration of general anesthesia and not involved in the surgical/diagnostic procedure. (For sedation of intubated, mechanically ventilated adult patients in the ICU, product labeling notes that the drug should be administered only by persons skilled in the management of critically ill patients and trained in cardiovascular resuscitation and airway management.)

Unpredictable and Profound Effects

Propofol dosing and titration is variable, based on the patient's tolerance to the drug. Profound changes can occur rapidly. A patient can go from breathing normally to a full respiratory arrest in seconds, even at low doses, without warning from typical assessment parameters. [2]

No Reversal Agent

Unlike other sedation agents (e.g., midazolam, morphine), there is no reversal agent for propofol. Adverse effects must be treated until the drug is metabolized.

Financial Incentives

Unwillingness of insurers to reimburse anesthesia care for some procedures such as diagnostic endoscopy has increased the use of nurse-administered propofol. (1,2) Untrained nurses may be caught in the middle of the debate and feel pressured to administer propofol.

Legal Barriers

Nurse-administered propofol falls under each state's Nurse Practice Act. More than a dozen states specifically consider this function beyond the scope of nursing practice. [2]

Safe Practice Recommendation: At each organization, an interdisciplinary team, including chair of the anesthesia department, should establish policies and practice guidelines for the administration of propofol (or other induction agents such as thiopental, methohexital, or etomidate) to nonventilated patients undergoing surgical or diagnostic procedures. To best inform your team's decision about this controversial issue, consider the following:

Review regulations/position statements. Check with your State Board of Nursing to determine if nurse-administered propofol is deemed within the professional nurses' scope of practice. If so, explore the various position statements available on this topic from professional societies, including the:

- American Society of Anesthesiologists (ASA)
- American Association of Nurse Anesthetists (AANA)
- American Association of Moderate Sedation Nurses (AAMSN)
- American Association for Accreditation of Ambulatory Surgery Facilities (AAAASF)
- American College of Gastroenterology (ACG)
- American Gastroenterological Association (AGA)

- American Society for Gastrointestinal Endoscopy (ASGE)
- Society of Gastroenterology Nurses and Associates (SGNA).

In brief, the ASA, AANA, and AAAASF believe that only persons trained in the administration of general anesthesia, who are not simultaneously involved in the procedures, should administer propofol to nonventilated patients. The ASA also suggests that, if this is not possible, non-anesthesia staff who administer propofol should be qualified to rescue patients whose level of sedation becomes deeper than intended, and who enter, if briefly, a state of general anesthesia. The ACG, AGA, ASGE, and SGNA endorse nurse-administered propofol under the direction of a physician if state regulations allow it, and if the nurse is trained in the use of drugs causing deep sedation and capable of rescuing patients from general anesthesia or severe respiratory depression.

Define policies. Based on patient safety, professional association position statements, and applicable state laws, determine the qualifications of professionals who can administer propofol to nonventilated patients during procedures. If nurse-administered propofol is acceptable, specify the circumstances and required education and mentorship that must be accomplished beforehand, and competencies that must be evaluated and met periodically (ACLS certification alone is not sufficient (2)). Decide if the location of propofol administration plays a factor. Location need not be limited if criteria are met, including expertise to intubate patients, which is difficult to meet in physician office settings. (1) Define the intended level of sedation. However, even if moderate sedation is intended, all patients given propofol should receive care consistent with deep sedation.

Establish a continuous monitoring process and assessment criteria (e.g., vital signs, oxygen saturation, ideally capnography) for nonventilated patients who are receiving propofol. Ensure that equipment is readily accessible at the point of care to maintain a patent airway, provide oxygen, intubate, ventilate, and offer circulatory resuscitation.

Conclusion. The debate about who should be allowed to administer propofol may continue, but one thing is clear: whenever propofol is used for sedation/anesthesia, it should be administered only by persons who are: (1) trained in the administration of drugs that cause deep sedation and general anesthesia, (2) able to intubate the patient if necessary, and (3) not involved simultaneously in the procedure itself.

