Procedural Sedation - Adult Patients

Providence

This course provides an overview of procedural sedation for adult patients.

You will review information on each topic and then be presented with questions to test your understanding.

CONCLUSION

Course and Concepts

Course Format

You will review information on each topic and then be presented with questions to test your understanding.

All activities must be completed before moving on to the next section.

The key concepts in this course are:

- Identify and describe the indications for use and desired outcomes in procedural sedation.
- Describe the sedation continuum.
- Define capnography.
- List at least one benefit that capnography offers that pulse oximetry does not.
- Differentiate between normal and abnormal capnography wave forms.
- List at least two potential causes for a loss of wave form.
- Identify potential actions to take if a patient's $EtCO_2$ is rising.
- Name the drugs most commonly used in sedation.
- Explain the clinical considerations with the drugs used in sedation.
- Identify the recommended doses and side effects of the drugs used in sedation.
- List considerations needed in drug administration in the geriatric populations.
- State the role of the RN during the procedural sedation process.
- Verbalize use of the ASA Classification Risk Assessment Tool.
- Relate the necessity of documented airway assessment by the Licensed Independent Practitioner [LIP] (Mallampati).
- Describe the pre-intra-post nursing management of the patient undergoing procedural sedation.
- Identify the equipment required for procedural sedation procedures.
- State when to use the Ramsay and Aldrete scales.
- List potential complications of procedural sedation.

- Identify first line emergency interventions required for the most commonly seen sedation complications.

CONTINUE

Content - Levels of Sedation Defined

Continuum of Sedation

Analgesia and sedation comprise a continuum.

It is not always possible to predict how an individual will respond.

The RN must be prepared to care for the patient if a deeper than intended level of sedation is attained.

Four Levels of Sedation

Before you peek at the answers below, can you name the four levels of sedation in order, beginning with the state of awake?

- American Society of Anesthesiologists

- American Society of Anesthesiologists

Minimal Sedation

- American Society of Anesthesiologists

Moderate/Dissociative Sedation

- American Society of Anesthesiologists

Deep Sedation

- American Society of Anesthesiologists

General Anesthesia

Review each of the question marks above before moving on.

Select each section below to review the definitions of each of the four levels of sedation.

Minimal Sedation

- A drug-induced state in which patients respond normally to verbal commands
- Cognitive function and coordination may be impaired
- Respiratory and cardiovascular functions are unaffected
- Patient has normal eye movements, respiratory rate and effort, and intact protective reflexes

Dissociative Sedation

- A trance-like cataleptic state in which the patient experiences profound analgesia and amnesia
- Airway protective reflexes, spontaneous respirations, and cardiopulmonary stability are all maintained

- Ketamine is the pharmacologic agent used for procedural sedation that produces this state

Moderate Sedation

- A drug-induced depression of consciousness during which patients respond purposefully to verbal commands, either alone or accompanied by light tactile stimulation
- No interventions are required to maintain patent airway or adequate respirations
- Cardiovascular functions and protective reflexes are usually maintained

Desired Outcomes:

- Primary objective/outcome: reduce the patient's anxiety and discomfort
- Produce amnesia
- Enhance patient's cooperation
- Maintain stable vital signs
- Allay fear and anxiety with minimal medication
- Rapid recovery from the procedure

Deep Sedation

- A drug-induced depression of consciousness during which patients cannot be easily aroused, but respond purposefully following repeated or painful stimulation
- Patients may need assistance in maintaining a patent airway and respirations may be inadequate
- Cardiovascular function is usually maintained

Desired Outcomes:

- Primary objective/outcome: drug-induced decrease of consciousness that allows for comfort in an otherwise painful medical procedure
- Patient cannot be easily aroused but can respond purposefully following repeated or painful stimulation

Anesthesia

- A drug-induced loss of consciousness during which patients are not arousable, even with painful stimulation
- Patent airway, adequate respirations, cardiovascular functions may be impaired and often require assistance
- Requires an Anesthesiologist/anesthesia provider

Expand and review the content above before moving on.

Four Levels of Sedation - Defined

System	Minimal Sedation	Moderate/Dissociative Sedation	Deep Sedation	General Anesthesia
Response LOC	Normal response to verbal stimulation	Drowsy; purposeful response to verbal or tactile stimulation	Purposeful response following repeated or painful stimulation	Unarousable even with painful stimulus
Airway	Unaffected	Unarousable even with painful stimulus	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

CONTINUE

Levels of Sedation Defined Review

Select All That Apply:

RN responsibilities during a procedure requiring moderate sedation include:

- [ ] Assisting the Licensed Independent Practitioner (LIP) with the procedure
- [ ] Continuous monitoring of patient status, including vital signs and level of sedation
- [ ] The administration of medication ordered by a qualified LIP

SUBMIT

Multiple Choice:

The desired outcomes for moderate sedation include:

- ◯ Reduction of patient anxiety and discomfort with minimal medications
- ◯ Produce amnesia and maintain stable vital signs
- ◯ Enhance the patient's cooperation
- ◯ Rapid recovery from the procedure
- ◯ All of the above

SUBMIT

Multiple Choice:

Which of the following is **NOT** a goal of procedural (moderate) sedation?

- ◯ Guard patient safety and welfare
- ◯ Maintain adequate sedation with minimal risk
- ◯ Allay patient fear and anxiety
- ◯ Produce an unconscious patient

SUBMIT

True or False:

Deep sedation requires a LIP who is certified in deep sedation to be present during the procedure.

- ◯ True
- ◯ False

SUBMIT

Multiple Choice Scenario:

Your patient assessment findings are the patient is in a drug induced depression of consciousness but can respond to verbal commands. The patient can maintain his airway and respirations and pulse oximetry readings are 93% with the protective reflexes intact.

Which level of sedation is the patient in?

- ◯ Minimal sedation
- ◯ Moderate sedation
- ◯ Deep sedation
- ◯ General anesthesia

SUBMIT

Multiple Choice Scenario:

Your patient is receiving moderate sedation for the closed reduction of a fracture of the right tibia. Halfway through the procedure the patient's heart rate increases to 140, respirations increase to 24, he is moaning and crying out in pain. He can respond to verbal commands and his protective reflexes remain intact.

What level of sedation is the patient exhibiting?

- ◯ Minimal sedation
- ◯ Moderate sedation
- ◯ Deep sedation

- General anesthesia

SUBMIT

Multiple Choice:

Which of the following is **NOT** a characteristic of moderate sedation?

- Patient is easily arousable
- Minimally depressed level of consciousness
- Patient is unable to purposely respond to verbal stimuli
- Protective airway reflexes are maintained

SUBMIT

Multiple Choice:

Expected outcomes of moderate sedation may include all of the following **except**:

- A calm, cooperative patient
- A sleepy but easily arousable patient
- A sleepy patient who requires a chin lift to maintain a patent airway
- Amnesia related to the procedure

SUBMIT

Multiple Choice:

The primary purpose for using moderate sedation is to:

- ◯ Reduce the number of involuntary muscle spasms
- ◯ Support cardiovascular functions and depress consciousness
- ◯ Decrease anxiety and discomfort during an invasive procedure
- ◯ Reduce chance of seizures in patients during an invasive procedure

SUBMIT

Complete the content above before moving on.

Content - Capnography: End Tidal CO_2 Monitoring During Sedation

Benefits of Capnography

Click or tap the box to the left of each statement to mark it as read. Review all to move on.

- [ ] Improved ventilation assessment
- [ ] Assessment of blood flow
- [ ] Protection from misplacement of tubes
- [ ] Ventilation monitoring
- [ ] Avoiding poor outcomes (e.g., oversedation during sedation)
- [ ] Avoiding unnecessary tests (e.g., ABGs)

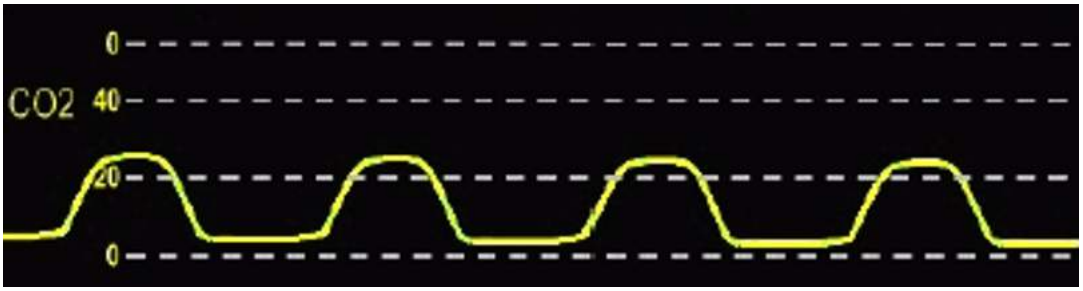
Complete the content above before moving on.

What is Capnography?

Capnography is the non-invasive measurement and numerical display of End-tidal CO_2 ($EtCO_2$), or the maximum expired CO_2 concentration during a respiratory cycle.

In an effective $EtCO_2$ tracing, note the rise and fall of expired CO_2 with each breath.

The normal range for $EtCO_2$ is 35-45 mm Hg



Waveform graphic courtesy of Covidien

Measuring Capnography

Exhaled carbon dioxide can be measured using various devices. The capnography equipment shown below are used to measure $EtCO_2$.

*These **examples** of capnography equipment **may not be representative of the equipment used at your ministry**.* **Be sure to familiarize yourself with the equipment you will be using.**

Oxygenation versus Ventilation

Pulse oximetry is used every day in the hospital setting, **but it is not enough to predict impending decline of a patient's pulmonary status!**

Case Study

Case Study

Let's review a patient scenario. You will want to consider what findings are expected and what findings are concerning to you. Think about whether important data is missing.

Click or tap the button below to get started!

Case Study - Mr. Wu

You are providing sedation and monitoring for Mr. Wu for a colonoscopy.

Mr. Wu is 78 with history of COPD and diabetes.

Prior to the procedure, you administer Versed 2 mg and Fentanyl 50 mcg IV.

Case Study - Mr. Wu

	11:15 Medication Administered	11:30 Mid-Procedure	11:45 Post-Procedure
RR	20	24	16
SpO_2	94%	94%	92%
$EtCO_2$	46	54	62

Monitoring Values

According to these values shown above, does Mr. Wu need any intervention? If you believe so, what would you do?

Click or tap the right arrow to the next screen when you are ready.

Case Study - Mr. Wu

If you said yes, you would be correct!

The procedure is over, yet Mr. Wu's CO_2 is still rising, his respiratory rate is decreasing, and his PaO_2 is dropping.

There are actually four interventions to consider. Can you name them all?

Jump to the last slide to see if you did!

