SEDATION/ANALGESIA
SELF STUDY
(Updated 9/2014)

Must be completed by RNs working in ED, CCU, DOU, NSC, CTU, 4 West, 5 West, PICU, PHRU, L&D, SDS, Cath Lab, Endoscopy, Radiology And Physicians with Sedation/Analgesia Privileges
Requirements for Competency

- Please read the module and review the policy prior to taking the test
- RN Competency with the policy & procedures must also be validated at the bedside.
  - An approved validator (designated by your manager) will sign you off on the skills portion
- ACLS and/or PALS certification is a pre-requisite for taking this module, for both RN and Physician
Objectives

• At the conclusion of this self-study, the clinician will be able to:
  – Describe Moderate Sedation
  – State the assessment and documentation requirements for administering and monitoring Moderate Sedation
  – Describe pharmacology and management of complications related to Moderate Sedation
Purpose

• This self-learning packet is designed to communicate the current policy and standards with regards to Sedation/Analgesia.

• Huntington Hospital policy goals support active communication of the Sedation/Analgesia process with the patient and other care providers to ensure patient safety.
Purpose

Although separate policies...

– “Patient Identification for Clinical Care and Treatment” (policy 8740.117),
– “Pre-Procedural Time-Out and Site Marking [Universal Protocol] (policy 8740.192), and
– “Labeling of Medication and Solution Containers” (policy 8740.199),

...all play an integral part in Sedation/Analgesia procedures.
### Terminology

- **Sedation/Analgesia**
  - “Sedation/analgesia” is the currently recognized terminology used in the description of pharmacological states that permit patients to tolerate unpleasant stimuli during procedures/surgery.
  - The standards for sedation/analgesia & anesthesia care apply when patients receive, in any setting, for any purpose, by any route, *moderate or deep sedation as well as general, spinal, or other major regional anesthesia.*
• Currently recognized levels include the following:
  – Minimal Sedation (anxiolysis)*
  – Moderate Sedation (formerly conscious sedation)
  – Deep Sedation
  – Anesthesia

*Does not require Sedation/Analgesia Record
Terminology

- **Minimal Sedation:**
  - Minimal Sedation (anxiolysis) is 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.
**Minimal Sedation:**

- Patients may receive an anxiolytic prior to a procedure with the intent to relax (not sedate) the patient. In this case it technically is not considered procedural sedation and it does not require a Sedation/Analgesia Record.

- However, the patient response, whether they have received the medication previously, and whether it is given in conjunction with other sedative/analgesics will determine if the RN needs to monitor the patient during transport and the procedure.
• Moderate Sedation: (formerly “Conscious Sedation”)
  – 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 clinician must be able to differentiate between a purposeful response, which indicates light sedation and a reflex withdrawal, which would indicate a deeper level of sedation.
Terminology

• **Deep Sedation:**
  – Deep sedation is a drug-induced depression of consciousness during which patients cannot be easily aroused but respond purposefully after 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.

• *RNs are not credentialed to administer deep sedation, but they must be able to recognize it if it happens inadvertently.*
Terminology

• **Anesthesia:**
  – Anesthesia consists of general anesthesia and spinal or major regional anesthesia.
  – It does not include local anesthesia.
  – General anesthesia is a drug-induced loss of consciousness during which patients are not arousable, even by painful stimulation.
  – The ability to independently maintain ventilatory function is often impaired.
  – Patients often require assistance in maintaining a patent airway, and positive pressure ventilation may be required because of depressed spontaneous ventilation or drug-induced depression of neuromuscular function.
  – Cardiovascular function may be impaired.
Although on paper these definitions are specific, in reality, procedural sedation and analgesia is a continuum.
Pharmacological Agents

• **Amnesic:**
  – A drug designed to decrease memory for an event. Especially helpful in diminishing future anxiety for children who may require multiple procedures. Will cause varying degrees of sedation. (e.g. midazolam)

• **Analgesic:**
  – A drug designed to reduce or eliminate the perception of pain. (e.g. acetaminophen, NSAIDs, local anesthetics)

• **Antagonist:**
  – A drug designed to antagonize or reverse the adverse effects of specific drugs such as the benzodiazepines and opioids. (e.g. flumazenil for benzodiazepines; naloxone for opioids)
• Whether a patient needs to be managed according to the Sedation/Analgesia policy is solely dependent on the intent of the drug administration AND the effect the drug has on the patient.
Patients Excluded from Policy

1. Patients who are not undergoing a diagnostic or therapeutic procedure, i.e. postoperative analgesia, sedation for treatment of insomnia.

2. Otherwise healthy patients receiving peripheral nerve blocks, local or topical anesthesia or analgesic agents administered by any route. When administering intravenous narcotics for pain relief, care must be taken to insure that the patient’s level of consciousness does not change. If it does, the guidelines in this policy apply.
Patients Excluded from Policy

3. Situations when it is anticipated that the required sedation will eradicate the purposeful response to verbal or tactile stimuli (as distinct from reflex withdrawal from a painful stimuli). Such patients require a greater level of care than is covered by this policy.

4. Perioperative management of patients undergoing general or major conduction anesthesia (spinal/epidural/caudal block).
Because the response to procedures is not always predictable and sedation-to-anesthesia is a continuum, it is not always possible to predict how an individual patient will respond. Therefore, qualified individuals are trained in professional standards and techniques to manage patients in the case of a potentially harmful event.
Medicating a patient for anxiety does not require use of the sedation/analgesia guidelines and documentation, because cardiac and respiratory functions are intact.
Monitoring Anxiolysis

...BUT

- Patients cannot be pre-medicated with sedatives or sedative-analgesics and sent off the unit for tests - in the case of one-time ordered anxiolytics or other medications UNLESS
  - monitored by an RN during transport and during the procedure or
  - patient response to the medication has been evaluated prior to sending the patient for the procedure.

- This also applies if existing medications are combined and their effects have not been previously evaluated.
• **Patient safety is the key**

If the patient has not previously received a drug or combination of drugs, the effect of the drug is unknown and therefore the patient’s response cannot be predicted. Even though this is not considered sedation/analgesia, in this case the nurse should monitor the patient/effect of medication to avoid untoward outcomes.
Some Important Points

- It is the responsibility of the physician ordering the procedure to communicate with the physician who will be performing the procedure & sedation/analgesia to discuss the plan and possible provisions and/or preparations.
- Open and active communication among caregivers regarding patient care is the key.
- Any questions regarding patient plan of care should be discussed with the appropriate physicians & caregivers to ensure patient safety.
Who Can Perform/Participate in Procedural Sedation

- **Certified RN:**
  - An RN who has
    - BLS *and* either PALS, ACLS or NRP competency *and*
    - Has completed this computer-based learning module (CBL) in the management and care of sedated patients, *and*
    - A sedation/analgesia competency has been validated.
Who Can Perform/Participate in Procedural Sedation

- **Credentialed MD/DO, DDS, PA, NP:**
  - A physician, dentist, physician assistant, or nurse practitioner who has completed the HMH sedation credentialing criteria and been granted sedation privileges. (For simplicity, this person will be referred to as the “physician.”)

It is the RN’s responsibility to make sure the person ordering the sedation is privileged to do so.
Checking Privileges

Select Intranet from Cerner Links Dropdown

Select Medical Staff Roster

Enter practitioner name or search by last name from the alpha listing

Check for “Sedation Analgesia” from the list

Click the link below to proceed:
Medical Staff Roster.
Sedation/Analgesia Policy Exclusions

The policy does not apply:

– to patients who are receiving sedatives or analgesics as a part of their regular plan of care and receive them prior to a procedure.

– if the patient normally receives combinations of medications for sedation or analgesia and the combination is ordered prior to a procedure.