9

Dilaudid®

Hydromorphone HCl
Analgesic – Antitussive

Action and Clinical Pharmacology: Hydromorphone has a strong analgesic action and antitussive activity. Small doses of hydromorphone produce effective and prompt relief of pain usually with minimal nausea and vomiting. Generally, when given parenterally, hydromorphone's analgesic action is apparent within 15 minutes and remains in effect for more than 5 hours. The onset of action of oral hydromorphone is somewhat slower, with measurable analgesia occurring within 30 minutes. When sleep follows the administration of hydromorphone, it is due to relief of pain, not to hypnosis.

Hydromorphone is approximately 8 times more potent on a milligram basis than morphine. In addition, hydromorphone is better absorbed orally than is morphine; the former is approximately 20 to 25% as active orally as i.m.

Hydromorphone has greater antitussive potency than codeine on a weight basis; however, its dependence liability is also greater than that of codeine.

After absorption hydromorphone is metabolized by the liver to the glucuronide conjugate which is then excreted in the urine.

Indications and Clinical Uses: Relief of moderate to severe pain.

Contra-Indications: Intracranial lesion associated with increased intracranial pressure, status asthmaticus, and pulmonary edema.

Precautions: May be habit-forming. Hydromorphone is a narcotic with an addiction liability similar to that of morphine and for this reason the same precautions should be taken in administering the drug as with morphine.

Pregnancy: As with all narcotics, hydromorphone should be used in early pregnancy only when expected benefits outweigh risks.

If necessary, hydromorphone may be given IV but the injection should be given very slowly. Rapid IV injection of narcotic analgesic agents, including hydromorphone, increases the possibility of adverse effects, such as hypotension and respiratory depression.

As with any narcotic analgesic agent, the usual precautions should be observed, and the possibility of respiratory depression should be kept in mind. If a patient shows signs of hypersensitivity to hydromorphone the treatment must be stopped.

Dilaudid injection has been reported to be physically or chemically incompatible with solutions containing sodium bicarbonate and thiopental sodium.

Children: Hydromorphone suppositories are not recommended for use in children.

Adverse Reactions: Nausea, vomiting, dizziness, somnolence, anorexia and constipation may occur. Pain at injection site; local tissue irritation and induration following s.c. injection, particularly when repeated in the same area.

Symptoms and Treatment of Overdose: Symptoms: Serious overdose with hydromorphone may be characterized by respiratory depression (a decrease in respiratory rate and/or tidal volume, Cheyne-Stokes respiration, cyanosis), extreme somnolence progressing to stupor or coma, skeletal muscle flaccidity, cold and clammy skin, and sometimes bradycardia and hypotension. In severe over dosage, apnea, circulatory collapse, cardiac arrest and death may occur.

Treatment: If significant respiratory depression occurs, it may be antagonized by naloxone as recommended by the manufacturer. Employ other supportive measures as indicated.

Dosage: Orally for adults, 2 to 4 mg every 4 to 6 hours as required. The usual adult parenteral dose for pain relief is 2 mg by subcutaneous or intramuscular routes every 4 to 6 hours as necessary. If necessary, hydromorphone may be given IV, but the injection should be given very slowly. Severe pain can be controlled with 3 to 4 mg every 4 to 6 hours as necessary. Rectal suppositories (3 mg) provide long-lasting relief and are especially useful at night. The oral liquid may be diluted in fruit juice or other beverage, if desired.

IV Initial: Opiate-naive: 0.2-0.6 mg every 2-3 hours as needed; patients with prior opiate exposure may tolerate higher initial doses. Dilute 2mg one ml ampoule into 9cc's of saline which is 0.2mg per ml.

Note: More frequent dosing may be needed.