Case Study - Mr. Wu

Interventions to consider:

- Stimulate him
- Insert an oral airway
- Neck/jaw positioning
- Watch for the need of drug reversal

Actions for abnormal $EtCO_2$

Alert the LIP of the patient's status and your concern:

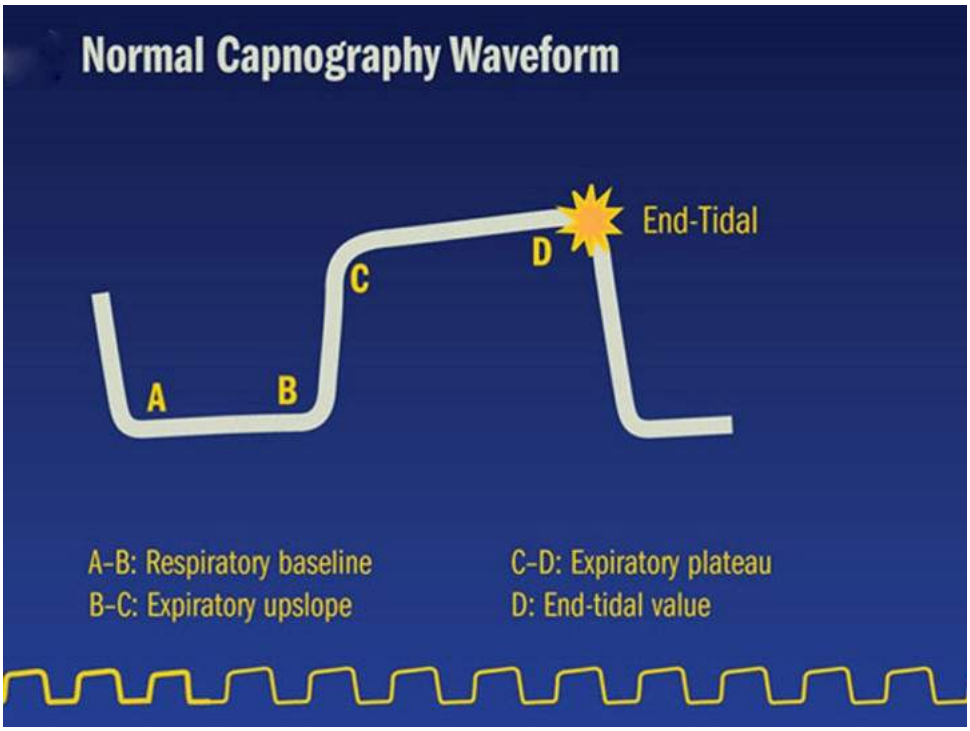
- If the $EtCO_2$ is high (e.g., > 50 mmHg), consider either inadequate ventilation or oversedation
- If the $EtCO_2$ is low (e.g., < 10 mmHg), consider partial or complete airway obstruction or loss of cardiac output

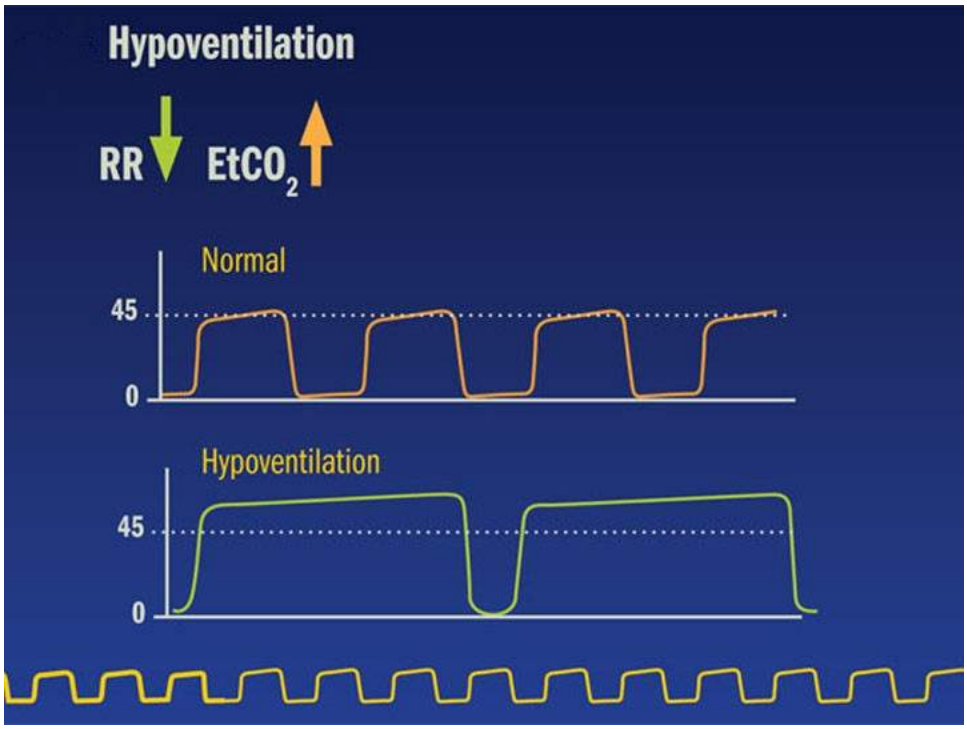
Interventions to consider include:

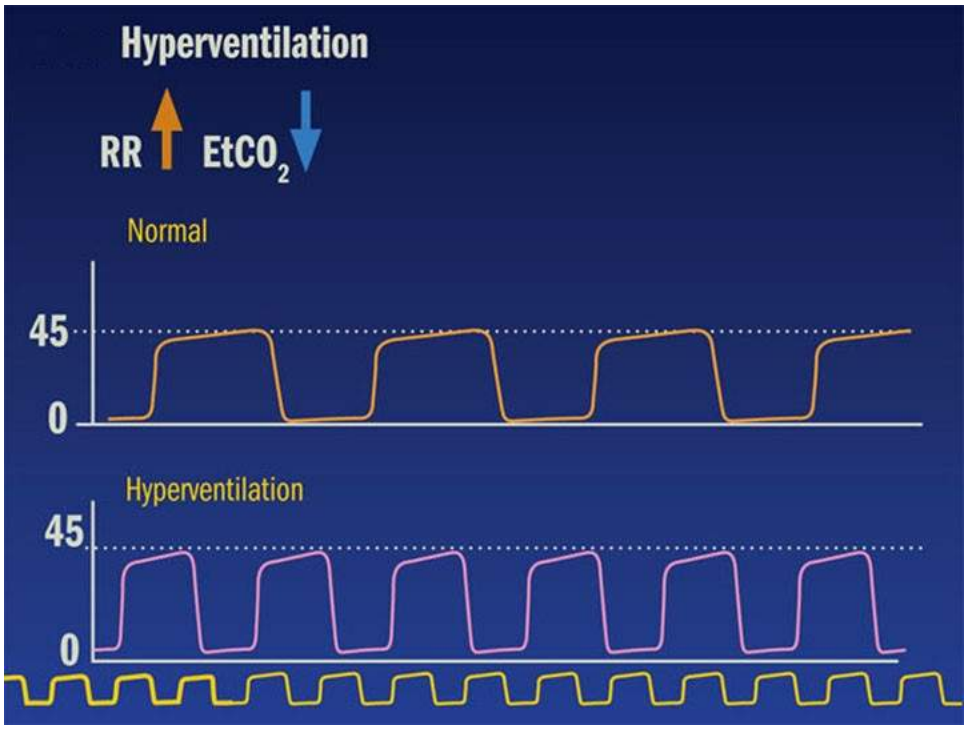
- Assess upper and lower airway patency and treat any obstruction or bronchospasm
- If concerned about decreased cardiac output, assess BP and pulse
- Treat per LIP order

Review both case studies above before moving on.

Capnography Wave Forms and Values







Waveform graphics courtesy of Covidien

CONTINUE

Determining Causes of Abnormal Wave Forms & Values

Abnormal wave forms may be seen during sedation. It is important to identify potential causes of these changes.

In the event of an abnormal wave form, check the equipment and the patient status

- Some abnormal wave forms can be due to poor connections, artifact, and misplaced cannulas rather than patient condition
- **Remember to check *both* equipment and patient!**

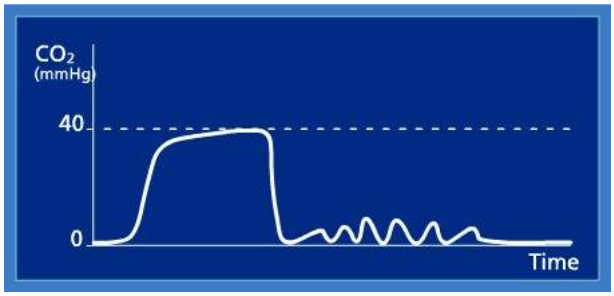
Select each section below to determine the causes of abnormal wave forms.

Abnormal Waveform - Loss of Waveform _

Sudden loss of waveform and $EtCO_2$ to zero or near zero means no respiration is detected!

Possible causes:

- Kinked or displaced cannula (check equipment first!)
- Apnea
- Very shallow respirations
- Total airway obstruction

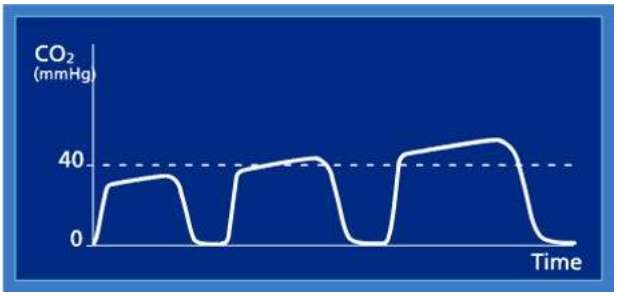


Abnormal Waveform - Increasing $EtCO_2$ Values

Gradual decrease in $EtCO_2$ with normal waveform indicates CO_2 production, or decreasing systemic or pulmonary perfusion

Possible causes:

- Hypoventilation due to analgesia or sedation
- Sudden increase in delivery of CO_2 to pulmonary circulation

