MUNSON HEALTHCARE

Overview of Procedural Sedation

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Goal and Objective

Goal

This course will ensure standardized practice for delivering sedation/analgesia during diagnostic and therapeutic procedures performed outside of the operating room, according to MHC policy. The ultimate outcome is to provide for the safety of our patients during sedation.

Objective

After completing this course, the participant will be able to identify the four levels of sedation.

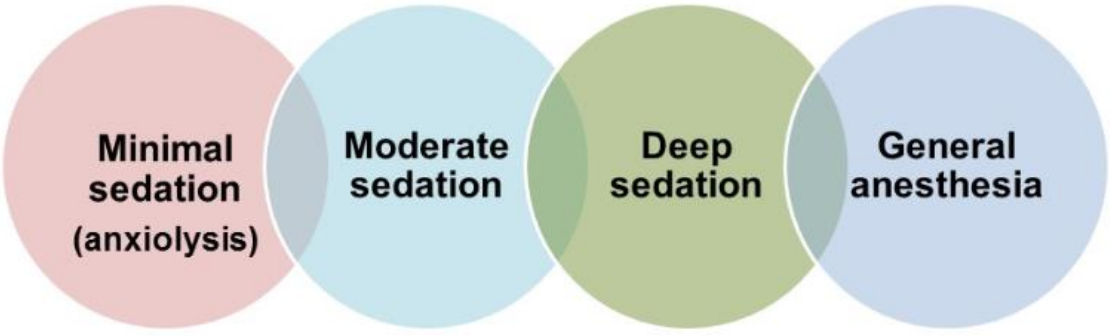
Exclusion List: Non-Procedural Sedation

The sedation policy and this education module **do not apply** when analgesics or sedative agents are given for the following:

- Pain management (analgesics given by **any** route).
- Minimal sedation (anxiolysis).
- Sedation during emergent medical care in an unstable patient.
- Sedation during ongoing ventilation therapy.
- Sedation for end of life/palliative care.
- Treatment of medical conditions such as delirium, alcohol withdrawal, traumatic brain injury, etc.

Four Levels of Sedation

In order to provide safe and effective care for patients receiving sedation, it is imperative that health care providers understand the four levels of sedation:



Minimal Sedation

This is a continuum. To understand, we will begin with minimal sedation, also known as anxiolysis.

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

Minimal Sedation (Anxiolysis)

Key Points – Minimal Sedation

- Anxiolysis is medication therapy given to reduce anxiety and to help patients relax, e.g., diazepam (Valium) PO or midazolam (Versed) IVP prior to a procedure.
- The patient continues to respond normally to verbal commands.
- This level of sedation has no effect on airway, breathing, or the cardiovascular system.
- Cognitive function and physical coordination may be impaired.

Moderate Sedation/Analgesia

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

Moderate Sedation

During moderate sedation, the patient experiences a depressed level of consciousness during which they retain their ability to maintain a continuously patent airway. The patient will respond appropriately to physical stimulation and verbal commands, yet maintain partial amnesia.

The patient receives relief from anxiety and pain, allowing them to tolerate unpleasant procedures.

Moderate sedation/analgesia also expedites the course of procedures that are uncomfortable and require the patient to not move:

- Central line placements
- Scope procedures (endoscopy, bronchoscopy)
- Chest tube placement
- Painful wound debridements

Moderate Sedation *(cont.)*

Key Points – Moderate Sedation

- The patient is able to respond to verbal commands.
- No interventions are needed to protect the airway or maintain heart rate and blood pressure, but close monitoring is essential.
- Cardiac monitoring is required for a patient with cardiovascular disease or dysrhythmia.
- Consents need to be signed before sedation is administered.

Clinical Characteristics of Moderate Sedation

Clinical characteristics of moderate sedation include:

- Maintenance of protective reflexes, i.e., gag reflex, ability to swallow, and ability to breathe without assistance.
- Independent and continuous maintenance of a patent airway.
- Purposeful response to physical stimulation and/or verbal commands.
- Easily aroused, with the provider talking in a normal tone of voice.
- Minimally depressed level of consciousness.
- Slightly slurred speech.

