

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.

Course and Concepts

LEVELS OF SEDATION & CAPNOGRAPHY

Content - Levels of Sedation Defined

Levels of Sedation Defined Review

Content - Capnography: End Tidal CO_2 Monitoring During Sedation

Capnography: End Tidal CO_2 Monitoring During Sedation Review

PRE/INTRA/POST SEDATION CONSIDERATIONS

Pre-Procedure Sedation Considerations

Content - Intra-Procedure Sedation Considerations

Intra-Procedure Sedation Considerations Review

Content - Post-Procedure Sedation Considerations

Post-Procedure Sedation Considerations Review

PHARMACOLOGY

Content - Pharmacology

Pharmacology Review

SEDATION COMPLICATIONS & RESCUE FOR ADULT PATIENTS

Content - Sedation Complications & Rescue for Adult Patients

Sedation Complications & Rescue for Adult Patients Review

CONCLUSION

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)

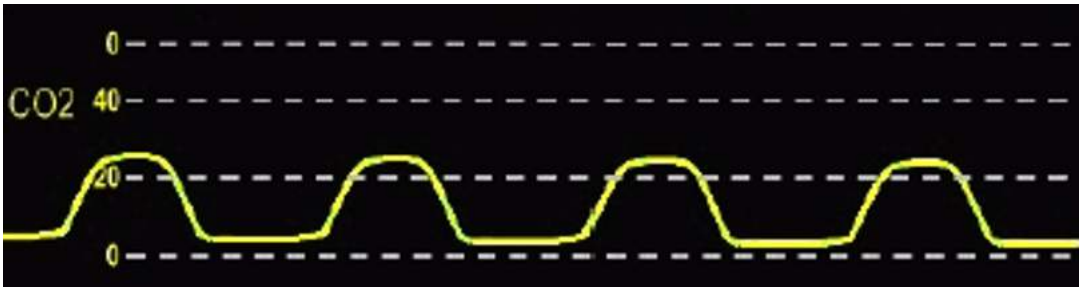
Complete the content above before moving on.

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:

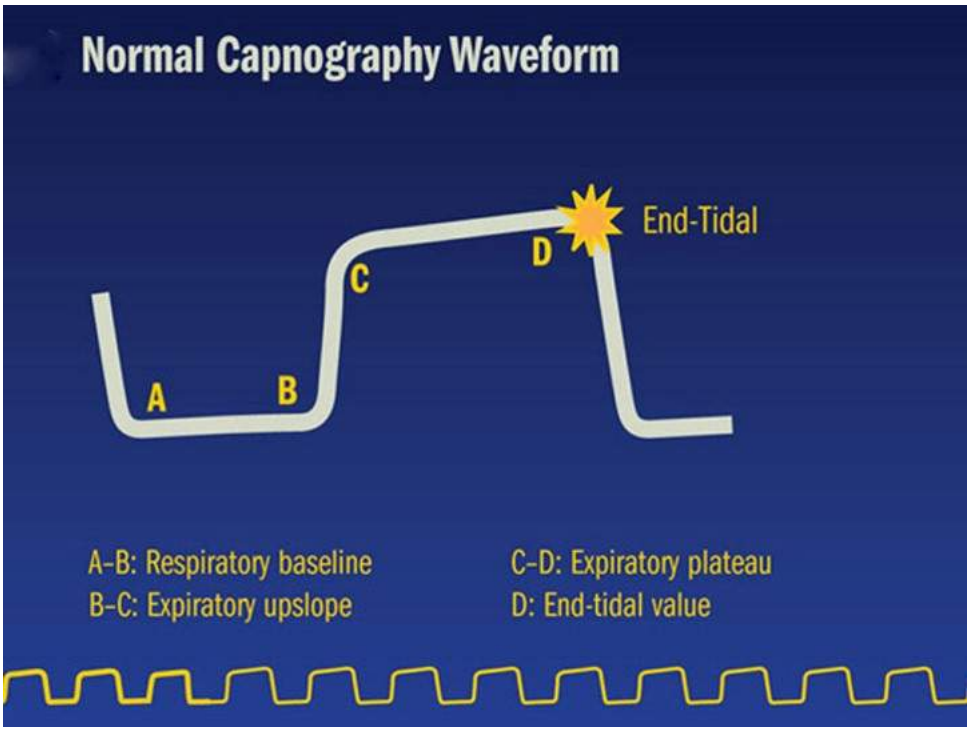
- If the $EtCO_2$ is high (e.g., > 50 mmHg), consider either inadequate ventilation or oversedation
- If the $EtCO_2$ is low (e.g., < 10 mmHg), consider partial or complete airway obstruction or loss of cardiac output

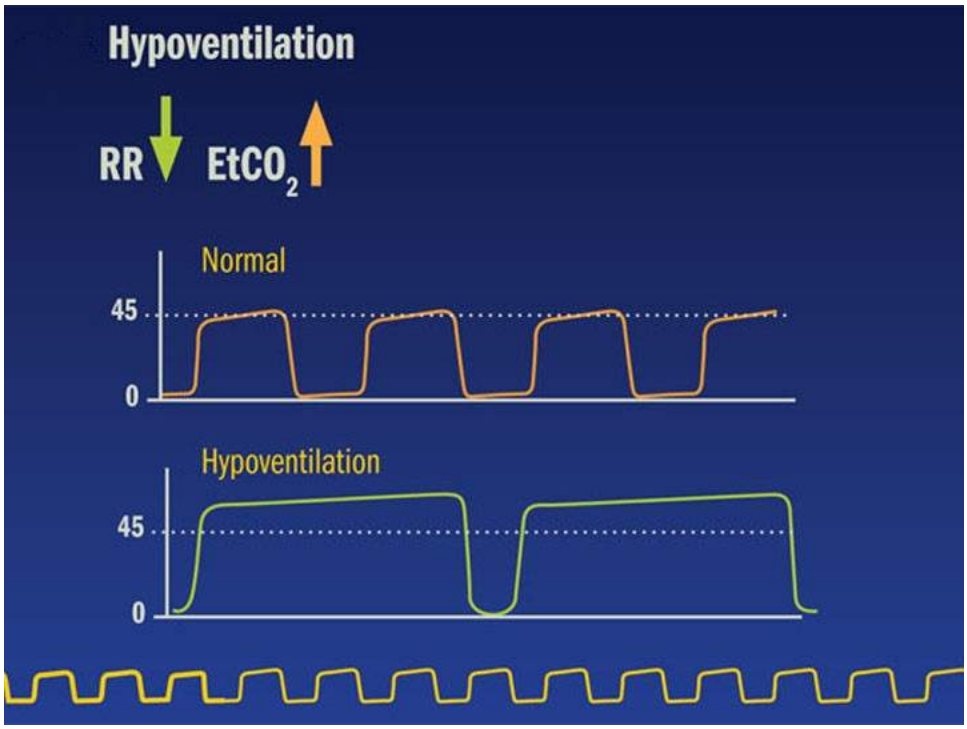
Interventions to consider include:

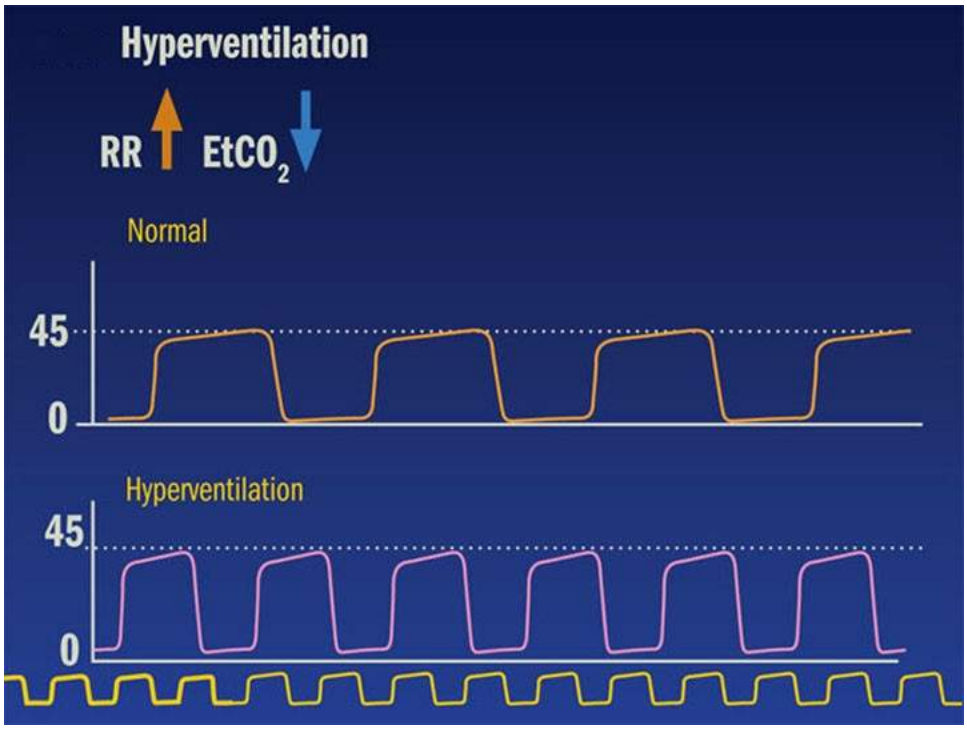
- Assess upper and lower airway patency and treat any obstruction or bronchospasm
- If concerned about decreased cardiac output, assess BP and pulse
- Treat per LIP order

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!**

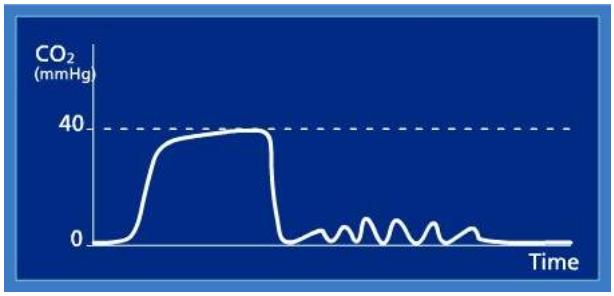
Select each section below to determine the causes of abnormal wave forms.

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

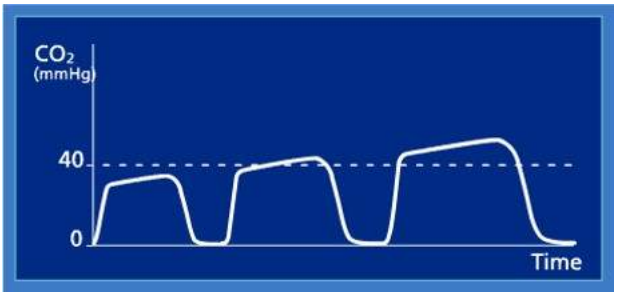


Abnormal Waveform - Increasing $EtCO_2$ Values

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

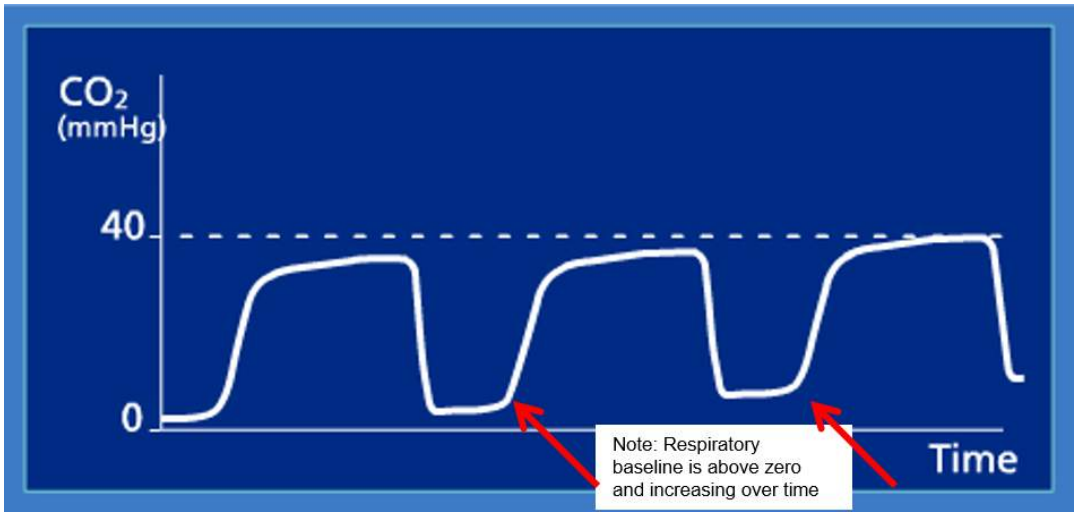


Abnormal Waveform - Rebreathing Exhaled CO_2

Rise in baseline CO_2 indicates rebreathing of CO_2

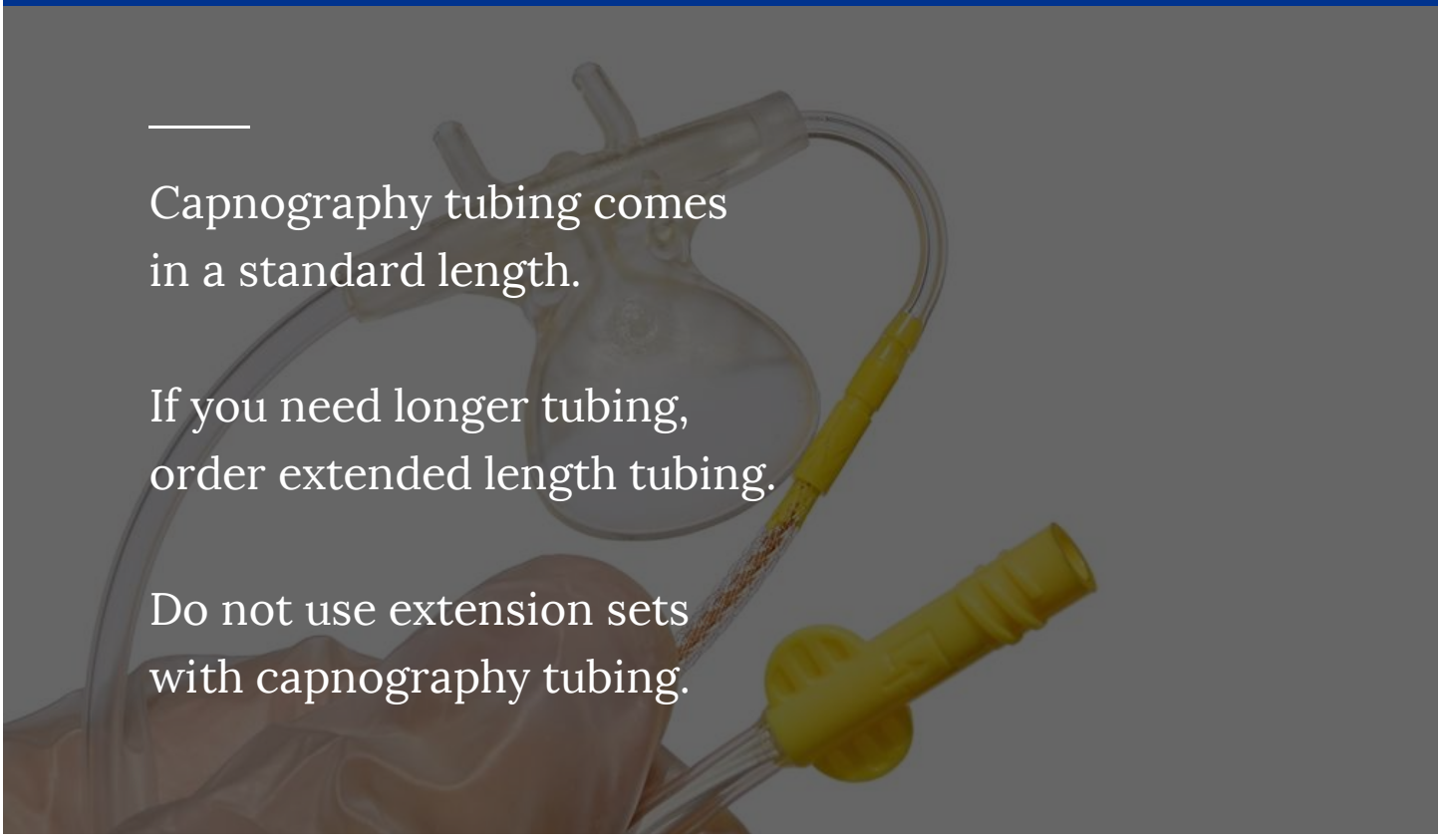
Possible causes:

- 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

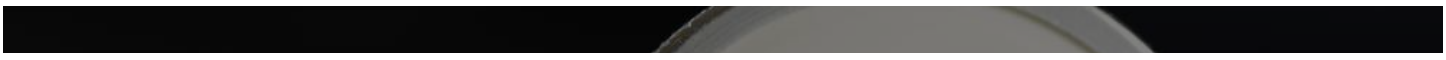
Scoring for STOP BANG:
5-8 "Yes" Responses = High risk of OSA
3-4 "Yes" Responses = Intermediate risk of OSA
0-2 "Yes" Responses = Low risk of OSA

- **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.

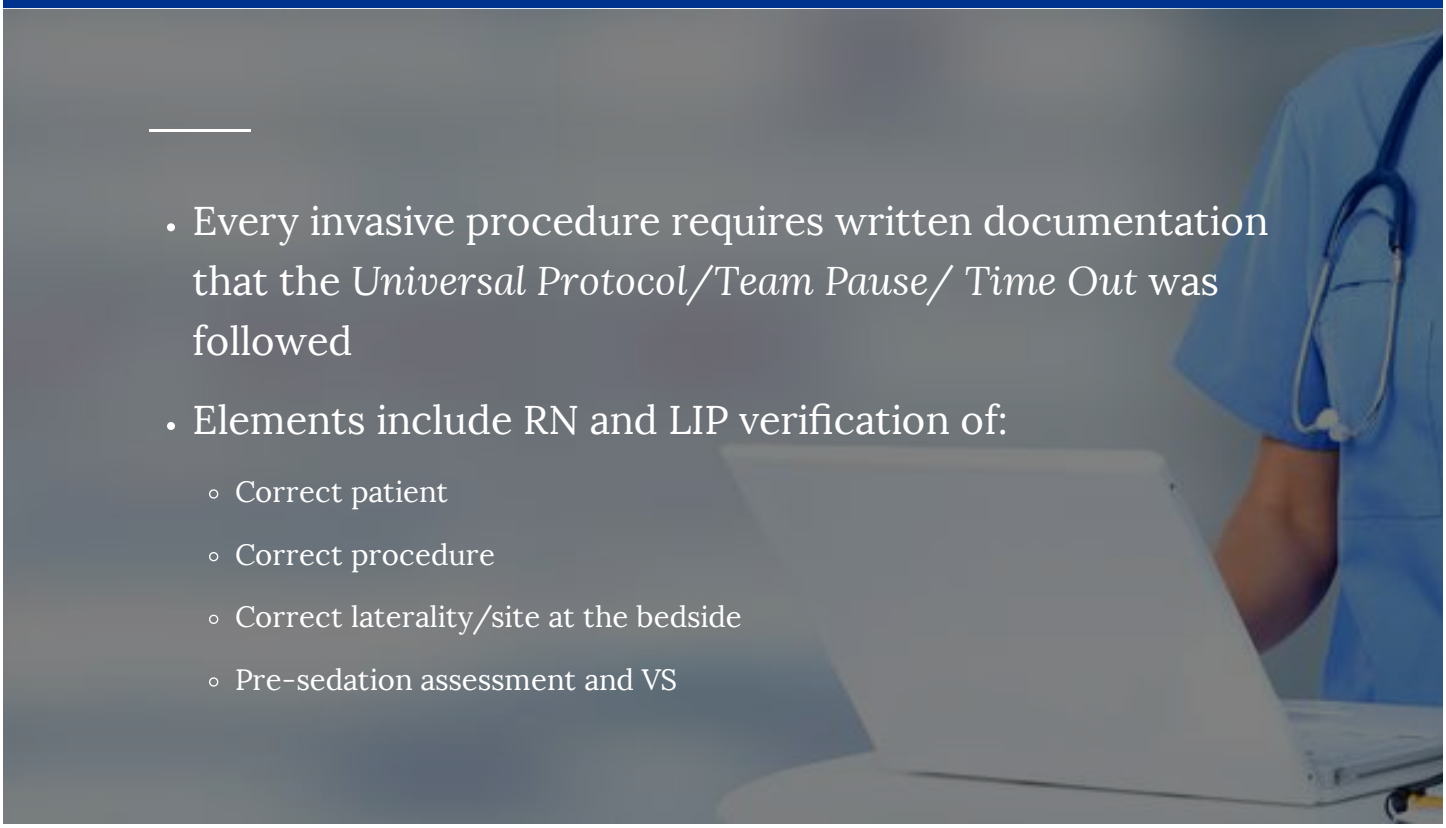
☐ The LIP and RN must consider whether sedation and monitoring would be more appropriately managed by an anesthesiologist.

🔒 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.

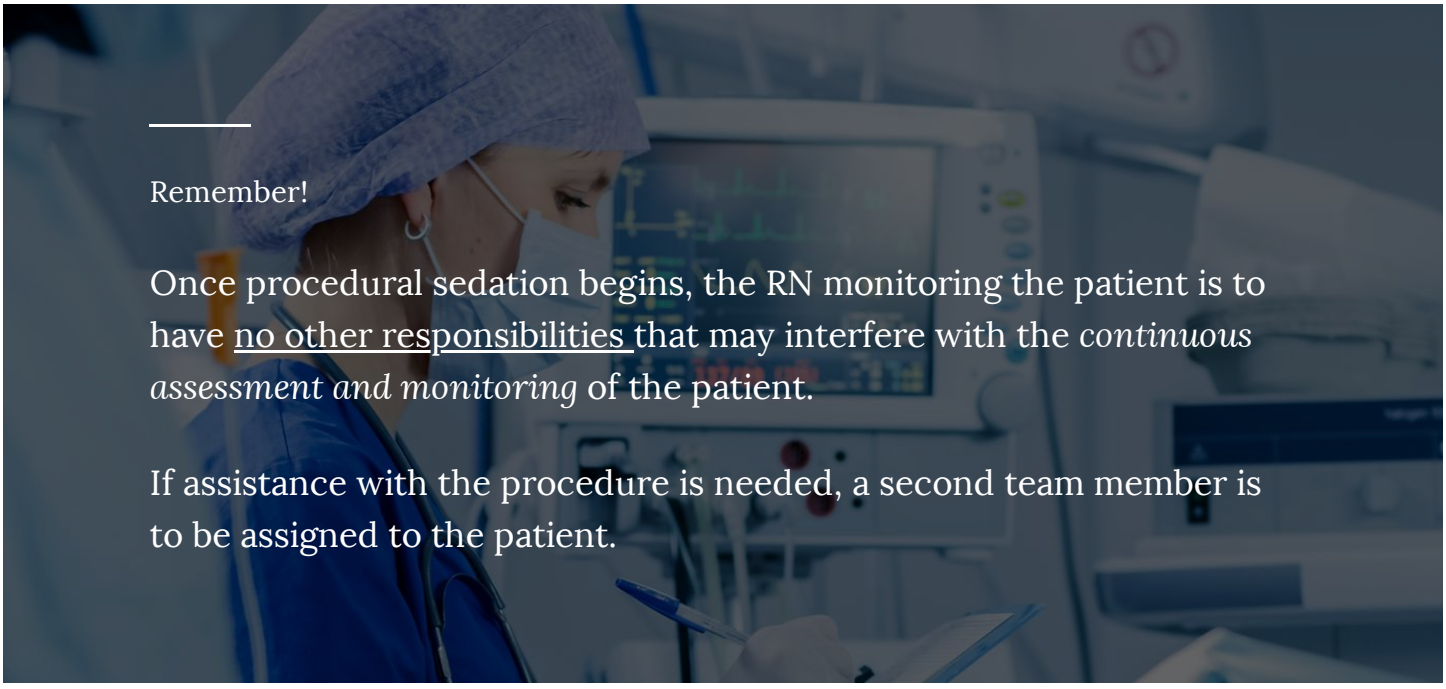
On the other extreme, **-5** represents a patient who is unarousable, with no response to voice or physical stimulation.

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	= 2
	• Arousable on calling	= 1
	• Not responding	= 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

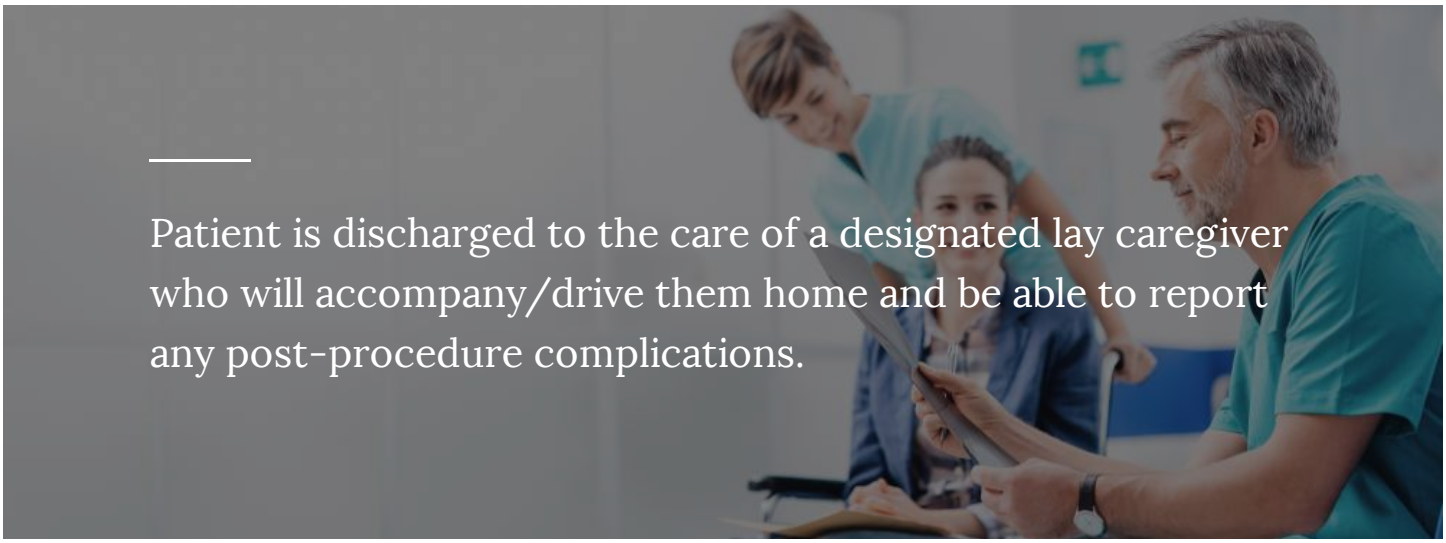
Patient may be discharged from **facility** when:

- 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

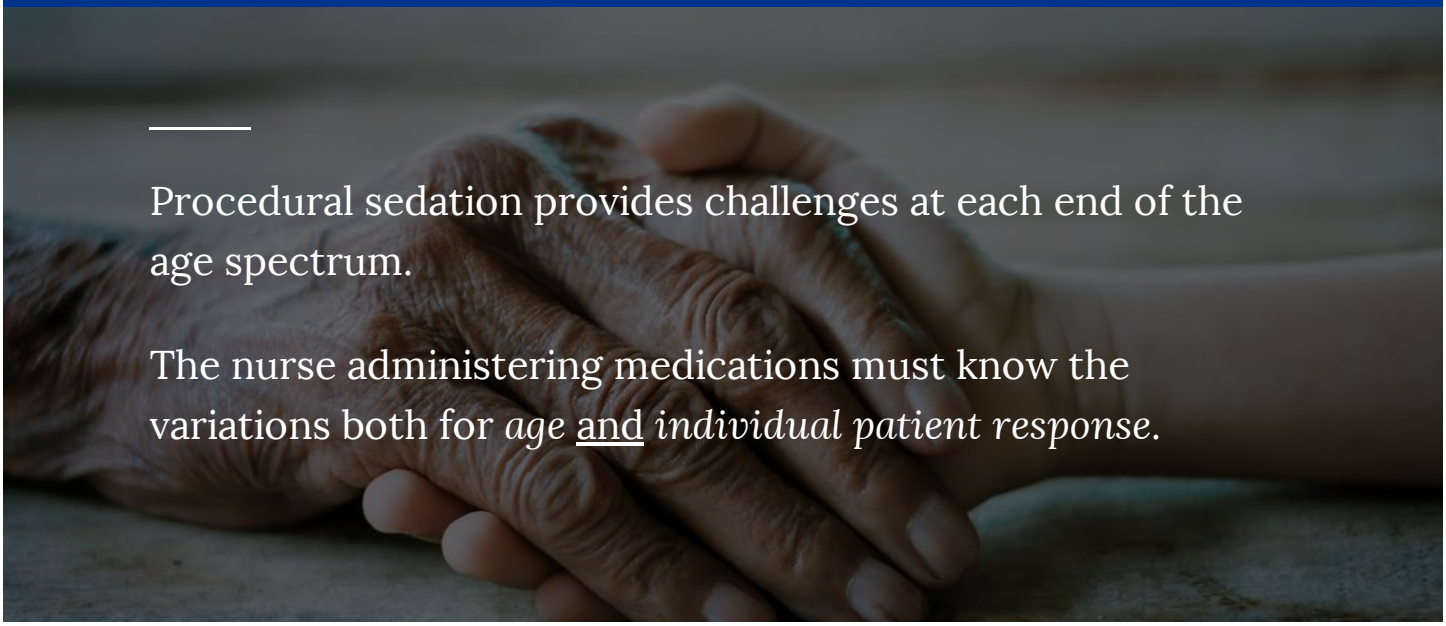
Consider your patient's response before administering the entirety of an ordered dose. It is acceptable to provide the ordered dose in incremental doses to assess effectiveness before administering the next portion.