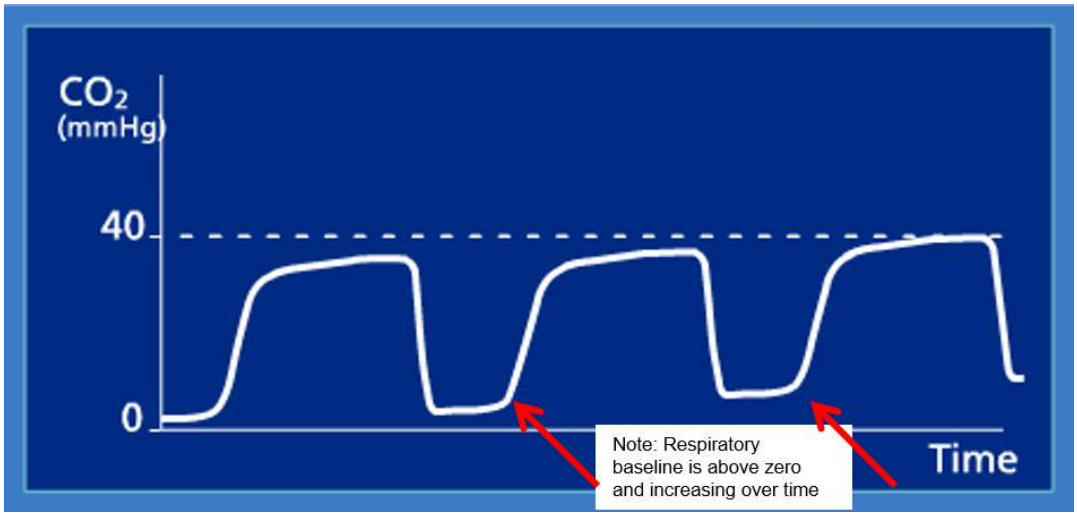


Abnormal Waveform - Rebreathing Exhaled CO_2

Rise in baseline CO_2 indicates rebreathing of CO_2

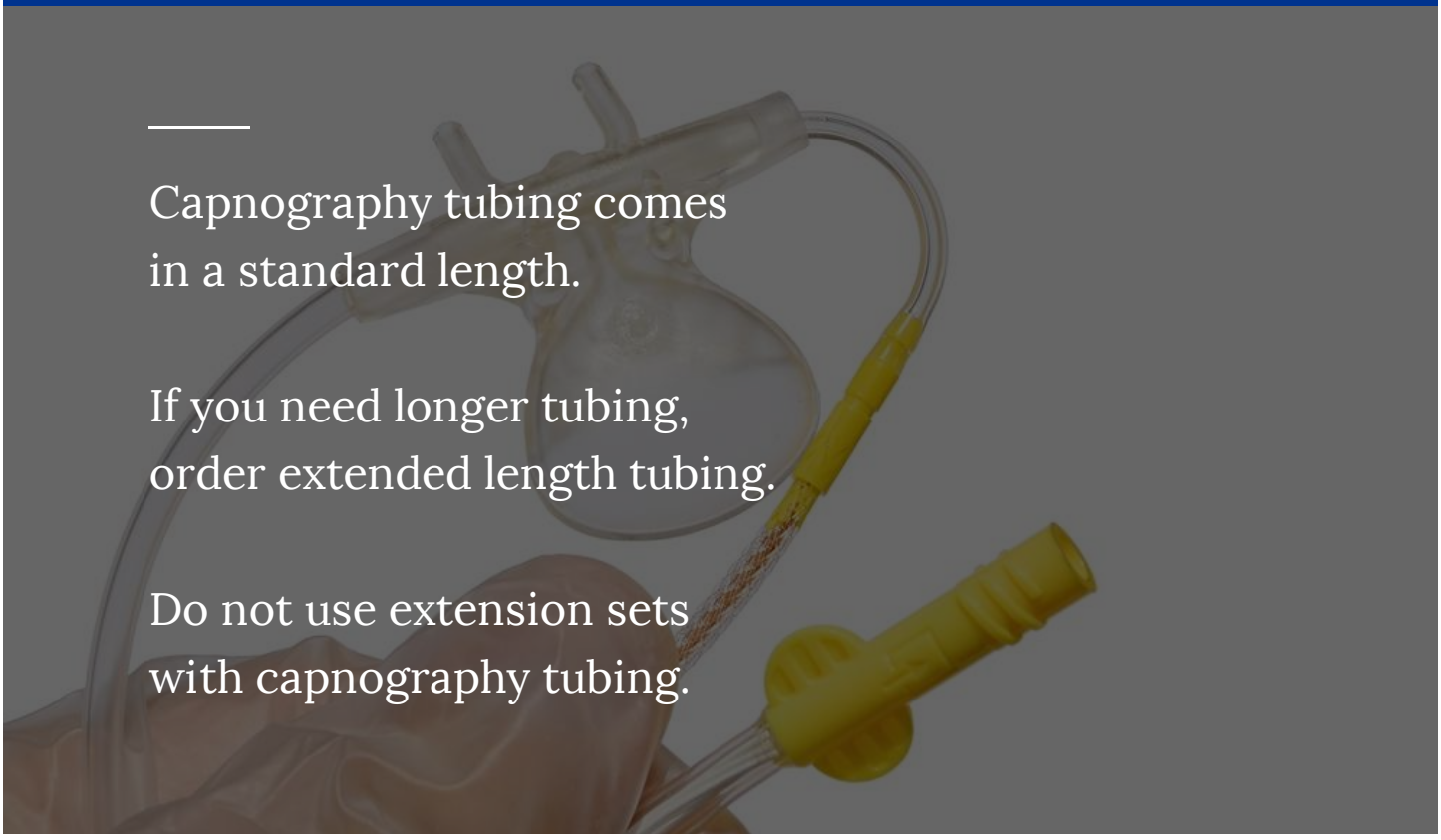
Possible causes:

- Poor head/neck alignment
- Draping at airway
- Insufficient flow to O_2 mask



Expand and review the content above before moving on.

Selecting the Correct Tubing



Capnography tubing comes designed for short term use or long term use. Review both uses by clicking or tapping on the flashcards below.

Short Term Use

Short term use tubing is only good for manufacturer recommended timeframe

- Typically used for monitoring during procedural sedation

Long Term Use

Long term use tubing has a filter for moisture control and can be used for longer durations

- This is the tubing to use if you anticipate the patient will need to be monitored after the procedure is complete

Complete the content above before moving on.

For more information on capnography or $ETCO_2$, click or tap the links below

Capnography

Respiratory compromise

Capnography during sedation

CONTINUE

Capnography: End Tidal CO_2 Monitoring During Sedation Review

True or False:

The normal $EtCO_2$ range is 35-45 mmHg.

- ◯ True
- ◯ False

SUBMIT

True or False:

Ventilation can be monitored with Pulse Oximetry.

- ◯ True
- ◯ False

SUBMIT

True or False:

Common causes of increase in $EtCO_2$ include and hypoventilation and oversedation.

- ◯ True
- ◯ False

SUBMIT

Multiple Choice:

When monitoring a patient using capnography during procedural sedation, the RN will intervene in response the following changes?

- ◯ Decreased respiratory rate
- ◯ Increased $EtCO_2$ value
- ◯ Loss of capnography waveform
- ◯ All of the above

SUBMIT

Multiple Choice:

If observing significant changes from baseline $EtCO_2$ value, the RN will:

- ◯ Instruct patient to take a deep breath
- ◯ Ensure patient has an open airway

- ◯ Check the cannula and reposition if necessary
- ◯ All of the above

SUBMIT

True or False:

An abnormal waveform can indicate equipment issues.

- ◯ True
- ◯ False

SUBMIT

True or False:

Pulse oximetry has limitations because there is a delay before oxygen saturation reflects hypoxia.

- ◯ True
- ◯ False

SUBMIT

Multiple Choice:

When is the best time to begin $EtCO_2$ monitoring?

- ◯ After the first dose of sedating medication
- ◯ When the pulse oximeter cannot display a reading
- ◯ Before any sedating medications are administered
- ◯ Only if supplemental oxygen is provided
- ◯ All of the above

SUBMIT

True or False:

Capnography provides a numeric value for $EtCO_2$ as well as a graphic display of the concentration of exhaled carbon dioxide in each breath.

- ◯ True
- ◯ False

SUBMIT

Multiple Choice:

Capnography should be utilized during procedural sedation:

- ◯ Only if supplemental oxygen is used
- ◯ To identify hypoventilation, apnea, or airway obstruction
- ◯ Instead of pulse oximetry
- ◯ If a patient needs to be intubated

SUBMIT

Multiple Choice:

Complete loss of the capnography waveform may result from:

- ◯ Hypoventilation
- ◯ No detection of breath
- ◯ Partial airway obstruction
- ◯ All of the above

SUBMIT

True or False:

Capnography provides caregivers with breath-to-breath information.

True

False

SUBMIT

Complete the content above before moving on.

Pre-Procedure Sedation Considerations

Assessment and Preparation

Safe and effective sedation requires assessment of patient's current condition, medical history, and individual risk factors.

Tools for Determining Sedation Risk Factors

Click or tap the checkbox to the left of each statement to mark it as read.

- [ ] Thorough medical history interview
- [ ] Physical exam within 30 days
- [ ] Patient's response to previous sedation/ anesthesia
- [ ] Use of American Society of Anesthesiologists (ASA) classification of physical status

- [ ] Airway assessment (Mallampati)
- [ ] Use of the STOP-BANG Assessment

Complete the content above before moving on.

Pre-Sedation Assessment

- LIP must be certified to perform moderate and/or deep sedation
- Requirements to be completed by LIP:
  - Current history and physical
    - Completed within 30 days
    - If over 24 hours old, must have an interval note
  - Airway assessment (Mallampati)
  - ASA score
  - Informed consent for procedure and sedation
- Site and/or procedural verification
- Nursing assessment (focused)

Sedation Risk Factor - Compromised Airway

COMPROMISED AIRWAY

Patients with anatomically compromised airways are at greater risk of respiratory complications

- The Mallampati assessment (performed by the LIP) provides information regarding airway risk
- The sedation nurse should verify the Mallampati assessment was performed and documented prior to administering sedation
    - Mallampati scores of 3 or 4 have higher risk for respiratory compromise

Image provided by UpToDate

CONTINUE

Sedation Risk Factor - Baseline Patient Condition

BASELINE PATIENT CONDITION

- The **ASA score** is a subjective assessment of patient's overall health

- It is used to assess the fitness of patients before a procedure/surgery

Class I	Normal healthy patient
Class II	Patient with mild systemic disease
Class III	Patient with severe systemic disease
Class IV	Patient with severe systemic disease that is a constant threat to life
Class V	Moribund patient not expected to survive 24 hours.

Optimal ASA Class for Procedures with Sedation

- ASA scores 1 and 2 are the best predictors of a successful outcome for the patient
- ASA score 3 and greater identifies a patient at higher risk for a negative outcome and may require closer monitoring and/or additional support

CONTINUE

Sedation Risk Factor -
Obesity & Sleep Apnea (OSA)

- Medications may cause relaxation of the oropharyngeal structure resulting in partial or total airway obstruction

- Additional precautions are taken for patients with sleep apnea and obesity
- Assess using STOP-BANG

STOP-BANG ASSESSMENT | PRECAUTIONS FOR OSA

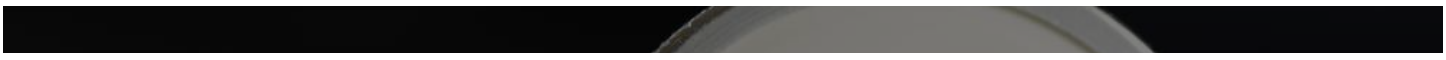
Scoring for STOP BANG:
5-8 "Yes" Responses = High risk of OSA
3-4 "Yes" Responses = Intermediate risk of OSA
0-2 "Yes" Responses = Low risk of OSA

- **S**noring
  - Do you **S**nore loudly?
- **T**ired
  - Do you often feel **T**ired, fatigued or sleepy during the daytime?
- **O**bserved
  - Has anyone **O**bserved you stop breathing during your sleep?
- **P**ressure
  - Do you have or are you being treated for high blood **P**ressure?
- **B**ody Mass Index
  - BMI > 35?
- **A**ge
  - > 50 years?
- **N**eck size
  - >16 inches or > 40 cm?
- **G**ender
  - Male?

STOP-BANG ASSESSMENT | PRECAUTIONS FOR OSA

- Management by anesthesia if the patient has severe central nervous system sleep apnea
- Position in lateral or semi-fowlers position if possible
- Use CPAP machine during the procedure and recovery phase if patient uses CPAP when they sleep
- Position patient to facilitate an open airway

CONTINUE



Sedation Risk Factor - Cardiac Disease

Cardiac Disease (Acute Coronary Syndrome, History of Myocardial Infarction/Occlusion, Angina, etc.)

- Review patient's chart to see if an ECG has been obtained within the last 6 months
    - If a recent ECG is not available, consider recommending a 12 lead ECG prior to the procedure
- If it is a non-cardiac procedure, a cardiology consult may be requested
- The patient should be on a cardiac monitor throughout the procedure

CONTINUE

Sedation Risk Factor - Other Complicating Conditions

Patients presenting with the following conditions are known to have increased risks with sedation:

1. Inability to communicate or cooperate
2. Multiple drug allergies
3. Multiple medications with potential for drug interaction with sedative analgesics
4. Current substance abuse
5. Obesity (BMI > 40)

Consider appropriate specialty consultation (anesthesia, obstetrics, cardiology, etc.):

- Known history of respiratory or hemodynamic instability
- Previous difficulties with sedation or anesthesia
- Severe sleep apnea or other airway related issues
- One or more significant co-morbidities
- Pregnancy

CONTINUE

Pre-Sedation Preparation - Nursing Assessment

General Assessment

- Vital signs: BP, HR, RR, SaO_2, $ETCO_2$
- Pain level
- Level of consciousness (Using Ramsay scale)

Airway Assessment	• Airway patency, ventilatory effort, lung sounds • Assess physical features that may cause difficulty in maintaining a patent airway or may impair intubation should the need arise (e.g., thick neck, reduced neck extension, TMJ, etc.)
Cardiac Assessment	• Cardiac rhythm, heart sounds, peripheral pulses and other indicators of tissue perfusion

Complete the content above before moving on.