Example:

In a normal tone of voice, the nurse asks the patient to take a deep breath and open their eyes. The patient should be able to follow this type of command at this level of sedation.

Clinical Characteristics of Moderate Sedation *(cont.)*

Key Points – Moderate Sedation

- Important: A reflex withdrawal from a painful stimulus is not considered a purposeful response and is a sign the patient is progressing to general anesthesia.
- All practitioners involved with moderate sedation must be prepared to "rescue" the patient from a deeper level of sedation than was intended.

Knowledge Check

During a procedure requiring moderate sedation, who is required to know how to rescue a patient from a deeper level of sedation than intended?
(Choose all that apply.)

- [x] The registered cardiovascular invasive specialists (RCIS) assisting with the procedure
- [x] The registered nurse (RN) assisting with the procedure
- [x] The provider performing the procedure

Deep Sedation/Analgesia

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

Deep Sedation

Deep sedation is used for procedures such as cardioversions, closed reductions of joint dislocations, or fractures. Patients who are deeply sedated cannot be easily aroused, but they do respond purposefully to repeated or painful stimulation, such as a vigorous sternal rub.

Deep Sedation *(cont.)*

Key Point: A reflex withdrawal from a painful stimulus is **not** considered a purposeful response and is a sign the patient is progressing to general anesthesia.

The patient's respiratory status may be affected and spontaneous respirations may be inadequate.

- Assistance may be needed to maintain a patent airway.
- Ventilation assistance may be required.

Progression from Moderate to Deep Sedation

Clinical indications: Progression from moderate to deep sedation/anesthesia:

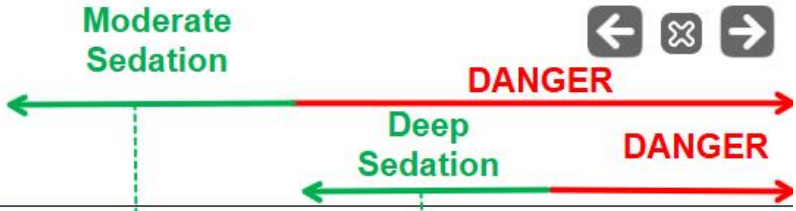
- Not easily aroused
- Partial or complete loss of protective reflexes
- Difficulty maintaining a patent airway independently
- Unable to respond to physical stimulation or verbal commands
- Severely slurred speech

Key Point:
ALL practitioners involved with deep sedation MUST be prepared to "rescue" the patient from deep sedation or general anesthesia.

Progression from Moderate to Deep Sedation *(cont.)*

Clinical indications: Identifying a patient is in deep sedation:

- Similar to general anesthesia, the patient may be unable to maintain a patent airway.
- Loss of protective reflexes (unable to swallow, no cough, no gag reflex).
- The patient purposefully responds to repeated painful stimulation, such as a vigorous sternal rub.



	Minimal Sedation Anxiolysis	*Moderate Sedation/ Analgesia ("Conscious Sedation")*	*Deep Sedation/ Analgesia*	*General Anesthesia*
Responsiveness	Normal response to verbal stimulation	Purposeful** response to verbal or tactile stimulation	Purposeful** response following repeated or painful stimulation	Unarousable even with painful stimulus
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Knowledge Check

Characteristics of anxiolysis include: (Choose all that apply.)

- [ ] Reflex withdrawal from a painful physical stimulus
- [x] Ability to respond normally to verbal commands
- [ ] Diminished respiratory rate or blood pressure
- [x] Ability to maintain a patent airway
- [x] Administering midazolam (Versed) to a stressed patient prior to a procedure

Knowledge Check *(cont.)*

Drag the type of sedation to the light blue box beside its description.