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

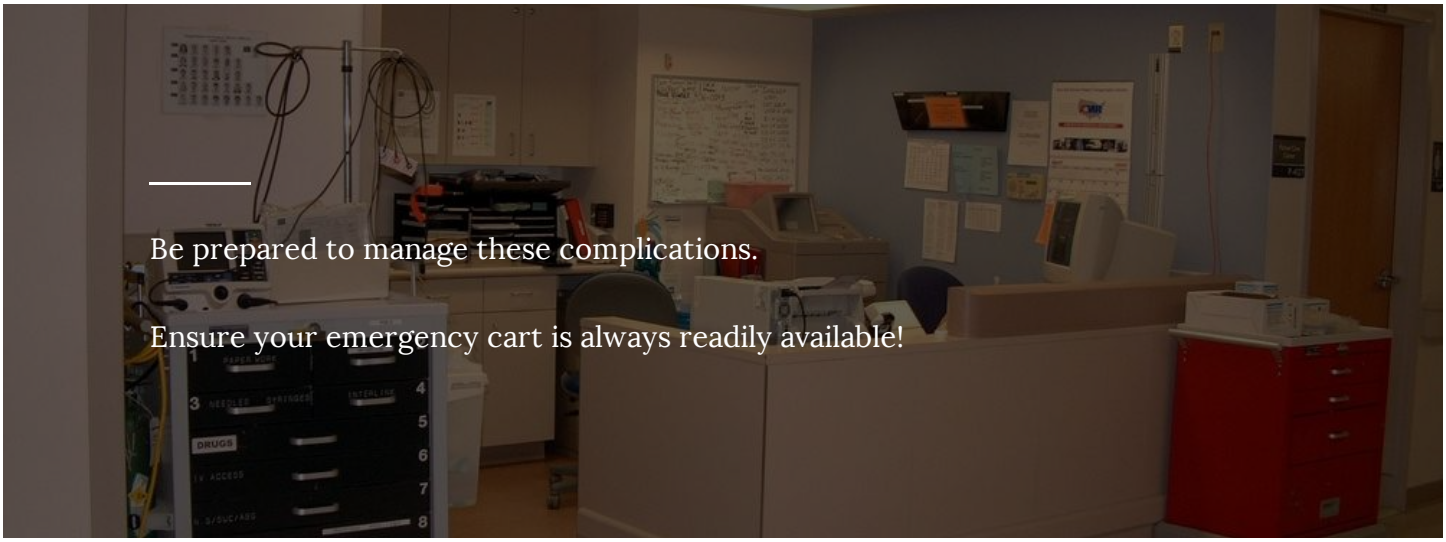
Complete the content above before moving on.

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

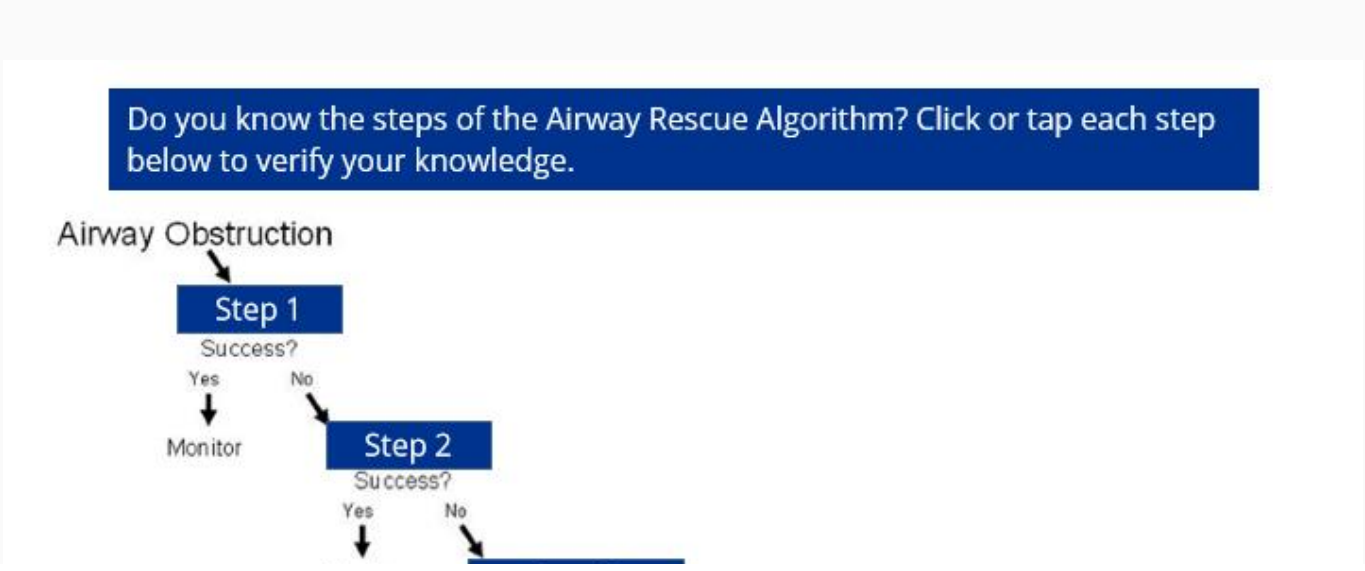


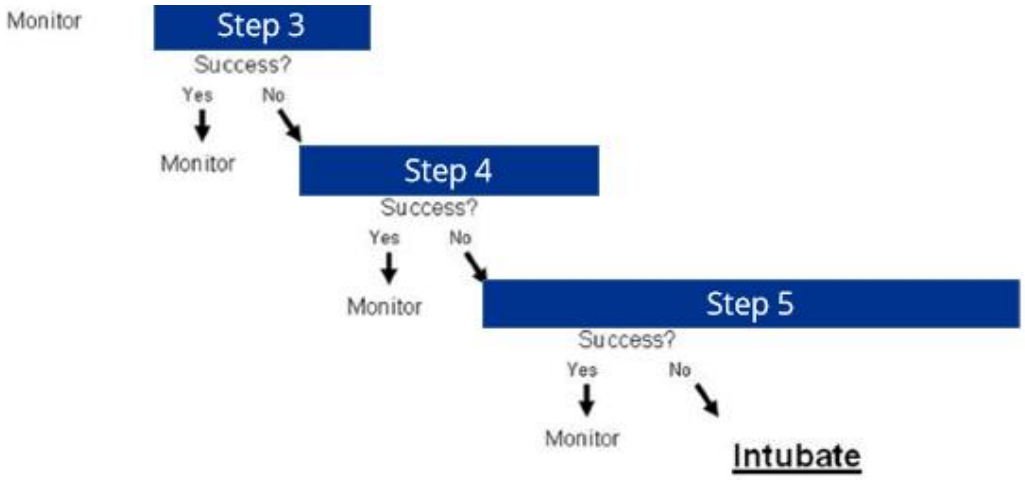
Airway Management



- 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



Procedural Sedation - Pediatric Patients

Providence

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

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

Course and Concepts

LEVELS OF SEDATION & CAPNOGRAPHY

Content - Levels of Sedation Defined

Levels of Sedation Defined Review

Content - Capnography: End Tidal CO_2 Monitoring During Sedation

Capnography: End Tidal CO_2 Monitoring During Sedation Review

PRE/INTRA/POST SEDATION CONSIDERATIONS

Pre/Intra/Post Sedation Considerations Overview

Pre-Procedure Sedation Considerations

Content - Intra-Procedure Sedation Considerations

Intra-Procedure Sedation Considerations Review

Content - Post-Procedure Sedation Considerations

Post-Procedure Sedation Considerations Review

Pre/Intra/Post Procedure Sedation Considerations Review

PHARMACOLOGY

Content - Pharmacology

Pharmacology Review

SEDATION COMPLICATIONS & RESCUE FOR PEDIATRIC PATIENTS

Content - Sedation Complications & Rescue for Pediatric Patients

Sedation Complications & Rescue for Pediatric Patients Review

CONCLUSION

References

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.
- 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 provider (Mallampati).
- Describe the pre-intra-post nursing management of the patient undergoing procedural sedation.
- Identify the equipment required for procedural sedation procedures.
- Interpret the Ramsay scale, the Aldrete scale, the State Behavioral Scale (SBS), and the Richmond Agitation-Sedation Scale (RASS).
- Name the drugs most commonly used in sedation.
- Identify the recommended doses and side effects of the drugs used in sedation.
- Relate the clinical considerations with the drugs used in sedation.
- 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 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 has 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:

- The primary objective/outcome is the reduction of 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
- Requires a Licensed Independent Practitioner (LIP) certified in deep sedation and a certified registered nurse (RN) to be present at the patient's bedside throughout administration of sedation

Desired Outcomes:

- The primary objective/outcome is a drug-induced decrease of consciousness which allows for comfort in an otherwise painful medical procedure
- The patient in deep sedation 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, and cardiovascular functions may be impaired and often require assistance
- Requires an Anesthesiologist/Anesthesia LIP

Expand and review the content above before moving on.

Four Levels of Sedation - Defined

System	Minimal Sedation	Moderate/Dissociative Sedation	Deep Sedation	General Anesthesia

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	No intervention required	Intervention may be required	Intervention often required
Spontaneous ventilation	Unaffected	Adequate	May be inadequate	Frequently inadequate
Cardiovascular function	Unaffected	Usually maintained	Usually maintained	May be impaired

CONTINUE

Levels of Sedation Defined Review

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:

During the procedure the patient is not easily aroused and no longer able to follow commands. Their respirations are depressed.

What is your assessment of the patient's status?

- ◯ The patient is at the moderate sedation level and is ready for the procedure to start
- ◯ The patient has moved to a deep sedation level

- ◯ The patient's sedation is at the anesthesia level

SUBMIT

Multiple Choice:

The primary purpose of using moderate sedation is to:

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

SUBMIT

Multiple Choice:

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

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

SUBMIT

Select all that apply:

RN responsibilities during a procedure requiring moderate sedation include:

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

SUBMIT

Multiple Choice:

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:

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

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 patient airway
- ◯ Amnesia related to the procedure

SUBMIT

Multiple Choice:

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, and 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

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
- [ ] Monitoring of ventilation
- [ ] Avoidance of poor outcomes (e.g., oversedation during sedation)
- [ ] Avoiding unnecessary tests (e.g., ABGs)

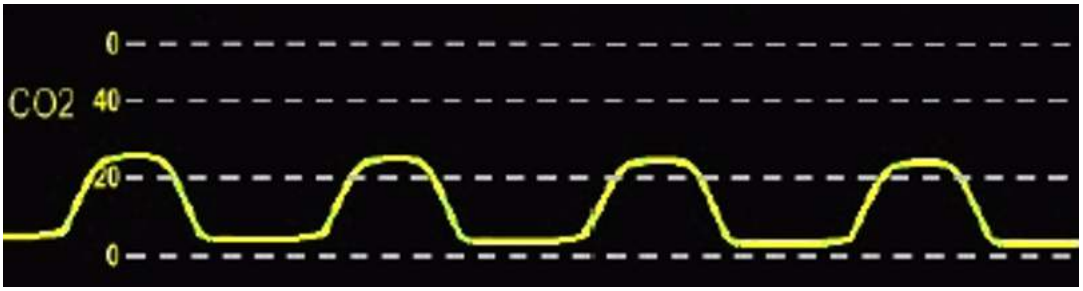
Complete the content above before moving on.

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.

Let's get started!

Case Study - Peter



Peter, who is 11 years old, just had an EGD.

Case Study - Peter

	11:15	11:30	11:45
RR	15	16	16
SpO_2	98%	96%	98%
Oxygen	Room air	Room air	2L NC

The post procedure oxygenation status for Peter is shown above. Is there anything about this that concerns you?

When you're ready with your answer, go to the next slide.

Case Study - Peter



If you didn't have any concerns, you are correct! His values look fine.

Now, consider what $EtCO_2$ measurement can provide. Do you know what might be missing?

Go to the next slide when you think you know.

Case Study - Peter

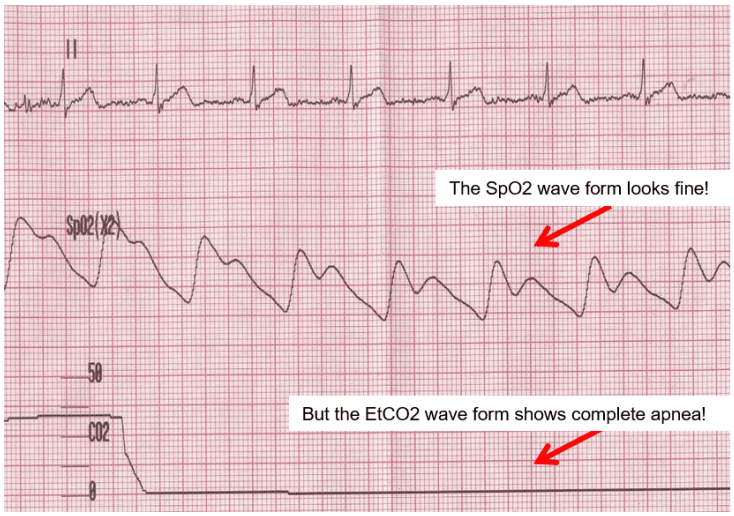
	11:15	11:30	11:45
RR	15	16	16
SpO_2	98%	96%	98%
Oxygen	Room Air	Room Air	2L NC
PaO_2	95	80	**90**
$PaCO_2$	39	54	**60**
pH	7.38	7.25	**7.23**

Note, the $PaCO_2$ is rising, which is causing a worsening pH.

- Pulse oximetry does not reveal dangerous changes in the pH!

So, even with good oxygenation you can have CO_2 retention, worsening patient condition, and poor outcomes.

Case Study - Peter



Oximetry versus Capnography

This wave form set demonstrates that $EtCO_2$ provides immediate indication of respiratory issues in an apneic episode.

Actions for abnormal EtCO2

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

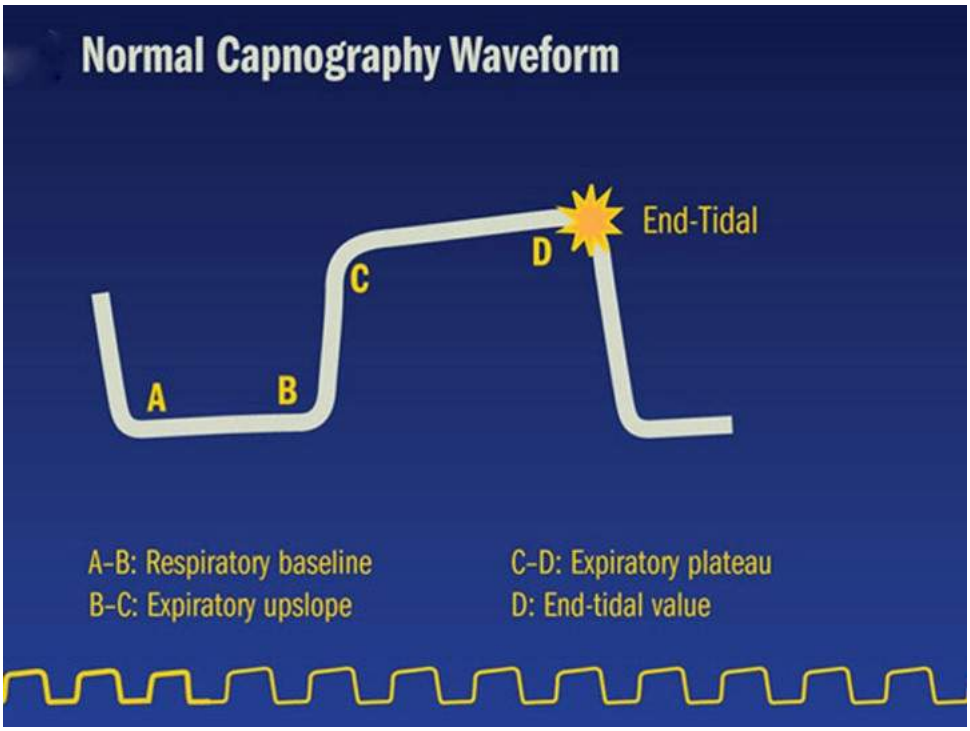
- If the $EtCO_2$ is high: Consider either inadequate ventilation (e.g., > 50 mmHg) or over sedation
- If the $EtCO_2$ is low, e.g., < 10 mmHg: Consider partial or complete airway obstruction or loss of cardiac output

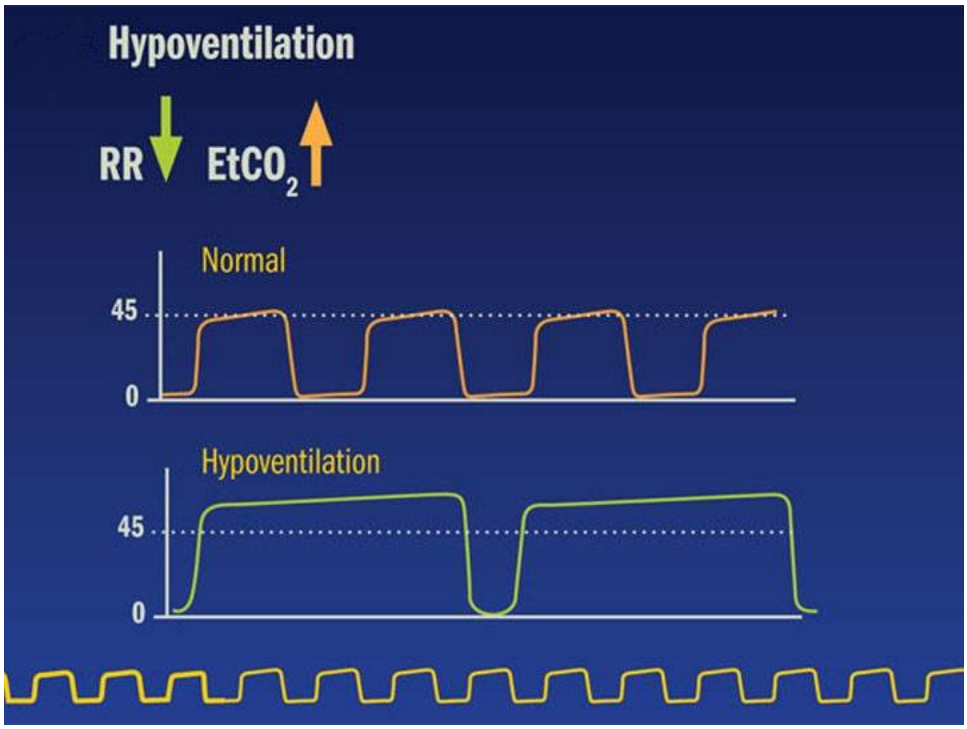
Interventions to consider include:

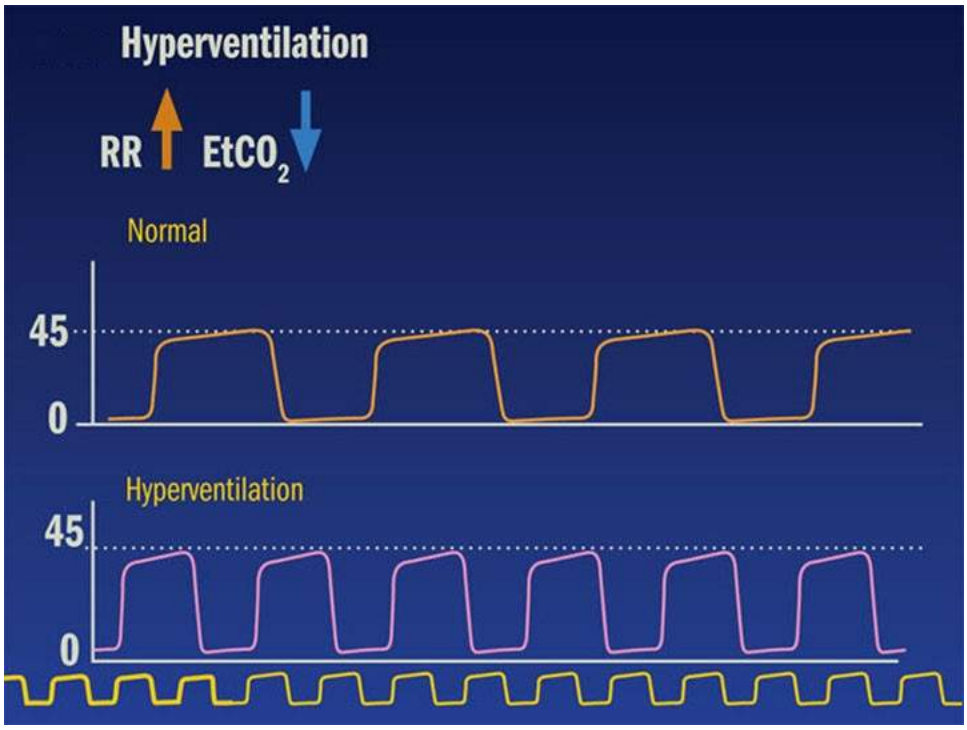
- Assess upper and lower airway patency and treat any obstruction or bronchospasm
- If concerned about decreased cardiac output, assess BP and pulse
- Treat per provider order

Review the case study above before moving on.

Capnography Wave Forms and Values







Waveform graphics courtesy of Covidien

CONTINUE

Determining Causes of Abnormal Wave Forms & Values



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!**

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

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

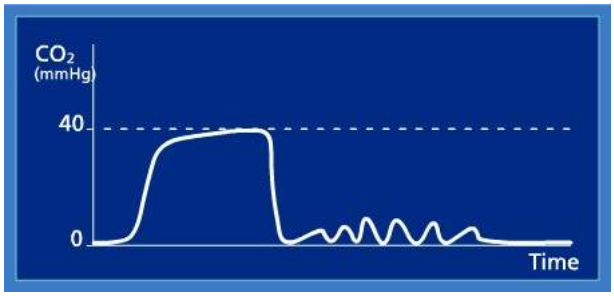
Abnormal Waveform - Loss of Waveform

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

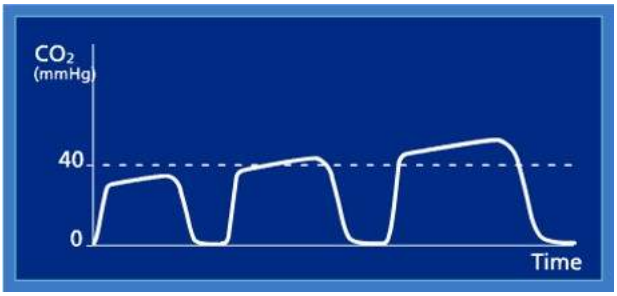


Abnormal Waveform – Increasing EtCO₂ Values

Gradual increase 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

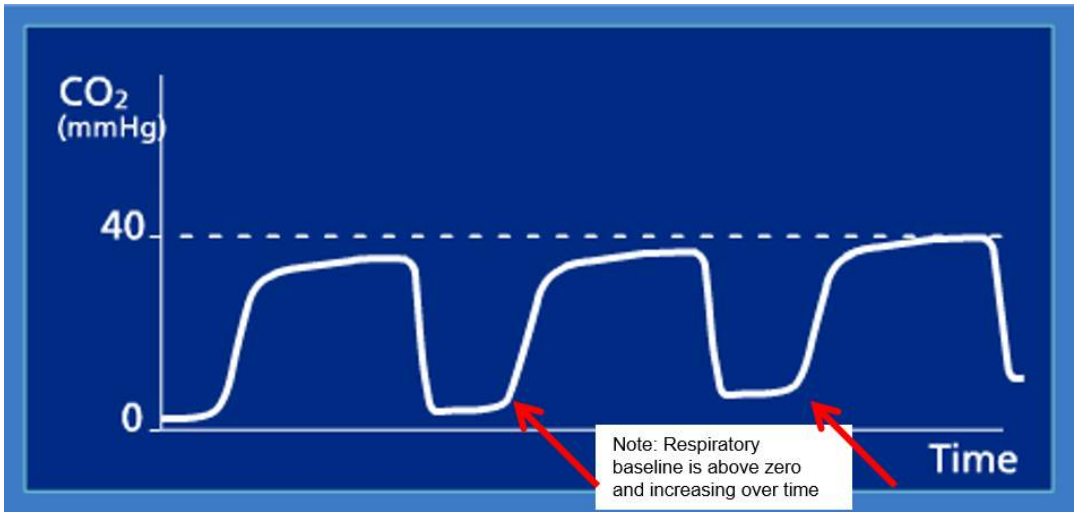


Abnormal Waveform – Rebreathing Exhaled CO₂

Rise in baseline CO_2 indicates rebreathing of CO_2

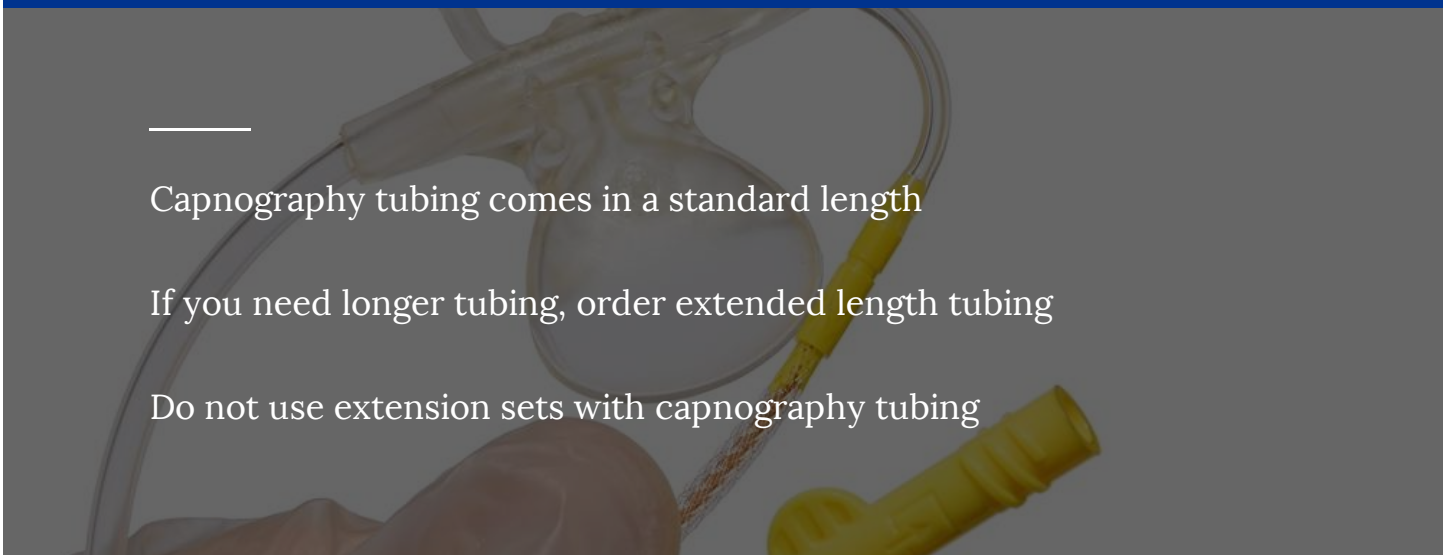
Possible causes:

- 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 hypoventilation and over sedation.