– However, if medications are combined or increased for the purpose of performing a procedure, and not normally received by the patient, this IS sedation/analgesia.
Sedation/Analgesia Record

Requires the use of Sedation/Analgesia Record, which will guide you, and includes:

- Physician documentation
- Pre-procedural checklist
- Aldrete Score
- Nursing care plan
- Pre-, intra-, and post-procedural documentation
- Discharge assessment
Informed consent must be obtained for the procedure, and documented on the chart.
Physician Responsibilities

All patients presenting for sedation/analgesia MUST have a documented history and physical exam performed within 24 hours of the scheduled procedure or exam. It shall include the following:

1. Abnormalities of the major organ systems
2. Previous anesthesia complications
3. Current medications and drug allergies/adverse reactions
4. Time and nature of last oral intake
5. History of tobacco, alcohol, or substance use or abuse
6. Airway assessment
Pre-Sedation Assessment

• If the H & P is more than 24-hours and less than 30-days-old, physician documentation will reflect a
  – Review of the history and physical and documentation that
    • There have been no significant change since the information was obtained OR
    • Significant changes are noted on the Sedation/Analgesia record or in the physician progress notes.
American Society of Anesthesiologists

• It is the responsibility of the physician planning to sedate the patient to assess the patient’s anesthesia risk prior to administering sedating agents.

CIRCLE PATIENT’S ASA Level:
I = A normal healthy patient other than surgical pathology - without a systemic disease.
II = A normal patient with mild systemic disease - no functional limitations.
III = A patient with a moderate to severe systemic disturbance due to medical or surgical disease - some functional limitation but not incapacitating.
IV = A patient with severe systemic disturbance which poses a constant threat to life and is incapacitating.
V = A moribund patient who is not expected to survive 24 hours with or without the procedure.
E = If the case is an emergency, the physical status is followed by letter “E” - eg, “IIIE.”
ASA Classification

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

<table>
<thead>
<tr>
<th>Status</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>A normal healthy patient</td>
</tr>
<tr>
<td>II</td>
<td>A normal patient with mild systemic disease</td>
</tr>
<tr>
<td>III</td>
<td>A patient with a severe systemic disease that limits activity but is not incapacitating</td>
</tr>
<tr>
<td>IV</td>
<td>A patient with an incapacitating systemic disease that is a constant threat to life</td>
</tr>
<tr>
<td>V</td>
<td>A moribund patient not expected to survive 24 hours with or without the procedure</td>
</tr>
<tr>
<td>VI</td>
<td>A declared brain-dead patient whose organs are being removed for donor purposes</td>
</tr>
<tr>
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<td>If the case is an emergency, the physical status is followed by the letter “E” – eg, “IIE”</td>
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http://www.asahq.org/clinical/physicalstatus.htm updated 4/19/06
## ASA Classification

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Patients that fall within these classifications are eligible to receive sedation/analgesia from non-anesthesiologists.

http://www.asahq.org/clinical/physicalstatus.htm updated 4/19/06
### ASA Classification

<table>
<thead>
<tr>
<th>Status</th>
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<tr>
<td>IV</td>
<td>A patient with an incapacitating systemic disease that is a constant threat to life</td>
</tr>
<tr>
<td>V</td>
<td>A moribund patient not expected to survive 24 hours with or without the procedure</td>
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<td>E</td>
<td>If the case is an emergency, the physical status is followed by the letter “E” – eg, “IIE”</td>
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</table>

Patients that fall within the IV and V classifications must have their sedation managed by an anesthesiologist.

http://www.asahq.org/clinical/physicalstatus.htm  updated 4/19/06
Pediatric Patients

- Provisions for pediatric patients (0 to 17 years):
  - The physician providing planned sedation/analgesia shall be qualified to care for this specific age group.
  - For patients in PEDS ICU, the pediatric intensivist will be responsible for the care of the patient.
History & Physical

• If the patient has no current H & P, one will be documented here:
Herbal Supplements

• Also important history information includes the patient’s prior use of herbs/homeopathy as some have been known to affect the efficacy or potency of sedatives/analgesics. Some examples include:
  – Valerian: may potentiate barbituates
  – Ephedrine, ma huang: sympathomimetic
  – Ginseng: decreases efficacy of opioids
  – St John’s Wort: decreases efficacy of benzodiazepines, causes hypotension with etomidate
• Of particular importance is the airway assessment.
Airway Assessment

• One of the biggest risks with sedation/analgesia is the possibility of the patient slipping down into deep sedation or even general anesthesia.
• At that point, the patient loses the ability to maintain a patent airway.
• Key parts of safely delivering Sedation/Analgesia are:
  – Recognizing a compromised airway AND
  – Having an idea of how you will rescue him if compromise occurs
• There are several ways to do this. . .
Review of Airway Anatomy

- **Anatomy of the Larynx**
  - The larynx is the most dynamic and multifunctional structure within the respiratory tract.
  - The three most important functions are regulation of airflow, protection of the lower airways, and phonation.
  - The framework of the larynx is composed of four cartilages (thyroid, cricoid, arytenoid, and epiglottic).
Review of Airway Anatomy

• Anatomy of the Larynx
  – These cartilages, suspended from the hyoid bone, are covered by tissue folds (e.g. paired vocal folds or “true vocal cords” and aryepiglottic folds), and the intrinsic laryngeal muscles.
  – Contraction of the laryngeal muscles moves the cartilage and alters the position and configuration of the tissue folds, thus facilitating laryngeal patency (e.g. during inspiration and expiration), closure, and complex opening/closure cycles (e.g. phonation).
Anatomy of the Larynx

[Top left image] Overview of airway
[Bottom left image] Proximal trachea
[Top right image] Larynx (voice box)
[Bottom right image] Distal airway (lower end of windpipe)
The most common complications associated with sedation are related to the respiratory tract, specifically, upper airway obstruction and hypoventilation, with subsequent hypoxemia and hypercarbia.

Several unique anatomical and physiological characteristics predispose the patient to upper airway obstruction and/or hypoxemia and $O_2$ desaturation:
Airway Assessment

- Factors contributing to upper airway obstruction include:
  - inability to open mouth
  - a relatively large tongue in comparison to the oropharynx
  - large adenoids and/or tonsils and other “soft tissues”
  - a long, stiff epiglottis
  - a highly compliant and compressible trachea
  - small mandible
Airway Assessment

- Factors contributing to hypoxemia and oxygen desaturation include:
  - increased $O_2$ consumption (demand)
  - decreased $O_2$ reserve
  - increased work of breathing as a result of a very compliant chest wall, less compliant lungs, increased small airway resistance, etc.
  - Fatigability of the muscles of ventilation
Airway Assessment

• The upper airway muscles act to maintain upper airway patency.
• The administration of drugs that cause sedation depress airway muscle activity, resulting in a reduction of muscle tone and subsequent airway obstruction.
• The laryngeal muscles are extremely sensitive to this drug-induced loss of motor tone and consequently, most prone to cause obstruction.
Airway Assessment

- As the laryngeal muscles relax, the cartilage and tissue folds move closer together and begin to obstruct air entry.
- Mechanical manipulations, such as extending the neck, will lessen collapse of the laryngeal structures, thereby improving air entry.
“A” is for “Airway”

Don’t forget your BLS!

Head-Tilt-Chin-Lift

Jaw-Thrust
Airway Management for Sedation and Analgesia

- Additionally, the epiglottis, tongue, soft palate, and other soft tissues in the pharynx, may contribute to drug-induced upper airway obstruction.
- When the motor tone of muscles, which are directly attached to or indirectly apply tension to these structures, is diminished, the lumen of the pharynx decreases and air entry is jeopardized.
Airway Management for Sedation and Analgesia

- Pharyngeal obstruction is usually localized, but as the depth of sedation increases, more muscles become involved and the degree of airway obstruction progresses.
Airway Management for Sedation and Analgesia

- Airway obstruction may also be secondary to secretions, blood, laryngospasm, bronchospasm, mechanical compression, edema, lesions, or a foreign body.
- There must ALWAYS be a functioning suction set-up when delivering sedation.
Anesthesiologists often use the Mallampati Classification System as a tool to predict airway difficulty.

– In this classification system, Class I and II airways are generally predicted to be easy to intubate, while Class III and IV are sometimes difficult.