Pre-Sedation Preparation - Verify NPO Status

VERIFY NPO STATUS

- To decrease risk of aspiration, NPO status must be evaluated prior to the administration of sedation
- Verify and document time of patient's last intake of food/fluids
- If the desired NPO status is not met, the goal of sedation should be carefully assessed and balanced with the urgency of the procedure
- May also consider anesthesia consult

NPO Guidelines

Substance	Time Recommendation
Clear liquids	2 hours
Light meal (toast, clear liquids)	6 hours
Fried foods, fatty foods, meat	8 or more hours

CONTINUE

Pre-Sedation Preparation - Patient Education

Patient instruction must include detailed, patient specific information that is pertinent to the planned procedure.

This includes:

- NPO
- Medication instructions and procedure specific preparation PRN
- Patient understanding of the planned procedure
- Need for a designated lay caregiver to escort patient home following discharge and be available for recommended post procedure care
- No driving for 24 hours

Pre-Sedation Preparation - Sedation Plan

Click or tap the checkbox to the left of each statement to confirm you have reviewed it.

☐ Discuss sedation plan and target level of sedation (Ramsay score) with LIP.

☐ The RN is expected to consider potential risk factors that may increase the chance of complications associated with procedural sedation.

- Communicate this information and any other concerns to the appropriate members of the healthcare team.

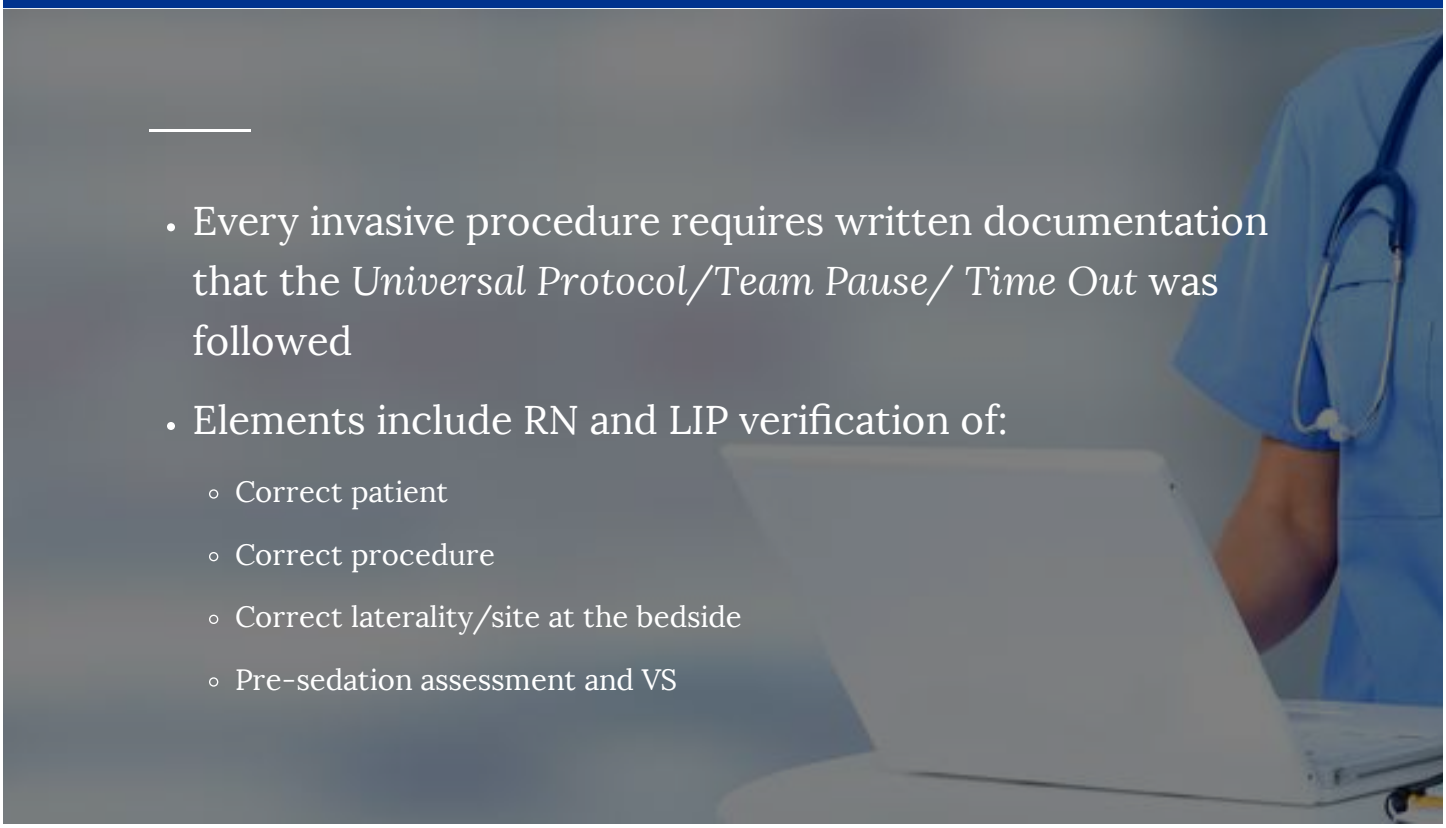
☐ The LIP and RN must consider whether sedation and monitoring would be more appropriately managed by an anesthesiologist.

🔒 Complete the content above before moving on.

Pre-Sedation Preparation - DNR/DNI Considerations

- DNR/DNI orders are not automatically rescinded during procedures.
- The existing DNR/DNI status is to remain active unless the LIP writes an order to initiate full code status during the procedure.
  - However, pre-existing code status may not be appropriate for the procedural circumstances as techniques routinely undertaken in the course of sedation could be classified as resuscitation.
- Every patient with DNR/DNI status should have a conversation with the LIP regarding code status prior to the procedure.

Pre-Sedation Preparation - Universal Protocol/Team Pause/Time Out



- Every invasive procedure requires written documentation that the *Universal Protocol/Team Pause/ Time Out* was followed
- Elements include RN and LIP verification of:
  - Correct patient
  - Correct procedure
  - Correct laterality/site at the bedside
  - Pre-sedation assessment and VS

Pre-Sedation Preparation - Required Equipment

Emergency equipment that must be immediately available:

Click or tap the checkbox to the left of each statement to mark it as read. Review all to move on.

- [ ] Bag/Valve/Mask and 100% oxygen source, airways, suction, and intubation equipment
- [ ] Code cart/defibrillator (include suction machine/equipment)
- [ ] Cardiac monitor (not required for all cases)
- [ ] Blood pressure monitoring (use correct cuff size)
- [ ] Pulse oximeter for continuous reading
- [ ] End-Tidal CO_2 monitor for continuous reading
- [ ] Patent IV site
- [ ] Drug antagonists/reversal agents (flumazenil and naloxone) must be at the bedside

Complete the content above before moving on.

Content - Intra-Procedure Sedation Considerations

Intra-Procedure Nursing Management

The sedation phase begins with the first dose of sedative agent. Level of sedation is assessed using a validated sedation scale.

Sedation ends when the procedure is complete and the patient achieves an Aldrete score of at least 8 (or pre-procedure score if baseline is < 8).

Sedation Scales

Sedation scales are tools used to:

- Determine accurate and consistent drug titration
- Decrease the risk of excessive drug dosing
- Decrease the risk of oversedation

Correlation between Ramsay Score and Level of Sedation

Ramsay Score	Clinical Status	Level of Sedation/Definition
1 2	Patient anxious, agitated or restless Patient cooperative, oriented and tranquil	**Minimal Sedation**: A drug induced state during which patients respond normally to verbal commands. Cognitive function and coordination may be impaired, but respiratory and cardiovascular functions are unaffected.
3	Patient asleep, responds to verbal commands	**Moderate Sedation**: A drug-induced depression of consciousness during which patients respond purposefully to verbal commands, either alone or accompanied by light tactile stimulation. No interventions are required to maintain patent airway or adequate respirations. Cardiovascular functions and protective reflexes are usually maintained.
4	Patient asleep, brisk response to light glabellar tap, tactile stimuli or loud noise	**Moderate** ← → **Deep**
5	Patient asleep, sluggish response to light glabellar tap, tactile stimuli or noise	**Deep Sedation:** A drug-induced depression of consciousness during which patients cannot be easily aroused but respond purposefully following repeated or painful stimulation. Patients may need assistance in maintaining a patent airway and respirations may be inadequate. Cardiovascular function is usually maintained.
6	No response to light glabellar tap* or loud noise	**General Anesthesia:** A drug-induced loss of consciousness during which patients are not arousable even with painful stimulation. Patent airway, adequate respirations, cardiovascular functions may be impaired and often require assistance.

Glabellar tap = Tap on forehead between eyebrows

Richmond Agitation-Sedation Scale (RASS)

RASS is a 10-point scale, with:

- four levels of anxiety or agitation,
- one level denoting a calm and alert state, and
- five levels of sedation,

On one extreme of the RASS score, **+4** represents a very combative, violent patient, who is considered dangerous to the staff.

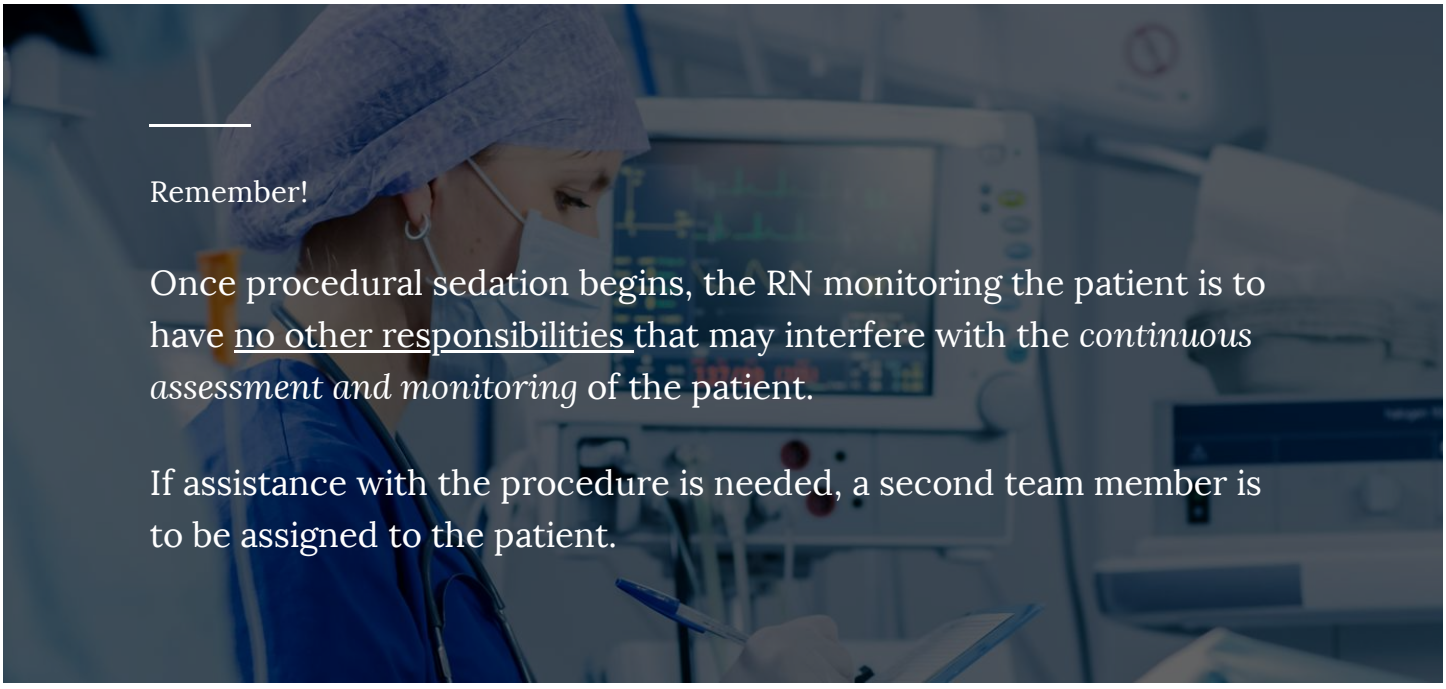
On the other extreme, **-5** represents a patient who is unarousable, with no response to voice or physical stimulation.