- ◯ 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

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

SUBMIT

True or False:

Capnography provides caregivers with breath-to-breath information.

- ◯ True

False

SUBMIT

True or False:

Capnography ($EtCO_2$) refers to continuous noninvasive technique that measures exhaled carbon dioxide.

True

False

SUBMIT

Complete the content above before moving on.

Pre/Intra/Post Sedation Considerations Overview

Procedural Sedation



A continuum exists between minimal, moderate, deep sedation, and general anesthesia. One level of sedation can quickly change to a deeper level due to unique characteristics of drugs used, as well as physical status and drug sensitivities of individual patients.

The patient's age and pre-existing medical conditions may significantly alter dosing requirements needed to achieve a level of minimal or moderate sedation. Administration of sedating agents requires ongoing assessment and monitoring of the patient and ability to respond immediately to deviations from the norm.

> **Note: If moderate procedural sedation progresses to a deeper level of sedation than anticipated, appropriate measures are immediately taken to return patient to intended level of sedation. Sedation administrators must have skills to rescue the patient from a deeper level of sedation than intended for the procedure.**

Procedural Sedation Roles

The following caregivers must be present during procedural sedation.

Please note that this may vary by ministry and type of procedure (e.g., orthopedic LIP assist for orthopedic injuries).

RN | LIP | RT

Requires initial and annual competency verifying the following:

- **Evidence of current Advanced Cardiac Life Support (ACLS) certificate Pediatric Advanced Life Support (PALS) in ED.**
- **Familiarity with pharmacologic agents employed in moderate sedation; including administration, adverse reactions and possible interventions.**
- **Able to identify and recognize acceptable and unacceptable vital signs.**
- **Knowledge of documentation and monitoring standards, and nursing roles and responsibilities.**



RN | LIP | RT

Licensed Independent Practitioner (LIP)



RN | LIP | RT

Respiratory Therapist (RT)



Click or tap each tab above before moving on.

Desired Outcomes of Moderate Sedation

The desired outcome of moderate sedation is a patient who:

- [ ] Is sedate and cooperative
- [ ] Lacks awareness or recall of procedure (amnesia)
- [ ] Has reduced pain perception (analgesia)
- [ ] Has decreased anxiety (anxiolysis)
- [ ] Has modified behavior and/or movement to allow safe completion of the procedure
- [ ] Is returned to a state in which discharge from medical and/or dental supervision is safe

CONTINUE

Pre-Procedure Sedation Considerations

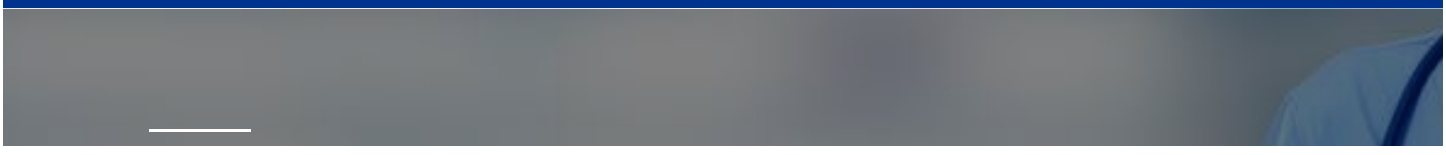
Roles and Responsibilities

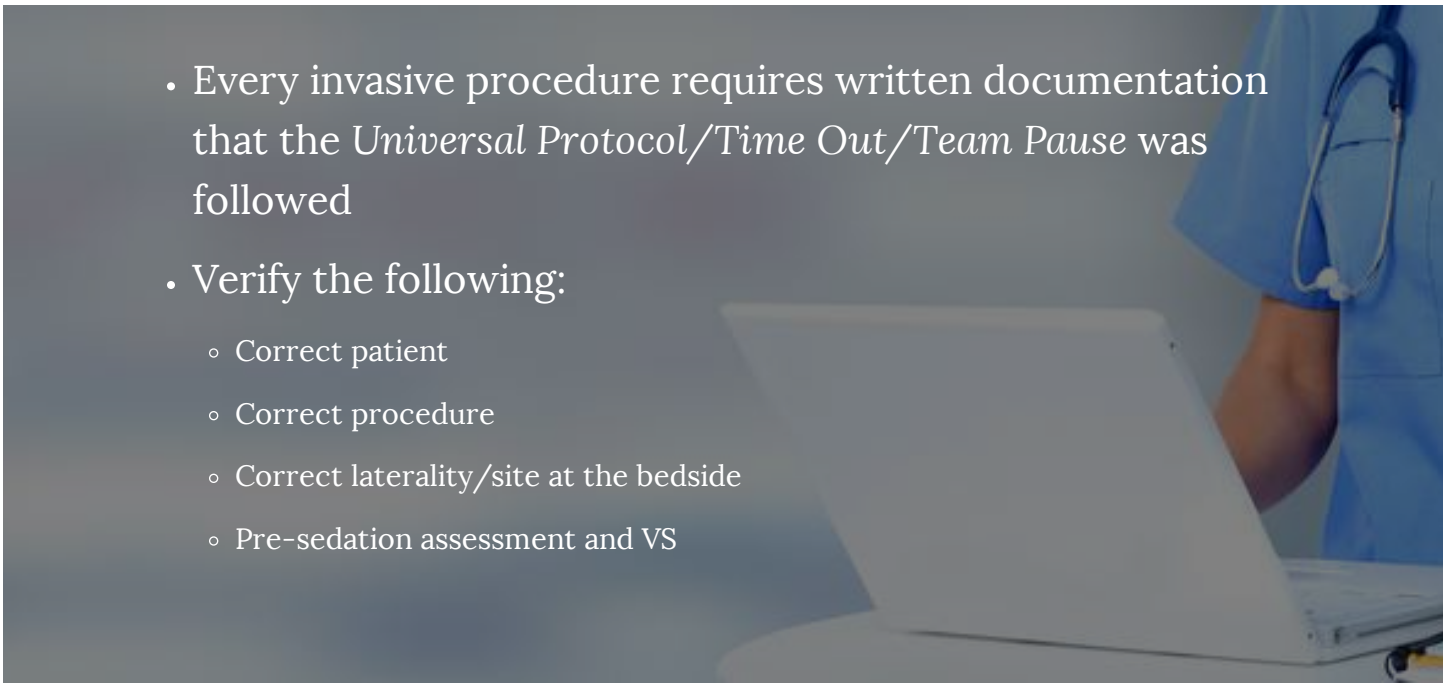
Pre-procedure

RN Responsibilities

- Verify ride contact info
- Add staff at bedside
- Baseline sedation score using ministry-specific sedation scale(s)
    - e.g., Ramsay, Aldrete, RASS, and/or SBS
- Temperature x1
- Baseline VS:
    - BP, HR, RR, $ETCO_2$, SPO_2, pain level
- Cardiac rhythm
- Confirm the LIP has completed the following:
    - Airway assessment (Mallampati classification)
    - American Society of Anesthesiologists (ASA) classification
    - Consents
- Universal Protocol/Team Pause/Time Out prior to procedure

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





Sedation Team Responsibilities

Sedation team verifies the following required equipment is immediately available:

Suction –

Functioning suction and appropriately sized catheters

Oxygen –

Supplemental oxygen and appropriate delivery system (tubing, face mask, bag-valve mask, and nasal cannulas)

Airway –

Oral airways, nasopharyngeal and oropharyngeal airways, laryngeal mask airways, laryngoscopy blades, endotracheal tubes, and stylets

Pharmacy –

All the basic drugs needed to support life during an emergency

Reversal agents are at the bedside

Monitors

Pulse oximeter with appropriate sized probes, end-tidal carbon dioxide monitor, blood pressure cuffs, etc.

Equipment

Equipment to dispense medication (IV supplies), Broselow Cart with defibrillator and intubation supplies

Expand and review additional SOAPME details before moving on.



Sedation Risk Factor - Compromised Airway

COMPROMISED AIRWAY

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

- The Mallampati assessment (performed by LIP) provides information regarding airway risk
  - 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 **American Society of Anesthesiologists (ASA) score** is a subjective assessment of the 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 of 3 or greater, special needs, anatomic airway abnormalities, or moderate to severe tonsillar hypertrophy present issues requiring additional and individual consideration.
    - The LIP is encouraged to consult with appropriate sub-specialist and/or an anesthesiologist prior to administration of sedation

CONTINUE



Sedation Risk Factor -
Other Complicating Conditions

PROCEED WITH CAUTION!

Patients presenting with the following conditions are known to have increased risks with sedation and are at the greatest risk of maintaining a patent airway or experiencing apnea during or following the sedation procedure.

Patients and their parents are instructed to refrain from pre-medicating for a procedure while at home or in route to the procedure.

1. Developmental disabilities
2. Younger than 6 years of age
3. Relevant diseases
4. Physical abnormalities (including genetic syndromes)
5. Neurological impairments
6. Obesity and/or a history of snoring or obstructive sleep apnea
7. History of seizures
8. History of prematurity

CONTINUE

Pre-Sedation Preparation - Sedation Plan

THIS IS IMPORTANT!

Click or tap the checkboxes to the left of each statement to mark them as read.

- [ ] Discuss sedation plan and target level of sedation (sedation score) with LIP
- [ ] The RN should 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 provider 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, or their legal guardian, should have a conversation with the LIP regarding code status prior to the procedure

CONTINUE

Content - Intra-Procedure Sedation Considerations

Intra-Procedure Care & Documentation



Note: The monitored items listed below may change depending on ministry and/or procedure. Confirm with your preceptor and/or LIP.

Continuous monitoring means you must complete the following every 5 minutes during moderate or deep sedation (unless it interferes with procedure):

- Blood pressure
- Heart rate
- Respiratory rate
- SPO_2
- $ETCO_2$
- Pain level
- Sedation level (Ramsay, RASS, etc.)
- ECG

Medication

Medication administration is to be performed incrementally with adequate time between doses to assess full pharmacologic effects. This must be documented in in Epic.

The administration of each dose must be individualized based upon patient's condition and observed response to previous dose.

Note:

- Combinations of sedation and analgesic drugs may be administered but should be treated as individual components to achieve desired effects.
- IV sedative/analgesic drugs should be administered in small, incremental doses, or by titrating to desired endpoint allowing sufficient time to elapse between doses so peak effect of each dose can be assessed before subsequent drug administration.
- When drugs are administered by non-IV routes, allow sufficient time for absorption and peak effects of previous dose before supplementation is considered.

CONTINUE

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 over-sedation

Ramsay Sedation Scale

The Ramsay Score can be directly correlated to the ASA definitions of Levels of Sedation.

Ramsay Sedation Scale:

Clinical Status	Score
Patient awake, anxious, agitated, or restless	**1**
Patient awake, cooperative, orientated and tranquil	**2**
Patient drowsy, with response to commands	**3**
Patient asleep, brisk response to glabellar tap* or loud auditory stimulus	**4**
Patient asleep, sluggish response to stimulus	**5**
Patient has no response to firm nail-bed pressure or other noxious stimuli	**6**

Clinical Status	Score
*glabellar tap = tap on forehead between eyebrows	

Ramsay Sedation Scale correlation to ASA Levels of Sedation:

Score	Clinical Status	Level of Sedation Definition
1 2	**Patient awake, anxious, agitated, or restless** **Patient awake, cooperative, orientated 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 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 glabellar tap 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 laud 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.

State Behavioral Scale (SBS)

A State Behavior assessment, especially in preverbal or nonverbal children is challenging. The SBS is a 6-point scale that describes state behavior on a scale of **-3 to +2**. Score the patient's response to voice then touch then noxious stimuli.

Score	Description	Definition
-3	**Unresponsive**	• No spontaneous respiratory effort • No cough or coughs with suctioning • No response to noxious stimuli

Score	Description	Definition
-2	**Responsive to noxious stimuli**	• Spontaneous yet supported breathing • Coughs with suctioning/repositioning • Responds to noxious stimuli
-1	**Responsive to gentle touch or voice**	• Spontaneous but ineffective non-supported breaths • Coughs with suctioning/repositioning • Responds to touch/voice
0	**Awake and able to calm**	• Spontaneous and effective breathing • Coughs when repositioned/occasional spontaneous cough • Responds to touch/no external stimulus is required to elicit response
+1	**Restless and difficult to calm**	• Spontaneous and effective breathing/having difficulty with ventilator • Occasional spontaneous cough • Responds to touch. No external stimulus is required to elicit response • Intermittently unsafe, increased movement (restless, squirming)
+2	**Agitated**	• May have difficulty breathing with ventilator • Coughing spontaneously • Unsafe (biting ETT, pulling at lines, cannot be left alone) • Unable to console

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.
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

Intra-Procedure Sedation Considerations Review

Multiple Choice:

You are taking care of a 13-year-old boy that is intubated for airway protection. While attempting to start an IV, your patient withdraws his hand from you and winces from the pain. You are able to calm him and start the IV. When you turn him on his side, he coughs and falls back asleep.

What is his SBS Score?

- ◯ -1
- ◯ -2
- ◯ 1

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."

What is the probable cause?

**Hint: type in your two word answer below.*

Type your answer here

SUBMIT

Select All That Apply:

Think about the patient in the question above. What should you do in this situation? Select the steps you should take from the list below.

- [ ] Open her airway by either repositioning her head, doing a head tilt/chin lift, jaw thrust, insert an oral/nasal airway, or ventilate with an ambu bag
- [ ] Provide supplemental oxygen and continue SaO_2 and $ETCO_2$ monitoring
- [ ] Anticipate the need for resuscitation and ensure you have emergency equipment at the bedside.

SUBMIT

Complete the content above before moving on.

Content - Post-Procedure Sedation Considerations

Post-procedural Monitoring



Who stays at the bedside?

During recovery, there is a minimum of:

- One qualified RN whose only responsibility is to constantly observe patients:
  - Vital signs
  - Airway patency
  - Adequacy of ventilation
  - Either administer medication or direct their administration

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
- [ ] Code cart/defibrillator immediately available (including one-way valve mask, airways, suction, ambu-bag, intubation equipment, emergency drugs)
- [ ] Drug antagonists nearby (Flumzaenil and Naloxone)

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

Once the procedure is complete and no further sedation has been given, continue to monitor and document until the patient achieves an Aldrete score of at least 8 (or the pre-procedure score if baseline is <8).

If score is less than 8 at the end of sedation phase, the monitoring nurse should contact the LIP and document the exception.

Monitor and Document

Monitor and document:

- Vital signs (BP, HR, RR, SpO_2, $ETCO_2$, pain level, sedation score) every 15 minutes (confirm frequency with your ministry) from administration of last dose of sedation mediation
- Aldrete score
- ECG

Additional Monitoring

After pharmacological reversal is completed, you must observe the patient to ensure that sedation and cardio-respiratory depression does not recur once the effect of the antagonist dissipates because duration of the medications administered for sedation may exceed the duration of the antagonist.

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 ***must be at least 1 at end of monitoring**	**= 2** **= 1** **= 0**
Respirations	• Able to breathe and cough freely • Dyspnea or limited breathing • Apneic	**= 2** **= 1** **= 0**
Oxygen Saturation	• Maintains value ≥ 92% on room air • Requires supplemental O2 to maintain saturation at ≥ 90% • Saturation ≤ 90% with supplemental O2	**= 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**

Discharge Criteria

Discharge Criteria

Patient may be discharged when:

- Cardiovascular function and airway patency are satisfactory and stable, vital signs are stable and similar to pre-procedure baseline measurements with no signs of respiratory distress
- Patient can:
  - Be easily aroused, and protective airway reflexes are intact
  - Talk (if age appropriate)
  - Sit up unaided (if developmentally appropriate)
    - If very young age, then patient should be back to pre-sedation level for that child

- State of hydration is adequate, has ingested and retained fluid
- No complications noted (e.g., no excessive bleeding from the wound, minimal nausea, vomiting, or dizziness)
- Pain is well tolerated
- Parents or guardians have received written instructions and prescriptions and demonstrate understanding of patient's post-procedural care needs, signs and symptoms of complications, reasons and how to contact the LIP, ensuring the parents or guardians can meet child's home care needs

Outpatient/Short Stay Discharge Criteria

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

- Provided written post-sedation/procedure instructions (signs and symptoms to monitor for, how to contact the care team prior to their follow-up appointment)
- Parent of guardian must be able to escort patient through post-discharge transportation (e.g., drive patient or travel with patient in taxi)
- Infants and toddlers in car seats require two adults present during transport so one may continuously observe the child during the drive
- Patients with anatomic airway problems, former preterm infants, underlying medical conditions (e.g., obstructive sleep apnea) should have a longer observation due to the increased risk to maintain a patent airway or experience apnea

Expand and review the content above before moving on.

Documentation Requirements



Document procedural sedation information:

- Pre-sedation assessment
- Patient education documented in Patient Education section in Epic
- Informed consent
- Current list of allergies and medications
- Time out/universal protocol/team pause (including pre-sedation assessment and VS)
- Documentation of vital signs, drugs, procedure details
- Post-sedation assessment
- Patient response to procedure/medications
- Discharge criteria met

Procedural Sedation Key Take-Aways

- ☐ Pre-procedure assessment must be completed by the LIP and include risk assessment, Mallampati, ASA score, and appropriate lab tests
- ☐ An informed consent must be obtained
- ☐ Monitoring of the patient during the sedation procedure is continuous

- When the RN is monitoring the patient, they may not leave the patient unattended or perform other tasks that would compromise patient monitoring including performance of the procedure itself

- [ ] Documentation of the sedation procedure will occur in a sedation narrator
- [ ] The RN must be familiar with the drugs used
- [ ] Use of reversal agents require additional monitoring post procedure
- [ ] Duration of monitoring:

  - From first dose of the sedating agent throughout the procedure.
  - Into the recovery phase until an Aldrete score of 8 is reached (or the pre-procedure score if baseline is <8).
  - Monitor continuously. Document a minimum of every 15 minutes or the frequency required by your ministry.
  - Document any deviations from baseline or expected results, and report to the LIP.

- [ ] If moderate sedation has progressed to deep sedation efforts need to be made to return the patient to the moderate sedation level
- [ ] The most common complications of procedural sedation are airway obstruction and over sedation
- [ ] Emergency equipment must be available at the bedside or within easy access during the procedure
- [ ] Post-procedure monitoring continues until discharge criteria are met
- [ ] Written discharge instructions will be provided
- [ ] The patient will be discharged to the care of a responsible adult

CONTINUE

Post-Procedure Sedation Considerations Review

Multiple Choice:

After his endoscopy, your patient is asleep, but arouses to voice (quickly falls back to sleep). He moves all extremities on command, his resp 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:

After a chest tube insertion, your 16-year=old patient is awake and talking, is able to move all extremities, has a resp. 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

Complete the content above before moving on.

Pre/Intra/Post Procedure Sedation Considerations Review

True or False:

Pediatric Procedural sedation is a continuum that exists between minimal, moderate, deep sedation, but does not include general anesthesia.

- ◯ True
- ◯ False

SUBMIT

Select All That Apply:

Sedation scales are important because they:

- ☐ Determine the risk of under-sedation
- ☐ Determine the risk of over-sedation
- ☐ Determine accurate and consistent drug titration

SUBMIT

Multiple Choice:

SOAPME stands for:

- ◯ Suction, Oral, Airway, Pharmacy, Monitors, Equipment
- ◯ Supplemental Oxygen, Oral, Airway, People, Monitors, Equipment
- ◯ Suction, Oxygen, Airway, Pharmacy, Medications, Equipment
- ◯ Suction, Oxygen, Airway, Pharmacy, Monitors, Equipment

SUBMIT

Multiple Choice:

The Mallampati assessment identifies the following:

- ◯ Airway malformations
- ◯ Risk for respiratory compromise
- ◯ Risk for aspiration
- ◯ Seizure risk

SUBMIT

Fill in the Blank:

A Ramsay score of ____ indicates moderate sedation:

Type your answer here

SUBMIT

Multiple Choice:

During the post-procedure care, you should document vital signs (BP, P, RR, SpO_2) every _____.

- ◯ 5 minutes
- ◯ 8 minutes
- ◯ 10 minutes
- ◯ 15 minutes

SUBMIT

Complete the content above before moving on.

Content - Pharmacology

Nursing Management Topics

Pharmacological Considerations

Verify the sedation plan with the LIP:

- Moderate versus deep sedation?
- Is the LIP certified 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: the risk of respiratory depression increases when multiple agents are used.



Review each tab above before moving on.

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.

Drugs Commonly Used in Procedural Sedation

Medication	Pharmacology	Effect	Adverse Effect

Dexmedetomidine	• Dose:
	  ◦ IN: 1-2 mcg/kg
	  ◦ IV: 0.2-0.4 mcg/kg
	• Onset: 5-10 minutes
	• Duration: 30-70 minutes
	May only be used during a moderate or deep sedation if the LIP is immediately available to respond during administration or patient is already intubated and ventilated
		• Sedation
		• Analgesia
			• Bradycardia
			• Hypotension
			• Hypertension
			Note: Use with caution in hypovolemia or reduced cardiac function

Medication	Pharmacology	Effect	Adverse Effect

Fentanyl	**Note:** 100 times more potent than morphine. ADMINISTER SLOWLY!
	• Dose:
	  ◦ IN: 0.5-2 mcg/kg (max 100mcg/dose)
	  ◦ IV: 0.5-1 mcg/kg (max 50 mcg/dose)
	  ◦ IM: 1-2 mcg/kg (max 50 mcg/dose)
	• Onset: 5-10 minutes
	• Duration: 30-60 minutes
		Analgesia only (does not produce amnesia)	• Respiratory depression
			• Hypotension
			• **WARNING:** Rapid administration of Fentanyl can cause chest wall rigidity, which may be fatal
			
			Note: Can produce profound sedation when used in combination with benzodiazepines and other CNS depressants
			
			Avoid in patients with gastrointestinal obstruction

Midazolam (Versed)	• Dose:
	  ◦ IN: 0.2-0.5 mg/kg (max 10 mg/dose)
	  ◦ IV: 0.05-0.1 mg/kg (max 10 mg/dose)
	  ◦ IM: 0.05-0.15 mg/kg (max 10 mg/dose)
	• Onset: 1-3 minutes
	• Duration: 15-60 minutes
		Sedation	Respiratory depression, apnea, hypotension
			
			Provides sedation with no analgesia
			
			Avoid in patients with acute narrow-angle glaucoma
			
			Is associated with paradoxical reactions in pediatric patients such as aggressive behavior or hyperactivity

Etomidate	• Dose: ◦ IV: 0.2-0.4 mg/kg (max 50 mcg/dose) • Onset: .05-1 minute • Duration: 2-5 minutes	• General anesthesia • Sedation	• Myoclonus • Nausea • Vomiting *Not to be given to patients with adrenal insufficiency* *Reduces intracranial pressure* *Lowers seizure threshold*

Medication	Pharmacology	Effect	Adverse Effect

Ketamine	• Dose:
	  ◦ IN: 3-6 mg/kg
	  ◦ IV: 1-2 mg/kg
	  ◦ IM: 2-5 mg/kg
	• Onset: 1-2 minutes
	• Duration: 15-30 minutes
	May only be used during a moderate or deep sedation if the LIP is immediately available to respond during administration or patient is already intubated and ventilated
		• Anesthesia
		• Sedation
			• Hypotension
			• Dysphoria
			• Hypersalivation
			• Vomiting
			When given with Propofol, reduce initial dose
			Seizures and agitation should be treated with benzodiazepines
			Ketamine-induced dystonia can be treated with diphenhydramine
			Not to be given to patients with known or suspected psychosis

Abbreviations:

IN= intranasal

IV= intravenous

IM= intramuscular

Other Pharmacological Agents

- Anesthetic agents such as Propofol, Etomidate, and Ketamine may be used in planned deep sedation
- Planned deep sedation by non-anesthesia may be performed only by LIPs certified in deep sedation
- Ketamine may only administered by personnel trained in administration of anesthesia (unless there is a departmental protocol approved by the medical staff)

Reversal Agents

REMINDER: Not every medication has a reversal agent!

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 - Fentanyl	**Reverse with nalaxone (Narcan)**

1 of 5

Benzodiazepines - Midazolam	**Reverse with flumazenil (Romazicon)**

2 of 5

Ketamine

No specific reversal agent (treat symptoms and provide supportive therapy)

Dexemedtomidine

No specific reversal agent (treat symptoms and provide supportive therapy)

Etomidate	**No specific reversal agent (treat symptoms and provide supportive therapy)**

Naloxone (Narcan)

- Duration is shorter than most opioids, so will likely need repeated doses (every 20-30 minutes)
- May titrate dose to reverse hypoventilation without reversing analgesic effect
- Dose:
  - IN: 2-4 mg
  - IV: 0.1 mg/kg (max 2 mg/dose)
  - IM: 0.1 mg/kg (max 2 mg/dose)
- Onset:
  - IN: 8-13 minutes
  - IV: 2 minutes
  - IM: 2-5 minutes
- Duration:
  - 30-120 minutes
    - ***IV route has the shortest duration**

Flumazenil

- Duration can be shorter than some benzodiazepines, so may need repeat doses
- Should be avoided in patients with seizure disorders or patients who take chronic benzodiazepines
- Dose:
  - IV: 0.01 mg/kg (max 0.2 mg/dose)
    - Maximum cumulative dose: 0.05 mg/kg or 1 mg (whichever is lower)
      - ***May repeat dose every 1 minute until total**

- Onset:
  - 1-2 minutes
- Duration:
  - 19-50 minutes

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 every 10 minutes for at least 30 minutes (every 5 minutes for deep sedation) until adequate respiratory effort
  - May require 2 or more hours of additional monitoring
- Provide respiratory support
  - Examples include:
    - Increasing oxygen
    - Jaw thrust/chin lift
    - Oral airway
    - Ambu bag
    - Prepare for intubation, etc.