– Though this system lacks specificity, it does allow for preparation for possible complications and improves communication between medical personnel with regards to a patient's airway.
Mallampati Classification System

**TABLE 1 - Mallampati Airway Classifications**

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class I</td>
<td>visualize the soft palate, uvula, fauces, anterior and posterior tonsillar pillars</td>
</tr>
<tr>
<td>Class II</td>
<td>soft palate, fauces, uvula</td>
</tr>
<tr>
<td>Class III</td>
<td>soft palate, base of uvula</td>
</tr>
<tr>
<td>Class IV</td>
<td>no structures are visible</td>
</tr>
</tbody>
</table>
Airway Management for Sedation and Analgesia

• In addition to the Mallampati classification system, other physical findings have been shown to be good predictors of a difficult airway. Factors used to predict a difficult intubation include:
  – Large tongue
  – Less than 6 cm distance from mandible to thyroid notch
  – Inability to place patient in “sniff” position
  – Short neck

Airway Maintenance

• Several airway manipulations can be performed in an effort to alleviate upper airway obstruction:
  – Extension of the neck
    • Causes the tissues of the pharynx and larynx, which had folded and collapsed inward, to be stretched, separated, and withdrawn from the lumen of the airway thus, improving airway patency.
    • Neck extension also aligns the axis of the trachea, pharynx, and oral cavity, which improves visualization of the vocal cords if emergent endotracheal intubation is required.
    • Elevation of the shoulders with a towel roll will help achieve neck extension.
Airway Maintenance

• Elevating the head with a folded blanket or small pillow results in anterior displacement of the cervical spine with subsequent alignment of the oral, pharyngeal and tracheal axes and improvement in airway patency.
Airway Assessment

- Important information to consider which may indicate the potential for airway obstruction include:
  - Presence of upper respiratory infection (prone to secretions and coughing)
  - Snoring or noisy breathing (large adenoids and/or tonsils)
  - Croupy cough
  - Inspiratory stridor (subglottic narrowing)
  - Asthma and/or atopy (general allergic response)
  - Previous anesthetic or sedation problems (especially associated with the airway)
  - Obesity
Airway Assessment

• Other risk factors:
  • Craniofacial abnormalities
  • Congenital anomalies, which are recognizable syndromes
  • Size of patient’s mouth, tongue, mandible
  • Oropharyngeal masses
  • Neck fullness or masses
  • Sleep apnea
Airway Assessment

• Patients identified to be at increased risk for upper airway obstruction or hypoventilation should be referred to the Department of Anesthesiology for a consultation and possible administration of a general anesthetic for the procedure.
Airway Management

- Anyone participating in Moderate Sedation should be competent inserting an oral airway.
- Insert facing upward, then turn so you “capture” the tongue.
Airway Management

- Safely delivering sedation means that you also have the appropriate size of oral airway readily available.

Sizing an oral airway.
Nursing Assessment

- Page 2 of the Sedation/Analgesia Record begins the nursing assessment.

- One of the most important things to note is the NPO status.
NPO Status

- Patients MUST be NPO, because they are at high risk for aspiration.
- Guidelines are in the policy.

<table>
<thead>
<tr>
<th>Ingested Material</th>
<th>Minimum Fasting Period (h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clear liquids‡</td>
<td>2 hrs</td>
</tr>
<tr>
<td>Breast milk</td>
<td>4 hrs</td>
</tr>
<tr>
<td>Infant formula</td>
<td>6 hrs</td>
</tr>
<tr>
<td>Non-human milk§</td>
<td>6 hrs</td>
</tr>
<tr>
<td>Light meal¶</td>
<td>6 hrs</td>
</tr>
</tbody>
</table>
Nursing Assessment

- Patients going home MUST have a verified ride prior to starting the procedure.

<table>
<thead>
<tr>
<th>HUNTINGTON HOSPITAL SEDATION / ANALGESIA RECORD</th>
</tr>
</thead>
<tbody>
<tr>
<td>DATE</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

| ATTENDING PHYSICIAN | |
|---------------------|---
|                     | |

[Image of a person driving with a red prohibition symbol]
Complete the Pre-Procedure checklist as you would for any other procedure.
Nursing Assessment

- All patients receiving sedation/analgesia MUST have a functioning intravenous line.

- This is the patient’s lifeline!
Nursing Assessment

- A nursing plan of care must be documented.
Aldrete Scoring System (Modified):

Now the nurse must determine the patient’s baseline using the Modified Aldrete Scoring System

- It provides an objective score by which the patient serves as his own control to determine suitability for discharge from the procedure area (inpatients only).
- For outpatients, the Aldrete Scoring System is used with additional criteria.
# Modified Aldrete Scoring System

<table>
<thead>
<tr>
<th><strong>ASSESSMENT</strong></th>
<th><strong>SCORE</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Activity</strong></td>
<td></td>
</tr>
<tr>
<td>Able to move 4 extremities voluntarily or on command</td>
<td>2</td>
</tr>
<tr>
<td>Able to move 2 extremities voluntarily or on command</td>
<td>1</td>
</tr>
<tr>
<td>Not able to move extremities voluntarily or on command</td>
<td>0</td>
</tr>
<tr>
<td><strong>Respiration</strong></td>
<td></td>
</tr>
<tr>
<td>Able to deep breathe and cough freely</td>
<td>2</td>
</tr>
<tr>
<td>Dyspnea, shallow or limited breathing</td>
<td>1</td>
</tr>
<tr>
<td>Apneic</td>
<td>0</td>
</tr>
<tr>
<td><strong>Circulation</strong></td>
<td></td>
</tr>
<tr>
<td>Blood Pressure ± 20% of pre-anesthesia level</td>
<td>2</td>
</tr>
<tr>
<td>Blood Pressure ± 20%-50% of pre-anesthesia level</td>
<td>1</td>
</tr>
<tr>
<td>Blood Pressure ± 50% of pre-anesthesia level</td>
<td>0</td>
</tr>
<tr>
<td><strong>Consciousness</strong></td>
<td></td>
</tr>
<tr>
<td>Fully Awake</td>
<td>2</td>
</tr>
<tr>
<td>Arousable on calling</td>
<td>1</td>
</tr>
<tr>
<td>Not responding</td>
<td>0</td>
</tr>
<tr>
<td><strong>O₂ Saturation</strong></td>
<td></td>
</tr>
<tr>
<td>Able to maintain SaO₂ &gt; 92% on room air</td>
<td>2</td>
</tr>
<tr>
<td>Needs supplemental O₂ to maintain SaO₂ &gt; 90%</td>
<td>1</td>
</tr>
<tr>
<td>SaO₂ &lt; 90% even with supplemental O₂</td>
<td>0</td>
</tr>
</tbody>
</table>

**Total**
Aldrete Scoring System (Modified):

- A more in-depth assessment of the patient’s level of consciousness is required, as well.
Aldrete Scoring System (Modified):

- The nurse will re-verify the patient’s medication list.

<table>
<thead>
<tr>
<th>TIME</th>
<th>Pre</th>
<th>Post</th>
<th>D/C</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOVES 4 EXTREMITIES VOLUNTARY OR COMMAND</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>MOVES 2 EXTREMITIES VOLUNTARY OR COMMAND</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>MOVES 0 EXTREMITIES VOLUNTARY OR COMMAND</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>SPONTANEOUS UNLABORED RESPIRATIONS</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>DYSPEA</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>APNEA</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>BP ± OR – 20% OF PREANESTHETIC LEVEL</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>BP ± OR – 20-50% OF PREANESTHETIC LEVEL</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>BP ± OR – 50% OF PREANESTHETIC LEVEL</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>AWAKE – ORIENTED X 3</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>ARROUSABLE ON CALLING</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>NOT RESPONDING</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>ABLE TO MAINTAIN 02 SATURATION &gt;92% ON ROOM AIR</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>NEEDS 02 INHALATION TO MAINTAIN 02 SATURATION &gt;90%</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>02 SATURATION &lt;90% EVEN WITH 02 SUPPLEMENT</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**TOTAL:** 22

- Patient’s Blood pressure, cardiac waveform (as indicated), and pain level will be monitored every 5 minutes and PRN during the procedure and following the procedure after the last dose of sedation/analgesia.
- Patient’s pain will be managed at or below FPG
- Patient/family/caregiver will be educated regarding procedure, equipment and post-procedure care.