Mechanically-ventilated patients (based on 70 kg patient): 0.7-2 mg every 1-2 hours as needed; infusion (based on 70 kg patient): 0.5-1 mg/hour

Patient-controlled analgesia (PCA): (Opiate-naive: Consider lower end of dosing range)
Usual concentration: 0.2 mg/ml
Demand dose: Usual: 0.1-0.2 mg; range: 0.05-0.5 mg
Lockout interval: 5-15 minutes
4-hour limit: 4-6 mg

Epidural:
Bolus dose: 1-1.5 mg
Infusion concentration: 0.05-0.075 mg/ml
Infusion rate: 0.04-0.4 mg/hour
Demand dose: 0.15 mg
Lockout interval: 30 minutes

Note: Intramuscular use may result in variable absorption and a lag time to peak effect.

Initial: Opiate-naive: 0.8-1 mg every 4-6 hours as needed; patients with prior opiate exposure may require higher initial doses; usual dosage range: 1-2 mg every 3-6 hours as needed

10

Precedex

Precedex is indicated for sedation in nonintubated patients prior to and during surgical and other procedures and in intubated and mechanically ventilated patients during treatment in an intensive care setting.

Precedex should be administered by continuous infusion not to exceed 24 hours.

Caution should be exercised when administering Precedex to patients with advanced heart block and/or severe ventricular dysfunction.

Clinically significant episodes of bradycardia, sinus arrest and hypotension have been associated with Precedex infusion and may necessitate medical intervention.

Initiation and maintenance dosing

Precedex is generally initiated with a loading dose of 1 mcg/kg over 10 minutes for both procedural sedation and ICU sedation.

However, coadministration of Precedex with anesthetics, sedatives, hypnotics and opioids can enhance the pharmacodynamic effects of these agents. Specific studies have confirmed these effects with sevoflurane, isoflurane, propofol, alfentanil and midazolam.

Therefore, a decrease in the dosage of Precedex or the concomitant agent may be required.

In patients already sedated with other anesthetics, sedatives or opioid analgesics, a loading dose may not be necessary.

Prior to initiating a loading dose, consideration should be given to the existing level of sedation and condition of the patient.

- **For ICU sedation**
  Maintenance dosing of Precedex is initiated at 0.4 mcg/kg/hr. and titrated over a dose range of 0.2 to 0.7 mcg/kg/hr.
- **For sedation during surgical and other procedures**
  After administration of a 1 mcg/kg loading dose, the maintenance dose of Precedex is initiated at 0.6 mcg/kg/hr. and titrated to achieve the desired clinical effect, with doses ranging from 0.2 to 1 mcg/kg/hr.

http://www.precedex.com/dosing/dosing-basics/

11

Certified Sedation Registered Nurse (CSRN)™ Scope of Practice

Certification is a process by which a nongovernmental agency validates, based upon predetermined standards, an individual nurse's qualification and knowledge for practice in a defined functional or clinical area of nursing.

Certified Sedation Registered Nurses (CSRNs) are registered nurses who become sedation certified by taking an advanced curriculum of study which focuses on the development of knowledge in the areas of patient assessment, pharmacology, airway, monitoring, equipment, emergencies, emergence, clinical judgment and critical thinking. It is within the scope of practice of a registered nurse to manage the care of patients receiving sedation during therapeutic, diagnostic, or surgical procedures under the guidance of a licensed independent provider (LIP) who is qualified by education, licensure and certification.

CSRNs are legally responsible for the sedation care they provide which is either determined by their state Board of Nursing (BON) policy and position statement on non-anesthetist's RNs giving sedation. If no BON policy on non-anesthesia RNs giving and monitoring sedation, then guidance should come from their facility sedation policy and their own job description. More information concerning CSRNs state policies in their states can be found at: https://sedationcertification.com/resources/position-statements/position-statements-by-state/clickable-map/

Responsibilities and Functions

The scope of practice of CSRNs includes, but is not limited to, the following:

1. Administration of moderate sedation medications by non-anesthetist RNs is allowed by state laws and institutional policy, procedures, and protocol.