Watch for post-procedure sedation

Once the stimulation from the procedure is over, the patient may progress to a deeper level of sedation than assessed throughout the procedure.

Maintain intra-procedure level of monitoring until patient is at least a 3 on the Ramsey Sedation Score.



CONTINUE

Pharmacology Review

True or False:

Fentanyl should be given quickly in order to avoid chest wall rigidity.

- ◯ True
- ◯ False

SUBMIT

Multiple Choice:

The reversal agent for Fentanyl is:

- ◯ Flumazenil
- ◯ Naloxone
- ◯ Morphine
- ◯ None available

SUBMIT

Multiple Choice:

Etomidate should be used with caution since it can:

- ◯ Increase clotting
- ◯ Decrease heart rate
- ◯ Lower seizure threshold

SUBMIT

Multiple Choice:

If a patient progresses beyond the goal of therapy, you should:

- ◯ Provide respiratory support
- ◯ Consider reversal agent
- ◯ Monitor patient every 10 minutes if in moderate sedation
- ◯ All of the above

SUBMIT

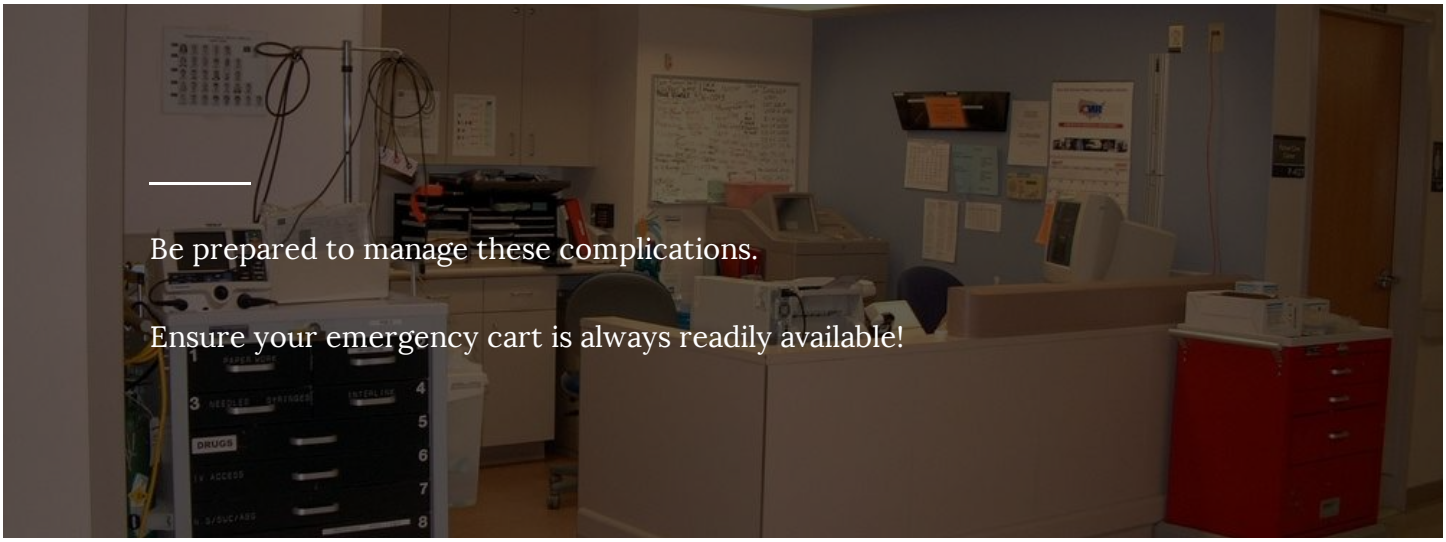
Complete the content above before moving on.

Content - Sedation Complications & Rescue for Pediatric 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.


Management of Sedation Complications
1
2
3
4
5



Do NOT give more sedation medication



Initiate emergency airway management



Communicate patient status to LIP



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 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
- In pediatric patients, a score of less than 0 on the State Behavior Scale indicates a transitions 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 as aspiration is the most common cause of death in procedural sedation.

6

If deep sedation has occurred, measures to return to the planned level of sedation need to be instituted.

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 LIPs certified in endotracheal intubation may perform airway intubation.

Complete the content above before moving on.

Reversal Agents

Remember, the half-life of reversal agents can be shorter than sedative medications - close and continued monitoring is essential.

- If a reversal agent is used, the patient must be observed and monitored long enough to ensure that sedation and cardio-respiratory depression does not recur once the effect of the antagonist dissipates.
- May require observation and monitoring at least 2 hours after last dose of a reversal agent.

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

CONTINUE

Sedation Complications & Rescue for Pediatric Patients Review

Multiple Choice:

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?

- ◯ As your ACLS/PALS certification is current, you intubate the patient
- ◯ Call for assistance (anesthesia or code) and support the airway until an LIP trained in pediatric intubation arrives
- ◯ Call an RRT
- ◯ Transfer the patient to the critical care unit immediately, then intubate

SUBMIT

Multiple Choice:

Your patient 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 RRT
- ◯ 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
- ◯ Intubate the patient immediately
- ◯ Reposition the airway using techniques for opening the airway

SUBMIT

True or False:

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

- ◯ True
- ◯ False

SUBMIT

Multiple Choice:

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:

Your patient has received a total of 10 mg of IV morphine sulfate for procedural sedation. She is restless and agitated. Her 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 indicate 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 3mm Hg 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.

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CONTINUE

Conclusion



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

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

Exit

Click to exit the course.

EXIT

PROVSOUTH: Tenecteplase for Acute Ischemic Stroke

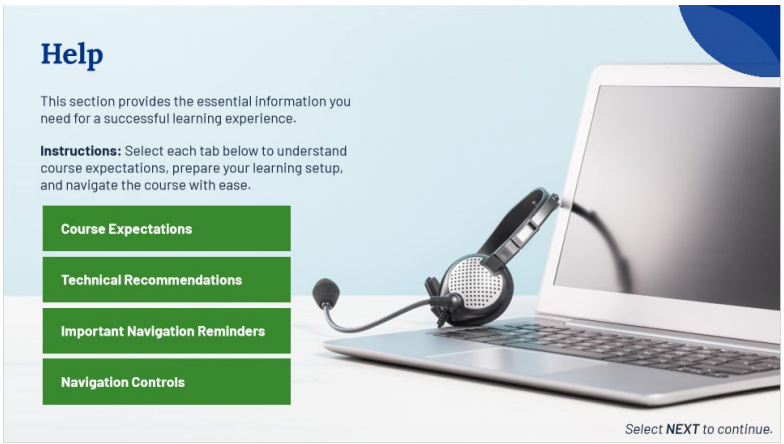
1. Tenecteplace for Acute Ischemic Stroke

1.1 Title

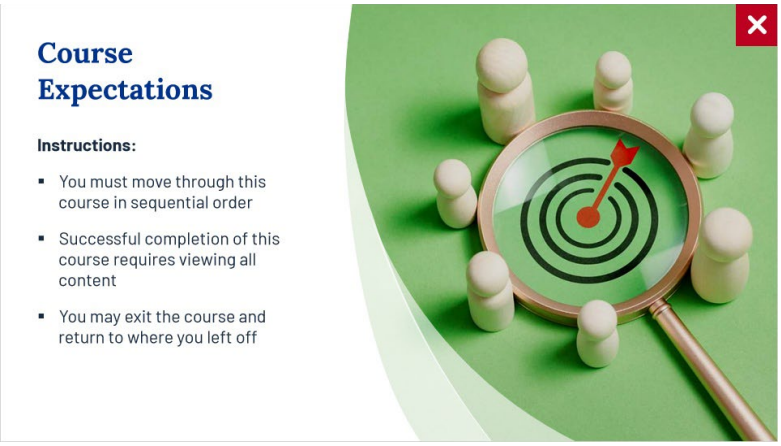


Notes:

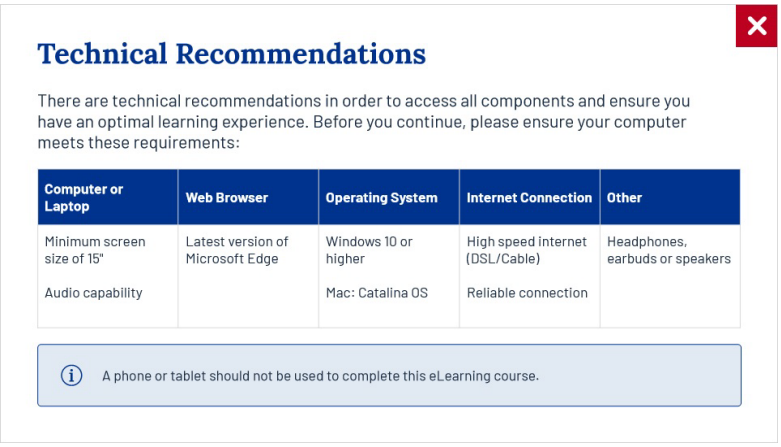
1.2 Help



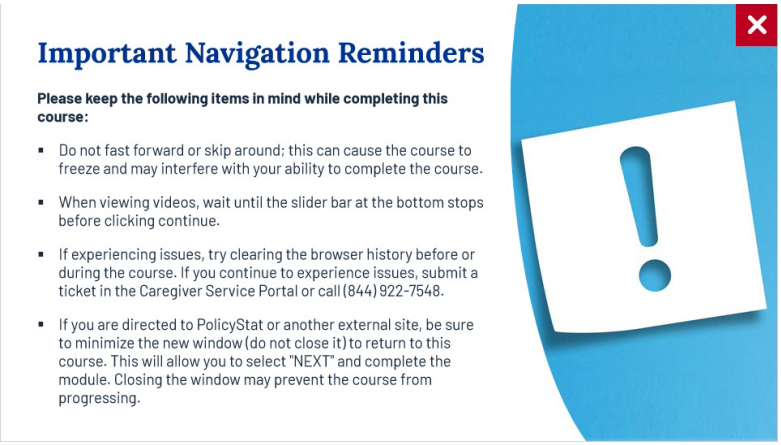
Course Expectations (Slide Layer)



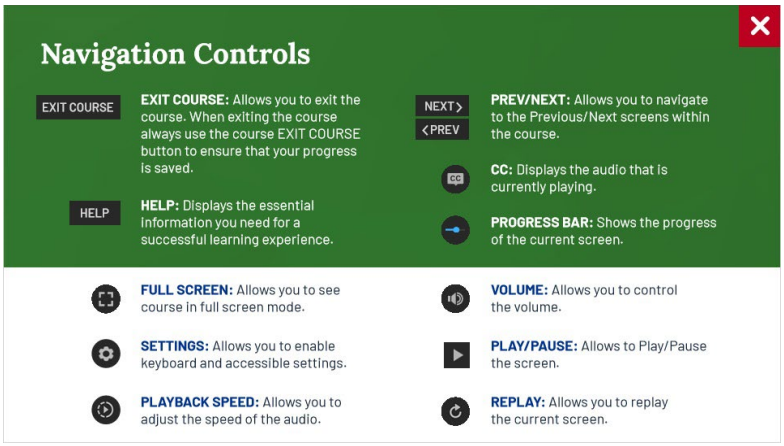
Technical Recommendations (Slide Layer)



Important Navigation Reminders (Slide Layer)



Navigation Controls (Slide Layer)



1.3 Learning Objectives

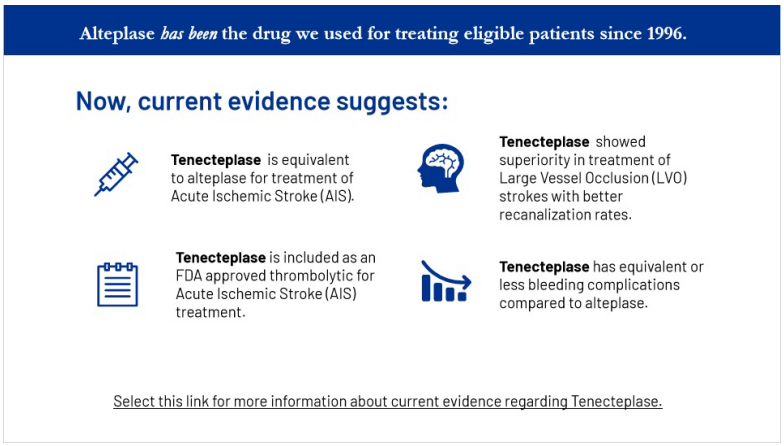


Notes:

1.4 The Case for Tenecteplase: Practice Change SBAR

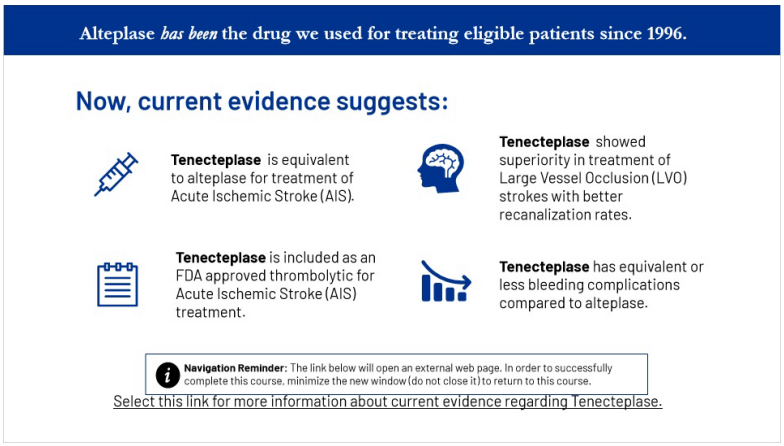


1.5 Overview

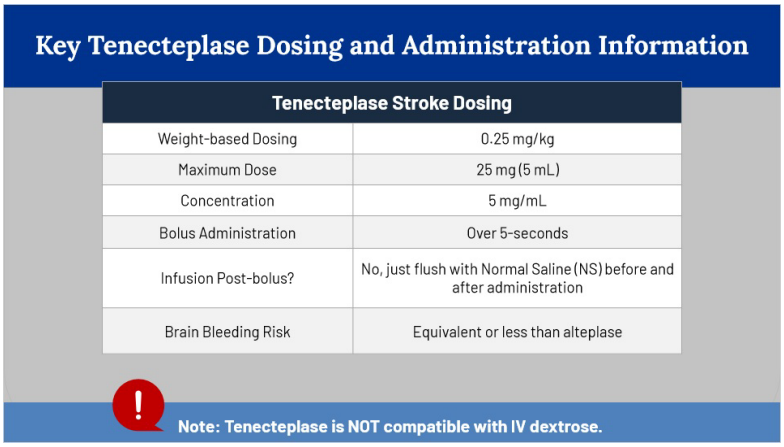


Notes:

Navigation Reminder (Slide Layer)



1.6 Note: Tenecteplase is NOT compatible with IV dextrose.

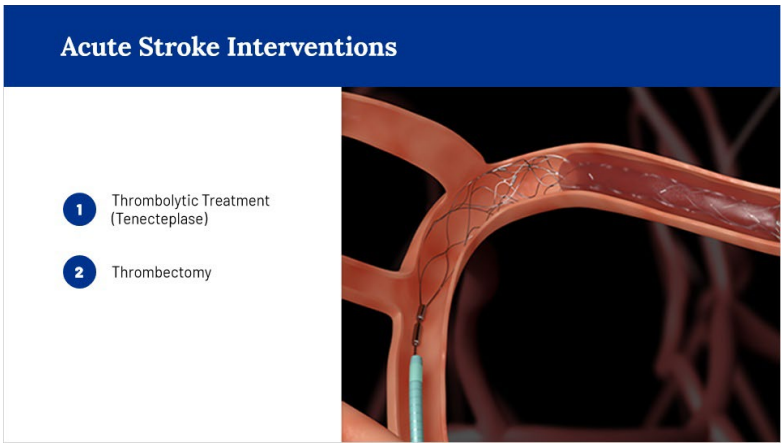


Notes:

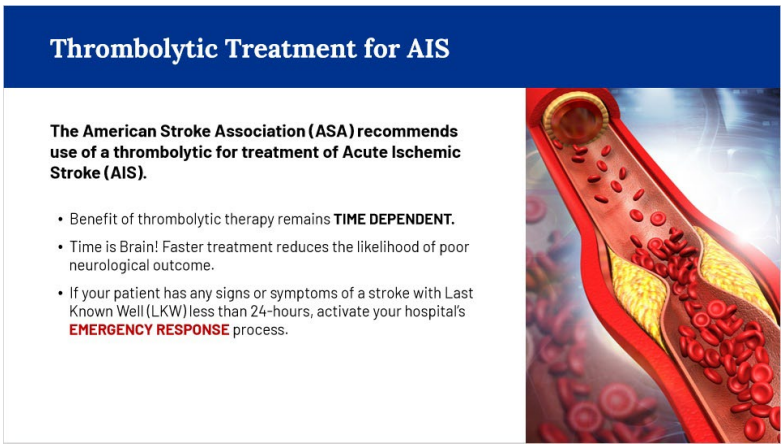
1.7 Acute Stroke Treatment



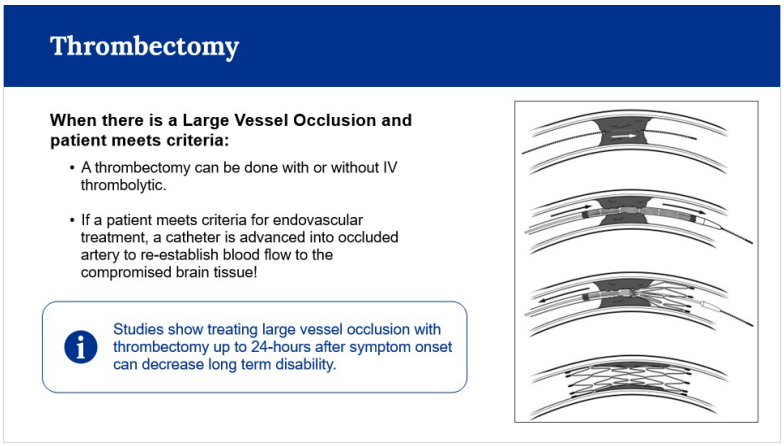
1.8 Stroke Treatment Options



1.9 Thrombolytic Treatment for AIS



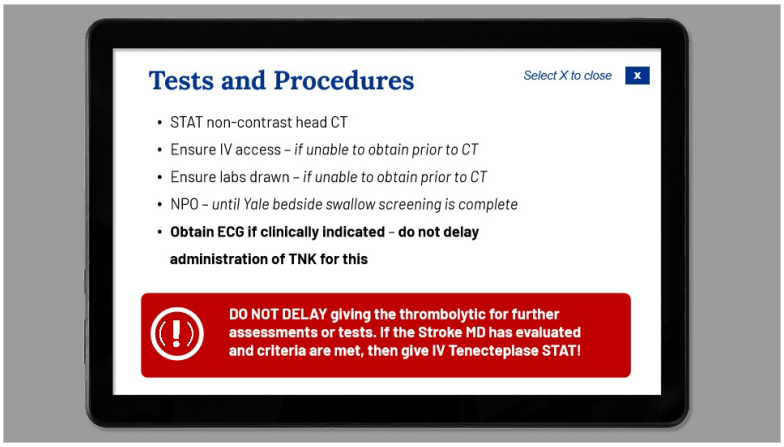
1.10 Thrombectomy



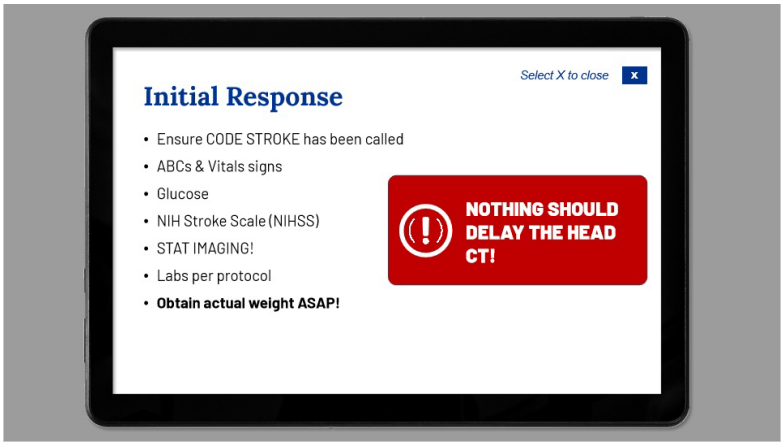
1.11 Responding to a Code Stroke



Tests and Procedures (Slide Layer)



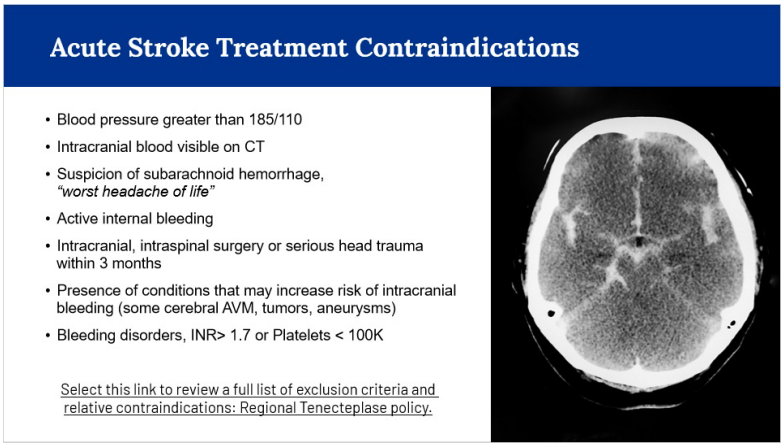
Initial Response (Slide Layer)



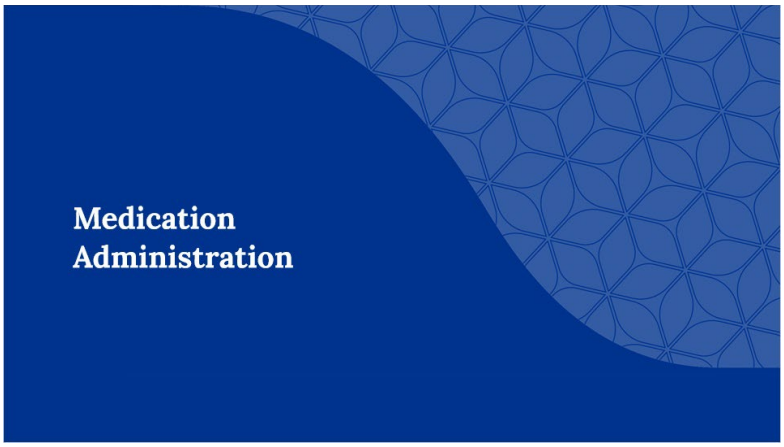
1.12 Contraindications



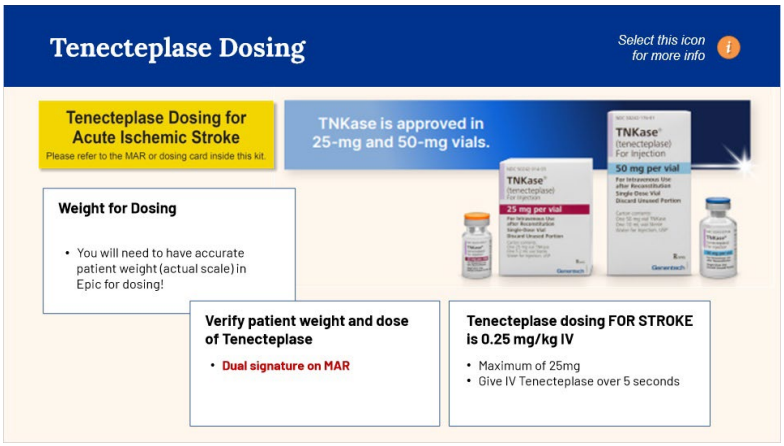
1.13 Acute Stroke Treatment Contraindications



1.14 Medication Administration



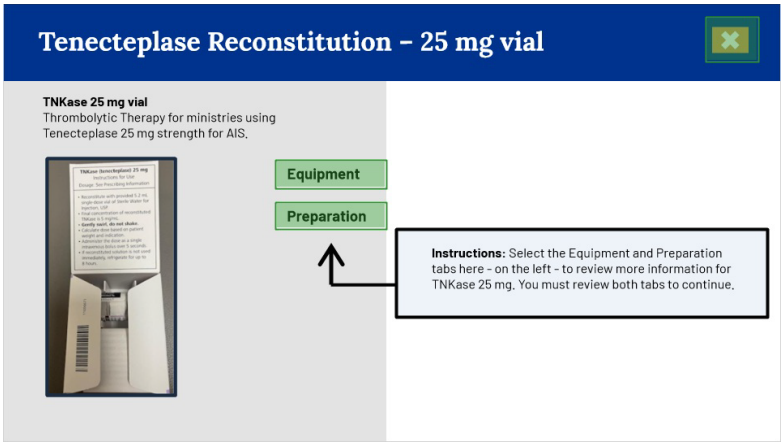
1.15 Tenecteplase Dosing



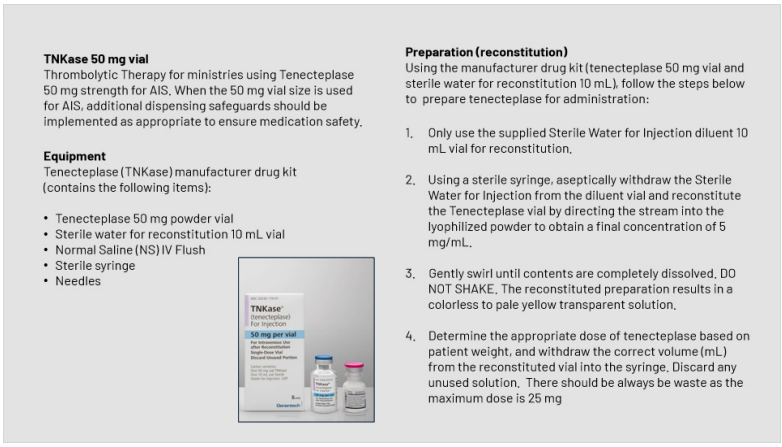
1.16 Tenecteplase Reconstitution



25 (Slide Layer)



do not use (Slide Layer)



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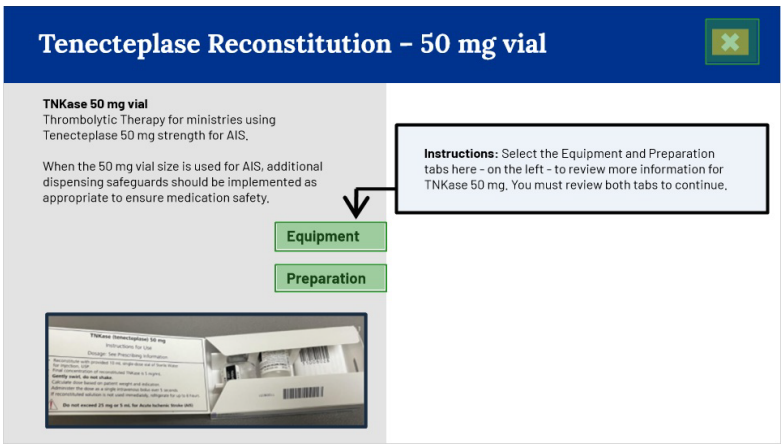


1.17 Best Practice

Best Practice

- Use a 5 mL syringe to draw up final dose to avoid exceeding max dose of 25 mg for stroke (5 mL).
- Dosing for Tenecteplase is calculated using a weight range.
- This works out to about 0.25 mg/kg.