- See Discharge section for Outcomes documentation

**BASELINE STATUS**

- Mental status: 
  - Awake & Calm
  - Awake & Apprehensive
  - Confused
  - Lethargic
  - Comatose
  - Parents with child

**LIST OF PATIENT’S CURRENT MEDICATIONS**

- Refer to H & P Page 1
- See MAR (inpatient)
- See Medication Reconciliation form (Outpatient)
Mount a pre-procedure ECG strip here.
In addition to all of the previously-mentioned items necessary to secure and maintain an airway, the following items/equipment must be in place prior to starting sedation/analgesia:

- Self-inflating positive pressure oxygen delivery system (BVM)
- Oxygen supply and variety of delivery systems, i.e. mask, nasal cannula
- Advanced airway management devices
- Pulse oximeter with continuous audible tones
- Automated or manual blood pressure cuff
- Source of suction, wall or portable, with various catheter sizes
- Cardiac monitor with waveform display and alarm capability
- Emergency crash cart, appropriate age-specific
- Emergency drugs, including reversal agents
- Immediate telephone access; immediate access to Code Blue Team
- Access to emergency power supply
Pre-Procedure Assessment

- Immediately prior to the procedure, all of these parameters will be measured and documented.
• Appropriate and effective pain management continues to be a priority when caring for patients undergoing sedation/analgesia, as the procedure or intervention for which the patient requires such may indeed cause the patient a degree of discomfort.
Choice of Agents

- Midazolam
- Fentanyl Citrate
- Morphine
One of the most important principles to remember when preparing to administer drugs for sedation and anesthesia is the extreme patient-to-patient variability in drug response.
Dosing Regimens

• Certain patients may not even tolerate the low end of the recommended doses, while others may require higher dosage limits to reach a desired effect.

• This variability reaffirms the importance of titrating drugs to achieve a specific clinical effect.
• As a general recommendation, the physician should begin titration with the lowest dose and observe the patient’s response for an appropriate period before administering subsequent doses.
Dosing Regimens

- Frequently, a combination of drugs may be required to prepare patients for procedures.
- The use of more than one drug may increase the risk of adverse effects such as respiratory depression, airway obstruction and apnea.
- **When more than one drug is used for sedation, the initial dose of each drug should be reduced by at least 25% to 33%.**
Psychologic Interventions

- In addition to administration of medications for procedural sedation, psychologic interventions (e.g. an informational video, behavioral therapy, distraction techniques like stories and music, and hypnosis) can be used as adjunctive or alternative therapy.
- These interventions are safe and may offer the advantage of generalization to other stressful situations.
- It is best to have someone other than the practitioner administer these therapies to the patient.
Pharmacological Agents for Sedation and/or Analgesia

- The appropriate selection of a single drug or combination of drugs is determined by a number of factors including:
  - age of the patient
  - type of procedure (painful vs. non-painful; short vs. long)
  - medical condition of the patient
  - need for complete immobility
  - need for anxiolysis and/or amnesia
  - availability of intravenous catheter
  - experience and competency of the practitioner
  - cost of the drug
Very Important!

- There must be easy access to the reversal agents, naloxone and flumazenil.
Pharmacological Agents for Sedation and/or Analgesia

- For relatively short, non-painful procedures like an MRI or CT scan, a sedative (e.g. pentobarbital or chloral hydrate) may be used.
- A painful and invasive procedure such as a bone marrow aspiration or placement of a chest tube may require the administration of an anxiolytic and a sedative-analgesic.

- **Route of Administration**
  - intravenous
  - orogastric, oral transmucosal
  - nasal
  - intramuscular
  - rectal
Pharmacological Agents

• **Anxiolytic:**
  – A drug designed to reduce patient anxiety, apprehension and stress. Also, may cause varying degrees of sedation.

• **Sedative:**
  – A drug designed to induce various levels of CNS mood alteration such as calmness and sedation. Often devoid of analgesic properties.

• **Sedative-analgesics & sedative-hypnotics:**
  – A drug designed to provide sedation and reduce or eliminate perception of pain.
• Individuals administering moderate or deep sedation and anesthesia are qualified and have the appropriate credentials to manage patients at whatever level of sedation or anesthesia is achieved, and choice of type or amount of drug is not limited.

• However, some medications have been restricted to certain areas for use in procedural sedation as specified in the formulary as a result of PT&D committee decision.
Agents Used

- This module will examine the use of the most common sedating agents in some depth. It is the responsibility of the individual practitioner to familiarize himself/herself with the agents used in the individual department.
Sedatives
Benzodiazepines & Barbiturates

- Benzodiazepines
  - Midazolam (Versed™)
  - Diazepam (Valium™)
- Barbiturates
  - Pentobarbital (Nembutal™)
  - Methohexital (Brevital™)
Sedatives

• ALL of these sedatives
  – Lack ANY analgesic properties.
  – Can cause CNS alteration, including
    • Hypersedation
    • Paradoxical restlessness and agitation
  – Can cause hypotension.
  – Should be used cautiously in patients with severe hepatic disease.
  – Should not be administered if the patient has a hypersensitivity.
• Benzodiazepines are excellent sedative drugs because they produce:
  – Sedation
  – Anterograde amnesia
  – Anxiolysis
  – Anti-convulsive effects
Benzodiazepines

- They act by modulating GABA in the CNS.
- They are metabolized in the liver and excreted by the kidneys.
- They have an enhanced risk of adverse reactions when used with other depressants.
- Should be used with caution in patients with severe cardiac, pulmonary, or renal disease.

- Their effects are reversible with flumazenil.
Benzodiazepines

• Midazolam
  – Water-soluble
  – Short-acting
  – 3-4 more powerful than diazepam
  – Onset:
    • IV 1-5 minutes
    • IM 15 minutes
  – Duration:
    • IV 0.5-1 hour (may persist for 3-4 hours)
    • IM 2-6 hours

• Diazepam
  – Not water-soluble
  – May cause a return of drowsiness 6 to 8 hours after administration due to an active metabolite, desmethyldiazepam.
  – Contraindicated
    • infants < 30 days of age
    • patients in shock, coma, or acute alcohol intoxication
    • patients with glaucoma
  – Onset:
    • IV 1-5 minutes
    • PO 30-60 minutes
Barbiturates

- Barbiturates
  - Depress impulse transmission within the central nervous system.
  - May cause nausea and vomiting.
  - Should be avoided by patients with porphyria, a hepatic disorder characterized by abdominal pains, extreme sensitivity to light and mental confusion.
  - Are metabolized in the liver.
Pentobarbital (Nembutal™)

- Pentobarbital is widely distributed to all tissues and body fluids.
- It is contraindicated in severe pulmonary disease.
- Has multiple drug interactions.
- Onset:
  - IV - immediate
  - IM - 10-15 minutes
  - PO/PR - 15-60 minutes
- Duration:
  - IV - 30+ minutes
  - PO/PR/IM - 1-4 hours
Methohexital (Brevital™)

- Methohexital is a short-acting barbiturate.
- Unlike other barbiturate anesthetics, methohexital sodium does not contain sulfur so it does not concentrate in fat deposits, thus it has fewer cumulative effects and faster recovery time.
- It is excreted by the kidney.
Sedatives - Pentobarbital

- Potential adverse reactions include:
  - respiratory depression (dose-dependent)
  - apnea
  - hypotension
  - CNS alteration (prolonged sedation, paradoxical restlessness and agitation)
  - enhanced depressant effects when combined with other CNS depressants
  - vomiting
  - multiple drug interactions

- Contraindications include:
  - hypersensitivity to barbiturates
  - porphyria (a genetic abnormality of metabolism causing abdominal pains, extreme sensitivity to light and mental confusion)
  - severe hepatic dysfunction
  - severe pulmonary disease
Methohexital (Brevital™)