Type of Sedation	Description
Deep Sedation	The patient is unresponsive to verbal commands, but does purposefully resond to a sternal rub. Assistance may be needed to maintain a patent airway and adequate ventilation.
Minimal Sedation (Anxiolysis)	The patient continues to respond normally to verbal commands. This level of sedation has no effect on airway, breathing, or the cardiovascular system.
Moderate Sedation	The patient is able to open their eyes and raise their hand when asked.

References

American Society of Anesthesiologists. *Position on monitored anesthesia care*. Last amended on October 23, 2019.

Munson Healthcare Policies and Procedures. (2022, December 16). *Sedation*. PolicyStat.

MUNSON HEALTHCARE

Procedural Sedation: Roles and Responsibilities

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October 2023

Goal and Objectives

Goal

This course will ensure standardized practice for delivering sedation/analgesia during diagnostic and therapeutic procedures performed outside of the operating room, according to MHC policy. The ultimate outcome is to provide for the safety of our patients during sedation.

Objectives

1. Identify who is qualified to order, administer, and monitor patients receiving moderate and deep sedation.
2. Describe the expected nursing care during procedural sedation.

Responsibilities

At MHC, Registered Nurses (RNs) and Registered Cardiovascular Invasive Specialists (RCIS) who will be monitoring sedated patients during procedures and administering moderate sedation are responsible for the following:

- Knowing the Sedation policy.
- Maintaining competence in sedation medication administration.
- Identifying when a patient has progressed to a deeper level of sedation than intended and intervening as needed.

NOTE: RNs and RCIS do not administer deep sedation for procedures.

Education Requirements

The education requirements for RNs and RCISs include:

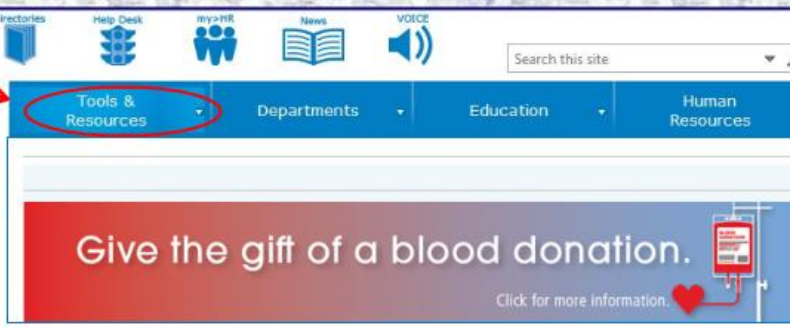
Upon hire:

- Current BLS certification.
- Completion of the online HealthStream assignment.
- Completion of the airway station during RN orientation.
- Completion of the cardiac rhythm competency, the Basic ECG interpretation exam, or current ACLS certification.

Periodically thereafter:

Completion of periodic sedation education and demonstration of competence.

Provider Credential Check



At MHC, all physicians, physician assistants (PAs), nurse practitioners (NPs), and oral surgeons must be credentialed to provide sedation/analgesia.

Credential information is available via MHC Intranet.

Click Tools & Resources.