Notes:

1.18 Tenecteplase Dosing

Tenecteplase Dosing

Step 1

- Tenecteplase dosing

Step 2

- Calculate dose according to patient's ACTUAL scale weight 0.25 mg per kg *(refer to the table on the right to find the patient dose)*

Step 3

- Withdraw the appropriate dose/volume of Tenecteplase solution based on weight

Step 4

- Round dose mL to the nearest 0.2 mL

Tenecteplase Dosing
Acute Ischemic Stroke

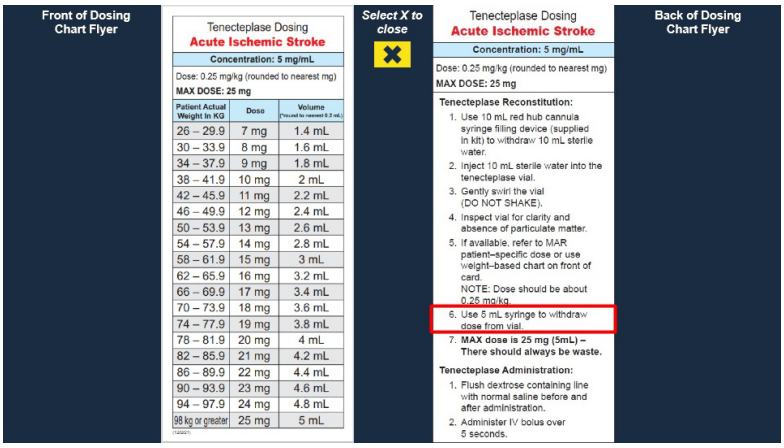
Concentration: 5 mg/mL

Dose: 0.25 mg/kg (rounded to nearest mg)

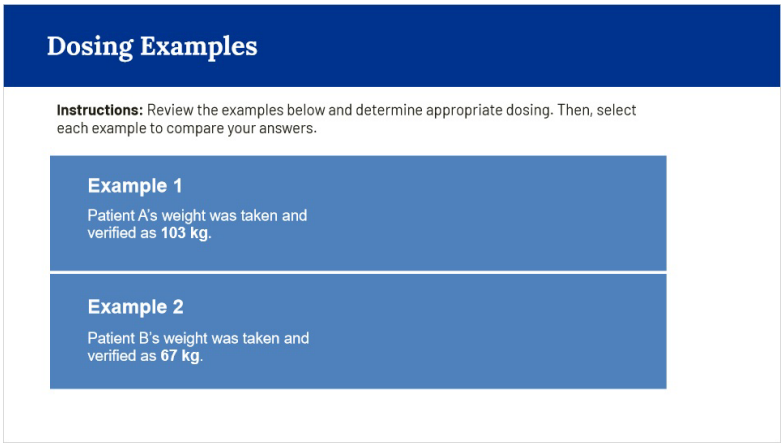
MAX DOSE: 25 mg

Patient Actual Weight In KG	Dose	Volume (*round to nearest 0.2 mL)
26 – 29.9	7 mg	1.4 mL
30 – 33.9	8 mg	1.6 mL
34 – 37.9	9 mg	1.8 mL
38 – 41.9	10 mg	2 mL
42 – 45.9	11 mg	2.2 mL
46 – 49.9	12 mg	2.4 mL
50 – 53.9	13 mg	2.6 mL
54 – 57.9	14 mg	2.8 mL
58 – 61.9	15 mg	3 mL
62 – 65.9	16 mg	3.2 mL
66 – 69.9	17 mg	3.4 mL
70 – 73.9	18 mg	3.6 mL
74 – 77.9	19 mg	3.8 mL
78 – 81.9	20 mg	4 mL
82 – 85.9	21 mg	4.2 mL
86 – 89.9	22 mg	4.4 mL
90 – 93.9	23 mg	4.6 mL
94 – 97.9	24 mg	4.8 mL
98 kg or greater	25 mg	5 mL

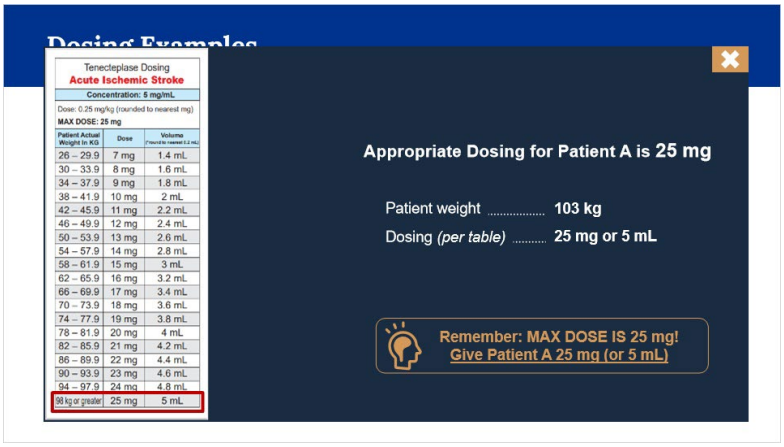
Table Zoom (Slide Layer)



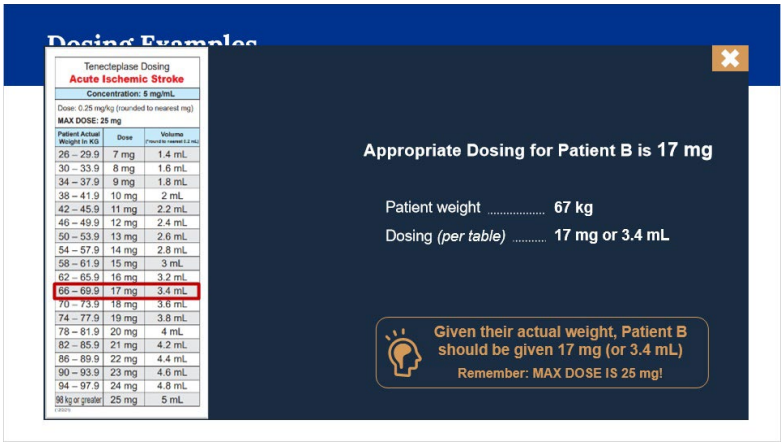
1.19 Dosing Examples



Example 1 (Slide Layer)



Example 2 (Slide Layer)

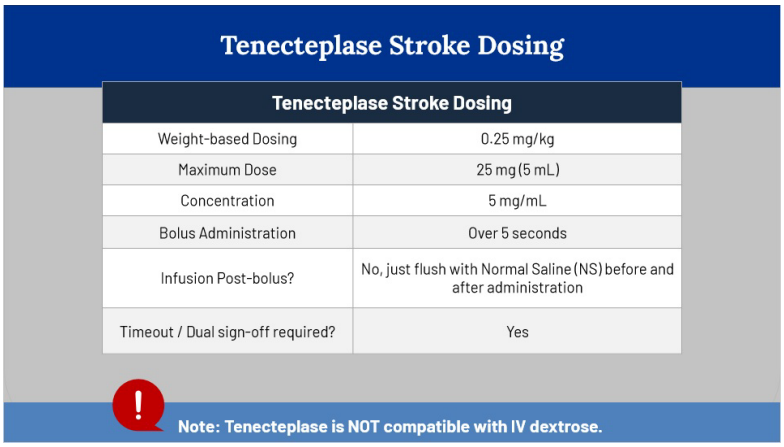


1.20 Before Administering



Notes:

1.21 Tenecteplase Stroke Dosing.



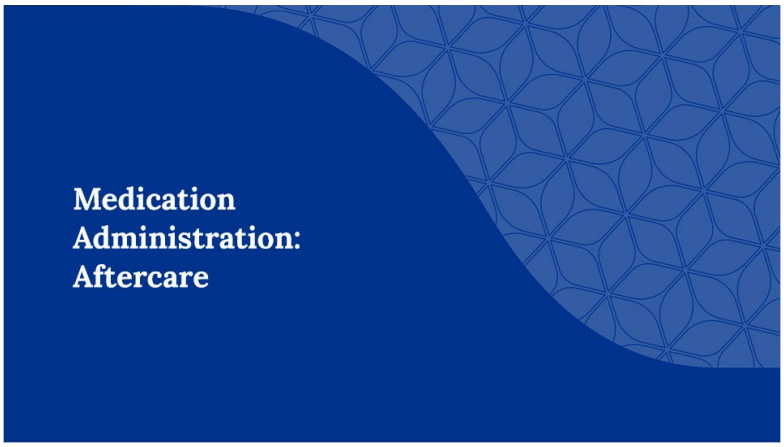
Notes:

1.22 Administering Tenecteplase

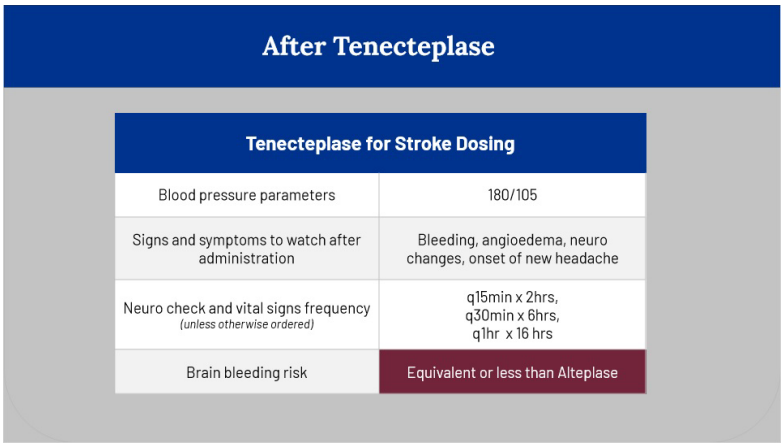


Notes:

1.23 Medication Administration: Aftercare

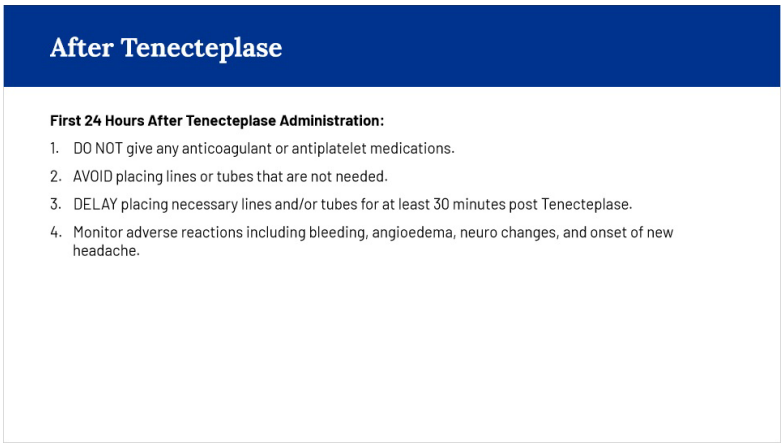


1.24 After Tenecteplase



Notes:

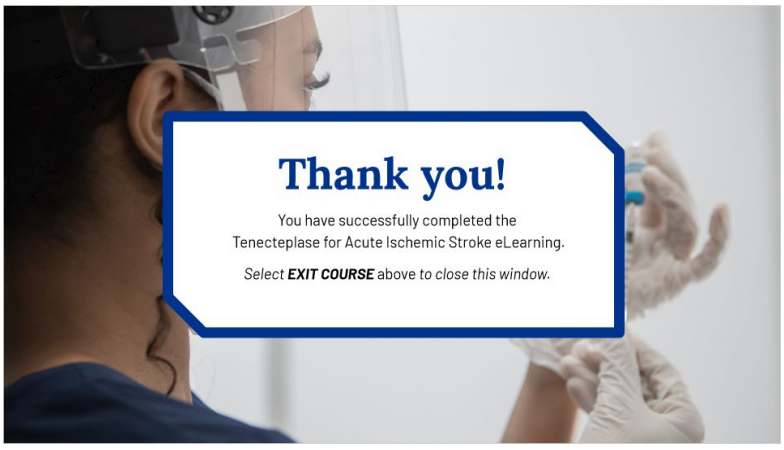
1.25 After Tenecteplase



1.26 Every 15 minutes



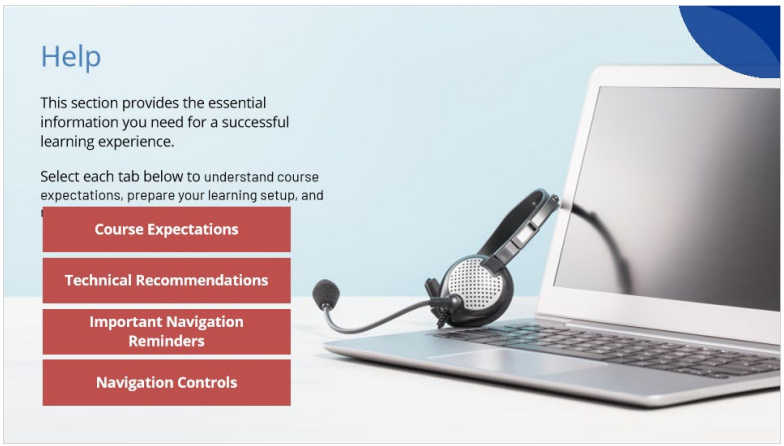
1.27 Conclusion



Notes:

2. HELP

2.1 Help

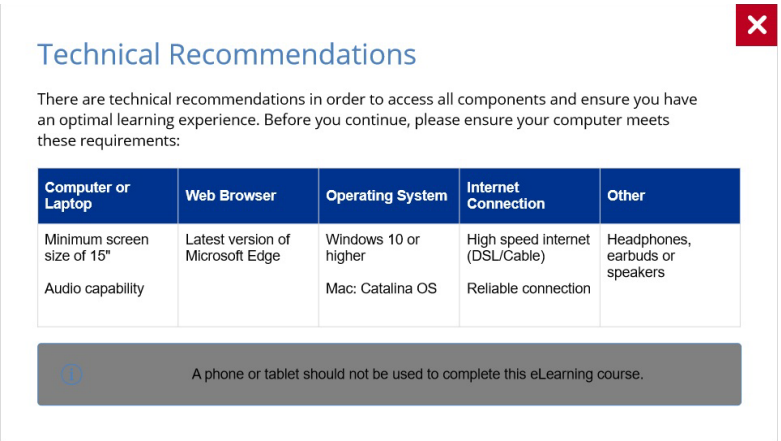


Notes:

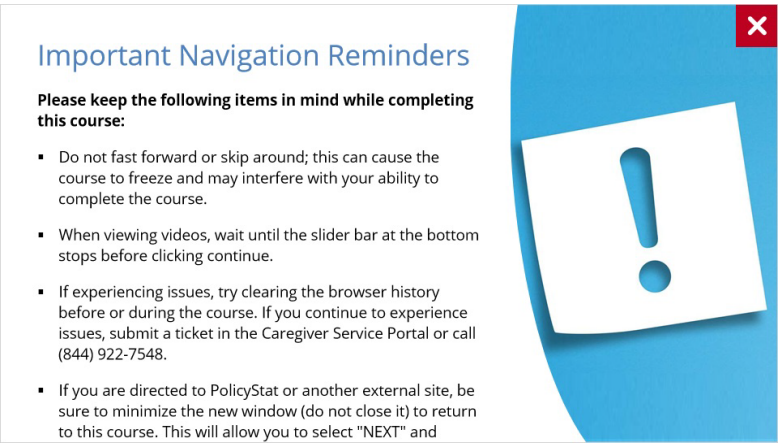
Course Expectations (Slide Layer)



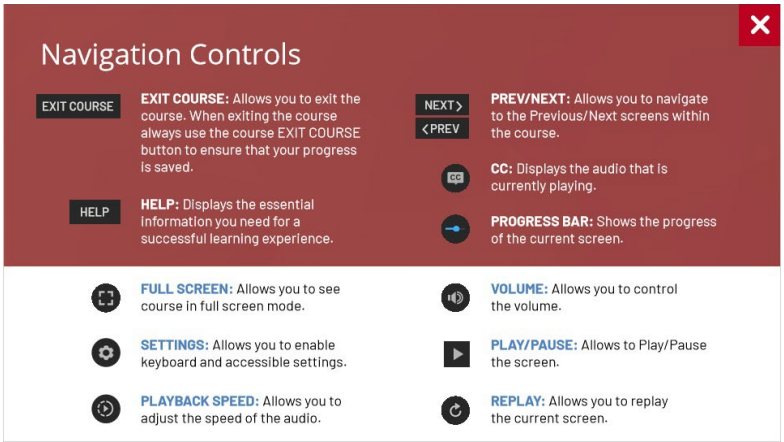
Technical Recommendations (Slide Layer)



Important Navigation Reminders (Slide Layer)

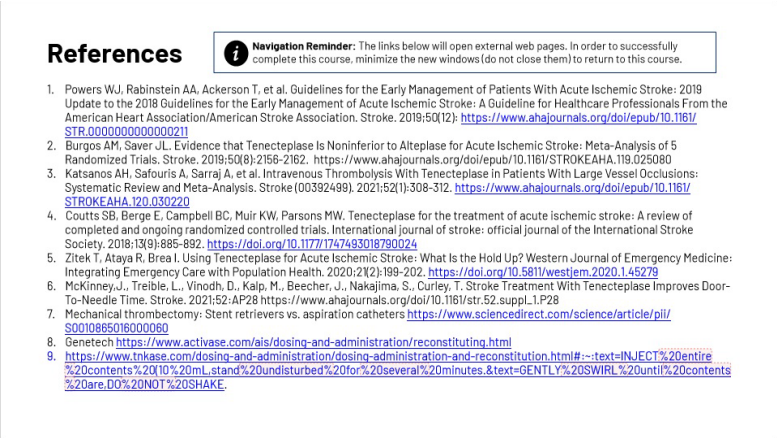


Navigation Controls (Slide Layer)



3. References

3.1 References



References

Navigation Reminder: The links below will open external web pages. In order to successfully complete this course, minimize the new windows (do not close them) to return to this course.

1. Powers WJ, Rabinstein AA, Ackerson T, et al. Guidelines for the Early Management of Patients With Acute Ischemic Stroke: 2019 Update to the 2018 Guidelines for the Early Management of Acute Ischemic Stroke: A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association. Stroke. 2019;50(12): https://www.ahajournals.org/doi/epub/10.1161/STR.0000000000000211
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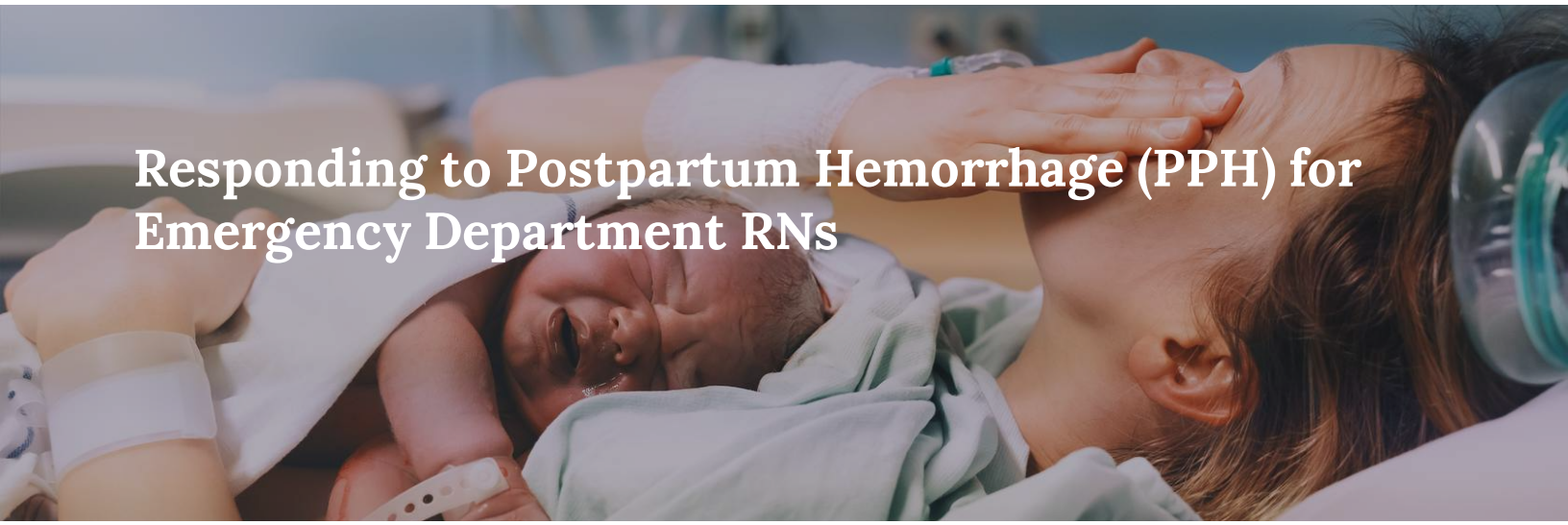
5. Zitek T, Ataya R, Brea I. Using Tenecteplase for Acute Ischemic Stroke: What Is the Hold Up? Western Journal of Emergency Medicine: Integrating Emergency Care with Population Health. 2020;21(2):199-202. https://doi.org/10.5811/westjem.2020.1.45279
6. McKinney,J., Treible, L., Vinodh, D., Kalp, M., Beecher, J., Nakajima, S., Curley, T. Stroke Treatment With Tenecteplase Improves Door-To-Needle Time. Stroke. 2021;52:AP28 https://www.ahajournals.org/doi/10.1161/str.52.suppl_1.P28
7. Mechanical thrombectomy: Stent retrievers vs. aspiration catheters https://www.sciencedirect.com/science/article/pii/S0010865016000060
8. Genetech https://www.activase.com/ais/dosing-and-administration/reconstituting.html
9. https://www.tnkase.com/dosing-and-administration/dosing-administration-and-reconstitution.html#:~:text=INJECT%20entire%20contents%20(10%20mL,stand%20undisturbed%20for%20several%20minutes.&text=GENTLY%20SWIRL%20until%20contents%20are,DO%20NOT%20SHAKE.



Responding to Postpartum Hemorrhage (PPH) for Emergency Department RNs

Providence

This course covers what Emergency Department (ED) RNs should be aware of to identify an obstetric hemorrhage and what actions the role should take to treat a postpartum hemorrhage (PPH).

- Course Objectives
- What is Postpartum Hemorrhage (PPH) and Why is It Important?
- Quantifying Blood Loss (QBL)
- Recognizing & Responding to PPH
- PPH Response Team
- Treatment & Common Medications
- Scenario-Based Assessment
- Summary

Course Objectives

Course Objectives

Upon completion of this course, the learner will be able to:

1. Identify the signs and symptoms of a postpartum hemorrhage (PPH).
2. Assess the patient for PPH.
3. Respond appropriately to PPH depending on your role.

CONTINUE

What is Postpartum Hemorrhage (PPH) and Why is It Important?

- **69% of maternal deaths occur 2 to 6 weeks postpartum**
- **Instances of PPH are on the rise (3% of deliveries in the US - more than 100,000 births per year)**
- **Postpartum hemorrhage is a leading cause of pregnancy-related deaths - most are preventable**
- **1/3 of PPH patients will have no risk factors prior to labor**

What is PPH?

- PPH is defined as cumulative blood loss of **greater than 1000mL** with evidence of maternal hypovolemia and/or hemodynamic instability
- Cumulative blood loss of **greater than 500mL** in vaginal deliveries activates **hemorrhage protocols**

PPH Risk Factors for Early Recognition

- History of PPH
- Known bleeding disorder
- Uterine fibroids
- History of prolonged labor
- Intrauterine infection
- Difficult or prolonged delivery time of the placenta
- Uterine over distention from: history of macrosomia (baby > 4 kg), multiple gestation, and/or polyhydramnios (large amount of amniotic fluid)

Etiology of PPH

Common causes of Primary PPH (< 24 hours postpartum)

1. Uterine atony
2. Genital tract lacerations
3. Retained or invasive placentation
4. Uterine rupture
5. Uterine inversion

6. Coagulopathy

Common causes of Secondary PPH (> 24 hours - 12 weeks postpartum), which is the **most common cause of PPH in the ED**

1. Infection
2. Retained placenta
3. Placental site subinvolution (large, dilated superficial spiral arteries that continue to bleed)
4. Coagulopathy

CONTINUE

Quantifying Blood Loss (QBL)

Denial leads to delay

- Studies show that when caregivers visually estimate blood loss, they often underestimate by 50%, which leads to delayed recognition and treatment.
- **Caregivers need to quantify blood loss every time**. A precise determination eliminates denial and helps the team of caregivers to know when to take action.
- Teams will follow the hemorrhage emergency plan. Refer to PPH Response Team Roles table later in this module and your ministry's policy.

Obstetric Hemorrhage Policy

Click or tap the button to the right to review the Southern California regional Obstetric Hemorrhage Policy.

CLICK OR TAP

CONTINUE

Obstetric Hemorrhage Emergency Plans

California Maternal Quality Care Collaborative (CMQCC) Obstetric Hemorrhage Emergency Management Plan

The CMQCC OB Hemorrhage Emergency Management Plan is available in two formats: table chart and flow chart.

Click or tap the rectangles below to view and download the two formats of the OB Hemorrhage Emergency Management Plan.

PDF

Appendix C Obstetric Hemorrhage Care Guidelines Table Format.pdf

208.1 KB

PDF

Appendix D Obstetric Hemorrhage Care Guidelines Flowchart Format.pdf

231.2 KB

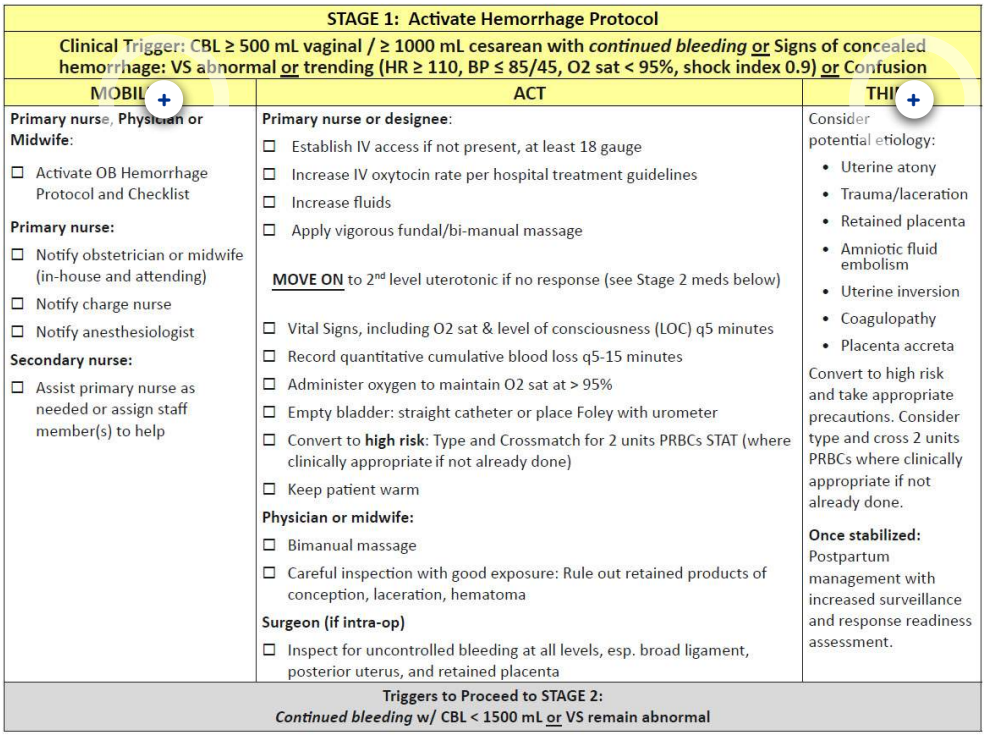
Stages of the CMQCC OB Hemorrhage Emergency Management Plan

Below, the three stages of the emergency management plan are broken out.