• It has quite a lot of side effects:
  – Laryngeal spasm
  – Tachyarrhythmia
  – Erythema
  – Injection site pain, pruritus
  – Urticaria
  – Abdominal pain,
  – Salivation
  – Muscle irritability
  – Headache
  – Spasmodic movement
  – Possible seizures
  – Hiccoughs
Methohexital (Brevital™)

- Safety and effectiveness in pediatric patients below the age of 1 month have not been established
- Use with caution in geriatric patients
- Not for
Methohexital (Brevital™)

• Onset:
  – IV - immediate
  – IM - 2-10 minutes
  – PR - 5-15 minutes

• Duration:
  – IV - 5-10 minutes;
  – IV with larger doses - (>240 mg) 15-30 minutes
  – IM - 40-60 minutes
  – PR - 25-45 minutes
Sedatives - Other

- **Diphenhydramine (Benadryl™)**
  - Diphenhydramine is a histamine receptor (H₁) antagonist that acts by occupying receptors on effector cell membranes, thereby preventing responses mediated by histamine.
  - The drug is effective in the treatment of allergic and anaphylactic reactions.
  - Diphenhydramine also causes sedation, anticholinergic effects such as dry mouth and increased heart rate and has antiemetic action.
  - Smooth muscle responses in bronchi and peripheral vasculature are inhibited and dystonic reactions reversed by diphenhydramine.
  - Diphenhydramine has no analgesic properties.
  - Diphenhydramine is extensively metabolized in the liver and excreted in the urine.
Sedatives: Diphenhydramine

- Potential adverse reactions include:
  - Anticholinergic symptoms (tachycardia, dry mouth, etc.)
  - CNS depression (additive sedation)
  - thickened bronchial secretions
  - paradoxical excitement

- Contraindications include:
  - hypersensitivity to diphenhydramine
  - use in newborn or pre-term infants
  - patients with increased hyperthyroidism, cardiovascular disease
  - use in patients with glaucoma
Sedatives – Other

• Diphenhydramine
  – Onset:
    • IV - immediate
    • PO - 15 minutes
  – Duration:
    • IV/PO - up to 6-8 hours
Sedative – Analgesics
Sedative-Analgesics

- Opioids (Narcotics)
  - The opioids are a class of drugs that act as agonists at opioid receptors in the spinal cord and higher levels in the CNS, altering both the perception and emotional response to painful stimuli.
  - Pharmacological effects include analgesia, sedation, alteration in mood, dose-related depression of respiration and pupillary constriction.
  - All of the opioids are well-distributed in body tissues, metabolized in the liver and excreted in the urine.
Sedative-Analgesics: Opioids

• Potential adverse reactions include:
  – respiratory depression (especially with rapid IV administration; reversible with naloxone)
  – hypotension/bradycardia
  – CNS alterations (agitation, lethargy, dysphoria, etc.)
  – nausea/vomiting/constipation
  – pruritus
  – urinary retention/biliary colic
  – enhanced adverse reactions may be seen when used in combination with other narcotics or benzodiazepines

• Contraindications include:
  – hypersensitivity to the specific opioid

*Use with caution in patients with severe respiratory depression, hepatic or renal dysfunction, or increased intracranial pressure*
# Sedative-Analgesics: Opioids

<table>
<thead>
<tr>
<th>Drug</th>
<th>Onset</th>
<th>Duration</th>
</tr>
</thead>
</table>
| Morphine & Hydro-morphone | IV: < 5 minutes  
PO: 1 hour  
PR: 20-60 minutes  
IM/SC: 10-30 minutes | All routes: up to 4-5 hours |
| Meperidene    | IV: 5 minutes  
PO: 15 minutes  
IM/SC: 10-20 minutes | All routes: up to 2-4 hours |
| Fentanyl      | IV: 5 minutes  
PO/transmucosal: 15 minutes  
IM/SC: 10-20 minutes | IV: 30-60 minutes  
PO/transmucosal:  
IM: 1-2 hours |
| Alfentanil    | IV: 1 minute                | IV: 5-10 minutes           |
# Sedative-Analgesics: Opioids

<table>
<thead>
<tr>
<th>Drug</th>
<th>Key Points</th>
</tr>
</thead>
</table>
| Morphine & Hydro-morphone| → Longer-acting opioid (2-5 hours)  
→ May cause histamine release with subsequent bronchospasm, urticaria, hypotension, or rarely anaphylaxis. Avoid use in patients with severe atopy (general allergic response) or asthma.  
→ Hydromorphone pharmacokinetics similar to morphine, approx 5 x more potent, less histamine release than morphine |
| Meperidine               | → 1/10th as potent as morphine; shorter duration  
→ Has a local anesthetic effect and results in greater sedation  
→ May cause tachycardia and euphoria  
→ Active metabolite, normeperidine, may cause seizures in patients with renal dysfunction  
→ Contraindicated in patients receiving MAO inhibitors |
# Sedative- Analgesics: Opioids

<table>
<thead>
<tr>
<th>Drug</th>
<th>Key Points</th>
</tr>
</thead>
</table>
| **Fentanyl** | → 75-100 times more potent than morphine  
→ Highly lipophilic and has shorter duration of action than morphine  
available in oral transmucosal form (Onsolis™)  
→ Minimal cardiovascular side effects  
→ Respiratory depression may last longer than analgesia  
→ May cause chest wall rigidity (usually at higher doses when given rapidly IV), which results in an inability to ventilate patient |
| **Alfentanil** | → Short-acting opioid: 1/5th to 1/10th as potent as fentanyl  
→ Best used as a single agent  
→ Associated with chest wall rigidity (usually at higher doses when given rapidly IV) |
Good news! Reversible with naloxone!
## Non-Opioid Analgesics

<table>
<thead>
<tr>
<th>Drug</th>
<th>Onset</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ofirmev</td>
<td>IV: 15 minutes</td>
<td>6-8 hours</td>
</tr>
<tr>
<td>Toradol</td>
<td>IV &amp; IM: 30 minutes</td>
<td>Up to 4-6 hours</td>
</tr>
</tbody>
</table>

### Key Points

<table>
<thead>
<tr>
<th>Drug</th>
<th>Key Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ofirmev</td>
<td>→ Acetaminophen (Intravenous)</td>
</tr>
<tr>
<td></td>
<td>→ Higher and more rapid peak plasma values</td>
</tr>
<tr>
<td></td>
<td>→ Consider total Acetaminophen dose</td>
</tr>
<tr>
<td></td>
<td>→ Treat toxicity with Intralipids</td>
</tr>
<tr>
<td>Toradol</td>
<td>→ NSAID</td>
</tr>
<tr>
<td></td>
<td>→ Use with care in renal insufficiency, history of asthma</td>
</tr>
<tr>
<td></td>
<td>→ Theoretical risk of bleeding</td>
</tr>
</tbody>
</table>
Sedative - Hypnotics
Sedative-Analgesics & Sedative-Hypnotics: Ketamine

• Ketamine (Ketalar™)
  – Ketamine is a drug that produces “dissociative anesthesia,” which resembles a cataleptic state, where the eyes remain open with a slow nystagmic gaze.
  – The patient is non-communicative, although wakefulness may appear to be present.
  – Ketamine apparently binds to opioid receptors, resulting in excellent analgesia.
  – Other receptors may also be involved in its action.
Sedative-Hypnotics: Ketamine

• Ketamine (Ketalar)
  – This drug is an excellent amnesic, but it is associated with several undesirable side effects including
    • Visual, auditory, proprioceptive and confusional hallucinations, which may progress to delirium,
    • Purposeless movements of the head and extremities, and
    • Production of copious secretions.
  – Concomitant administration of a benzodiazepine and atropine may reduce the incidence of hallucinations and secretions respectively.