Provider Credential Check

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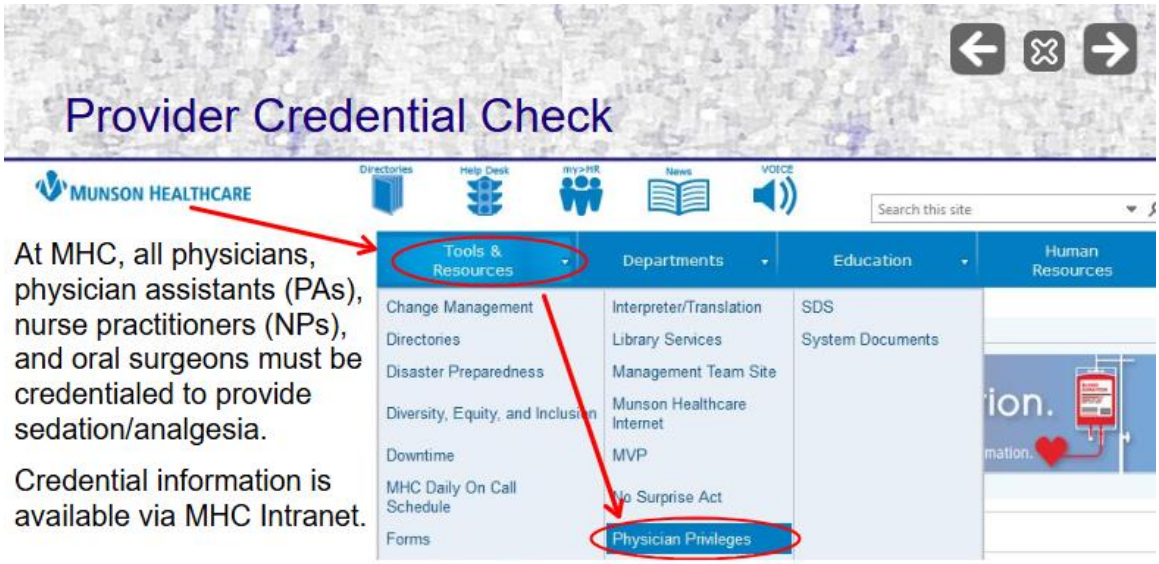
Click Tools & Resources.

Click Physician Privileges.

Provider Credential Check



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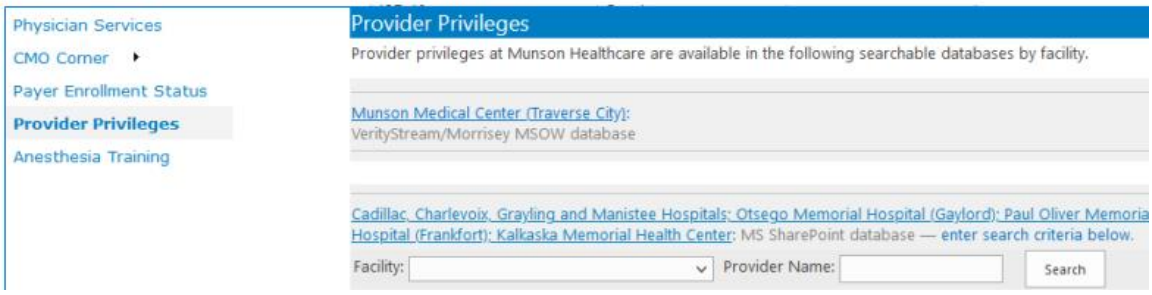
Credential information is available via MHC Intranet.



Knowledge Check

Who can administer moderate and deep sedation for procedural sedation (assuming they have the proper credentials and have completed the education)? (Choose all that apply.)

- [x] Oral Surgeon
- [ ] ICU RN who is ACLS-certified
- [x] Physician
- [x] Physician Assistant
- [x] Nurse Practitioner

Pre-procedure Responsibilities: Provider Assessment

The proceduralist/provider is required to complete a comprehensive assessment of the patient prior to performing the procedure. This includes:

- A determination of the patient's American Society of Anesthesiologists Classification (ASA Class).
  - This is used as a guideline for **NPO status**.
- An airway assessment.

Key Points:

- Anesthesiology can be consulted on any case, but consultation is **advisable** for patients with an ASA Class of IV or V.
  (See next page for description.)
- The pre-procedure assessment must be documented by the anesthesia provider.

Pre-procedure Responsibilities: ASA Classification

American Society of Anesthesiologists Classification ("ASA Class") [6]	
ASA I	A normal healthy patient
ASA II	A patient with mild systemic disease
ASA III	A patient with severe systemic disease that limits activity but is not incapacitating
ASA IV	A patient with severe systemic disease that is a constant threat to life
ASA V	A moribund patient who is not expected to survive without the operation or procedure
ASA VI	A declared brain-dead patient whose organs are being removed for donor purposes

= Anesthesia consultation advised.