2. A qualified anesthesia provider or attending physician selects and orders the medications to achieve moderate sedation.

3. ·Guidelines for patient monitoring, drug administration, and protocols for dealing with potential complications or emergency situations are available and have been developed in accordance with accepted standards of anesthesia practice.

4. The registered nurse managing the care of the patient receiving moderate sedation shall have no other responsibilities that would leave the patient unattended or compromise continuous monitoring.

5. The registered nurse managing the care of patients receiving moderate sedation is able to:

    a. Demonstrate the acquired knowledge of anatomy, physiology, pharmacology, cardiac arrhythmia recognition and complications related to moderate sedation and medications.

    b. Assess total patient care requirements during moderate sedation and recovery. Physiologic measurements should include, but not be limited to, respiratory rate,

oxygen saturation, blood pressure, cardiac rate and rhythm, and patient's level of consciousness.

c. Understand the principles of oxygen delivery, respiratory physiology, transport and uptake, and demonstrate the ability to use oxygen delivery devices.

d. Anticipate and recognize potential complications of moderate sedation in relation to the type of medication being administered.

e. Possess the requisite knowledge and skills to assess, diagnose and intervene in the event of complications or undesired outcomes and to institute nursing interventions in compliance with orders (including standing orders) or institutional protocols or guidelines.

f. Demonstrate skill in airway management resuscitation.

g. Demonstrate knowledge of the legal ramifications or administering moderate sedation and/or monitoring patients receiving moderate sedation, including the RN's responsibility and liability in the event of an untoward reaction or life-threatening complication.

6. The institution or practice setting has in place an educational/competency validation mechanism that includes a process for evaluating and documenting the individuals' demonstration of the knowledge, skills, and abilities related to the management of patients receiving moderate sedation. Evaluation and documentation of competence occurs on a periodic basis according to institutional policy.

Additional nurse sedation responsibilities which are within the expertise of the individual CSRN may include the following:

1. Administration/management: scheduling, material and supply management, development of policies and procedures, fiscal management, performance evaluations, preventative maintenance, billing, data management, and supervision of staff, students or ancillary personnel.
2. Quality assessment: data collection, reporting mechanism, trending, compliance, committee meetings, departmental review, problem-focused studies, problem solving, interventions, documents and process oversight.
3. Education: clinical and didactic teaching, BCLS/ACLS instruction, in-service commitment and facility continuing education.
4. Research: conducting and participating in departmental, hospital-wide, and university-sponsored research projects.
5. Committee appointments: assignment to committees, committee responsibilities, and coordination of committee activities.

6. Interdepartmental liaison: interface with other departments such as nursing, surgery, obstetrics, postsedation care units (PACU), outpatient surgery, admissions, administration, laboratory, pharmacy, etc.
7. Clinical/administrative oversight of other departments: respiratory therapy, PACU, operating room, surgical intensive care unit, pain clinic, etc.

The functions listed above are a summary of CSRN clinical practice and are not intended to be all-inclusive.

12

Sample Procedural Policy for Sedation

Your Facility Information Here

Subj: MODERATE SEDATION

References:

a) "Practice Guidelines for Sedation and Analgesia by Non-Anesthesiologists" Anesthesiology, V 96, No 4, Apr 2002
b) "Considerations for Policy Guidelines for Registered Nurses Engaged in the Administration of Sedation" CRNA Practice AANA.
c) Kost, Michael, (1998), Moderate Sedation/Analgesia Core Competencies for Practice, Second Edition, Elsevier, St. Louis
d) Odom-Forren, Jan and Donna Watson, *Practical Guide to Moderate Sedation/Analgesia,* Second Edition, Elsevier, St. Louis.