• Ketamine is distributed to highly-perfused tissues such as the brain and is extensively metabolized in the liver and excreted in the urine.
Sedative-Hypnotics: Ketamine

- **Potential adverse reactions include:**
  - inducing a state of general anesthesia
  - excessive salivation
  - hallucinations and nightmares
  - sympathetic stimulation
  - elevated BP, intracranial pressure (ICP), intraocular pressure (IOP)
  - purposeless movements of head and extremities
  - loss of protective reflexes
  - respiratory depression (rare)
  - nystagmus

- **Contraindications include:**
  - patients with head injury associated with increased ICP, loss of consciousness, or altered mental status
  - open globe injury
  - presence of hypertension or left ventricular outflow obstruction (aortic stenosis)
  - psychotic disorders
  - hypersensitivity to ketamine
  - thyrotoxicosis
Sedative-Hypnotics: Ketamine

• Onset:
  – IV    immediate
  – PO    15-30 minutes
  – IM    3-4 minutes

• Duration:
  – IV/PO up to 5-10 hours
    (average recovery time is 1-2 hours)
  – IM    12-25 hours
Sedative-Hypnotics: Ketamine

- Ketamine use is limited to CCU, ED and OR.
Sedative-Hypnotics: Etomidate

- **Etomidate**
  - **Note:** Etomidate is restricted per formulary to the areas of Surgery and Emergency Department.
  - Used for Rapid Sequence Intubation (RSI) and other specific procedures in the ED, etomidate cannot be used outside of these areas unless supervised by an anesthesiologist.
Sedative-Hypnotics: Etomidate

- Etomidate is a short-acting hypnotic, which appears to have gamma-aminobutyric acid (GABA)–like effects.
- Etomidate does not cause significant cardiovascular or respiratory depression, but may cause a brief period of apnea.
- Also, it does not appear to elevate plasma histamine or cause histamine release when administered in recommended doses.
Sedative-Hypnotics: Etomidate

- Etomidate slightly lowers intracranial pressure and it usually causes a moderate decrease in intraocular pressure.
- Etomidate is metabolized in the liver and excreted primarily by the kidneys
Sedative-Hypnotics: Etomidate

• Potential adverse reactions include:
  – inducing a state of general anesthesia
  – myoclonus (actual occurrence of seizure activity rare)
  – hypotension
  – nausea & vomiting

• Contraindications include:
  – hypersensitivity to etomidate
  – patients with severe cardiovascular disease
  – patients with severe asthma
  – not recommended in children under 10 years of age
Sedative-Hypnotics: Etomidate

• Onset:
  – IV immediate

• Duration:
  – IV 4-10 minutes
**Hypnotic/Amnesic: Propofol**

- Mechanism of action: GABA-A receptor activity in the brain, as well as sodium channel and endocannabinoid system

- Uses
  - Induction and maintenance of general anesthesia
  - Sedation for mechanically ventilated patients
  - Procedural sedation
Hypnotic/Amnesic: Propofol

- Properties
  - Fast induction and recovery
  - No analgesic properties
  - Cardiac Depressant
  - Respiratory depressant
  - High dose response curve, wide variation of patient response
Hypnotic/Amnesic: Propofol

• Contraindications
  – Soy or egg allergy-risk of anaphylaxis

• Side Effects
  – Painful on injection
  – Myoclonic movements
  – Formulation not bacteriostatic- risk of sepsis
Analgesics  (Adjunctive Therapy to Sedation)

- Local and Topical Anesthetics (e.g. lidocaine, bupivacaine, ropivacaine, Ela-max)
  - The local anesthetics produce reversible blockade of conduction of nerve impulses by preventing increases in permeability of nerve membranes to sodium ions.
  - Progressive increases in the concentrations of local anesthetics results in interruption of transmission of autonomic, somatosensory and somatomotor impulses, producing autonomic nervous system blockade, sensory anesthesia and skeletal muscle paralysis.
  - Local anesthetics are either esters or amides.
  - Depending on the particular local anesthetic, produces local vasoconstriction, which limits systemic absorption and prolongs the duration of action of the anesthetic.
  - Side effects are rare when dosages of local anesthetic fall within the recommended ranges.
  - Local anesthetics are metabolized in the liver.
Analgesics  (Adjunctive Therapy to Sedation)

• Potential adverse reactions include:
  – restlessness, tinnitus, seizures, coma
  – respiratory depression or apnea
  – bradycardia, hypotension, heart block
  – nausea, vomiting
  – methemoglobinemia (prilocaine; found in EMLA but not Ela-Max)

• Contraindications include:
  – hypersensitivity to specific type of local anesthetic

*Use with caution in patients with hepatic dysfunction or heart failure

* Administration of local anesthetics only is not considered part of the Sedation/Analgesia policy; usage is customarily paired with an analgesic.
Analgesics  (Adjunctive Therapy to Sedation)

• Local Anesthetic Toxicity Treatment
  – Airway management
  – Seizure suppression if needed
  – ACLS
  – Transfer to location where cardiopulmonary bypass is immediately available
  – Administer 20% Intralipid (see next slide)
Analgesics (Adjunctive Therapy to Sedation)

• Local anesthetic toxicity treatment with Intralipid therapy (values in parens are based on a 70-kg adult)
  – Bolus 1.5 ml/kg IV over 1 minute (approx 100 ml)
  – Initiate continuous infusion 0.25 ml/kg/min (approx 500 ml) over 30 min
  – Repeat bolus Q 5 min for persistent CV collapse
  – Double infusion rate for hypotension
  – Continue infusion for minimum of 30 minutes

Note: Bupivicaine has the highest risk of local anesthetic toxicity
The Procedure
Assessment

• Noninvasive modalities used to detect hypoxemia include:
  – Pulse oximetry
  – Heart rate (i.e., assume bradycardia/tachycardia is secondary to hypoxia until proven otherwise)
  – Clinical observation (color)

• Hypoventilation may be monitored by observation:
  – Patient (respiratory effort, color, rate)
  – Airway and lung auscultation
  – End-tidal CO₂ monitoring, if available
Assessment

• Monitoring

Respiratory assessment focuses on oxygenation (delivery of 02 to tissues) and ventilation (exchange of air between the lungs and the atmosphere).

• Pre-procedural – Baseline assessment obtained

• Intra-and post-procedure –
  – Monitor every 5 minutes based on the duration of action of medication AND
  – Every 5 minutes until Aldrete Score > 8 or return to baseline.
Special Circumstances

- There are certain situations when some of these parameters might be difficult to obtain and/or interfere with the exam in progress, i.e. during an MRI exam, the magnet will interfere with the EKG tracing.
- Use MRI compatible monitoring equipment to avoid issues.
- If MRI compatible monitoring not available, reliance on the arterial waveform from the pulse oximeter would suffice, especially in the absence of any history of cardiac problems.
- The blood pressure being taken every 5 minutes would also possibly agitate the patient so the interval might be extended to every 10 to 15 minutes.
Special Circumstances

- For pediatric patients, taking the blood pressure every 5 minutes might disturb the child and disrupt the procedure: less frequent blood pressure monitoring would be acceptable as long as there is adequate monitoring of heart rate and pulse oximetry.
Assessment

• Monitoring

  • Post Procedure – Once returned to baseline, monitor every 15 minutes for 30 minutes at a minimum.
  • Additional monitoring may be required based on individual patient’s response.
Key Point

• Patients are less likely to have a problem during a painful procedure because the discomfort stimulates the breathing process.
• Once the procedure is over, the risk resumes.
Post-Procedure

• The physician will remain in attendance until the recovery is judged adequate.
Assessment

• **Airway Intervention**
  - With the onset of drug administration (except for pure analgesic agents), it is vital to closely observe the patient's head position.
  - Allowing the head to flex forward will often result in upper airway obstruction and hypoventilation.
  - Keeping the head extended, in the “sniffing position” will help to maintain, but not guarantee an unobstructed airway.
The identification and treatment of pain is an important component of the plan of care. Individuals are assessed based on their:

- clinical presentation
- services sought, and
- in accordance with the care, treatment and services provided
Pain Management

- A comprehensive pain assessment is conducted as appropriate to the patient’s condition and the scope of care, treatment, and services provided.
- The assessment methods are appropriate to the patient’s age and/or abilities using pain scales.
- When pain is identified, the patient is treated by the hospital or referred for treatment.
Sedation/Analgesia Record

Monitoring requirements included on record for Pre, Intra, and Post Procedural period.