This is intended to help caregivers to focus on what their roles demand during each stage.

Click or tap the markers in each stage below for more details.

Stage 1



STAGE 1: Activate Hemorrhage Protocol		
Clinical Trigger: CBL ≥ 500 mL vaginal / ≥ 1000 mL cesarean with *continued bleeding* or Signs of concealed hemorrhage: VS abnormal or trending (HR ≥ 110, BP ≤ 85/45, O2 sat < 95%, shock index 0.9) or Confusion		
MOBIL	**ACT**	**THI**
Primary nurse, Physician or Midwife: ☐ Activate OB Hemorrhage Protocol and Checklist **Primary nurse:** ☐ Notify obstetrician or midwife (in-house and attending) ☐ Notify charge nurse ☐ Notify anesthesiologist **Secondary nurse:** ☐ Assist primary nurse as needed or assign staff member(s) to help	**Primary nurse or designee**: ☐ Establish IV access if not present, at least 18 gauge ☐ Increase IV oxytocin rate per hospital treatment guidelines ☐ Increase fluids ☐ Apply vigorous fundal/bi-manual massage **MOVE ON** to 2nd level uterotonic if no response (see Stage 2 meds below) ☐ Vital Signs, including O2 sat & level of consciousness (LOC) q5 minutes ☐ Record quantitative cumulative blood loss q5-15 minutes ☐ Administer oxygen to maintain O2 sat at > 95% ☐ Empty bladder: straight catheter or place Foley with urometer ☐ Convert to **high risk**: Type and Crossmatch for 2 units PRBCs STAT (where clinically appropriate if not already done) ☐ Keep patient warm **Physician or midwife:** ☐ Bimanual massage ☐ Careful inspection with good exposure: Rule out retained products of conception, laceration, hematoma **Surgeon (if intra-op)** ☐ Inspect for uncontrolled bleeding at all levels, esp. broad ligament, posterior uterus, and retained placenta	Consider potential etiology: • Uterine atony • Trauma/laceration • Retained placenta • Amniotic fluid embolism • Uterine inversion • Coagulopathy • Placenta accreta Convert to high risk and take appropriate precautions. Consider type and cross 2 units PRBCs where clinically appropriate if not already done. **Once stabilized:** Postpartum management with increased surveillance and response readiness assessment.
Triggers to Proceed to STAGE 2: ***Continued bleeding* w/ CBL < 1500 mL or VS remain abnormal**		

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Activate PPH protocol

RN or LP to activate protocol/checklist

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Triggers to Proceed to STAGE 2: ***Continued bleeding* w/ CBL < 1500 mL or VS remain abnormal**		

Initiate preparations

- Establish IV of at least 18 gauge
- Complete fundal massage
- Monitor vital signs
- Record QBL
- Give uterotonic drugs as directed
- Empty bladder using Foley catheter with urimeter
- Type & Crossmatch 2U PRBC

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Triggers to Proceed to STAGE 2: ***Continued bleeding* w/ CBL < 1500 mL or VS remain abnormal**		

Consider potential cause

Attempt to determine cause of hemorrhage

Stage 2

STAGE 2: Mobilize Team and Blood Bank Support		
Clinical Trigger: Continued bleeding or Vital Sign instability, and < 1500 mL cumulative blood loss		
MOBILIZE	**ACT**	**THINK**
Perform duties by assigned role: ☐ Activate OB Rapid Response Team: **PHONE #:**_____ **If not included in OB RRT:** ☐ Call obstetrician or midwife to bedside ☐ Call Anesthesiologist ☐ Notify Perinatologist or 2nd OB ☐ Notify nursing supervisor ☐ Notify blood bank of hemorrhage; order products as d[illegible]ed ☐ Bring hemor[illegible] cart to the patient's location ☐ Initiate OB hemorrhage record scribing ☐ Assign single [illegible]n to communicate with blood bank ☐ Assign a family support person/medical social worker per procedure	ESTABLISH TEAM LEADERSHIP AND ASSIGN ROLES Administer 2nd level uterotonic medication: ☐ **Methylergonovine** 0.2 mg IM per protocol (if not hypertensive) ☐ If hypertensive or Methylergonovine dose ineffective: **carboprost** 250 mcg IM ☐ Can repeat carboprost up to 3 times every 20 min (note: 75% respond to first dose) ☐ ***Only** If hypertensive and asthmatic*: **Misoprostol** 800 mcg SL ☐ Continue IV oxytocin and provide additional IV crystalloid solution ☐ Administer tranexamic acid (TXA) 1 gram IV over 10 minutes – may give a second dose of 1 gm if bleeding continues after 30 minutes or if bleeding stops and then restarts within 24 hours of completing the first dose **Team leader:** **Do not delay other interventions while waiting for response to medications (see right column - THINK)** ☐ Order labs STAT (CBC/Plts, Chem 12 panel, Coag Panel II, ABG) ☐ Bimanual uterine massage ☐ Vaginal Delivery: Complete evaluation of vaginal wall, cervix, placenta, uterine cavity (if not already done) ☐ Intra-op cesarean: Inspect for uncontrolled bleeding at all levels, esp. broad ligament, posterior uterus, and retained placenta (if not already done) ☐ Move to OR or location where higher level of care can be adequately provided ☐ Order 2 units PRBCs and bring to the bedside - consider use of **Emergency Release** products (un-crossmatched) ☐ **Transfuse PRBCs based on clinical signs** and response, do not wait for lab results; KEEP AHEAD W/ VOLUME & BLOOD PRODUCTS **Primary nurse (or designee)**: ☐ Establish 2nd large bore IV, at least 18 gauge ☐ Assess and announce Vital Signs and quantitative cumulative blood loss q5-15 minutes ☐ Set up blood administration set and blood warmer for transfusion ☐ Administer meds, blood products and draw labs, as ordered ☐ Keep patient warm **Second nurse**: ☐ Obtain hemorrhage cart if not already in the room ☐ Obtain portable light ☐ Place Foley with urometer (if not already done) ☐ Obtain blood products from the blood bank (or send designee) ☐ Assist with move to OR or higher level of care (if indicated) **Blood Bank:** ☐ Prepare to activate massive transfusion protocol if needed	**[illegible]entially advance through procedures** and [illegible]er interventions based on etiology: **Vaginal birth** If **trauma** (vaginal, cervical or uterine): • Visualize and repair If **retained placenta**: • D&C If **uterine atony** or lower uterine segment bleeding: • Intrauterine balloon **Intra-op C-section**: • Uterine suture • Intrauterine balloon • Uterine artery ligation If **uterine inversion**: • Anesthesia and uterine relaxation drugs for manual reduction If **amniotic fluid embolism**: • Maximally aggressive respiratory, vasopressor and blood product support **[illegible]l signs derangement inconsistent with measured blood loss consider concealed hemorrhage**: lower uterine genital tract hematoma with extension; uterine rupture, broad ligament laceration; or other source of internal bleeding; **move to laparotomy.** Consider activating MTP if there is continued bleeding. **Once stabilized:** Postpartum management with increased surveillance and response readiness assessment.
Re-Evaluate Bleeding and Vital Signs **Triggers to Proceed to STAGE 3:** ***Continued bleeding* with CBL > 1500mL or > 2 units PRBCs given or abnormal VS or suspicion of DIC**		

STAGE 2: Mobilize Team and Blood Bank Support		
Clinical Trigger: Continued bleeding or Vital Sign instability, and < 1500 mL cumulative blood loss		
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Re-Evaluate Bleeding and Vital Signs **Triggers to Proceed to STAGE 3:** ***Continued bleeding*** **with CBL > 1500mL or > 2 units PRBCs given or abnormal VS or suspicion of DIC**		

Activate hemorrhage protocol and checklist

STAGE 2: Mobilize Team and Blood Bank Support		
Clinical Trigger: Continued bleeding or Vital Sign instability, and < 1500 mL cumulative blood loss		
MOBILIZE	**ACT**	**THINK**
Perform duties by assigned role: ☐ Activate OB Rapid Response Team: **PHONE #:**_____ **If not included in OB RRT:** ☐ Call obstetrician or midwife to bedside ☐ Call Anesthesiologist ☐ Notify Perinatologist or 2nd OB ☐ Notify nursing supervisor ☐ Notify blood bank of hemorrhage; order products as (…)d ☐ Bring hemo… cart to the patient's location ☐ Initiate OB hemorrhage record scribing ☐ Assign single person to communicate with blood bank ☐ Assign a family support person/medical social worker per procedure	**ESTABLISH TEAM LEADERSHIP AND ASSIGN ROLES** Administer 2nd level uterotonic medication: ☐ **Methylergonovine** 0.2 mg IM per protocol (if not hypertensive) ☐ If hypertensive or Methylergonovine dose ineffective: **carboprost** 250 mcg IM ☐ Can repeat carboprost up to 3 times every 20 min (note: 75% respond to first dose) ☐ ***Only*** *If hypertensive and asthmatic:* **Misoprostol** 800 mcg SL ☐ Continue IV oxytocin and provide additional IV crystalloid solution ☐ Administer tranexamic acid (TXA) 1 gram IV over 10 minutes – may give a second dose of 1 gm if bleeding continues after 30 minutes or if bleeding stops and then restarts within 24 hours of completing the first dose **Team leader:** **Do not delay other interventions while waiting for response to medications (see right column - THINK)** ☐ Order labs STAT (CBC/Plts, Chem 12 panel, Coag Panel II, ABG) ☐ Bimanual uterine massage ☐ Vaginal Delivery: Complete evaluation of vaginal wall, cervix, placenta, uterine cavity (if not already done) ☐ Intra-op cesarean: Inspect for uncontrolled bleeding at all levels, esp. broad ligament, posterior uterus, and retained placenta (if not already done) ☐ Move to OR or location where higher level of care can be adequately provided ☐ Order 2 units PRBCs and bring to the bedside - consider use of **Emergency Release** products (un-crossmatched) ☐ **Transfuse PRBCs based on clinical signs** and response, do not wait for lab results; KEEP AHEAD W/ VOLUME & BLOOD PRODUCTS **Primary nurse (or designee)**: ☐ Establish 2nd large bore IV, at least 18 gauge ☐ Assess and announce Vital Signs and quantitative cumulative blood loss q5-15 minutes ☐ Set up blood administration set and blood warmer for transfusion ☐ Administer meds, blood products and draw labs, as ordered ☐ Keep patient warm **Second nurse**: ☐ Obtain hemorrhage cart if not already in the room ☐ Obtain portable light ☐ Place Foley with urometer (if not already done) ☐ Obtain blood products from the blood bank (or send designee) ☐ Assist with move to OR or higher level of care (if indicated) **Blood Bank:** ☐ Prepare to activate massive transfusion protocol if needed	**Sequentially advance through procedures** and other interventions based on etiology: **Vaginal birth** If **trauma** (vaginal, cervical or uterine): • Visualize and repair If **retained placenta**: • D&C If **uterine atony** or lower uterine segment bleeding: • Intrauterine balloon **Intra-op C-section**: • Uterine suture • Intrauterine balloon • Uterine artery ligation If **uterine inversion**: • Anesthesia and uterine relaxation drugs for manual reduction If **amniotic fluid embolism**: • Maximally aggressive respiratory, vasopressor and blood product support If **vital signs derangement inconsistent with measured blood loss consider concealed hemorrhage**: lower uterine genital tract hematoma with extension; uterine rupture, broad ligament laceration; or other source of internal bleeding; **move to laparotomy.** Consider activating MTP if there is continued bleeding. **Once stabilized:** Postpartum management with increased surveillance and response readiness assessment.
Re-Evaluate Bleeding and Vital Signs **Triggers to Proceed to STAGE 3:** ***Continued bleeding*** **with CBL > 1500mL or > 2 units PRBCs given or abnormal VS or suspicion of DIC**		

Initiate preparations

Get help, but primary RN STAY AT BEDSIDE

STAGE 2: Mobilize Team and Blood Bank Support		
Clinical Trigger: Continued bleeding or Vital Sign instability, and < 1500 mL cumulative blood loss		
MOBILIZE	**ACT**	**THINK**
Perform duties by assigned role: ☐ Activate OB Rapid Response Team: **PHONE #:**_____ **If not included in OB RRT:** ☐ Call obstetrician or midwife to bedside ☐ Call Anesthesiologist ☐ Notify Perinatologist or 2nd OB ☐ Notify nursing supervisor ☐ Notify blood bank of hemorrhage; order products as directed ☐ Bring hemorrhage cart to the patient's location ☐ Initiate OB hemorrhage record scribing ☐ Assign single person to communicate with blood bank ☐ Assign a family support person/medical social worker per procedure	**ESTABLISH TEAM LEADERSHIP AND ASSIGN ROLES** Administer 2nd level uterotonic medication: ☐ **Methylergonovine** 0.2 mg IM per protocol (if not hypertensive) ☐ If hypertensive or Methylergonovine dose ineffective: **carboprost** 250 mcg IM ☐ Can repeat carboprost up to 3 times every 20 min (note: 75% respond to first dose) ☐ ***Only*** *If hypertensive and asthmatic:* **Misoprostol** 800 mcg SL ☐ Continue IV oxytocin and provide additional IV crystalloid solution ☐ Administer tranexamic acid (TXA) 1 gram IV over 10 minutes – may give a second dose of 1 gm if bleeding continues after 30 minutes or if bleeding stops and then restarts within 24 hours of completing the first dose **Team leader:** **Do not delay other interventions while waiting for response to medications (see right column - THINK)** ☐ Order labs STAT (CBC/Plts, Chem 12 panel, Coag Panel II, ABG) ☐ Bimanual uterine massage ☐ Vaginal Delivery: Complete evaluation of vaginal wall, cervix, placenta, uterine cavity (if not already done) ☐ Intra-op cesarean: Inspect for uncontrolled bleeding at all levels, esp. broad ligament, posterior uterus, and retained placenta (if not already done) ☐ Move to OR or location where higher level of care can be adequately provided ☐ Order 2 units PRBCs and bring to the bedside - consider use of **Emergency Release** products (un-crossmatched) ☐ **Transfuse PRBCs based on clinical signs** and response, do not wait for lab results; KEEP AHEAD W/ VOLUME & BLOOD PRODUCTS **Primary nurse (or designee)**: ☐ Establish 2nd large bore IV, at least 18 gauge ☐ Assess and announce Vital Signs and quantitative cumulative blood loss q5-15 minutes ☐ Set up blood administration set and blood warmer for transfusion ☐ Administer meds, blood products and draw labs, as ordered ☐ Keep patient warm **Second nurse**: ☐ Obtain hemorrhage cart if not already in the room ☐ Obtain portable light ☐ Place Foley with urometer (if not already done) ☐ Obtain blood products from the blood bank (or send designee) ☐ Assist with move to OR or higher level of care (if indicated) **Blood Bank:** ☐ Prepare to activate massive transfusion protocol if needed	**Sequentially advance through procedures** and other interventions based on etiology: **Vaginal birth** If **trauma** (vaginal, cervical or uterine): • Visualize and repair If **retained placenta**: • D&C If **uterine atony** or lower uterine segment bleeding: • Intrauterine balloon **Intra-op C-section**: • Uterine suture • Intrauterine balloon • Uterine artery ligation If **uterine inversion**: • Anesthesia and uterine relaxation drugs for manual reduction If **amniotic fluid embolism**: • Maximally aggressive respiratory, vasopressor and blood product support If **vital signs derangement inconsistent with measured blood loss consider concealed hemorrhage**: lower uterine genital tract hematoma with extension; uterine rupture, broad ligament laceration; or other source of internal bleeding; **move to laparotomy.** Consider activating MTP if there is continued bleeding. **Once stabilized:** Postpartum management with increased surveillance and response readiness assessment.
Re-Evaluate Bleeding and Vital Signs **Triggers to Proceed to STAGE 3:** ***Continued bleeding*** **with CBL > 1500mL or > 2 units PRBCs given or abnormal VS or suspicion of DIC**		

Initiate preparations

Foley with urimeter

STAGE 2: Mobilize Team and Blood Bank Support		
Clinical Trigger: Continued bleeding or Vital Sign instability, and < 1500 mL cumulative blood loss		
MOBILIZE	**ACT**	**THINK**
Perform duties by assigned role: ☐ Activate OB Rapid Response Team: **PHONE #:**_____ **If not included in OB RRT:** ☐ Call obstetrician or midwife to bedside ☐ Call Anesthesiologist ☐ Notify Perinatologist or 2nd OB ☐ Notify nursing supervisor ☐ Notify blood bank of hemorrhage; order products as directed ☐ Bring hemorrhage cart to the patient's location ☐ Initiate OB hemorrhage record scribing ☐ Assign single person to communicate with blood bank ☐ Assign a family support person/medical social worker per procedure	**ESTABLISH TEAM LEADERSHIP AND ASSIGN ROLES** Administer 2nd level uterotonic medication: ☐ **Methylergonovine** 0.2 mg IM per protocol (if not hypertensive) ☐ If hypertensive or Methylergonovine dose ineffective: **carboprost** 250 mcg IM ☐ Can repeat carboprost up to 3 times every 20 min (note: 75% respond to first dose) ☐ ***Only*** *If hypertensive and asthmatic:* **Misoprostol** 800 mcg SL ☐ Continue IV oxytocin and provide additional IV crystalloid solution ☐ Administer tranexamic acid (TXA) 1 gram IV over 10 minutes – may give a second dose of 1 gm if bleeding continues after 30 minutes or if bleeding stops and then restarts within 24 hours of completing the first dose **Team leader:** **Do not delay other interventions while waiting for response to medications (see right column - THINK)** ☐ Order labs STAT (CBC/Plts, Chem 12 panel, Coag Panel II, ABG) ☐ Bimanual uterine massage ☐ Vaginal Delivery: Complete evaluation of vaginal wall, cervix, placenta, uterine cavity (if not already done) ☐ Intra-op cesarean: Inspect for uncontrolled bleeding at all levels, esp. broad ligament, posterior uterus, and retained placenta (if not already done) ☐ Move to OR or location where higher level of care can be adequately provided ☐ Order 2 units PRBCs and bring to the bedside - consider use of **Emergency Release** products (un-crossmatched) ☐ **Transfuse PRBCs based on clinical signs** and response, do not wait for lab results; KEEP AHEAD W/ VOLUME & BLOOD PRODUCTS **Primary nurse (or designee)**: ☐ Establish 2nd large bore IV, at least 18 gauge ☐ Assess and announce Vital Signs and quantitative cumulative blood loss q5-15 minutes ☐ Set up blood administration set and blood warmer for transfusion ☐ Administer meds, blood products and draw labs, as ordered ☐ Keep patient warm **Second nurse**: ☐ Obtain hemorrhage cart if not already in the room ☐ Obtain portable light ☐ Place Foley with urometer (if not already done) ☐ Obtain blood products from the blood bank (or send designee) ☐ Assist with move to OR or higher level of care (if indicated) **Blood Bank:** ☐ Prepare to activate massive transfusion protocol if needed	**Sequentially advance through procedures** and other interventions based on etiology: **Vaginal birth** If **trauma** (vaginal, cervical or uterine): • Visualize and repair If **retained placenta**: • D&C If **uterine atony** or lower uterine segment bleeding: • Intrauterine balloon **Intra-op C-section**: • Uterine suture • Intrauterine balloon • Uterine artery ligation If **uterine inversion**: • Anesthesia and uterine relaxation drugs for manual reduction If **amniotic fluid embolism**: • Maximally aggressive respiratory, vasopressor and blood product support If **vital signs derangement inconsistent with measured blood loss consider concealed hemorrhage**: lower uterine genital tract hematoma with extension; uterine rupture, broad ligament laceration; or other source of internal bleeding; **move to laparotomy.** Consider activating MTP if there is continued bleeding. **Once stabilized:** Postpartum management with increased surveillance and response readiness assessment.
Re-Evaluate Bleeding and Vital Signs **Triggers to Proceed to STAGE 3:** ***Continued bleeding*** **with CBL > 1500mL or > 2 units PRBCs given or abnormal VS or suspicion of DIC**		

Initiate preparations

Blood bank: T and C 2 units

STAGE 2: Mobilize Team and Blood Bank Support		
Clinical Trigger: Continued bleeding or Vital Sign instability, and < 1500 mL cumulative blood loss		
MOBILIZE	**ACT**	**THINK**
Perform duties by assigned role: ☐ Activate OB Rapid Response Team: **PHONE #:**_____ **If not included in OB RRT:** ☐ Call obstetrician or midwife to bedside ☐ Call Anesthesiologist ☐ Notify Perinatologist or 2nd OB ☐ Notify nursing supervisor ☐ Notify blood bank of hemorrhage; order products as directed ☐ Bring hemorrhage cart to the patient's location ☐ Initiate OB hemorrhage record scribing ☐ Assign single person to communicate with blood bank ☐ Assign a family support person/medical social worker per procedure	**ESTABLISH TEAM LEADERSHIP AND ASSIGN ROLES** Administer 2nd level uterotonic medication: ☐ **Methylergonovine** 0.2 mg IM per protocol (if not hypertensive) ☐ If hypertensive or Methylergonovine dose ineffective: **carboprost** 250 mcg IM ☐ Can repeat carboprost up to 3 times every 20 min (note: 75% respond to first dose) ☐ ***Only*** *If hypertensive and asthmatic:* **Misoprostol** 800 mcg SL ☐ Continue IV oxytocin and provide additional IV crystalloid solution ☐ Administer tranexamic acid (TXA) 1 gram IV over 10 minutes – may give a second dose of 1 gm if bleeding continues after 30 minutes or if bleeding stops and then restarts within 24 hours of completing the first dose **Team leader:** **Do not delay other interventions while waiting for response to medications (see right column - THINK)** ☐ Order labs STAT (CBC/Plts, Chem 12 panel, Coag Panel II, ABG) ☐ Bimanual uterine massage ☐ Vaginal Delivery: Complete evaluation of vaginal wall, cervix, placenta, uterine cavity (if not already done) ☐ Intra-op cesarean: Inspect for uncontrolled bleeding at all levels, esp. broad ligament, posterior uterus, and retained placenta (if not already done) ☐ Move to OR or location where higher level of care can be adequately provided ☐ Order 2 units PRBCs and bring to the bedside - consider use of **Emergency Release** products (un-crossmatched) ☐ **Transfuse PRBCs based on clinical signs** and response, do not wait for lab results; KEEP AHEAD W/ VOLUME & BLOOD PRODUCTS **Primary nurse (or designee)**: ☐ Establish 2nd large bore IV, at least 18 gauge ☐ Assess and announce Vital Signs and quantitative cumulative blood loss q5-15 minutes ☐ Set up blood administration set and blood warmer for transfusion ☐ Administer meds, blood products and draw labs, as ordered ☐ Keep patient warm **Second nurse**: ☐ Obtain hemorrhage cart if not already in the room ☐ Obtain portable light ☐ Place Foley with urometer (if not already done) ☐ Obtain blood products from the blood bank (or send designee) ☐ Assist with move to OR or higher level of care (if indicated) **Blood Bank:** ☐ Prepare to activate massive transfusion protocol if needed	**ntially advance through procedures** and interventions based on etiology: **Vaginal birth** If **trauma** (vaginal, cervical or uterine): • Visualize and repair If **retained placenta**: • D&C If **uterine atony** or lower uterine segment bleeding: • Intrauterine balloon **Intra-op C-section**: • Uterine suture • Intrauterine balloon • Uterine artery ligation If **uterine inversion**: • Anesthesia and uterine relaxation drugs for manual reduction If **amniotic fluid embolism**: • Maximally aggressive respiratory, vasopressor and blood product support If **vital signs derangement inconsistent with measured blood loss consider concealed hemorrhage**: lower uterine genital tract hematoma with extension; uterine rupture, broad ligament laceration; or other source of internal bleeding; **move to laparotomy.** Consider activating MTP if there is continued bleeding. **Once stabilized:** Postpartum management with increased surveillance and response readiness assessment.
Re-Evaluate Bleeding and Vital Signs **Triggers to Proceed to STAGE 3:** ***Continued bleeding*** **with CBL > 1500mL or > 2 units PRBCs given or abnormal VS or suspicion of DIC**		

Find cause

Use a **standard** second line medication for atony

STAGE 2: Mobilize Team and Blood Bank Support		
Clinical Trigger: Continued bleeding or Vital Sign instability, and < 1500 mL cumulative blood loss		
MOBILIZE	**ACT**	**THINK**
Perform duties by assigned role: ☐ Activate OB Rapid Response Team: **PHONE #:**_____ **If not included in OB RRT:** ☐ Call obstetrician or midwife to bedside ☐ Call Anesthesiologist ☐ Notify Perinatologist or 2nd OB ☐ Notify nursing supervisor ☐ Notify blood bank of hemorrhage; order products as directed ☐ Bring hemorrhage cart to the patient's location ☐ Initiate OB hemorrhage record scribing ☐ Assign single person to communicate with blood bank ☐ Assign a family support person/medical social worker per procedure	**ESTABLISH TEAM LEADERSHIP AND ASSIGN ROLES** Administer 2nd level uterotonic medication: ☐ **Methylergonovine** 0.2 mg IM per protocol (if not hypertensive) ☐ If hypertensive or Methylergonovine dose ineffective: **carboprost** 250 mcg IM ☐ Can repeat carboprost up to 3 times every 20 min (note: 75% respond to first dose) ☐ ***Only*** *If hypertensive and asthmatic:* **Misoprostol** 800 mcg SL ☐ Continue IV oxytocin and provide additional IV crystalloid solution ☐ Administer tranexamic acid (TXA) 1 gram IV over 10 minutes – may give a second dose of 1 gm if bleeding continues after 30 minutes or if bleeding stops and then restarts within 24 hours of completing the first dose **Team leader:** **Do not delay other interventions while waiting for response to medications (see right column - THINK)** ☐ Order labs STAT (CBC/Plts, Chem 12 panel, Coag Panel II, ABG) ☐ Bimanual uterine massage ☐ Vaginal Delivery: Complete evaluation of vaginal wall, cervix, placenta, uterine cavity (if not already done) ☐ Intra-op cesarean: Inspect for uncontrolled bleeding at all levels, esp. broad ligament, posterior uterus, and retained placenta (if not already done) ☐ Move to OR or location where higher level of care can be adequately provided ☐ Order 2 units PRBCs and bring to the bedside - consider use of **Emergency Release** products (un-crossmatched) ☐ **Transfuse PRBCs based on clinical signs** and response, do not wait for lab results; KEEP AHEAD W/ VOLUME & BLOOD PRODUCTS **Primary nurse (or designee)**: ☐ Establish 2nd large bore IV, at least 18 gauge ☐ Assess and announce Vital Signs and quantitative cumulative blood loss q5-15 minutes ☐ Set up blood administration set and blood warmer for transfusion ☐ Administer meds, blood products and draw labs, as ordered ☐ Keep patient warm **Second nurse**: ☐ Obtain hemorrhage cart if not already in the room ☐ Obtain portable light ☐ Place Foley with urometer (if not already done) ☐ Obtain blood products from the blood bank (or send designee) ☐ Assist with move to OR or higher level of care (if indicated) **Blood Bank:** ☐ Prepare to activate massive transfusion protocol if needed	**Sequentially advance through procedures** and other interventions based on etiology: **Vaginal birth** If **trauma** (vaginal, cervical or uterine): • Visualize and repair If **retained placenta**: • D&C If **uterine atony** or lower uterine segment bleeding: • Intrauterine balloon **Intra-op C-section**: • Uterine suture • Intrauterine balloon • Uterine artery ligation If **uterine inversion**: • Anesthesia and uterine relaxation drugs for manual reduction If **amniotic fluid embolism**: • Maximally aggressive respiratory, vasopressor and blood product support **+ signs derangement inconsistent with sured blood loss consider concealed hemorrhage**: lower uterine genital tract hematoma with extension; uterine rupture, broad ligament laceration; or other source of internal bleeding; **move to laparotomy.** Consider activating MTP if there is continued bleeding. **Once stabilized:** Postpartum management with increased surveillance and response readiness assessment.
Re-Evaluate Bleeding and Vital Signs **Triggers to Proceed to STAGE 3:** ***Continued bleeding*** **with CBL > 1500mL or > 2 units PRBCs given or abnormal VS or suspicion of DIC**		