Pre-procedure Responsibilities: RN/RCIS Role

The RN or RCIS assisting with a procedure requiring sedation must ensure the following documentation is complete:

- Patient/family education
- Patient monitoring during procedure
- Time-based documentation during procedure

Prior to the procedure, the RN/RCIS must ensure all necessary supplies and equipment are available.

Pre-procedure Responsibilities: Patient Preparation

Procedural sedation preparation is the same as any other procedure or surgery.

- Ensure all orders and diagnostic tests are complete, e.g., lab tests, x-rays, skin preps, etc.
- Verify the patient's NPO status. Follow orders based on ASA class.
- Educate the patient and family regarding the procedure scheduled and expectations of sedation; CONSENT SIGNED prior to any administration of sedation.

Pre-procedure Responsibilities: Patient Preparation *(cont.)*

Validate all required components are complete:

1. Valid H&P is less than 30-days old with reassessment of the patient documented within 24-hours of admission prior to the procedure.
2. Validation of the correct surgical/invasive procedure
3. Evaluation immediately prior to the procedure
4. Medications
5. Allergies and previous drug reactions
6. Patient's age
7. Patient's weight
8. Pre-procedure laboratory and other diagnostic testing
9. Consent

Pre-procedure Responsibilities: Patient Preparation *(cont.)*

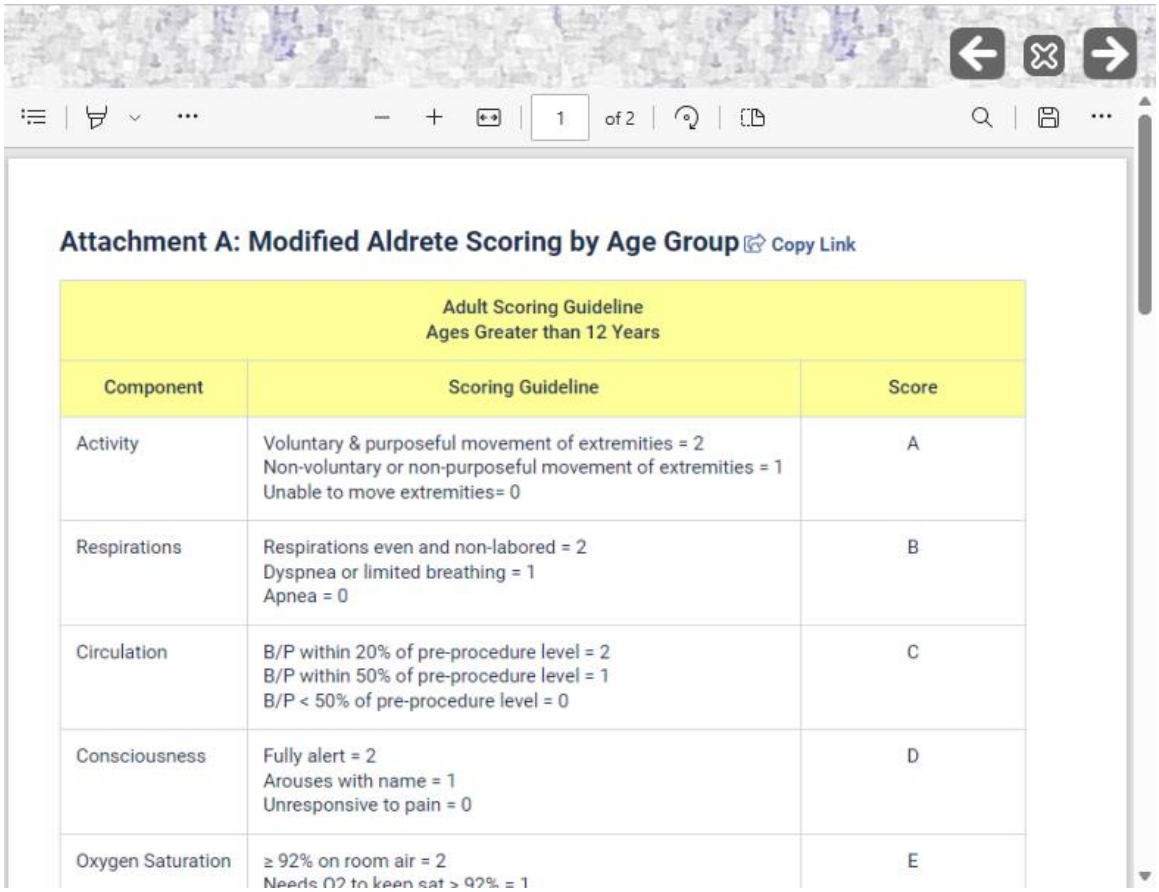
- Ensure a comprehensive assessment of the patient is completed.
- Perform a baseline pain assessment.
- Verify patent IV access.
- Pre-oxygenate the patient via nasal cannula at a flow rate of 2 L/m (unless medically contraindicated).
- Verify emergency equipment is available and in working condition.
- Identify the patient, using two identifiers. Validate the correct patient, procedure, and site.
- Perform a time-out prior to beginning the procedure.