- Document reversal agent, if used
- Document drug/dose and route
- Document Pain Assessment and FPG

**SEDATION/ANALGESIA RECORD**

<table>
<thead>
<tr>
<th>DRUG</th>
<th>ROUTE</th>
<th>DRUG</th>
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</table>

**MONITORING**

- Blood Pressure
- Heart Rate

**OXYGEN METHOD OF DELIVERY**

- Reversal
- Drugs
- Available
- Narcotic (morphine
- Reversal
- Nitrous oxide
- Reversal
- Sedation
- Patient
- Response
- Code

**PAIN SCALE**

- Numeric
- Descriptor
- Location
- Site
- Description
- Quality
- Pain Level
- Behavior
- GI
- Itching
- Respiratory
- Vomiting

**POST-PROCEDURE**

- Once returned to baseline, monitor every 15 minutes for 30 minutes at a minimum.
- Side Bells Up
- Brakes On
- Call Bell Within Reach
- Surrey/Bed in low position
- Family/S.O. with Patient

*If reversal agents are used, the patient must be monitored for an amount of time sufficient to allow for the possible re-sedation of the patient, usually 2 hours.
Sedation/Analgesia Record

<table>
<thead>
<tr>
<th>Time</th>
<th>Blood Pressure</th>
<th>Heart Rate</th>
<th>Rhythm</th>
<th>Respiratory Rate</th>
<th>Airway Patent?</th>
<th>Oxygen Saturation</th>
</tr>
</thead>
</table>

**Airway patent?**
- "Yes" or
- Checkmark acceptable

If procedure lengthy, copy page three and continue flowsheet documentation on additional sheet; indicate "see next page" or continuation in discharge column.
Follow policy regarding intervals and duration of monitoring post procedure.

Utilize patient progress notes, if required, to document additional patient information. This section can be used for pre-intra-post and discharge documentation notes.

<table>
<thead>
<tr>
<th>DATE / TIME</th>
<th>FOCUS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Form
Page 4
<table>
<thead>
<tr>
<th>DISCHARGE ASSESSMENT - Inpatient &amp; Outpatient</th>
</tr>
</thead>
<tbody>
<tr>
<td>In order to be discharged from the hospital or procedure area, documentation must reflect that the patient has achieved a minimum Aldrete score of ≥8 or has returned to the pre-procedure baseline.</td>
</tr>
<tr>
<td>Outcomes Achieved Prior to Discharge:</td>
</tr>
<tr>
<td>☐ Cardiovascular function and airway patency are satisfactory and stable</td>
</tr>
<tr>
<td>☐ Patient's pain is controlled at or below FPG</td>
</tr>
<tr>
<td>☐ Patient has ability to retain oral fluids (if appropriate)</td>
</tr>
<tr>
<td>DISCHARGE SUMMARY (Outpatient):</td>
</tr>
<tr>
<td>☐ IV discontinued, catheter intact, site clear</td>
</tr>
<tr>
<td>Ambulating: ☐ Yes ☐ No ☐ NA</td>
</tr>
<tr>
<td>Nausea: ☐ Yes ☐ No</td>
</tr>
<tr>
<td>Vomited: ☐ Yes ☐ No</td>
</tr>
<tr>
<td>Comments: ____________________________________________</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HOME CARE (Outpatient):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copy of Printed Discharge Instructions Given for:</td>
</tr>
<tr>
<td>Above instructions discussed with: ☐ Patient ☐ Family/Caregiver</td>
</tr>
<tr>
<td>Patient/Family/Caregiver verbalize understanding ☐</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DISPOSITION:</th>
</tr>
</thead>
<tbody>
<tr>
<td>To: ☐ Home ☐ Other:</td>
</tr>
<tr>
<td>Via: ☐ Wheelchair ☐ Ambulatory ☐ Gurney ☐ Other:</td>
</tr>
<tr>
<td>By: ☐ Private Car ☐ Ambulance ☐ Taxi ☐ Other:</td>
</tr>
<tr>
<td>In possession of: ☐ Belongings ☐ Medications ☐ Other:</td>
</tr>
<tr>
<td>☐ Discharge Prescription</td>
</tr>
<tr>
<td>☐ Patient released to the care of a responsible adult</td>
</tr>
<tr>
<td>Name: ____________________________________________</td>
</tr>
</tbody>
</table>

Ensure you document this information!

The Home Care section MUST be completed for outpatients. Use narrative section to document if the choices listed do not meet your needs.

This section MUST be completed, whether the patient is being discharged home or back to originating nursing unit.

Document Care Plan Outcomes here!
Key Point

• Following the instructions on the Sedation/Analgesia Record will effectively guide you!
Reversal Agents

undo
Reversal Agents

• If a patient lapses into deeper than moderate sedation, or otherwise becomes unstable, a reversal agent may need to be given.

  • *If a reversal agent is used, the patient must be monitored for a minimum of 2 hours before discharge.*
Reversal or Antagonist Agents:  Naloxone

- **Naloxone (Narcan™)**
  - Naloxone is an opioid-competitive antagonist that reverses the CNS and respiratory depression caused by narcotics.
  - Naloxone may be administered via several routes including IV, IM, SC and down an endotracheal tube (ET).
Reversal or Antagonist Agents: Naloxone

- Naloxone (Narcan™)
  - It is important to remember that naloxone has a shorter half-life than some of the narcotics (e.g. morphine and meperidine), therefore doses may have to be repeated.

- Naloxone is metabolized primarily in the liver and excreted in the urine.
Reversal or Antagonist Agents: Naloxone

- Naloxone (Narcan™)
  - Naloxone will also promptly reverse opioid-induced analgesia.

\[ + \text{naloxone} = \]
Reversal or Antagonist Agents: Naloxone

- Potential adverse reactions include:
  - reversal of analgesia
  - nausea/vomiting
  - hypertension/tachycardia
  - pulmonary edema
  - cardiac dysrhythmias
  - hypotension
  - precipitation of opioid withdrawal symptoms

- Contraindications include:
  - hypersensitivity to naloxone
Reversal or Antagonist Agents: Naloxone

- **Usual Dosage:**
  - Pediatrics: IV: 0.1 mg/kg; Minimum 0.5 mg/dose, Maximum 2 mg/dose
  - Adults: IV: 0.2-0.4 mg. MR q 2-3 minutes up to 10 mg as necessary
    
    IV single maximum dose: 2mg

- **Onset:**
  - IV 2 minutes
  - IM 15 minutes

- **Duration:**
  - IV 30-60 minutes

- **DO NOT combine with other drugs**
Reversal or Antagonist Agents: Flumazenil

• Flumazenil (Romazicon™)
  – Flumazenil is a benzodiazepine-receptor antagonist that reverses the sedative effects, psychomotor impairment and possibly amnesic response caused by benzodiazepines.
  – Flumazenil also has a shorter half-life than some of the benzodiazepines (e.g. Valium, Ativan) therefore, doses may have to be repeated when the longer-acting benzodiazepines are used.

• Flumazenil is metabolized primarily in the liver and excreted in the urine.
Reversal or Antagonist Agents: Flumazenil

• Potential adverse reactions include:
  – sweating/flushing/hot flashes
  – nausea/vomiting/hiccups
  – CNS agitation/seizures
  – abnormal vision
  – paresthesias
  – precipitation of benzodiazepine withdrawal symptoms

• Contraindications include:
  – hypersensitivity to benzodiazepines or flumazenil
  – patients on chronic benzodiazepine therapy
  – patients with seizure disorders controlled by benzodiazepines
**Reversal or Antagonist Agents: Flumazenil**

- **Usual Dosage for reversal of sedation:**
  - Pediatrics: IV- 0.01 mg/kg/dose
  - Adults: 0.2 mg/dose over 15 seconds, wait 45 seconds, may repeat q 60 seconds x 4 doses to a total of 1 mg (give undiluted or diluted in NS, not to exceed 1mg/min). If resedation occurs, dosage may be repeated after 20 minutes; however, no more than 1 mg should be administered at one time (at a rate of 0.2 mg/min) and no more than 3mg/hr.