1. Purpose. To establish minimum requirements for administering and monitoring sedation, and establishing "one standard of care" for all patients throughout this facility, utilizing guidelines established in references (a) and (b).

a. Patients in the Special Care Unit on ventilators.

b. Patients under age 12.

c. Situations requiring sedation/analgesia for patients who are not undergoing a diagnostic/therapeutic procedure for (i.e., pain control or treatment of insomnia).

d. Situations where the clinician's intent is to provide anxiolysis, using standard recommended doses of benzodiazepines alone or in combination with a narcotic.

e. Circumstances that require the assistance of a qualified anesthesia provider, including:

(1) Situations requiring sedation during which it is anticipated that the required sedation will eradicate the purposeful response to verbal commands or tactile stimulation and/or result in partial or complete loss of protective airway reflexes including the ability to independently maintain a patent airway.

(2) Preoperative management of patients undergoing general anesthesia or major conduction blockade.

2. Cancellation. See or create institution policy

3. Definition. Sedation is produced by the administration of drug(s) which depress the level of consciousness (with or without providing analgesia) while retaining the ability to independently and continuously maintain a patent airway and to respond appropriately to verbal and physical stimuli. Adequate respiratory drive is maintained.

4. Patient Evaluation

a. The need for any short-term therapeutic, diagnostic, or surgical procedure and subsequent use of sedation will be directed by a credentialed physician and/or dentist.

b. Practitioners are required to consult with an anesthesia provider when there is a question regarding the appropriate delivery of sedation.

c. Patients (or their legal guardians) will be informed of the risks and benefits of sedation and agree to its administration. Informed Consent and Authorization for Sedation form will be used to obtain written informed consent.

d. Patients undergoing sedation for elective procedures should adhere to the following NPO guidelines put forth by the anesthesia department: no solids for six hours prior to scheduled procedure and stop clear liquids two hours prior to scheduled procedure to allow gastric emptying.

e. A Sedation Pre-Procedure Evaluation must be completed and included in the medical record. Post-procedure care must be documented on the Sedation Monitoring Record.

f. Constant monitoring of the patient is required to assess the level of sedation and to ensure the safety of patients undergoing procedures requiring sedation.

5. Practitioners

a. The minimum number of available medical personnel for any procedure employing sedation will be two: however, the monitor shall have no other duties. The operator (physician or dentist performing the procedure(s)) and the monitor (an assistant formally trained to administer medications and sedation under the direction of the operator, to monitor appropriate physiologic parameters, and to assist in supportive or resuscitative measures as required). These personnel will be available to the patient from the time of administration of sedation until recovery is complete. When needed, a third person will be used to assist and or circulate during the procedure.

b. The operator is required to hold current credentials and facility privilege as established by the facility and granted by administration.

c. The provider performing the procedure will verify that all Practitioners who perform sedation have completed an Advanced Cardiac Life Support course.

d. The operator selects, orders, and signs the order for the medication to produce sedation.

e. The sedation monitor must complete a sedation course, be able to monitor and react appropriately to the patient's responses to medication and at a minimum, changes in: .

(1) Vital signs.
(2) Level of consciousness.
(3) Airway status.
(4) Oxygen saturation.

f. The monitor will not engage in any tasks that would compromise continuous patient assessment. (i.e. circulation, assistant)

6. Equipment

a. The following equipment must be present, in working order, and ready for use in the room where sedation is being administered:

(1) Oxygen
(2) Suction
(3) Emergency airway equipment
(4) Non-invasive blood pressure (BP) monitor or manual BP cuff
(5) Pulse oximeter
(6) Cardiac (EKG) monitor
(7) Narcan and Romazicon or their equivalents.
(8) Emergency medications

b. A cardiac arrest cart with defibrillator will be in close proximity to the sedation and recovery site as defined by Joint Commission standards.

c. All patients receiving IV sedation must have a patent IV with continuous administration of IV fluids per physician's order. Patent "saline/heparin locks" are acceptable for patients with contraindication to IV fluids. **IV fluid for resuscitation should be readily available**. The physician will determine the need for IV access in patients receiving sedation by any other route of administration i.e. oral sedation.

d. Oxygen must be available, however, is not required to be utilized if O_2 saturation remains greater than 95% at room air.