Score	Definition
+4	Combative, overtly combative or violent, immediate danger to staff.
+3	Very agitated, pulls on or removes tubes or catheters or is aggressive.
+2	Agitated, frequent non-purposeful movement or ventilator dyssynchrony.
+1	Restless, anxious or apprehensive but movements not aggressive or vigorous.

Score	Definition
0	Alert and calm.
-1	Drowsy, but sustains more than 10 seconds awake, with eye opening in response to verbal command.
-2	Light sedation: Awakens briefly (less than 10 seconds) with eye contact to verbal command.
-3	Moderate sedation: Any movement, except eye contact, in response to command.
-4	Deep sedation: No response to voice, but any movement to physical stimulation.
-5	Unarousable: No response to voice or physical stimulation.

Source: "The Richmond Agitation-Sedation Scale: validity and reliability in adult intensive care unit patients." *Am J Respir Crit Care Med* 2002;166:1338-1344.

CONTINUE



Remember!

Once procedural sedation begins, the RN monitoring the patient is to have no other responsibilities that may interfere with the *continuous assessment and monitoring* of the patient.

If assistance with the procedure is needed, a second team member is to be assigned to the patient.

Intra-Procedure Care & Documentation - Moderate Sedation

Monitoring	Frequency

Monitoring	Frequency
Electrocardiogram (ECG)	Continuously
Heart rate	Continuously
Ventilatory status, including: respiratory rate, oxygen saturation, and end-tidal carbon dioxide ($ETCO_2$)	Continuously
Blood pressure	Continuously
Sedation status	Continuously
Documentation	**Frequency**
RR, O_2 sat, $ETCO_2$, BP, HR, ECG, sedation level (respective scale/score used at your ministry)	Q 5 min
If change in patient condition: RR, O_2 sat, $ETCO_2$, BP, HR, **and** sedation level	Q 5 min until patient condition stabilizes

CONTINUE

Intra-Procedure Sedation Considerations Review

Multiple Choice:

You are providing sedation for a patient mid-endoscopy. He was medicated before the procedure started with Fentanyl 25 mcg IV and Versed 2.5 mg IV. You are unable to arouse your patient with a light tap to the forehead, nor does he arouse when you call his name loudly.

What is his Ramsay Sedation Score?

- ◯ 4
- ◯ 5
- ◯ 6

SUBMIT

Multiple Choice:

Your patient has been medicated with Morphine 4 mg IV and Versed 5 mg IV. He is sleeping but responds to commands.

What is his Ramsay Score?

- ◯ 2
- ◯ 3
- ◯ 4

SUBMIT

Complete the content above before moving on.

Content - Post-Procedure Sedation Considerations

Post-Procedure Equipment

- [ ] Patent IV site with IV fluids
- [ ] Oxygen and O_2 delivery devices (flow meters, nasal cannulae, face mask)
- [ ] Pulse oximeter
- [ ] Blood pressure monitoring (use correct cuff size)
- [ ] Cardiac monitor (if patient at risk)
- [ ] Code cart/defibrillator immediately available (including one-way valve mask, airways, suction, ambu-bag, intubation equipment, emergency drugs)
- [ ] Drug antagonists nearby

You should also consider monitoring $ETCO_2$ if you think the patient is at risk for post-procedure respiratory issues.

Post-Procedure Nursing Management

Continuous Monitoring

Continuous monitoring for no less than 30 minutes from administration of last dose of sedation medication **and** until an Aldrete score of greater than or equal to eight (≥ 8) is reached (or pre-procedure score if baseline is < 8).

Documentation

Documentation every 15 minutes for no less than 30 minutes from administration of last dose of sedation medication **and** until an Aldrete score of greater than or equal to eight (≥ 8) is reached (or pre-procedure score if baseline is < 8).

Additional Monitoring _

Additional monitoring may be required depending on patient's clinical status.

Post-Procedure Monitoring & Documentation

Monitoring	Frequency
Electrocardiogram (ECG)	Continuously
Heart rate	Continuously
Ventilatory status, including respiratory rate, oxygen saturation, and end-tidal carbon dioxide ($ETCO_2$)	Continuously
Blood pressure (e.g., every 5 minutes)	Continuously
Sedation level	Continuously
Documentation	**Frequency**
HR, BP, RR, O_2 sat, $ETCO_2$, sedation level, ECG (when included in plan of care)	Q 15 min
Aldrete score	Q 30 min

Aldrete Score

The Aldrete score evaluates recovery after sedation/anesthesia and patient readiness for discharge.

Level of Consciousness	• Fully awake or responds easily to verbal stimuli or pre-procedure baseline • Arousable on calling • Not responding	= 2 = 1 = 0

	Must be at least 1 at end of monitoring	
Respirations	• Able to breath and cough freely • Dyspnea or limited breathing • Apneic	**= 2** **= 1** **= 0**
Oxygen Saturation	• Maintains value ≥ 92% on room air • Requires supplemental O_2 to maintain saturation at ≥ 90% • Saturation ≤ 90% with supplemental O_2	**= 2** **= 1** **= 0**
Hemodynamic stability	• Blood pressure ± 20% baseline • Blood pressure ± 20-50% baseline • Blood pressure ± 50% baseline	**= 2** **= 1** **= 0**
Physical Activity	• Ability to move all extremities voluntarily or on command • Moves 2 extremities voluntarily or on command • Moves 0 extremities voluntarily or on command	**= 2** **= 1** **= 0**

Post-Procedure Nursing Management

Watch for Post-Procedure Sedation

- Once stimulation from the procedure is over, the patient may progress to a level of sedation deeper than what was assessed throughout the procedure
- This is why it is important to continue assessing sedation level in the post-procedure period

If reversal agents are used, ensure assessments are adequate to identify oversedation recurrence once the effect of the antagonist dissipates. This may require up to *2 hours of increased observation*.

Discharge Criteria

Procedural Area Discharge Criteria

Patient may be discharged from **procedural area** when patient has attained an Aldrete score of at least 8 (or pre-procedure score if baseline is < 8)

- Patient is alert and oriented
  - Mental status returned to baseline level or orientation
- Protective reflexes have returned to pre-procedure function
- Vital signs and respiratory function are stable (pre-procedure range) with adequate end-tidal CO_2 and O_2 saturation

Facility Discharge Criteria

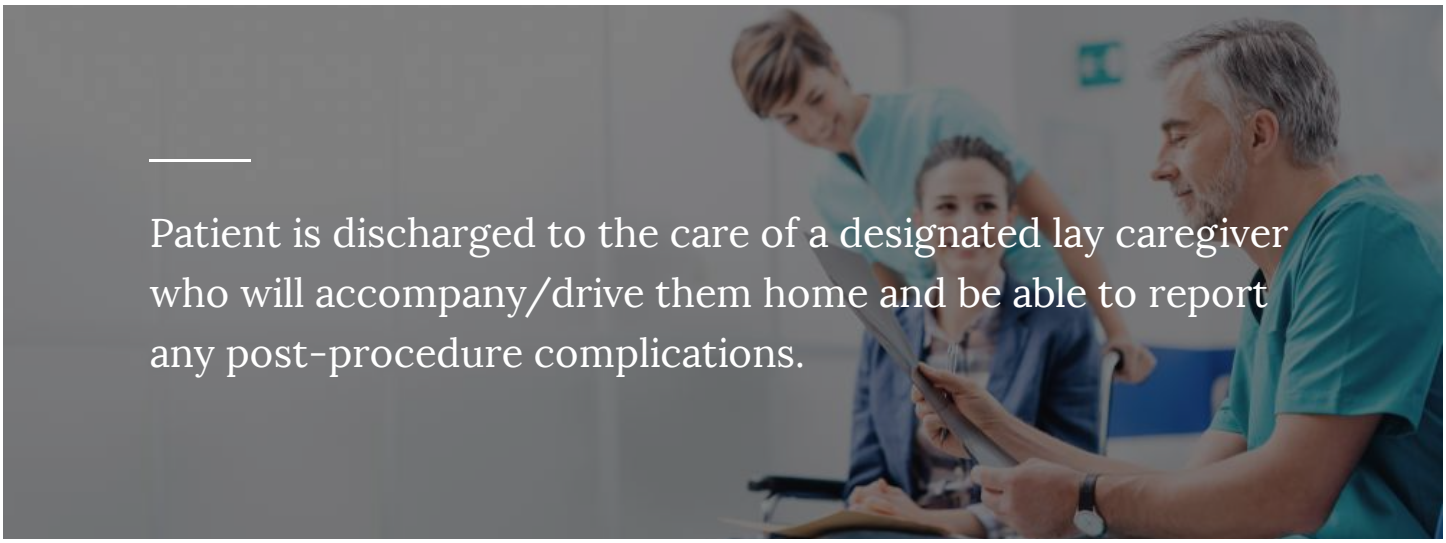
Patient may be discharged from **facility** when:

- Drinking liquids and/or eating light snack without nausea/vomiting

- Ambulating without dizziness
- Voiding without problems
- Minimal or no pain from the procedure
- If reversal agent used, a sufficient duration of monitoring completed to ensure re-sedation does not recur
    - Approximately 2 hours or more, based upon patient condition

Expand and review the content above before moving on.

Discharge



Discharge Education

- **Review information about expected behavior following sedation with patient and designated lay caregiver**
- **Provide written discharge instructions:**
    - No driving or using sharp instruments or equipment for 24 hours
    - Diet restrictions/allowances
    - No alcohol consumption for 24 hours
    - Use of medications

- Warning signs of complications or adverse drug interactions
- Special instructions in case of emergency
- Wound care or specific post procedure care
- Routine follow up with provider
- Provider contact numbers

Documentation Requirements

Document procedural sedation:

- Pre-sedation assessment
- Patient education
- Informed consent
- Current list of allergies and medications
- Time out/universal protocol/team pause (including pre-sedation assessment and vital signs)
- Documentation of vital signs, drugs, and procedure details
- Post-sedation assessment
- Patient response to procedure/medications

- Discharge criteria met

CONTINUE

Post-Procedure Sedation Considerations Review

Match the appropriate scale to the correct use.