- **Onset:**
  - IV 1-2 minutes

- **Duration:**
  - IV 1-4 hours
Again- Please note:
If a reversal agent is used, the patient must be monitored for a minimum of 2 hours before discharge.
Management of Complications

• The administration of sedatives and/or sedative-analgesics is associated with potential risks and complications.
• There are numerous case reports and clinical studies attempting to document and quantify these risks.
• The FDA has gathered a series of over 150 severe adverse drug reactions utilizing a self-reporting system.
• Over 40% were related to human error, and 8% specifically involved the drug morphine.*

Conclusions from the FDA and other studies include:

- All sedatives and narcotics have caused problems even in "recommended doses"
- All areas using sedation have reported adverse events
- Children 1-5 years of age are at most risk. Most had no severe underlying disease
- Respiratory depression, airway obstruction and apnea are the most frequent causes of adverse events
- Adverse events involved: multiple drugs, drug errors or overdose, inadequate evaluation, inadequate monitoring, inadequate practitioner skills and premature discharge
Management of Complications

• Additional factors affecting development of procedural complications have been identified, such as:
  – age and medical condition of patient
  – type and combination of medication used
  – dose of medication
  – route of administration
  – rate of administration
  – medication sensitivities
  – amount of procedural and recovery period stimulation
Hypoventilation (Respiratory Depression)

Respiratory depression is the most common complication of Sedation/Analgesia

– In addition to sedative medications potentiating upper airway obstruction, it is important to remember that certain medications used for sedation or analgesia cause direct depression of the respiratory centers in the brain.

– The sedatives (e.g. barbiturates and benzodiazepines) as well as the opioids, are potent respiratory depressants, especially when used in combination.
Respiratory Depression

• All equipment and personnel needed to initiate and maintain an advanced airway must be readily available during sedation/analgesia.
• Be ready!
Hypoventilation (Respiratory Depression)

• The potential for respiratory compromise increases proportionally to the number of drugs administered.
## Complications, Causes and Interventions

<table>
<thead>
<tr>
<th>Complication</th>
<th>Possible Cause</th>
<th>Supportive Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vomiting</td>
<td>• Crying&lt;br&gt;• Full stomach (air or food products)&lt;br&gt;• Pain&lt;br&gt;• Most common with narcotics and chloral hydrate</td>
<td>• Position patient to lateral decubitus position&lt;br&gt;• Assure patent airway&lt;br&gt;• Suction&lt;br&gt;• Antiemetic treatment when applicable</td>
</tr>
<tr>
<td>Untoward reactions:</td>
<td>• Deep sedation&lt;br&gt;• Minimal stimulation&lt;br&gt;• Hypoglycemia&lt;br&gt;• Hypothermia&lt;br&gt;• Most common with narcotics, midazolam, chloral hydrate, ketamine</td>
<td>• Assure patent airway&lt;br&gt;• Supplemental $O_2$&lt;br&gt;• Restraints&lt;br&gt;• Drug treatment when applicable</td>
</tr>
</tbody>
</table>
## Complications, Causes and Interventions

<table>
<thead>
<tr>
<th>Complication</th>
<th>Possible Cause</th>
<th>Supportive Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypotension</td>
<td>• Bleeding</td>
<td>• Position</td>
</tr>
<tr>
<td></td>
<td>• Hypoxia</td>
<td>• IV fluid</td>
</tr>
<tr>
<td></td>
<td>• Myocardial depression</td>
<td>• Vasopressors</td>
</tr>
<tr>
<td></td>
<td>• Allergic reaction</td>
<td>• Reversal agent</td>
</tr>
<tr>
<td></td>
<td>• Most common with IV morphine</td>
<td>• Inotropes</td>
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</tbody>
</table>
## Complications, Causes and Interventions

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<tr>
<th>Complication</th>
<th>Possible Cause</th>
<th>Supportive Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac dysrhythmias</td>
<td>Hypoxia</td>
<td>Assure patent airway</td>
</tr>
<tr>
<td>Cardiac arrest</td>
<td>Vagal stimulation</td>
<td>Supplemental $O_2$</td>
</tr>
<tr>
<td></td>
<td>Pain</td>
<td>BVM ventilation</td>
</tr>
<tr>
<td></td>
<td>Hypovolemia</td>
<td>Drug treatment when applicable</td>
</tr>
<tr>
<td></td>
<td>Fever</td>
<td>BLS/ACLS, as indicated</td>
</tr>
<tr>
<td></td>
<td>Medications</td>
<td>IVF</td>
</tr>
<tr>
<td>Hypothermia</td>
<td>Exposure</td>
<td>Analgesics/antipyretic</td>
</tr>
<tr>
<td></td>
<td>Stress</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Apply warming techniques</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Supplemental $O_2$</td>
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</tbody>
</table>
## Complications, Causes and Interventions

<table>
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<tr>
<th>Complication</th>
<th>Possible Cause</th>
<th>Supportive Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seizures</td>
<td>• Hypoxia&lt;br&gt;• Hypoglycemia&lt;br&gt;• Underlying medical condition&lt;br&gt;• Fever&lt;br&gt;• Local anesthetic toxicity</td>
<td>• Assure patent IV&lt;br&gt;• Supplemental $O_2$&lt;br&gt;• BVM ventilation&lt;br&gt;• BLS/ACLS prn&lt;br&gt;• Blood glucose monitoring&lt;br&gt;• Antipyretics&lt;br&gt;• Anticonvulsants</td>
</tr>
<tr>
<td>Anaphylaxis</td>
<td>• Drug/latex sensitivity&lt;br&gt;• Sensitivity to medications used</td>
<td>• Assure patent airway&lt;br&gt;• Epinephrine 1:1000&lt;br&gt;• Supplemental $O_2$&lt;br&gt;• IVF&lt;br&gt;• BLS/ACLS, as indicated&lt;br&gt;• IV steroids&lt;br&gt;• Benadryl</td>
</tr>
</tbody>
</table>
Management of Complications

• A systematic approach is critical for the safe management of sedation.
• To help minimize or eliminate these risks, this self-learning module has presented key elements of this systems approach including:
  – an understanding of the proper terminology
  – types of drugs and appropriate selection
  – pre-procedural patient evaluation, informed consent, NPO status, age- and size-appropriate-equipment
  – intra-procedural monitoring and documentation
  – post-procedural monitoring and discharge criteria
Think It Through!

The patient’s internist orders Ativan 2mg PO to be given before he goes for a CT scan. The RN is not going with the patient, and he has not had this drug before. Can it be given & the patient sent to CT if a physician order is received?

Yes
No
The patient has been having terrible back pain and the MD ordered new medication started this morning. The patient feels better now, but wants the pain shot again before going down for his MRI. Is that considered sedation-anaesthesia?

Yes
No
Think It Through!

The patient says she has claustrophobia and can’t tolerate the MRA unless she has something to relax her. The patient is getting Xanax prn, and had a dose yesterday. The Xanax was given prior to sending the patient to MRA. Is that considered sedation-analgesia?

Yes

No
I’m sorry that is incorrect. Pre-medication of a patient prior to sending him off the floor for a test without having previously evaluated the response to the medication is very unsafe. Patients are not typically monitored in diagnostic procedure areas. PO Ativan peak action occurs between 1-2 hours after administration.

The nurse is not meeting the standard for assessment and reassessment of the patient after medication administration if the patient is off the unit for a test.
That is CORRECT!!!

Pre-medication of a patient prior to sending him off the floor for a test without having previously evaluated the response to the medication is very unsafe. Patients are not typically monitored in diagnostic procedure areas. PO Ativan peak action occurs between 1-2 hours after administration, leaving the patient vulnerable.
That is incorrect! The RN has evaluated the patient’s response to the medication, and it is being given for routine pain relief. He should be able to be sent safely off the floor.
That is CORRECT! The RN has already evaluated the patient’s response to the medication, and it is being given for routine pain relief.
That is incorrect!

That is considered anxiolysis (anxiety reduction) and the drug effects have been previously evaluated. The patient can have the drug and go to MRA.
That is CORRECT!

That is considered anxiolysis (anxiety reduction) and the drug effects have been previously evaluated. The patient can have the drug and go to MRA.