7. Monitoring

a. Minimum monitoring will include:

(1) BP
(2) Pulse and respiratory rate
(3) Oxygen saturation (continuous monitoring with pulse oximetry)
(4) Level of consciousness
(5) EKG

b. A Standardized Sedation Monitoring Record will be completed by the sedation monitor for all patients receiving sedation, and will be included in their medical record. Documentation must include:

(1) Beginning and end time of procedure
(2) Pre-medication, time and effect
(3) Type and amount of IV fluids
(4) Name, dose, route, and time of all drugs given
(5) Patient response to all drugs given, including adverse drug reactions or untoward/significant responses as well as their management and outcome.
(6) Oxygen delivered: liters per minute and route
(7) BP, pulse and respiratory rates, oxygen saturation and level of consciousness must be documented in the flow sheet at least every five minutes or more frequently as the patient's clinical needs dictate. EKG abnormalities must be documented. A pre and post EKG strip is recommended.

8. Post-Procedure. Patients who receive sedation will continue to be monitored after the procedure until they are fully recovered. Patients will be "recovered" when specific criteria indicate a return to safe physiological and psychological levels. Minimum criteria for recovery are as follows:

a. Heart Rate (HR) and BP are within 20% of pre-procedure baseline, patient responds easily, maintains room air oxygen saturation of $\geq$95% and is free from nausea and vomiting.
b. Minimal pain or free form pain
c. If patient is experiencing difficulty meeting discharge criteria, they may be transferred to the post anesthesia care unit (PACU) for further monitoring/recovery.

9. Discharge

a. For patients returning to the ward, a verbal report including the following will be provided to the nurse receiving the patient:

(1) Pre-procedure BP, HR, oxygen saturation and level of consciousness.
(2) Total drugs given (name, dosage and time of last dose).
(3) Problems encountered during or post-procedure.
(4) Total IV fluids and status of IV.

b. For patients returning home, verbal and written discharge instructions will be provided to the patient and responsible adult accompanying the patient. There must be documentation that the patient has received instructions and verbalize that they understand the instructions.

Instructions must include at least the following:

(1) Information on the possible residual effects and side effects of the anesthetics and instruction on what to do and who to call for assistance /emergency.
(2) Instructions on advancement of diet as needed
(3) Restrictions on activity if any
(4) Medications if any
(5) Follow-up appointment

10. Risk Management or other appropriate person or committee will monitor the number of cases performed. In addition, they will monitor adverse events via the variance report system. The following events should be reported as variances:

    a. Patients with oxygen saturation below 90% for greater than 1 minute
    b. Patients requiring airway resuscitation
    c. Patients requiring cardiovascular support
    d. Patients requiring transfer to PACU due to inability to meet discharge criteria within one hour of end of procedure
    e. Usage of Narcan (naloxone) or Romazicon (flumazenil)
    f. Other adverse events. (i.e. unexpected somnolence, chest pain, behavioral problems, allergic reactions, transfer to critical care or other facility)

11. Procedure Review. This procedure policy will be reviewed every year and revised as necessary by the Sedation Program Manager with oversight by the Executive Board of the Provider Staff. All personnel involved in the care of patients through the Sedation Program will familiarize themselves with this sedation policy.