Quantify blood loss

- Retain blood-soaked items
- Weigh blood-soaked items

Stage 3

STAGE 3: Initiate Massive Transfusion Protocol & Surgical Approaches		
Clinical Trigger: *Continued bleeding* with CBL > 1500mL or > 2 units PRBCs given or abnormal VS or suspicion of DIC		
MOBILIZE	**ACT**	**THINK**
Perform duties by assigned role: ☐ **Activate Massive Transfusion Protocol** PHONE #:_____ **Ensure additional team experts available.** **Examples:** ☐ Advanced Gyn surgeon (e.g., Gyn Oncologist) ☐ Second anesthesiologist ☐ Main OR staff ☐ Adult intensivist ☐ Supervisor, CNS, or manager ☐ **Reassign staff as needed** ☐ If considering selective embolization, call-in Interventional Radiology team and second anesthesiologist Blood Bank: ☐ **Prepare to issue additional blood products as needed in accordance with MTP** – stay ahead ☐ If patient at risk for multiorgan failure or residual coagulopathy **– contact ICU regarding transfer.** ☐ Continue family support	**Reidentify team leadership and micro brief with additional team members** **Team leader:** ☐ **Order Massive Transfusion Pack** ☐ (PRBCs + FFP + 1 pheresis pack Plts—see note in right column) ☐ **Move to OR** if not already there ☐ Repeat CBC/Plts, Coag Panel II STAT and Chem 12 panel q30-60 min ☐ Repeat ABGs ☐ Consider cell saver if preplanned or immediately available; notify transfusionist **Anesthesiologist** (as indicated): ☐ Ongoing monitoring of VS *and communication to team* ☐ Arterial blood gases ☐ Consider central hemodynamic monitoring ☐ CVP or PA line ☐ Arterial line ☐ Vasopressor support ☐ Intubation ☐ Calcium replacement ☐ Electrolyte monitoring ☐ Ensure large bore IV for transfusion **Primary nurse:** ☐ Announce cumulative quantitative blood loss q5-10 minutes ☐ Apply upper body warming blanket ☐ Use fluid warmer and/or rapid infuser for fluid & blood product administration ☐ Apply sequential compression stockings to lower extremities ☐ Circulate in OR **Second nurse and/or anesthesiologist:** ☐ Continue to administer meds, blood products and draw labs as ordered **Third Nurse:** ☐ Recorder	Interventions based on etiology not yet completed **Prevent hypothermia, acidemia** **Conservative or Definitive Surgery:** • Uterine sutures • Uterine artery ligation • Hysterectomy **For Resuscitation:** **Aggressively Transfuse** **Based on Vital Signs, Blood Loss** **After the first 2 units of PRBCs use** **Near equal FFP and PRBC for massive hemorrhage:** **1 PRBC to 1 FFP** **1 platelet apheresis pack per 4-6 units PRBCs** **If above measures unproductive:** Interventional Radiology (IR) for selective embolization as appropriate if patient stable for transport and team *immediately available* - physician who is able to immediately call for and move to surgery should be in house. **Unresponsive Coagulopathy:** • Role of rFactor VIIa is very controversial. After 8-10 units PRBCs and coagulation factor replacement with ongoing hemorrhage, may consider risk/benefit of rFactor VIIa in consultation with hematologist or trauma surgeon **Once Stabilized:** Modified postpartum management with increased surveillance; consider ICU

STAGE 3: Initiate Massive Transfusion Protocol & Surgical Approaches		
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Initiate massive transfusion protocol

- Transfuse aggressively
- Near 1:1 ratio PRBC:FFP
- Rapid use of FFP may be as important as ratio
- 1PLT pheresis pack per 4-6 units PRBC

STAGE 3: Initiate Massive Transfusion Protocol & Surgical Approaches		
Clinical Trigger: *Continued bleeding* with CBL > 1500mL or > 2 units PRBCs given or abnormal VS or suspicion of DIC		
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Mobilize help

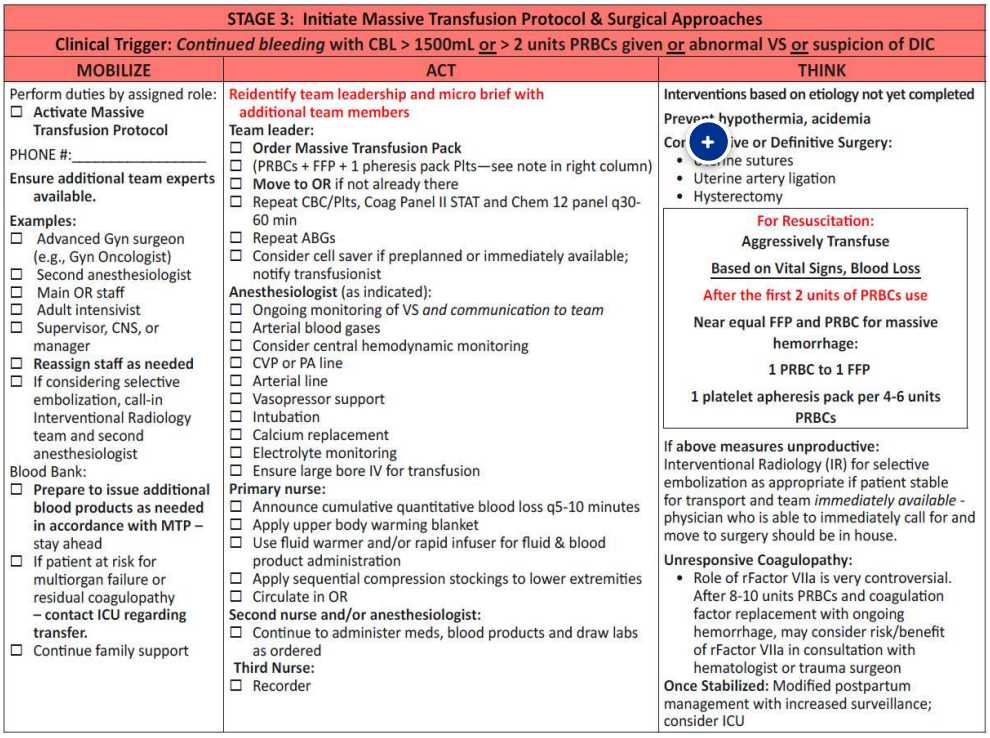
Advanced surgeon:

- Gyn
- Gyn onc
- Trauma
- MFM

STAGE 3: Initiate Massive Transfusion Protocol & Surgical Approaches		
Clinical Trigger: *Continued bleeding* with CBL > 1500mL or > 2 units PRBCs given or abnormal VS or suspicion of DIC		
MOBILIZE	**ACT**	**THINK**
Perform duties by assigned role: ☐ **Activate Massive Transfusion Protocol** PHONE #:_____ **Ensure additional team experts available.** **Examples:** ☐ Advanced Gyn surgeon (e.g., Gyn Oncologist) ☐ Second anesthesiologist ☐ Main OR staff ☐ Adult intensivist ☐ Supervisor, CNS, or manager ☐ **Reassign staff as needed** ☐ If considering selective embolization, call-in Interventional Radiology team and second anesthesiologist Blood Bank: ☐ **Prepare to issue additional blood products as needed in accordance with MTP** – stay ahead ☐ If patient at risk for multiorgan failure or residual coagulopathy **– contact ICU regarding transfer.** ☐ Continue family support	Reidentify team leadership and micro brief with additional team members **Team leader:** ☐ **Order Massive Transfusion Pack** ☐ (PRBCs + FFP + 1 pheresis pack Plts—see note in right column) ☐ **Move to OR** if not already there ☐ Repeat CBC/Plts, Coag Panel II STAT and Chem 12 panel q30-60 min ☐ Repeat ABGs ☐ Consider cell saver if preplanned or immediately available; notify transfusionist **Anesthesiologist** (as indicated): ☐ Ongoing monitoring of VS *and communication to team* ☐ Arterial blood gases ☐ Consider central hemodynamic monitoring ☐ CVP or PA line ☐ Arterial line ☐ Vasopressor support ☐ Intubation ☐ Calcium replacement ☐ Electrolyte monitoring ☐ Ensure large bore IV for transfusion **Primary nurse:** ☐ Announce cumulative quantitative blood loss q5-10 minutes ☐ Apply upper body warming blanket ☐ Use fluid warmer and/or rapid infuser for fluid & blood product administration ☐ Apply sequential compression stockings to lower extremities ☐ Circulate in OR **Second nurse and/or anesthesiologist:** ☐ Continue to administer meds, blood products and draw labs as ordered **Third Nurse:** ☐ Recorder	**Interventions based on etiology not yet completed** **Prevent hypothermia, acidemia** **Conservative or Definitive Surgery:** • Uterine sutures • Uterine artery ligation • Hysterectomy **For Resuscitation:** **Aggressively Transfuse** **Based on Vital Signs, Blood Loss** **After the first 2 units of PRBCs use** **Near equal FFP and PRBC for massive hemorrhage:** **1 PRBC to 1 FFP** **1 platelet apheresis pack per 4-6 units PRBCs** **If above measures unproductive:** Interventional Radiology (IR) for selective embolization as appropriate if patient stable for transport and team *immediately available* - physician who is able to immediately call for and move to surgery should be in house. **Unresponsive Coagulopathy:** • Role of rFactor VIIa is very controversial. After 8-10 units PRBCs and coagulation factor replacement with ongoing hemorrhage, may consider risk/benefit of rFactor VIIa in consultation with hematologist or trauma surgeon **Once Stabilized:** Modified postpartum management with increased surveillance; consider ICU

Massive transfusion protocol details

Ratios and packs for massive hemorrhage



STAGE 3: Initiate Massive Transfusion Protocol & Surgical Approaches

Clinical Trigger: *Continued bleeding* with CBL > 1500mL or > 2 units PRBCs given or abnormal VS or suspicion of DIC

MOBILIZE	ACT	THINK
Perform duties by assigned role: ☐ **Activate Massive Transfusion Protocol** PHONE #:_____ **Ensure additional team experts available.** **Examples:** ☐ Advanced Gyn surgeon (e.g., Gyn Oncologist) ☐ Second anesthesiologist ☐ Main OR staff ☐ Adult intensivist ☐ Supervisor, CNS, or manager ☐ **Reassign staff as needed** ☐ If considering selective embolization, call-in Interventional Radiology team and second anesthesiologist Blood Bank: ☐ **Prepare to issue additional blood products as needed in accordance with MTP** – stay ahead ☐ If patient at risk for multiorgan failure or residual coagulopathy **– contact ICU regarding transfer.** ☐ Continue family support	Reidentify team leadership and micro brief with additional team members **Team leader:** ☐ **Order Massive Transfusion Pack** ☐ (PRBCs + FFP + 1 pheresis pack Plts—see note in right column) ☐ **Move to OR** if not already there ☐ Repeat CBC/Plts, Coag Panel II STAT and Chem 12 panel q30-60 min ☐ Repeat ABGs ☐ Consider cell saver if preplanned or immediately available; notify transfusionist **Anesthesiologist** (as indicated): ☐ Ongoing monitoring of VS *and communication to team* ☐ Arterial blood gases ☐ Consider central hemodynamic monitoring ☐ CVP or PA line ☐ Arterial line ☐ Vasopressor support ☐ Intubation ☐ Calcium replacement ☐ Electrolyte monitoring ☐ Ensure large bore IV for transfusion **Primary nurse:** ☐ Announce cumulative quantitative blood loss q5-10 minutes ☐ Apply upper body warming blanket ☐ Use fluid warmer and/or rapid infuser for fluid & blood product administration ☐ Apply sequential compression stockings to lower extremities ☐ Circulate in OR **Second nurse and/or anesthesiologist:** ☐ Continue to administer meds, blood products and draw labs as ordered **Third Nurse:** ☐ Recorder	**Interventions based on etiology not yet completed** **Prevent hypothermia, acidemia** **Cor ive or Definitive Surgery:** • ine sutures • Uterine artery ligation • Hysterectomy **For Resuscitation:** **Aggressively Transfuse** **Based on Vital Signs, Blood Loss** **After the first 2 units of PRBCs use** **Near equal FFP and PRBC for massive hemorrhage:** **1 PRBC to 1 FFP** **1 platelet apheresis pack per 4-6 units PRBCs** **If above measures unproductive:** Interventional Radiology (IR) for selective embolization as appropriate if patient stable for transport and team *immediately available* - physician who is able to immediately call for and move to surgery should be in house. **Unresponsive Coagulopathy:** • Role of rFactor VIIa is very controversial. After 8-10 units PRBCs and coagulation factor replacement with ongoing hemorrhage, may consider risk/benefit of rFactor VIIa in consultation with hematologist or trauma surgeon **Once Stabilized:** Modified postpartum management with increased surveillance; consider ICU

Invasive surgical techniques

- Uterine Artery Ligation
- Hysterectomy
- Other surgical procedure as determined by the surgeon

> **Note: Detailed information about PPH medications will be discussed later in this module.**

Click or tap the rectangle below to view and download the full version of the stages displayed above.

This tool is provided by the California Maternal Quality Care Collaborative (CMQCC) Task Force.

PDF

Appendix B - Obstetric Hemorrhage Care Guidelines Checklist Format.pdf

345.8 KB

CONTINUE

QBL and Fluid Replacement

- Appropriate IV access
- Fluid resuscitation
    - Warmed crystalloids at 3:1 ratio to QBL
    - Consider colloids and early plasma replacement
- Type and crossmatch
    - prbc, FFP, cryoprecipitate, platelets
- Oxygenate and keep warm

Example of Dry Weights to Quantify Blood Loss

To calculate dry weights, your ministry will have:

- a chart available with dry weights like the sample below

OR

- the weight calculation will be built into the scale

Please note that the image below is intended to be a sample only. Your ministry will have its own resource.

Items	Quantity	Total Saturated Weight	Minus Total Dry Weight	QBL (1Gm = 1ml)
			Total QBL=	

Sample dry weight chart

Walkthrough of Dry Weights Chart to Quantify Blood Loss

Directions: Click or tap the marker above each column to learn more about what should appear in each. Review all to move on.

	Items	Quantity	Total Saturated Weight	Minus Total Dry Weight	QBL (1Gm = 1ml)
QBL 1	Pad	1	272 gms	25 gms	247 gms
	Chux	1	518 gms	125 gms	393 gms
	Chux	1	447 gms	125 gms	322 gms
					Total QBL #1 = 962 ml
QBL 2	Pad	1	203 gms	25 gms	178 gms
	Chux	1	575 gms	125 gms	450 gms
					Total QBL #2 = 628 ml
				Cumulative	Total QBL= 1590 ml

	Items	Quantity	Total Saturated Weight	Minus Total Dry Weight	QBL (1Gm = 1ml)
QBL 1	Pad	1	272 gms	25 gms	247 gms
	Chux	1	518 gms	125 gms	393 gms
	Chux	1	447 gms	125 gms	322 gms
					Total QBL #1 = 962 ml
QBL 2	Pad	1	203 gms	25 gms	178 gms
	Chux	1	575 gms	125 gms	450 gms
					Total QBL #2 = 628 ml
				Cumulative	**Total QBL=** 1590 ml

Items

List out each blood soaked item (peripad, chux, laps sponge, etc.).

	Items	Quantity	Total Saturated Weight	Minus Total Dry Weight	QBL (1Gm = 1ml)
QBL 1	Pad	1	272 gms	25 gms	247 gms
	Chux	1	518 gms	125 gms	393 gms
	Chux	1	447 gms	125 gms	322 gms
					Total QBL #1 = 962 ml
QBL 2	Pad	1	203 gms	25 gms	178 gms
	Chux	1	575 gms	125 gms	450 gms
					Total QBL #2 = 628 ml
				Cumulative	**Total QBL=** 1590 ml

Quantity

List quantity of each item.

	Items	Quantity	Total Saturated Weight	Minus Total Dry Weight	QBL (1Gm = 1ml)
QBL 1	Pad	1	272 gms	25 gms	247 gms
	Chux	1	518 gms	125 gms	393 gms
	Chux	1	447 gms	125 gms	322 gms
					Total QBL #1 = 962 ml
QBL 2	Pad	1	203 gms	25 gms	178 gms
	Chux	1	575 gms	125 gms	450 gms
					Total QBL #2 = 628 ml
				Cumulative	**Total QBL=** 1590 ml

Total Saturated Weight

Total weight on scale of blood soaked item.

	Items	Quantity	Total Saturated Weight	Minus Total Dry Weight	QBL (1Gm = 1ml)
QBL 1	Pad	1	272 gms	25 gms	247 gms
	Chux	1	518 gms	125 gms	393 gms
	Chux	1	447 gms	125 gms	322 gms
					Total QBL #1 = 962 ml
QBL 2	Pad	1	203 gms	25 gms	178 gms
	Chux	1	575 gms	125 gms	450 gms
					Total QBL #2 = 628 ml
				Cumulative	Total QBL= 1590 ml

Minus Total Dry Weight

There is a dry weight chart on the Hemorrhage cart that lists the dry weight of peripads, chux, laps sponge, etc. Put the dry weight of the item in this column.

	Items	Quantity	Total Saturated Weight	Minus Total Dry Weight	QBL (1Gm = 1ml)
QBL 1	Pad	1	272 gms	25 gms	247 gms
	Chux	1	518 gms	125 gms	393 gms
	Chux	1	447 gms	125 gms	322 gms
					Total QBL #1 = 962 ml
QBL 2	Pad	1	203 gms	25 gms	178 gms
	Chux	1	575 gms	125 gms	450 gms
					Total QBL #2 = 628 ml
				Cumulative	Total QBL= 1590 ml

QBL (1gm = 1ml)

Total saturated weight of item –(minus) Total dry weight of item = QBL

Complete the content above before moving on.

Key Points for Measuring QBL

Click or tap each checkbox below to mark it as read.

- [ ] Zero the scale before weighing items.
- [ ] Be sure to subtract the dry weight of the item (peri-pad, Chux, washcloth).
- [ ] Calculate and record cumulative blood loss every time you weigh blood-soaked items.
- [ ] 1gm of weight = 1ml of blood.
- [ ] Cumulative blood loss is used to identify hemorrhage stage to guide care.

Complete the content above before moving on.

Recognizing & Responding to PPH

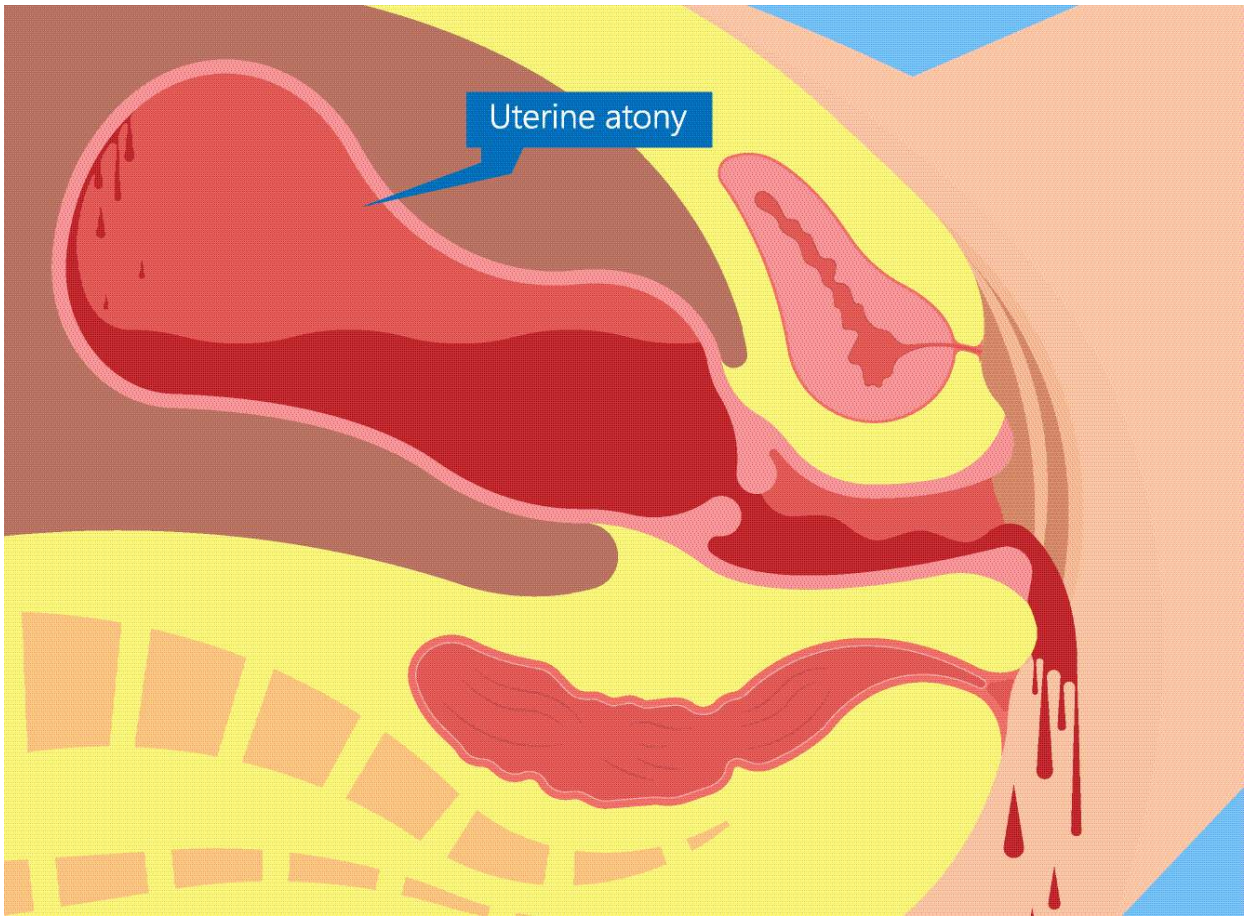
Noncontracted Uterus

A noncontracted uterus is where the uterus fails to contract down to its pre-pregnant size in a timely, predictable manner.

How Does a Noncontracted Uterus Lead to PPH?

- After delivery, normal uterine contraction causes the vessels of the placental site to constrict by applying pressure to the site like a tourniquet.
- In the case that the uterus doesn't contract, there won't be sufficient pressure on the vessels and the patient will continue to bleed.

What Should a Fundus Feel Like?