Pre-procedure Responsibilities: The Modified Aldrete Score (or validated tool)

Modified Aldrete Scoring is a measurement tool rating post-procedure recovery of consciousness, activity, respirations, and blood pressure.

- A pre-procedural Aldrete score is necessary to establish an accurate baseline of the patient's status.
- Pre-existing conditions should be considered when evaluating the patient's score.
- A post-procedural score should equal the pre-procedural baseline score prior to discharge from the recovery area.

PRINT the Modified Aldrete Scoring document for use with answers on the quiz.



Attachment A: Modified Aldrete Scoring by Age Group Copy Link

Adult Scoring Guideline Ages Greater than 12 Years		
Component	**Scoring Guideline**	**Score**
Activity	Voluntary & purposeful movement of extremities = 2 Non-voluntary or non-purposeful movement of extremities = 1 Unable to move extremities= 0	A
Respirations	Respirations even and non-labored = 2 Dyspnea or limited breathing = 1 Apnea = 0	B
Circulation	B/P within 20% of pre-procedure level = 2 B/P within 50% of pre-procedure level = 1 B/P < 50% of pre-procedure level = 0	C
Consciousness	Fully alert = 2 Arouses with name = 1 Unresponsive to pain = 0	D
Oxygen Saturation	≥ 92% on room air = 2 Needs O2 to keep sat > 92% = 1	E

Knowledge Check

The Modified Aldrete Scoring Guideline used to compare the patient's pre- and post-sedation status includes: (Choose all that apply.)

- [x] Activity
- [x] Respirations
- [ ] Pulse
- [ ] Cardiac rhythm
- [x] Blood pressure

Pre-procedure Responsibilities: Baseline Assessment

Immediately prior to medication administration, assess the following baseline parameters:

- Blood pressure
- Heart rate
- Respiratory rate
- Oxygen saturation
  - Maintain adult $SpO_2 \geq 92\%$ and pediatric $SpO_2 \geq 95\%$.
- End-tidal CO_2 level
  - Maintain CO_2 at 35 – 45 mmHg.
  - The CO_2 level will increase if the patient's ventilatory status is compromised.
- Level of consciousness
- Cardiac rhythm
  - Continuous ECG monitoring is required for **all** patients with a cardiac history or expected dysrhythmias, and for **all** deep sedation cases.
- Modified Aldrete score

Knowledge Check

Pre-oxygenation at 2 L/m via nasal cannula is required for all procedural sedation cases, unless medically contraindicated.

- (●) True
- ( ) False

Pre-procedure Responsibilities: Time-Out

Key Point: A "time-out" is **mandatory** prior to the start of the procedure.