Ramsay Sedation Scale	Used to measure level of sedation during and post-procedural monitoring
Aldrete Scale	Used to determine readiness for discharge after a procedure

SUBMIT

Use the Aldrete score tool below to answer the questions that follow:

Level of Consciousness	• Fully awake or responds easily to verbal stimuli or pre-procedure baseline • Arousable on calling • Not responding ***Must be at least 1 at end of monitoring***	**= 2** **= 1** **= 0**
Respirations	• Able to breath and cough freely • Dyspnea or limited breathing • Apneic	**= 2** **= 1** **= 0**
Oxygen Saturation	• Maintains value ≥ 92% on room air • Requires supplemental O_2 to maintain saturation at ≥ 90% • Saturation ≤ 90% with supplemental O_2	**= 2** **= 1** **= 0**
Hemodynamic stability	• Blood pressure ± 20% baseline • Blood pressure ± 20-50% baseline • Blood pressure ± 50% baseline	**= 2** **= 1** **= 0**
Physical Activity	• Ability to move all extremities voluntarily or on command • Moves 2 extremities voluntarily or on command • Moves 0 extremities voluntarily or on command	**= 2** **= 1** **= 0**

Multiple Choice Scenario:

After his endoscopy, your patient is asleep, but arouses to voice (quickly falls back to sleep). He moves all extremities on command, his respiratory rate is 8, his BP is 110/60 (baseline was 158/88), and his SPO_2 is 93-94% on 2 liters O_2 (baseline was 98% on room air).

What is his Aldrete score?

◯ 5

- ◯ 6
- ◯ 7
- ◯ 8

SUBMIT

Multiple Choice Scenario:

After a cardioversion for atrial fibrillation, your patient is awake and talking. He is able to move all extremities, has a respiratory rate of 12, his is BP 124/74 (baseline was 132/80), and his $Sa0_2$ is 96% on room air (baseline was 98%).

What is his Aldrete score?

- ◯ 7
- ◯ 8
- ◯ 9
- ◯ 10

SUBMIT

Fill in the Blank:

You are in the middle of a procedure using moderate sedation, your patient is on her back. Her pulse oximetry measurement falls to 86% (her baseline was 92%), her $ETCO_2$ rises to 60 (from her baseline of 40), and she is making “crowing sounds” with inspiration. What is the probable

cause?

(Hint: type in your 2 word answer below)

Type your answer here

SUBMIT

Multiple Choice:

The most frequent complication of moderate procedural sedation is:

- ◯ Allergic reaction to the drugs being administered
- ◯ Airway obstruction
- ◯ Hypotension
- ◯ Bradycardia

SUBMIT

Select All That Apply:

You are performing moderate sedation for an 82-year-old patient. Which of the following procedural sedation principles apply to this patient?

- ☐ Use incremental doses
- ☐ Allow adequate time between doses to achieve peak pharmacologic effects (5-10 minutes)

- [ ] Medication dosing should be increased 30-50% in the geriatric patient
- [ ] Assess effectiveness of each dose before administering more medication
- [ ] Geriatric patients are at high risk for over sedation and respiratory depression

SUBMIT

Multiple Choice Scenario:

You are in the middle of a moderate sedation procedure. Your patient's pulse oximeter measurement is down to 86%. The baseline is 92%. $ETCO_2$ is 50 and the waveform is getting taller. The patient is positioned on his back with sonorous respirations. What is the possible cause?

- ◯ He is sleeping
- ◯ He has an airway obstruction
- ◯ He has secretions in the back of his mouth
- ◯ He is hyperventilating

SUBMIT

Multiple Choice:

How frequently is the patient monitored during moderate procedural sedation?

- ◯ Every 5 minutes

- ◯ Every 15 minutes through the procedure
- ◯ Every 15 minutes until the Aldrete score is 8 or greater
- ◯ Continuously

SUBMIT

True or False:

The Aldrete Score is used throughout procedural sedation to assess the level of sedation.

- ◯ True
- ◯ False

SUBMIT

Multiple Choice:

What action should the RN take if the documented ASA Risk classification score is 4?

- ◯ None, it is only an assessment of risk.
- ◯ Refuse to help with the procedure as the RN's license is at risk.
- ◯ Discuss concerns with the LIP to ensure the patient's safety during the procedure. Escalate concern to immediate supervisor if needed.
- ◯ Call the RRT.

SUBMIT

Multiple Choice:

The Ramsey Sedation Scale tool is used for all **except**:

- ◯ Determining accurate and consistent drug titration
- ◯ Decreasing excessive drug administration
- ◯ Decreasing risk of sedation beyond the planned level of sedation
- ◯ Correlation to the Modified Aldrete Recovery Scale

SUBMIT

Multiple Choice:

The patient is sleeping but does awaken and respond easily to verbal and/or light tactile stimulation. Vital signs are stable, and respirations are unlabored. Airway patency is maintained without additional intervention.

What level of sedation has been achieved?

- ◯ Minimal sedation
- ◯ Moderate sedation
- ◯ Deep sedation

- ◯ General anesthesia

SUBMIT

Multiple Choice:

The patient is awake during the procedure, but calm and cooperative. Her vital signs are stable. She is a little slow in her verbal responses, but her responses are appropriate.

What level of sedation has been achieved?

- ◯ Minimal sedation
- ◯ Moderate sedation
- ◯ Deep sedation
- ◯ General anesthesia

SUBMIT

Multiple Choice Scenario:

You are performing the moderate sedation for a 42-year-old patient. How long should you wait to assess the effectiveness of a dose of before administering more medication?

- ◯ 1-2 minutes
- ◯ 3-5 minutes

- ◯ 5-8 minutes
- ◯ 10-15 minutes

SUBMIT

Multiple Choice Scenario:

Your patient is receiving procedural sedation for the closed reduction of a fracture of the left arm. Halfway through the procedure the patient's heart rate increases to 140, respirations are 26, he is moaning and responding to verbal command.

Using the Ramsey Sedation Scale, where would you rate the patient's sedation level?

- ◯ Ramsey 1: Patient is anxious, agitated, and restless
- ◯ Ramsey 2: Patient cooperative, oriented
- ◯ Ramsey 3: Patient asleep, responding to verbal commands
- ◯ Ramsey 4: Patient is asleep, brisk response to light gabellar tap or loud auditory stimulus

SUBMIT

Multiple Choice Scenario:

Mrs. Goldbloom, a 76-years-old patient, is going to have a colonoscopy under procedural sedation.

What interventions need to be considered?

- Total drug dosage should be decreased by 30-50% with careful titration of drugs
- Drugs will take longer to metabolize and therefore will circulate longer
- Mrs. Goldbloom will require careful and extended monitoring during the recovery period
- She is at high-risk for over-sedation and respiratory depression
- All of the above

SUBMIT

Complete the content above before moving on.

Content - Pharmacology

Nursing Management Topics

Click or tap the plus sign (+) next to each statement to read more. Review all to move on.

Pharmacological Considerations

Verify the sedation plan with the LIP:

- Moderate versus deep sedation?
- Is the LIP trained for the intended level of sedation?

Goals of Medication Administration

- A rapid and predictable onset of action following drug administration
- Minimal adverse respiratory and/or cardiovascular effects
- Allow for quick recovery
- Optimal patient satisfaction

Titrating Sedation Medications

- The administration of each dose of medication will be by the order of the LIP performing the procedure
- RN must be familiar with sedation medication, appropriate dosing, time to peak effect, and side effects
- Dosages and rates of administration must be individualized to patient response

Titrate each drug individually for desired effect:

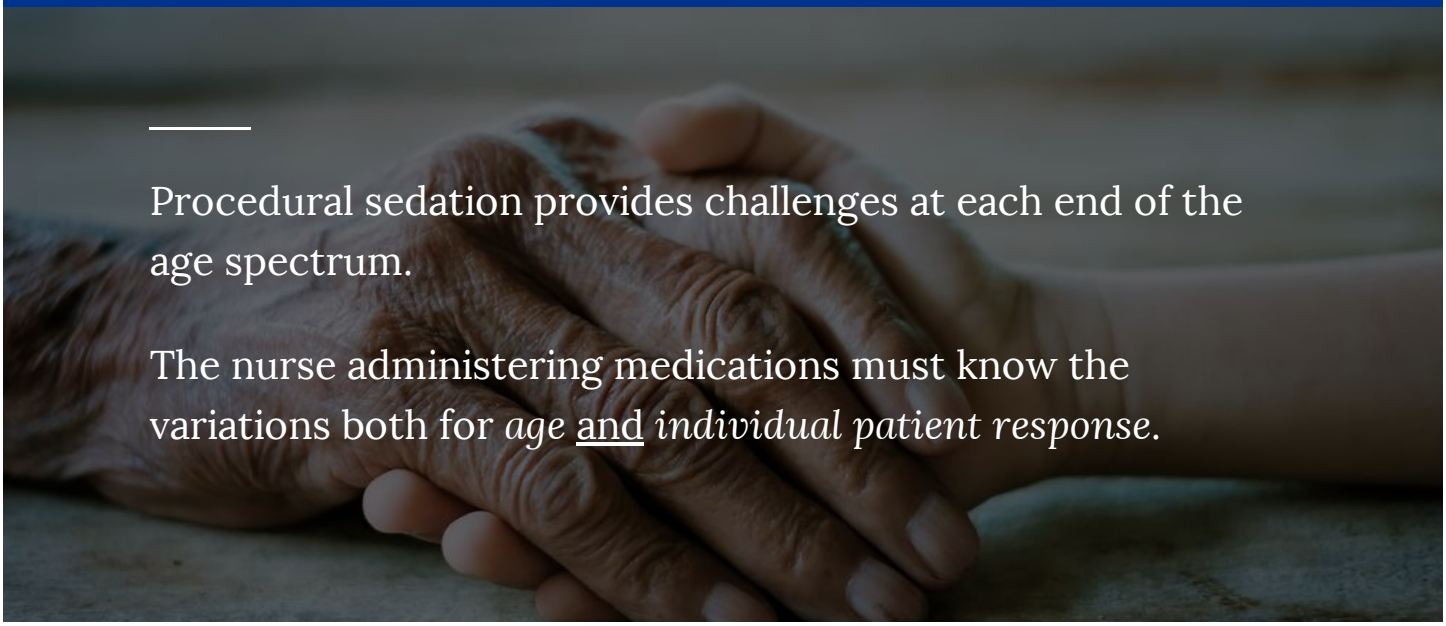
- Use incremental doses
- Allow adequate time between doses to achieve peak pharmacologic effects
- Assess effectiveness of each dose before administering more medication

Consider your patient's response before administering the entirety of an ordered dose. It is acceptable to provide the ordered dose in incremental doses to assess effectiveness before administering the next portion.

Remember: Risk of respiratory depression increases when multiple agents are used.

Expand and review the content above before moving on.

Medication Administration Across the Lifespan



Geriatric Considerations

- [ ] Aging is associated with a progressive decrease in the function of the major organ systems by 1-1.5% after 30 years
- [ ] Drugs circulate longer and take longer to metabolize
- [ ] Elderly persons often have co-morbidity health issues which may result in poly-pharmacy practices
  - Careful pre-procedure assessment is needed to identify possible synergistic drug interactions
- [ ] This population is at high risk for over sedation and respiratory depression
  - Geriatric patients will require close and extended monitoring throughout the procedure and recovery
- [ ] Discuss the sedation plan with LIP
  - Consider reducing the dosages of sedating agents by 30-50% in the geriatric patient

CONTINUE

Medications Used for Procedural Sedation

The two main types of medications used for procedural sedation are **Opioids/Synthetic Opioids** and **Benzodiazepines**.

Barbiturates *can* be used for sedation, but they are used infrequently.

Note: Combining drugs increases the risk of adverse effects in ALL age groups.