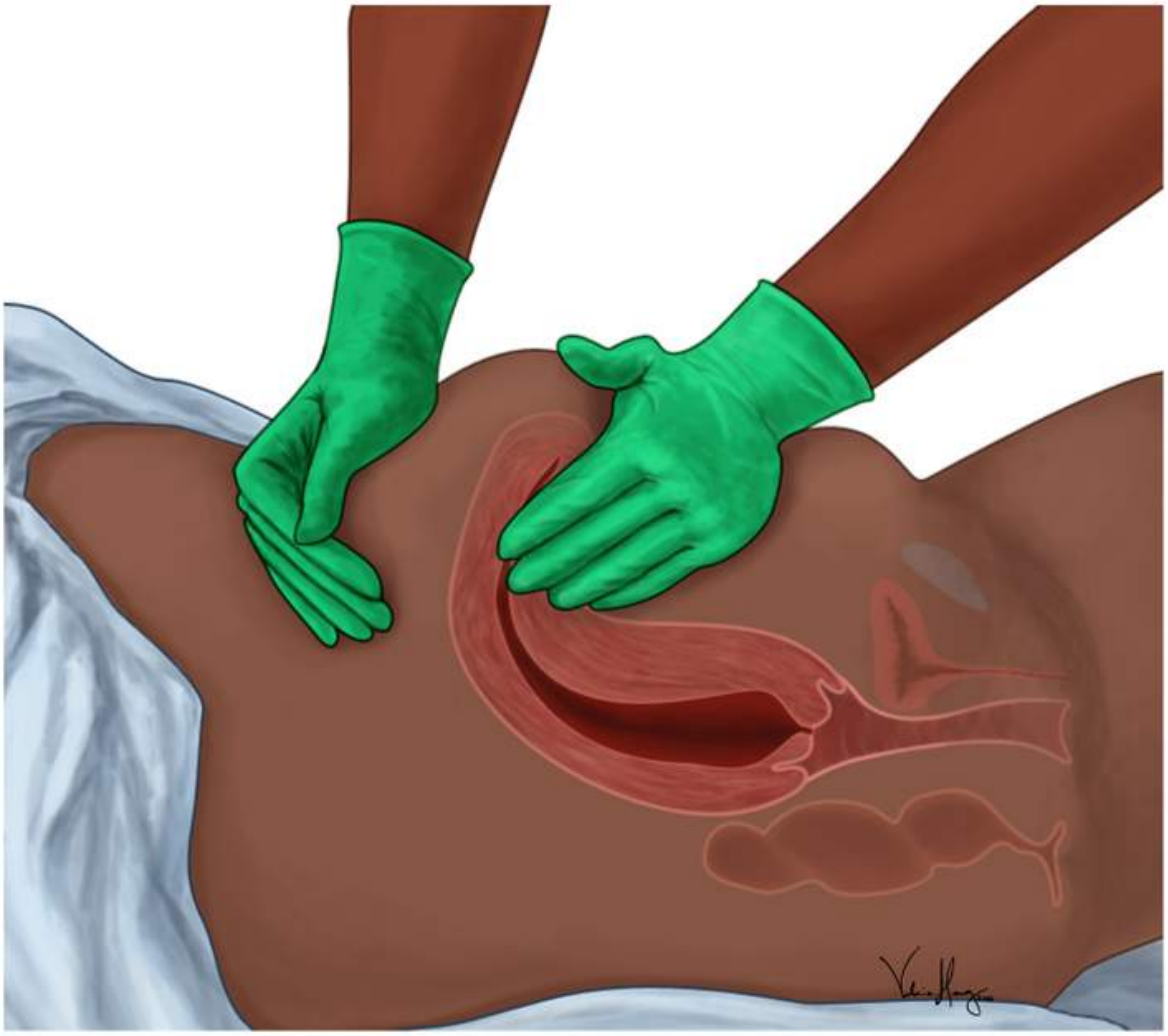
- Palpate the abdomen between umbilicus and pubis symphysis and look for fundus to feel like a firm ball
- Uterine atony is when the uterus has not contracted properly and can lead to significant bleeding
- An atonic uterus feels squishy/boggy or floppy when palpated, like a deflated, spongy balloon

Fundal Massage

Use two hands:

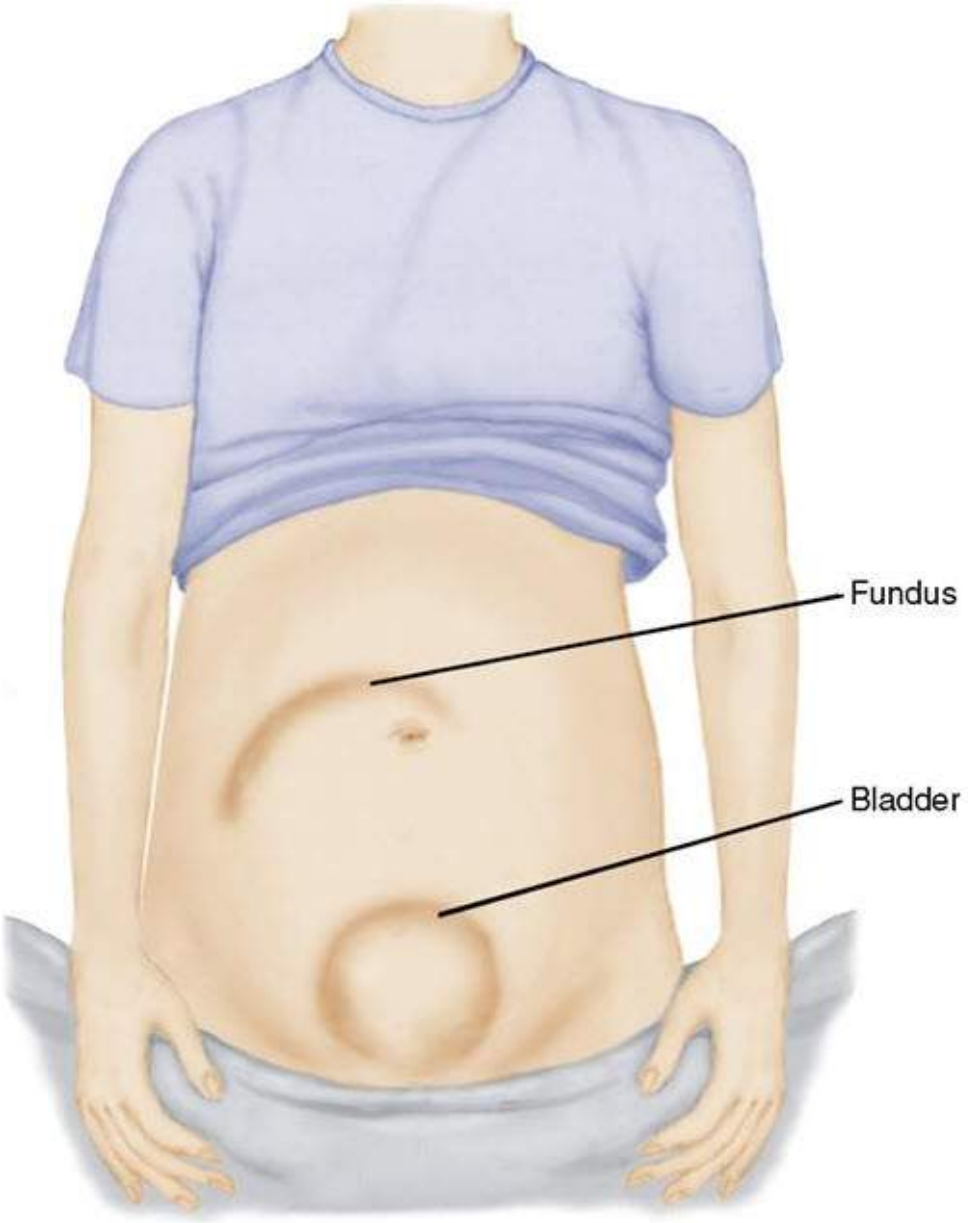
- One hand is cupped to massage and gently compress the fundus toward the lower uterine segment

- The other hand remains cupped against the uterus at the level of the symphysis pubis to support the uterus
- Provide continuous fundal massage until uterus is firm and bleeding has decreased



Source: ausmed.com

Foley Catheter Insertion



Source: nursekey.com

- Insert foley catheter to drain bladder to help the uterus to contract
- A full bladder will displace the uterus to the right and not allow for contraction of the uterus

CONTINUE

PPH Response Team

Know Your Role

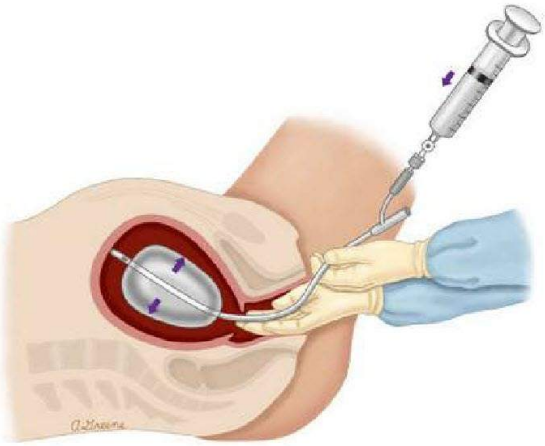
Review your role and the roles of others to determine best practices as a team. Team members outlined below:

- [ ] Nursing/Rapid Response
- [ ] Perinatal/ED CNA, NA, OBT, EMT, ER Tech, PCA
- [ ] Blood bank or laboratory
- [ ] Operating Room
- [ ] Physicians: Anesthesia, Assistants, Specialists/Laborists
- [ ] House Supervisor

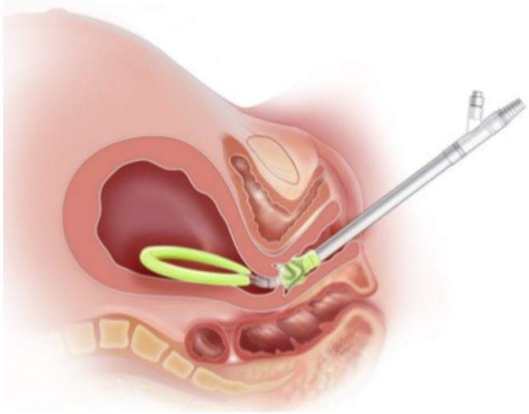
Physician/LP (Hospitalist, Laborist, Midwife, ED Physician, PA)

- Comes to bedside
- Has awareness of risk factors for PPH
- Communicates with team regarding plan of care

- Manages PPH using established evidence-based protocols/order sets
- Recognizes early on the need for and requests emergency release of 2 units PRBCs
- Activates MTP [large, rapid transfusion] if >2 units of blood product required
- Calls for backup, as needed
- Knows stages of hemorrhage and interventions for each stage
- Knows medication used during PPH
- Prepares for tamponade/Bakri Balloon or JADA insertion completed by OB Physician (review image below).



Bakri



JADA

ED RN —

- Recognizes hypovolemic shock
- Recognizes PPH
- Quantifies blood loss by weighing materials and communicates to Physician/LP
- Calls L&D RN to ED
- Gets PPH Kit/Medications
- Initiates fundal massage
- Starts IV to administer blood and sets up rapid infuser for blood and blood products
- Assists in tamponade balloon/Bakri Balloon or JADA insertion

- Takes vital signs
- Records

Perinatal/ED CNA, NA, OBT, EMT, ER Tech, PCT

- *Know if your unit has a PPH cart and be prepared to retrieve it for the team.*
    - Obtains vital signs and monitors for tachycardia and decreased BP
    - Reports observations about patient's vaginal bleeding:
        - > 1 pad/hour
        - Gushing
        - Large clots
    - Notifies RN if any of the above is present
    - Notifies RN if patient complains of symptoms of PPH or response to treatment, for example:
        - Dizziness
        - Nausea
        - Weakness
        - Altered mental status/confusion
        - Rapid breathing
        - Headache
        - Pallor
        - Feeling cold
    - Supports the quantification of blood loss:
        - Retains all blood-soaked items
        - Weighs blood-soaked items using dry weight table or dry weights programmed into scale, depending on availability at ministry

RRT/MET RN —

- Assists with blood admin and rapid infuser during massive transfusion efforts
- Establishes IV/IO access if needed
- Facilitates transfer to higher level of care or OR when indicated
- Helps initiate standardized procedures

Complete the content above before moving on.

Treatment & Common Medications

Uterotonic Drug Therapy

Know if your unit has a PPH cart with medications or ask L&D RN to bring PPH cart and medications.

Get medications for PPH in one of the following ways:

1. L&D RN brings hemorrhage cart and drugs if not stocked in the ED
2. Use Pyxis
3. Contact pharmacy

Review the medications below typically in postpartum hemorrhage kit used for PPH therapy:

Drug/Medication	Dose	Route	Frequency	Side Effects	Contraindications
Pitocin (IV)	30u/500mL	30u/500mL saline; wide open until fundus firm, then 100 mL/hour	Continuous based on uterine tone	N/V, water intoxication	None

Drug/Medication	Dose	Route	Frequency	Side Effects	Contraindications
Pitocin (IM)	10u/1mL (1 vial)	10u/1mL saline	q 5 minutes, maximum 2 vials (20u/2mL)	N/V, water intoxication	None
Methergine (Methyl-ergonovine) • **DO NOT GIVE IF PATIENT IS HYPERTENSIVE** • **Must be refrigerated**	0.2 mg	IM	Q2-4 hr	HTN, N/V, hypotension	HTN, migraines, Raynaud's, CAD, scleroderma
Tranexamic Acid [TXA](Cyklokapron) • *Must be given as an adjunct treatment, not a stand-alone treatment	1000 mg	IV over minimum 10 min	May repeat x1 after 30 minutes if still bleeding	Hypotension if given too rapidly	History of thromboembolic disorders, kidney disease. Should be given within 3 hrs of bleeding onset.
Cytotec (Misoprostol)	200-1000 mcg	600 mcg PO, 800 mcg PR	Single dose	N/V, F/C, diarrhea	None
Hemabate (Carboprost)(PGF2) • **DO NOT GIVE IF PATIENT HAS ASTHMA**	250 mcg	IM	Q15-90 min Max = 8	N/V, F/C, diarrhea	Asthma; active cardiac, renal, liver, lung disease

Drug/Medication	Dose	Route	Frequency	Side Effects	Contraindications
• Must be refrigerated					

IMPORTANT: Patient <u>will</u> experience diarrhea with Hemabate.

RN must request LIP order for 4 mg Loperamide PO (Imodium) with first dose of Hemabate, then 2 mg PRN loose stool up to 16 mg/day max.

Clinical pearl: Do **<u>NOT</u>** give methergine if patient is hypertensive.

Clinical pearl: Do **<u>NOT</u>** give hemabate if patient has asthma.

CONTINUE

Transfusion Guidelines & Protocols

> **Determine if OB transfusion protocols exist at your ministry.**

CMQCC Transfusion Guidelines for PPH

- For massive ongoing hemorrhage
- Resuscitation transfusion not based on labs but **clinical status**
- Seek to avoid coagulopathy - ratio of 6:4:1 or 1:1:1
- Transfuse with uncrossed RPBCs until crossed blood available
- Goal to reach near equal ratio
- Based on stage of OB emergency

Massive Transfusion Protocols

Each ministry will have their own protocol for massive transfusions. Look up your ministry's massive transfusion protocol and refer to it.

Consult with your OB, MD, or LP to determine what protocol to follow and which blood products to provide.

CMQCC recommends:

- Goal near equal ratio of PRBC:FFP after first 2U
- One unit platelets (single platelet pheresis pack) given for every 4-6 units PRBCs

Follow your ministry's protocol.

IV Gauge

Use largest IV gauge you can to get second line in before vasoconstriction develops!

CONTINUE

Scenario-Based Assessment

Scenario-Based Assessment

Review the following scenario and answer the questions that follow. You may open and/or download both the **Postpartum Hemorrhage Algorithm** and the **CMQCC OB Hemorrhage Emergency Management Plan Checklist** documents below to help you answer the questions. Open these documents by clicking or tapping the rectangle.

PDF

Postpartum Hemorrhage Algorithm.pdf
33.4 KB

PDF

Appendix B - Obstetric Hemorrhage Care Guidelines Checklist Format.pdf
345.8 KB

Mrs. Marla Smith is a 38 year-old who came to the ED. She was brought to the ED by EMS because she felt faint and dizzy and had a lot of vaginal bleeding post a spontaneous, uncomplicated vaginal delivery at home 60 minutes ago. Husband is en route with the baby and the doula who assisted in delivery. Her

vital signs in triage were T 98.4, P 100, BP 96/64 R 16. Her skin is pale and cool to touch. She is alert, but dizzy with some nausea.

You take the patient back to a room for further assessment.

What medical and obstetrical history shows an increased risk for postpartum hemorrhage after delivery? Select all that apply.

- [ ] History of coagulation disorder
- [ ] Patient states she needs stitches “down there” because she has a bad tear from delivery
- [ ] Patient states the placenta hasn’t delivered yet
- [ ] History of a postpartum hemorrhage with her previous pregnancy
- [ ] Newborn is in the 8th percentile for weight (small for gestational age)

SUBMIT

Complete the content above before moving on.

Patient's history reveals she had a precipitous (rapid) delivery, resulting in a third degree perineal laceration that is bleeding heavily and needs repairing.

This is her second baby. She had a postpartum hemorrhage after her first baby.

Upon assessment of her fundus, you find it is distended above her umbilicus and boggy. You observe heavy vaginal bleeding with large clots.

What are your next steps? Select all that apply.

- [ ] Call the obstetrician or laborist for help
- [ ] Call Labor and Delivery for help
- [ ] Place two large bore IV catheters and draw labs
- [ ] Provide fundal massage and place foley catheter
- [ ] Initiate postpartum hemorrhage protocol medications, if indicated

SUBMIT

Complete the content above before moving on.

After the initial steps of fundal massage, foley placement, and administration of IV Pitocin, the patient's fundus is firm and at the level of the umbilicus.

The OB and labor and delivery RN are now at the bedside. They observe a constant trickle of bright red blood at the vaginal opening.

Although you will be giving a FULL report, what specific details should you provide them *immediately* regarding the patient's delivery? Select all that apply.

- [ ] Patient's baby was in the eighth percentile for weight
- [ ] Patient has a history of postpartum hemorrhage
- [ ] Patient has an unrepaired third degree laceration that is still bleeding

- [ ] The patient wants a sandwich now because she is feeling better

SUBMIT

Complete the content above before moving on.

The third degree perineal laceration is likely the source of bright red bleeding and should be repaired to achieve hemostasis. The OB team will suture the laceration while continuously monitoring for further bleeding.

All blood soaked items should be weighed to quantify actual blood loss to determine if further treatment, interventions, or transfusion is required.

Who can perform quantitative blood loss (QBL)?

- ( ) Only the LP may perform QBL
- ( ) Only an RN may perform QBL

Any caregiver role who understands how to measure QBL and work the scale may perform QBL

SUBMIT

Complete the content above before moving on.

When Mrs. Smith's first QBL was measured, the patient had 1 blood-soaked pad that weighed 272 grams, 1 blood soaked chux that weighed 518 grams, and 1 more blood soaked chux that weighed 497 grams. The pad dry weight is 25 grams, and the chux dry weight is 125 grams.

Use the blood-soaked item calculator below to determine Mrs. Smith's first QBL.

Type your calculation in the yellow field next to **Total QBL =** in numerical form, then select the **Submit** button.

Items	Quantity	Total Saturated Weight	Minus Total Dry Weight	QBL (1Gm = 1ml)
Pad	1	272	25	247
Chux	1	518	125	393
Chux	1	497	125	372
				Total QBL=

Complete the content above before moving on.

Based on the QBL you calculated above, what state hemorrhage is Mrs. Smith in?

- Stage 0
- Stage 1
- Stage 2
- Stage 3

SUBMIT

Complete the content above before moving on.

5 minutes later, Mrs. Smith's second QBL was measured. The patient had 1 blood-soaked pad that weighed 203 grams and 1 blood soaked chux that weighed 518 grams. The pad dry weight is 25 grams, and the chux dry weight is 125 grams.

Use the blood-soaked item calculator below to determine Mrs. Smith's second QBL.

Type your calculation in the yellow field next to **Total QBL =** in numerical form, then select the **Submit** button.

Items	Quantity	Total Saturated Weight	Minus Total Dry Weight	QBL (1Gm = 1ml)
Pad	1	203	25	
Chux	1	575	125	
				Total QBL=

Complete the content above before moving on.

Based on both QBLs you calculated above, what is Mrs. Smith's cumulative QBL in ml? Type your answer in numerical form in the designated space below.

- First QBL = 1012 ml

- Second QBL = 628 ml

Type your answer here

SUBMIT

Complete the content above before moving on.

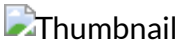
Based on the cumulative QBL you calculated above, what state hemorrhage is Mrs. Smith in?

- Stage 0
- Stage 1
- Stage 2
- Stage 3

SUBMIT

Complete the content above before moving on.

Summary



Thank you for completing the Responding to Postpartum Hemorrhage (PPH) for Emergency Department RNs course!

If you have any unit-specific questions about policies and procedures within your ministry, please contact your nursing unit manager or preceptor.

Reference

California Maternal Quality Care Collaborative Obstetric Hemorrhage Task Force. (2022). *OB Hemorrhage Toolkit V 3.0*. https://www.cmqcc.org/resources-tool-kits/toolkits/ob-hemorrhage-toolkit

Exit

Click to exit the course.

EXIT

Status **Active** PolicyStat ID **18463351**

Providence
Santa Rosa
Memorial Hospital

Origination	06/1977
Last Approved	07/2025
Effective	07/2025
Last Revised	07/2025
Next Review	07/2027
Owner	Hiranya Abeysekara: Supervisor Clinical Laboratory
Area	Lab Services - Microbiology
Applicability	CA - Santa Rosa Memorial Hospital

Collection and Care of Urine Specimens

COPY

PURPOSE/DEFINITION:

Collection of urine for laboratory examination is done to determine specific bacterial, cellular, or chemical properties to assist in diagnosis of disease entities. The amount of urine required and the time it is collected will vary according to the test to be performed.

POLICIES/GENERAL INSTRUCTIONS:

1. Urine supports rapid bacterial growth if left at room temperature; therefore, specimens should be taken to the laboratory within 15 minutes of collection for processing or refrigeration. If transport to the lab for is delayed, it can be refrigerated for up to two hours after which a new specimen must be obtained. If the specimen has been transferred into a grey top boric acid tube.
2. Urine tests that are sent to reference laboratory may require special handling and/or preservatives. Refer to the Reference Laboratory's collection information.
3. If patient is menstruating, the perineal area should be cleansed and a fresh vaginal tampon inserted before specimen is collected. The presence of RBC's will be detected on microscopic examination.
4. Label generated from the Laboratory Information System (LIS) must be affixed to each specimen container. During downtime, alternate labeling is acceptable.
5. Specimen must be placed in a biohazard bag, sealed, and transported to the lab.

6. Hazardous specimen should be clearly marked; ie red bagged or labeled with special sticker. If possible there should be three-day delay before collection of urine from Radiation Therapy.
7. For Urine Culture, clean-catch specimen, catheter aspiration, and pedi-bagged specimens are acceptable. Quantitative studies of organisms are done to determine the presence, type, and degree of pathogens in the urine . One (1) to five (5) milliliters of urine is required.
8. Routine Macroscopic Urinalysis includes a study of general appearance, pH, specific gravity, protein, glucose, ketones, occult blood, bilirubin. Routine Microscopic Urinalysis includes sediment analysis. Twelve (12) milliliters of urine is optimal.
9. Twelve or 24 hour Creatinine and Urea Clearance require urine and blood specimen. The blood is drawn during the collection period. It is part of the tests to determine the excretion rate.

EQUIPMENT FROM FLOOR SUPPLY:

1. A sterile urine container collection kit for Routine Urinalysis, Urine Culture, or Random chemistry test
2. Grey top BD Boric Acid tube for Culture and Sensitivity testing.
3. 24-hour urine collection bottle for timed urine tests
4. For Catheters, syringe with small gauge needle and prep pads
5. For babies or young children, plastic pedi-bag
6. Computer generated specimen identification label.
7. Clean urinal, appropriate container and graduated pitcher.
8. Electronic health record barcoded specimen label

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PROCEDURE:

1. Explain midstream clean catch procedure to patient.
2. Have patient wash hands!
3. Wash and glove your hands.
4. Midstream Collection:
    a. MALE: cleanse urethral meatus with three changes of castile soap towelettes, starting at the urethral orifice and cleansing away from the orifice (if foreskin is present, it must e retracted throughout the entire procedure). Initiate the stream of urine. Wait a few seconds, then collect the midstream specimen by passing the sterile collection cup into the stream of urine without stopping the flow. Optimal volume to collect 12 milliliters and no more than half full. Remove and close container securely. Wipe dry any excess urine on outside of container. Label properly.
    b. FEMALE: Retract labia minora with non-dominant hand. Cleanse vulvar area with three changes of castile soap towelettes beginning above the urethral orifice and moving downward posteriorly; ie front to back. Maintain hold on labia and initiate stream of urine. Wait for a single stream to be achieved. Collect the midstream specimen by passing the sterile collection cup into the stream of urine without

stopping the flow. Obtain at least 12 milliliters and no more than half full. Remove and close container securely. Wipe dry any excess urine on outside of container. Label properly.

5. Pedi-Bag collection: Before attaching bag, perform careful perineal prep and cleansing as noted above or as preferred by pediatrician. The bag containing the specimen is not to be sent to the laboratory, but rather use a 12 milliliter syringe to transfer this to a sterile specimen container. Indicate on the container that this is a "bagged" urine specimen. This assists the physician and Clinical Laboratory Scientist (CLS) to interpret any mixed growth with occurs with this type of collection when Urine Culture is performed.
6. Catheter Aspiration: Only to be done by RNs. Cleanse the surface of the collection port (just below the "Y" connection) with alcohol prep pad. Allow to air-dry thoroughly. Puncture the port with a small gauge needle and syringe and withdraw specimen. Aspiration of the catheter line tubing is contraindicated when a collection port is available. NEVER take urine from the collecting bag or lower portion of the collection tubing. NEVER disconnect catheter tubing for the purpose of obtaining a specimen . After obtaining the specimen, cap the syringe securely and label properly. Please note this was a "CATHETER" aspiration collection. The laboratory must know this so that the correct quantitative studies are done for Urine Culture. If desired, the urine specimen may be aseptically transferred to a sterile specimen container by removing the needle from the syringe and carefully expelling the urine into the sterile container.
7. Timed Urine Specimens: 12 hour, 24 hour collections (Creatinine, Urea Clearance, other timed Urine tests)
    a. Timed urine specimens are done to determine a specific function of the kidneys during a designated period of time. The length of study and type of collection bottle will vary according to the test ordered. Some will required preservatives.
    b. All timed urine specimens are started with an empty bladder and ended when the bladder is emptied for the final specimen. The exact time of starting and ending specimens should be indicated on label. If possible timed specimens should be scheduled to end at 0700.
    c. Explain the test and its duration to the patient to insure his/her cooperation in obtaining an accurate collection. Instruct the patient that he/she is to void into a suitable container or bedpan for the duration of the test procedure and to notify a nurse of each voiding so that it can be added to the specimen container. It is important that the patient be instructed to void in a separate container and to avoid any contamination of the urine with stool.
    d. Keep the urine specimen refrigerated during the collection period.
    e. At the end of the test period, have the patient empty his bladder again, add that specimen to the collection. Note the time of the last voiding on the specimen label. This ends the timed urine collection.
    f. For Creatinine and Urea Clearance, it is required to obtain blood Creatinine or Urea specimen during the urine collection time to determine excretion rate.
    g. Order the test in LIS and respond to the prompts if appropriate. On the LIS label, write the collection time/period and sign.
    h. Submit the specimen to the laboratory immediately.

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Approval Signatures

Step Description	Approver	Date
Laboratory Services Medical Director	Wanhua Yang: MD	07/2025
	Hiranya Abeysekara: Supervisor Clinical Laboratory	07/2025

Applicability

CA - Providence Santa Rosa Memorial Hospital

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Standards

No standards are associated with this document

Status **Active** PolicyStat ID **19033234**

Providence
Santa Rosa
Memorial Hospital

Origination	07/2025
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Last Revised	09/2025
Next Review	09/2028
Owner	Dalila Formato: Project Coordinator
Area	Infection Prevention Services
Applicability	CA - Santa Rosa Memorial Hospital

Prevention of Catheter Associated Urinary Tract Infection (CAUTI)

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Purpose

In keeping with the mission and values of Providence, Providence Santa Rosa Memorial Hospital (PSRMH) adopts the system policy titled " Catheter Associated Urinary Tract Infection (CAUTI) Prevention Viewing PSJH-CLIN-1210 Catheter Associated Urinary Tract Infection (CAUTI) Prevention **with the exception of the information below:**

Urine Culture Collection

Replacing the Foley catheter before collecting a urine sample for culture is essential to reduce the risk of contamination, which can lead to false positives indicating a urinary tract infection (UTI). False positives may result in misdiagnosis and inappropriate treatment. Therefore, it is crucial to follow proper procedures to ensure accurate diagnostic results.

For patients with a Foley catheter in place for **24 hours or more**, consult the attending healthcare provider before collecting a urine sample for microscopy or culture. Obtain an order to remove the existing catheter, and request an order for straight catheterization if obtaining a midstream specimen is challenging.

If the healthcare provider decides to continue using the urinary catheter, request an order to replace the catheter before collecting the urine sample to minimize contamination risks. Ensure the specimen is

promptly transferred to the laboratory, ideally within 15 minutes, to maintain its integrity for accurate testing and analysis.

Daily CHG Treatment

Daily CHG treatment will be performed on patients having a indwelling urinary catheter of any type, including those patients with catheters present on admit.

PSRMH Adult Acute Urinary Retention Pathway

Adhere to the attached **Santa Rosa Memorial Hospital Acute Urinary Retention Protocol (PSRMH Nursing Pathway for Adult Acute Urinary Retention)** when ordered.

Reference

PSJH-CLIN-1210 Catheter Associated Urinary Tract Infection (CAUTI) Prevention

Carlee Hoxworth MPH, CIC , Addressing [Urinary Tract Infection]. In: Dean R, Popescu S, eds. APIC Text. [Revised January 26, 2024]. Available at 34. Urinary Tract Infection | Prevention Measures for Healthcare-Associated Infections | Table of Contents | APIC. Accessed July 30, 2024.

Approvals

Infection Prevention Committee 09/2025
Medical Executive Committee 09/2025
Community Board 09/2025

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Attachments

PSRMH Nursing Pathway for Adult Acute Urinary Retention

Approval Signatures

Step Description	Approver	Date
	Dalila Formato: Project Coordinator	10/2025

Applicability

CA - Providence Santa Rosa Memorial Hospital

Standards

No standards are associated with this document

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