During the time-out, the entire procedural team must pause, including the patient when possible, and verify the:

- Correct patient, using two patient identifiers
- Correct procedure
- Correct site (if applicable), including laterality

There must be **100% agreement** of the team **prior to starting** the procedure.

The time-out **must be documented** in the patient's medical record.

Intra-procedure Responsibilities: Monitoring

At a minimum, the following parameters should be monitored and documented **after every medication administration** and **every 5-10 minutes** during the procedure, following each additional dose of medication and more frequently as the patient's clinical needs dictate.

- Blood pressure
- Heart rate
- Respiratory rate
- Oxygen saturation
  - Maintain adult $SpO_2 \geq 92\%$
  - Maintain pediatric $SpO_2 \geq 95\%$.
- Identification and management of adverse events
- Level of consciousness
- Medication: dose, route, time
- Modified Aldrete score
- Pain level
- $EtCO_2$ level

Intra- & Post-procedure Assessment Considerations

Monitor the following to determine the patient's tolerance to the procedure:

- Significant variances in blood pressure, heart rate, respiratory rate and effort, SpO_2, and end-tidal CO_2.
- The patient's response **or** lack of response to verbal and physical stimuli.
- Facial grimacing and physical posturing, tensing, or flaccidity.

When observing the above, ask yourself:

- "Is the patient sedated enough?"
- "Is the patient experiencing pain?"
- "Is the patient over-sedated or at risk of being over-sedated?"

Post-procedure Monitoring

Post-procedure, the following page lists parameters which should be monitored continuously and documented **every 15 minutes**, depending on the patient's condition and the procedure performed.

Documentation will continue through the post-procedure period until the patient reaches 8 or greater on the Modified Aldrete score.

Post-procedure Responsibilities: Monitoring

At a minimum, the following parameters should be monitored and documented **after every medication administration** and **every 5-10 minutes** during the procedure, following each additional dose of medication and more frequently as the patient's clinical needs dictate.

- Blood pressure
- Heart rate
- Respiratory rate
- Oxygen saturation
  - Maintain adult $SpO_2 \geq 92\%$
  - Maintain pediatric $SpO_2 \geq 95\%$.
- Identification and management of adverse events
- Level of consciousness
- Medication: dose, route, time
- Modified Aldrete score
- Pain level
- $EtCO_2$ level

Post-procedure Responsibilities: Monitoring *(cont.)*

- Blood pressure
- Heart rate
- Respiratory rate
- Oxygen saturation
  - Maintain adult $SpO_2 \geq 92\%$
  - Maintain pediatric $SpO_2 \geq 95\%$.
- Identification and management of adverse events.
- Level of consciousness
- Medication: dose, route, time
- Modified Aldrete score
- Pain level
- Nausea
- End-tidal CO_2 level
  - Maintain CO_2 at 35 – 45 mmHg.
  - The CO_2 level will increase if the patient's ventilatory status is compromised.
- Cardiac rhythm
  - Continuous ECG monitoring is required for **all** patients with a cardiac history or expected dysrhythmias and for **all** deep sedation cases.

Post-procedure Assessment Considerations

- Patients may continue to be at significant risk for persistent/residual sedation effects or for developing complications after the procedure is completed.
- The reassessment and documentation of vital signs will revert to unit-specific standards of practice once the post-procedure monitoring criteria have been met.
- The patient's pain level may become more acute as the level of sedation decreases and will need to be treated accordingly.

Post-procedure and Over-Sedation

Over-sedated patients will require an extended recovery period.

Key Points:

- Monitor Patient - If the patient received a reversal agent due to over-sedation, they must be monitored for a minimum of two hours after the last dose of the reversal agent.
- Submit a VOICE File:
  - When a reversal agent is used to rescue a patient.
  - If there are any complications or adverse outcomes.

Discharge from Procedural Units

Patients are either discharged to their inpatient unit or discharged to home from the procedural unit.