12. Forms. Sedation Monitoring Record, and Informed Consent and Authorization for Sedation are to be used.

_____
Administrator Name and Signature

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Pediatric Sedation Table

Sedative Drugs for Pediatrics

Drug	Route	Dose	Repeat Dose	Onset of Action	Duration of Effect	Indication For:	Absolute & Relative Contraindications	Considerations
CHLORAL HYDRATE	Oral/ Rectal	30-100 mg/kg (may result in deep sedation) Age guidelines: 0-6 mo: 30-60 mg/kg 6-12 mo: 60-75 mg/kg >12 mo: ≥ 75 mg/kg	20 mg/kg (25-30 min after initial dose)	15-30 min	60-120 min	• Noninvasive Procedures CT ECHO MRI	• OSA • Gastritis or gastric ulcer • Hepatic dysfunction • Hemodynamic instability • Allergy to chloral hydrate • Respiratory Distress	• If repeat dose is required, assure that child is adequately alert to swallow medication. If not, administer rectally. • Monitor the child according to level of sedation. • Provide calm, quiet environment, avoiding unnecessary disturbances. • Most effective in children < 2 yo • Sedative effect less predictable with rectal administration than oral administration
CLONIDINE	Oral	3-5 mcg/kg	—	30-45 min	90 min	• Noninvasive Procedures EEG PFTs	• Hypotension • Bradycardia	• Minimal respiratory depression • Slow onset • Potential use in children with autism
DEXMEDETOMIDINE	Intravenous	1-2 mcg/kg over 10 min, Continuous infusion of 1-3 mcg/kg/hr	0.5 mcg/kg	10 min	1-2 hrs	• Noninvasive Procedures CT MRI EEG	• Allergy to Dexmedetomine • Blood pressure instability • Bradycardia • SA/AV Nodal block • Digoxin therapy	• "Cooperative Sedation" and Hypnotic effects resemble natural sleep • Less respiratory depression effects than most other sedative agents • Induction and recovery is usually very smooth. • Distinct advantage in children with Autism
	Oral Intranasal	2-4 mcg/kg 1-2 mcg/kg	—	45 min 30 min	2 hrs 90 min			
ETOMIDATE	Intravenous	0.2-0.3 mg/kg		1 min	10-15 min	• Noninvasive Procedures CT • Invasive Procedures (+) analgesic	• Airway Instability • Respiratory Distress	• Expect deep sedation immediately • Myoclonus may occur • Transient adrenocortical dysfunction
FENTANYL	Intravenous	0.5-2 mcg/kg (infused slowly over 1-2 min)	0.5-1 mcg/kg IV every 2-3 min.	2-3 min (peak effect 4-5 min)	30 min	• Invasive Procedures ± BNZ-Propofol Heme-Onc Orthopedic	• Airway instability • Cardiopulmonary compromise • Allergy to fentanyl	• Chest wall rigidity and apnea can occur with rapid administration and high doses. • Expect deep sedation. • Effects are accentuated by concurrent benzodiazepines. • Respiratory side effects may "reoccur" following completion of painful procedure. • Good opioid choice for acute, procedural pain.
	OTFC	15-20 mcg/kg		15-30 min				
KETAMINE	Intravenous	0.5-1.0 mg/kg (±) Midazolam 0.1 mg/kg IV Atropine .01-.02 mg/kg IV	0.5 mg/kg IV	1-2 minutes	10-20 min	• Invasive Procedures • Distressful Procedures	• Increased intraocular pressure • Intracranial hypertension • Intracranial mass • Hypertension • Psychiatric hx • Allergy to ketamine	• Expect deep sedation and monitor accordingly. • Ketamine can cause unusual dreams or hallucinations. Prepare the child for a floating feeling and dreaming. • The child may appear to be more alert than really is. • IV Ketamine will need to be repeated if the procedure is greater than 10-15 minutes. • Amnesia is usually obtained. • Nausea is a common side effect. • Ketamine causes nystagmus. Inform parents that this is a normal, expected effect. • Oral Ketamine has a bitter taste. Some children tolerate oral ketamine better if mixed with a small amount of juice.
	Oral Rectal	6-10 mg/kg 4-8 mg/kg (±) Midazolam 0.2 mg/kg Atropine 0.02 mg/kg		20-30 min 15-20 min	1-2 hours			
	Intranasal	3-9 mg/kg	—	5-10 min	30-45 min			