CONTINUE

Drugs Commonly Used in Procedural Sedation

Medication	Pharmacology	Effect	Adverse Effect
Morphine sulfate *Opioid*	• Dose: 2-4 mg IV • Onset: 5-10 minutes • Duration: 2-5 hours	Analgesia	Respiratory depression, apnea, laryngospasm, chest wall rigidity with RAPID administration, hypotension, bradycardia, shock, urinary retention, pupil constriction, agitation, tremor, and/or dysphoria
Hydromophone HCl (Dilaudid) *Synthetic opioid*	• Dose: 0.2-2 mg IV (decrease dose by 30-50% in geriatric patients) • Onset: 5-10 minutes • Duration: 2-3 hours	Analgesia *Shorter duration of effect than morphine*	Respiratory depression, hypotension, bradycardia, syncope, circulatory depression, drowsiness, dysphoria, and/or vertigo **WARNING:** Rapid administration of Fentanyl can cause chest wall rigidity, which may be fatal

Medication	Pharmacology	Effect	Adverse Effect
Fentanyl *Synthetic opioid*	<u>Note:</u> 100 times more potent than morphine. ***ADMINISTER SLOWLY!*** • Dose: 25-100 mcg IV • Onset: 3-5 minutes • Duration: 30-60 minutes		
Diazepam (Valium)* *Benzodiazepine*	• Dose: 1-5 mg IV • Onset: IV 2-5 minutes PO 45-60 minutes • Duration: IV 6 hours, PO up to 24 hours	Amnesia, anxiolysis, muscle relaxation, anticonvulsant	Respiratory depression, apnea with rapid administration, hypotension, bradycardia, confusion, restlessness, agitation, and/or combativeness **Diazepam is irritating to vein, may be painful on administration*
Midazolam (Versed) *Benzodiazepine*	• Dose: 0.5-1 mg IV • Onset: 1-5 minutes • Duration: 45-60 minutes Before administering a second dose, evaluate the effect of the medication: • 2 minutes for IV route • 5-10 minutes for nasal route • 10-20 minutes for oral route		
Phenobarbital *Barbiturates*	• Dose: 100-320 mg IV (larger doses may be needed for patients with epilepsy) • Onset: IV 5 minutes • Duration: 10-12 hours	CNS depression, anticonvulsant	Respiratory depression, apnea (Increases with rapid administration - Do not administer greater than 50 mg/min), hypotension, circulatory collapse, and/or paradoxical excitement

Reversal Agents

Remember: Not every medication has a reversal agent!

CONTINUE

Test Yourself

Before you click or tap to flip each card below to reveal the corresponding reversal agent, test yourself to see if you can recall what they are. Review all cards before moving on.

Opioids	Reverse with nalaxone (Narcan)

1 of 5

Benzodiazepines	Reverse with flumazenil (Romazicon)

2 of 5

Barbiturates

NO specific reversal agent

- Treat symptoms and provide supportive therapy

3 of 5

Naloxone (Narcan)

Respiratory depression:
Titrate agent using 1-10 micrograms/kg every 1-2 minutes as necessary until effective respiratory effort resumed

- Will maintain some analgesia for underlying pain

Acute pulmonary edema:
Provide full, immediate reversal using 0.1 mg/kg to max dose of 2 mg

- Will experience pain and hypertension associated with full reversal dose

4 of 5

Flumazenil (Romazicon)

- Dose = 0.2 mg
- May repeat, as needed

Safety Note: *The use of Flumazenil may lower the seizure threshold in patients taking long term benzodiazepines*

Complete the content above before moving on.

Treating Oversedation

If your patient progresses beyond the goal of therapy, supportive therapy should be provided.

- Consider reversal agent (per LIP order)
- Continue continuous monitoring for at least 30 minutes AND an Aldrete > 8 following procedure
  - May require 2 or more hours of additional monitoring
- Provide respiratory support, for example:
  - Increase oxygen
  - Jaw thrust/chin lift
  - Oral airway
  - Ambu bag
  - Prepare for intubation, etc.

CONTINUE

Pharmacology Review

True or False:

The correct drug administration procedure is to titrate each drug individually and to assess the effectiveness of the drug before giving additional doses.

- ◯ True
- ◯ False

SUBMIT

Multiple Choice Scenario:

An endoscopy procedure has been ongoing for 30 minutes. The patient has received a total of Versed 7 mg IV and Fentanyl 100 mcg IV to achieve the planned level of moderate sedation. His vital signs have been stable. Respirations have slowed to 10 are even and unlabored. Oxygen saturation (SpO_2) is 90% on room air and his $ETCO_2$ is 46. The patient's response to a tap on the forehead is sluggish and he is unable to respond to commands.

The most appropriate nursing action at this time would be:

- ◯ Continue continuous monitoring. Increase documentation to Q 5 minutes until patient returns to planned moderate level of sedation, then resume documentation Q 10 minutes
- ◯ Administer a reversal agent immediately as the patient has crossed into deep sedation
- ◯ Ensure the patient's airway remains patent and ventilations adequate

- Be prepared to administer reversal agents should the patient's respiratory status decline further or the patient does not return to the moderate level of sedation quickly
- All but administer a reversal agent

SUBMIT

Multiple Choice Scenario:

Ms. Carson, an 82-year-old female in good health, is having an electrical cardioversion for sudden onset of rapid atrial fibrillation. The LIP plans to use Versed for the procedural sedation drug.

What considerations need to be made before proceeding with the cardioversion?

- Consider co-morbidities in determining the drug dose of Versed
- Give IV fluids rapidly to increase the elimination of the drug from the patient's system
- Reduce the total drug dose by 30-50% due to patient's age
- All of the above

SUBMIT

Multiple Choice Scenario:

Mr. Miller is undergoing an electrical cardioversion at the bedside. He has received Versed and Fentanyl for sedation and analgesia. The patient is now sleeping and does not awaken to normal tone of voice but attempts to open his eyes when tapped on the forehead and weakly squeezes the nurse's hand when asked.

What nursing interventions should be implemented?

- Increase frequency of monitoring
- Apply oxygen per nasal cannula at 2 liters/minute
- Prepare reversal agent and notify the physician
- Continue continuous patient monitoring

SUBMIT

Multiple Choice:

Which of the following statements about Fentanyl are true?

- 100 times more potent than Morphine Sulfate
- Short duration analgesic
- Rapid IV infusion may result in skeletal muscle and chest wall rigidity
- Onset of action for IV dose is 2-3 minutes
- All of the above

SUBMIT

Multiple Choice:

Adequate moderate sedation is achieved when the patient:

- ◯ No longer has a gag reflex
- ◯ Begins to snore
- ◯ Begins to relax and speech is slurred
- ◯ No longer responds to painful stimuli

SUBMIT

True or False:

As long as the patient is sedated you do not need to use analgesia.

- ◯ True
- ◯ False

SUBMIT

Select All That Apply:

Opiates most commonly used as adjuncts to benzodiazepines for procedural sedation are:

- ☐ Oxycodone
- ☐ Fentanyl

- [ ] Morphine sulfate
- [ ] Tramadol

SUBMIT

Multiple Choice:

In geriatric patients, the drug doses used in moderate sedation should be reduced by:

- ◯ 10-20%
- ◯ 15-40%
- ◯ 25-55%
- ◯ 30-50%

SUBMIT

Multiple Choice:

The appropriate dose of flumazenil (Romazicon) for reversing midazolam is:

- ◯ 0.2 mg IV
- ◯ 1 mg IV every 2 minutes

- ◯ 2 mg IV and repeat after 5 minutes of observation if needed
- ◯ 1 mg IV followed by 0.4 mg Narcan IV

SUBMIT

Multiple Choice:

Goals of drug administration in procedural sedation are:

- ◯ Minimum side effects
- ◯ Rapid recovery
- ◯ Patient satisfaction
- ◯ All of the above

SUBMIT

Multiple Choice:

The possible adverse effect of most concern when using midazolam is:

- ◯ Seizures
- ◯ Flaccid paralysis
- ◯ Respiratory depression

- ◯ Cardiac arrhythmias

SUBMIT

Multiple Choice:

Which of the following is true when administering reversal agents?

- ◯ The patient must be continuously monitored long enough to ensure that sedation and cardio-respiratory depression does not recur once the effect of the reversal agent dissipates
- ◯ The patient must be monitored every 15 minutes for 2 hours following administration of a reversal agent
- ◯ There is a reversal agent for every medication that may be used during procedural sedation
- ◯ One dose of a reversal agent will return patient to the desired level of procedural sedation

SUBMIT

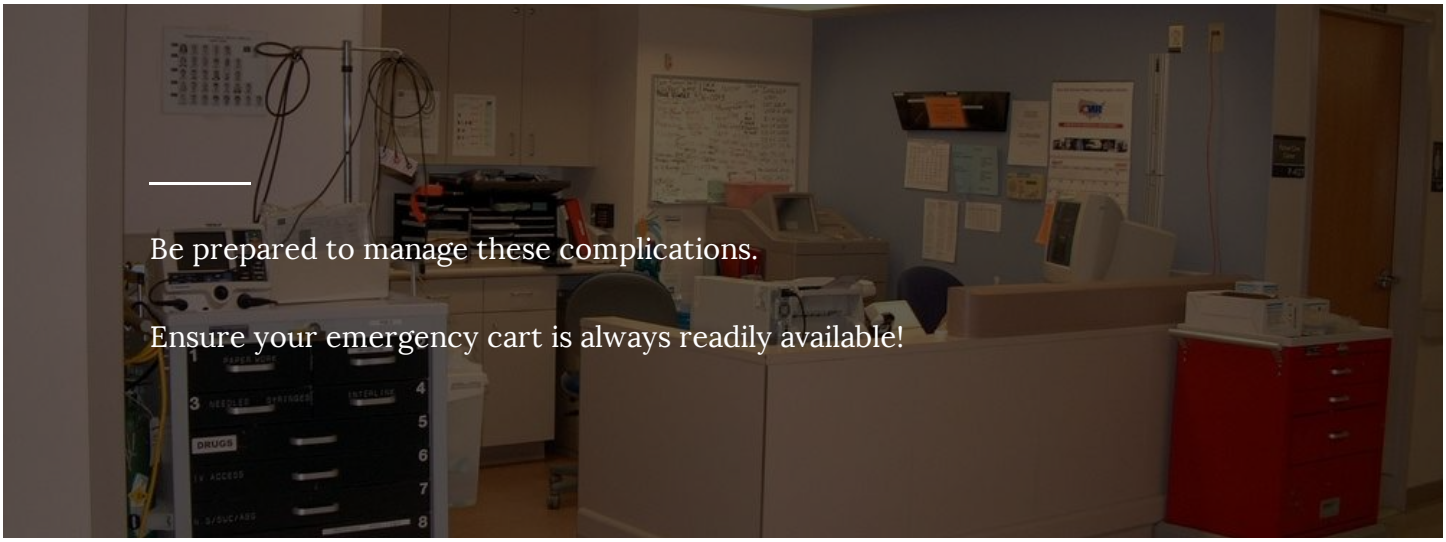
Complete the content above before moving on.