Drug	Route	Dose	Repeat Dose	Onset of Action	Duration of Effect	Indication For:	Absolute & Relative Contraindications	Considerations
METHOHEXITAL	Rectal	25-30 mg/kg	——	5-15 min	30-90 min	• Noninvasive Procedures CT	• Airway instability • Respiratory distress • Temporal lobe seizures • Cardiovascular instability • Allergy to methohexital	• Expect deep sedation and monitor accordingly • Onset of action is variable. Remain with child throughout sedation. • Dilute to 10% solution with sterile water • Airway obstruction and respiratory depression are potential side effects.
MIDAZOLAM	Intravenous	0.05-0.1 mg/kg per dose up to 2 mg/kg total dose	0.025-0.05 mg/kg	1 min	30 min	• Distressful Procedures • Premedicant • Invasive Procedures (+) analgesic	• Airway instability • Respiratory distress • Cardiovascular compromise • Allergy to midazolam	• Very good premedicant and adjunct with opioids. • Potent antegrade amnestic • Disinhibition may occur. • Children may complain of dizziness • Poor hypnotic
	Intranasal	0.2-0.4 mg/kg		10 min	60 min			
	Oral	0.3-0.75 mg/kg		15-30 min	60 min			
	Rectal			15-20 min				
MORPHINE	Intravenous	0.05-0.2 mg/kg	0.025-0.1 mg/kg titrate every 10-15 min until desired effect	2-6 min (peak effect 10-20 min)	2-4 hrs	• Invasive Procedures (long duration) wound care	• Airway instability • Respiratory distress • Cardiovascular compromise • Allergy to morphine	• Difficult to titrate for procedural pain control. • Effects are accentuated by concurrent benzodiazepine use. • Histamine release may result in flushing and itching.
PENTOBARBITAL	Intravenous	2-6 mg/kg (usual 4 mg/kg) ~ max single dose 160 mg	1-3 mg/kg (4-5 min after initial dose)	1-2 min	45-60 min	• Noninvasive Procedures CT MRI	• Airway instability • Respiratory distress • Cardiovascular compromise • Porphyria • Allergy to barbiturates	• Expect loss of consciousness and deep sedation in minutes. • Monitor child immediately following administration and throughout sedation. • Airway obstruction and respiratory depression are potential effects. • Induction is best achieved in a quiet, dimly lit environment; keep stimulation to a minimum.
	Oral	4-5 mg/kg	2 mg/kg	10-20 min	60-100 min			
PROPOFOL	Intravenous	1-2 mg/kg per minute until asleep (total ~3-5 mg/kg) then Continuous infusion at 50-150 mcg/kg/min	0.5-1 mg/kg bolus	1 min	5-10 min	• Noninvasive Procedures • Invasive Procedures ± analgesic	• Airway instability • Respiratory distress • Cardiovascular compromise	• Expect loss of consciousness and deep sedation immediately • Potential for respiratory depression and hypoxemia is high. Preemptive O2 administration is indicated. • Potential for cardiovascular depression is high. • Peripheral administration of propofol can be painful (use with lidocaine).

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Answers to Competency Quizzes

Competency Quiz 1

1. a
2. c
3. d
4. b
5. c
6. d
7. d
8. b
9. c
10. d
11. c
12. c

Competency Quiz 2

1. b
2. c
3. d
4. b
5. a
6. a
7. b
8. c
9. c
10. a
11. a
12. c

Competency Quiz 3

1. c
2. c
3. c
4. a
5. b
6. c
7. d
8. c
9. a
10. c
11. b
12. c

Competency Quiz 4

1. b
2. d
3. a
4. b
5. c
6. c
7. a
8. d
9. d
10. c
11. a
12. d

Competency Quiz 5

1. b
2. c
3. d
4. c
5. a
6. d
7. b
8. a
9. c
10. d
11. b
12. a

Competency Quiz 6

1. c
2. a
3. d
4. c
5. b
6. c
7. c
8. c
9. b
10. a
11. d
12. c

Competency Quiz 7

1. a
2. b
3. d.
4. c
5. a
6. d
7. a
8. c
9. b
10. b
11. a
12. b