Content - Sedation Complications & Rescue for Adult Patients

Manage Complications of Sedation

Signs and symptoms of over sedation:

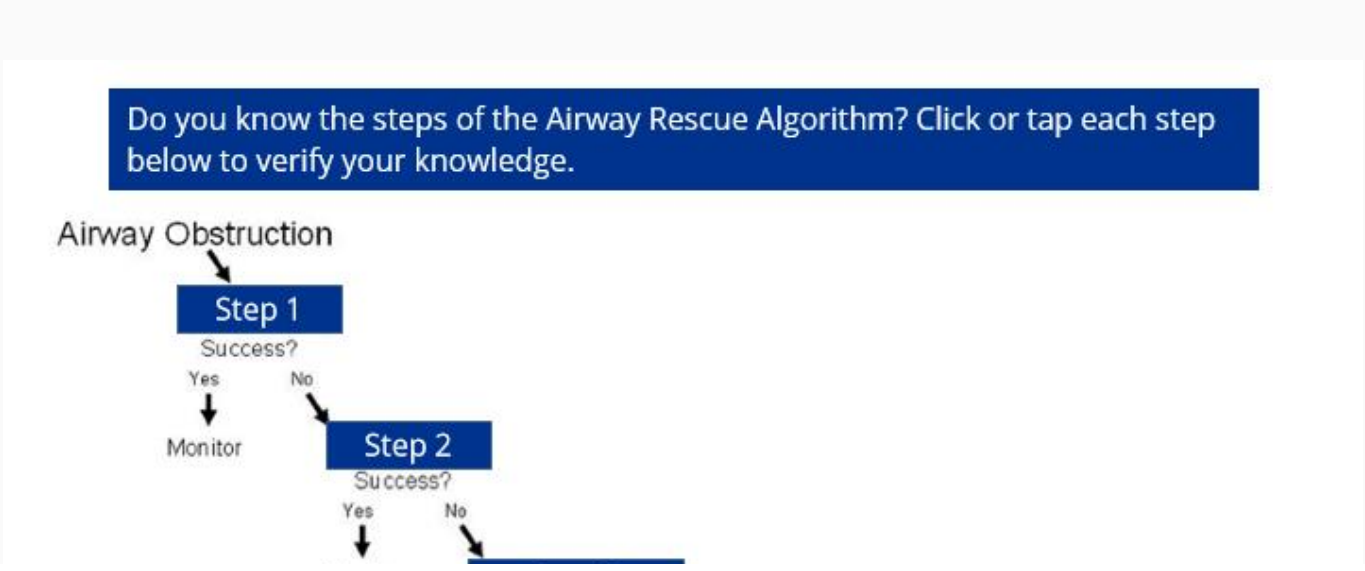
- [ ] Respiratory depression
- [ ] Airway compromise (most common sedation complication)
- [ ] Unresponsiveness
- [ ] Cardiovascular instability

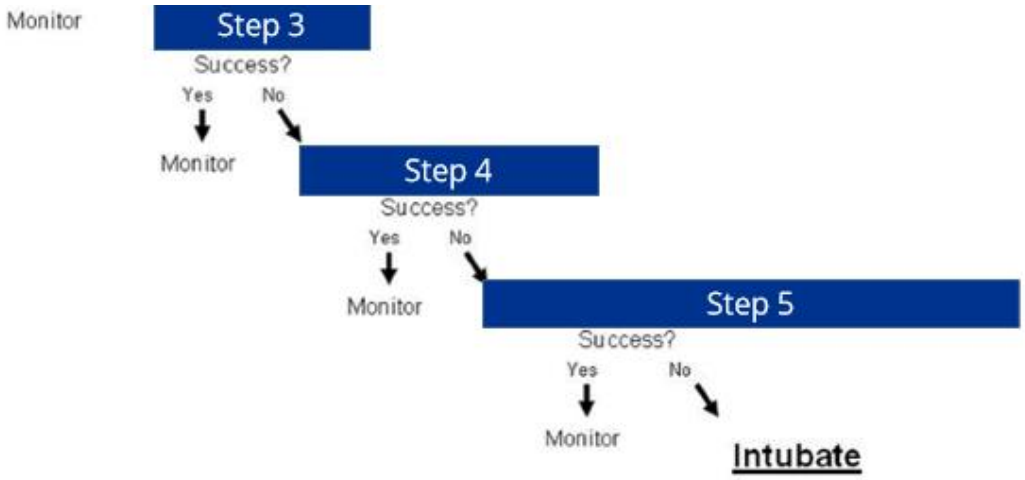


Airway Management

- Airway obstruction is the most common complication in sedation
- Follow ACLS/PALS airway management guidelines
- Airway resuscitation equipment must be at the bedside or immediately available (Airways, Ambu Bag, Suction)
- Oxygen mask or nasal cannula must be immediately available

Airway Rescue Algorithm





Complete the content above before moving on.

Click or tap on the numbers below to review five ways to manage sedation complications. Review all to move on.

Do NOT give more sedation medication

Initiate emergency airway management

Communicate patient status to provider

Consult with LIP about further management of patient status including use of reversal agents

If reversal agents are used, ensure assessments are adequate to identify over-sedation recurrence once the effect of the antagonist dissipates (may require up to 2 hours of increased observation)

Review all five ways to manage sedation complications above before moving on.

Identifying Patients Transitioning to Deep Sedation

If the patient transitions to unplanned deep sedation, it is imperative that you initiate rescue procedures!

- The patient has transitioned to deep sedation if they cannot be easily aroused (even if they respond purposefully following repeated or painful stimuli)
  - These patients may have trouble breathing and often require assistance in maintaining a patent airway
- A score of 5 or 6 on Ramsay sedation score is indicative of transition to deep sedation

Actions for When Sedation Progresses Deeper Than Planned

Let's take a look at the steps to take when a patient progresses deeper into sedation than anticipated. Appropriate measures need to be taken to return patient to planned sedation level.

1

Notify team involved with the procedure of patient's status:

"The patient's sedation is increasing and has transitioned to a deeper sedation level than planned. We need to address sedation level before proceeding."

2

Assess patient's airway.

If respirations are impaired, prepare rescue procedures:

1. Manually open airway (jaw thrust)
2. Consider insertion of oral or nasal airway
3. Assist with ventilations (bag/valve mask)
4. Prepare for intubation: Consider calling for anesthesia or code blue as appropriate to situation
5. Suction airway PRN

4

Be aware that the progression towards deep sedation varies from person to person.

5

Be alert to accumulation of secretions in the airway - aspiration is the most common cause of death in procedural sedation.

6

If deep sedation has occurred, institute measures to return to the planned level of sedation.

7

Monitor patient for signs of decreased respiratory status and airway compromise. Follow airway rescue algorithm as needed.

8

Administer reversal agents per LIP orders.

Document patient status every 5 minutes, including:

- BP
- Pulse
- Respirations
- $ETCO_2$
- Pulse oximetry
- Sedation level
- ECG pattern

Remember!

Only caregivers specifically certified in endotracheal intubation may perform airway intubation.

Complete the content above before moving on.

Complications: Allergic Reactions

Allergic Reactions

Although they are rare, allergic reactions to medications do occur. Be sure to note allergies and symptoms at the pre-procedure assessment.

The following are the most common signs of an allergic reaction:

- Generalized flush with tingling
- Pruritus
- Tachycardia
- Urticaria
- Angioedema
- Inspiratory stridor
- Wheezing
- Sudden hypotension
- Cardiac arrhythmias
- Loss of consciousness
- Seizures

Responding to an Allergic Reaction

1. Stop procedure
2. Administer appropriate drugs to counteract the allergic response as ordered:
    a. Epinephrine
    b. Benadryl
    c. Hydrocortisone, etc.
3. Monitor blood pressure
4. Support cardiovascular system with emergency medications/fluids
5. Keep airway patent
6. Anticipate possible endotracheal intubation
7. Consider calling RRT (or Code Blue)

CONTINUE

Sedation Complications & Rescue for Adult Patients Review

Multiple Choice Scenario:

Your patient has progressed to unplanned deep sedation during the procedure. He does not have spontaneous respirations, the SpO_2 has dropped to 65% on 6 L of O_2 and the $ETCO_2$ waveform is flat. The LIP decides to stop the procedure to intubate the patient.

What should you do?

- ◯ Intubate the patient
- ◯ Call for assistance and support the airway until the LIP intubates the patient
- ◯ Call an RRT
- ◯ Transfer the patient to the critical care unit immediately, then intubate

SUBMIT

Multiple Choice Scenario:

Mr. Smythe has received 4 mg of morphine sulfate IV. You notice during your procedural assessment that hives are forming. He is now having difficulty breathing with high pitched crowing on inspiration with stridor. His blood pressure has dropped from 140/78 to 80/40. You alert the LIP of the suspected allergic reaction.

Which of the following interventions would you **NOT** perform?

- ◯ Stop the procedure

- ◯ Administer medications to reverse the allergic reaction per LIP order
- ◯ Intubate the patient immediately
- ◯ Call code team
- ◯ Support the airway

SUBMIT

Select All That Apply:

Your patient's baseline vital signs are HR 78, RR 16, B/P 132/78, O_2 saturation 96%, and $ETCO_2$ 35 mmHg on room air. 15 minutes into the procedure, you obtain the following vital signs: HR 65, RR 10, B/P 120/70, O_2 saturation 94%, $ETCO_2$ 47 mmHg.

Which parameter(s) is/are of concern and bears closer observation?

- ☐ RR of 10
- ☐ $ETCO_2$ of 47
- ☐ HR of 65
- ☐ B/P of 120/70
- ☐ O_2 saturation of 94%

SUBMIT

Multiple Choice:

What would be the first line intervention if airway obstruction is suspected?

- ◯ Administer the appropriate reversal agent
- ◯ Continue pulse oximetry monitoring
- ◯ Reposition the airway using techniques for opening the airway
- ◯ Intubate the patient immediately

SUBMIT

True or False:

The most common cause of death in procedural sedation is respiratory depression.

- ◯ True
- ◯ False

SUBMIT

Multiple Choice Scenario:

Your patient has received large doses of midazolam (Versed) and fentanyl for painful debridement of a wound. 20 minutes into the procedure the patient begins to have sonorous respirations. You perform a chin lift and reassess the patient's status. The patient does not respond to verbal, tactile or painful stimuli.

Which level of sedation describes the patient's current status?

- ◯ Minimal sedation
- ◯ Moderate sedation
- ◯ Deep sedation
- ◯ General anesthesia

SUBMIT

Multiple Choice Scenario:

Your patient is undergoing procedural sedation for suturing of a large laceration. 20 minutes into the procedure his Ramsey Sedation Scale has changed from 3 to 1. He is moaning and withdrawing from painful stimuli with each placement of the skin staple.

What is your assessment?

- ◯ The patient is hypoxic
- ◯ Patient needs a different pain medication
- ◯ The patient has inadequate analgesia for the procedure
- ◯ The patient is allergic to the medication used for the procedure

SUBMIT

Multiple Choice Scenario:

Your patient has received a total of 10 mg of IV morphine sulfate for procedural sedation. He is restless and agitated. His respirations are 10 and shallow.

What may be the cause?

- ◯ The patient is responding to the painful procedure and needs more medication
- ◯ The patient is showing early signs of an allergic response to the morphine sulfate
- ◯ The patient may be showing signs of hypoxemia and further assessment is needed
- ◯ The patient is having an opposite effect with the use of morphine sulfate and a different drug should be administered

SUBMIT

Select All That Apply:

Which of the following would suggest that your patient has drifted into deep sedation?

- ☐ Vital signs are stable, but oxygen saturation has decreased slightly
- ☐ Respirations have decreased to 10/minute, oxygen saturation remains at 99%, and $ETCO_2$ is 3 mmHg above baseline
- ☐ Patient attempts to open eyes only after pain stimulus (e.g., sternal rub)
- ☐ A chin lift is required to maintain a patent airway and $ETCO_2$ has risen 10 mm Hg above baseline

SUBMIT

Complete the content above before moving on.

Conclusion

Congratulations!
You have completed this course.

Thank you for completing the Procedural Sedation - Adult Patients course!

If you have any unit-specific questions, please contact your nursing unit manager or preceptor.

Exit
Click to exit the course.

EXIT