Patients may be discharged when **at least** 30 minutes have elapsed since the last dose of sedation/analgesia was given.

Key Points:

If a reversal agent was administered, the patient must be monitored for at least 2 hours after the last dose of reversal agent was given.

Monitoring can continue on an inpatient unit.

Discharge Criteria

Prior to discharge, the following criteria must be met:

- Vital signs must be stable.
- Modified Aldrete score must be ≥ 8.
- None, or mild nausea with no active emesis.
- Patient is arousable with protective reflexes intact.
- Pain-free, mild discomfort, or controlled with analgesics.
- Mobility must be back to pre-procedure baseline.

Interpreting the Modified Aldrete Score

A patient requires either **a score ≥ 8** or **a proceduralist/provider's order** to be transferred or discharged from the procedural unit. Other department/ procedural-specific discharge criteria may also need to be applied.

Key Point:

A score < 8 indicates the patient should be closely monitored with interventions applied as indicated.

Discharging Inpatients vs. Outpatients

Inpatients:

- A full hand-off report must be given to the next provider of care.

Outpatients:

- Written discharge instructions must be reviewed with the patient and responsible party.
- Discharge instructions include the hospital- and department-specific instructions and the 24-hour minimum restrictions mandated for patients who have received pain or sedative agents, including an emergency phone number.

Key Point:

A responsible individual **must** be available to transport the patient home.

Knowledge Check

You are caring for a patient immediately post-bronchoscopy. She is very groggy, but arouses when you call her name. She can move her extremities when asked, but she keeps falling back to sleep. Her respirations are non-labored, but her respiratory rate is 9-10. Her blood pressure is 108/68 (baseline was 124/78). She needs O_2 at 2 L/m via nasal cannula to keep her oxygen saturation at 93%.

What is her Modified Aldrete Score?

- ○ 4
- ○ 5
- ○ 6
- ◉ 7
- ○ 8

Knowledge Check *(cont.)*

Continuing with the same patient in the previous question, what does her score need to be for her to be discharged from the procedural area?

- ○ Greater than or equal to 4
- ○ Greater than or equal to 6
- ◉ Greater than or equal to 8
- ○ Greater than or equal to 10

Reference

Munson Healthcare Policies and Procedures. (2022, December 16). *Sedation*. PolicyStat.

Symptom Management for Procedural Sedation

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Goal and Objectives

Goal

This course will increase the participant's knowledge of managing potential symptoms associated with patients receiving procedural sedation.

Objectives

1. Identify when a patient has progressed to a deeper level of sedation.
2. Identify nursing interventions appropriate to the patient's rescue needs.

Common Side Effects of Sedation

The most common side effects of sedation administration are:

- Respiratory depression
- Hypotension
- Nausea and vomiting
- Paradoxical response

The most common adverse effect of opioids, especially when combined with sedatives, is respiratory depression.

If left untreated, respiratory depression can progress to apnea, followed by cardiac arrest.

$EtCO_2$ and pulse oximetry may show early signs of respiratory distress.

Treatment of Respiratory Depression

- **Stop all administration of opioids and sedatives!**
  - The duration of these medications depends on the drug, dose, route of administration, and the patient's condition.
- Maintain an open airway:
  1. Reposition the head/neck using the chin-lift or jaw-thrust.
  2. Provide oxygen therapy. Be prepared to use an ambu bag if necessary.
  3. Insert a nasal or oropharyngeal airway as necessary.
- If airway management is not effective, administer the appropriate reversal agent:
  - Flumazenil (Romazicon) for benzodiazepines.
  - Naloxone (Narcan) for opioids.
- Call MRT as appropriate.

If the patient does not respond to airway management maneuvers and the reversal agent, call a Code Blue (5-5555)!

Knowledge Check

The most common side effect of sedation administration is:

- (●) Respiratory Depression
- ( ) Paradoxical Response
- ( ) Nausea and Vomiting
- ( ) Hypotension

Knowledge Check *(cont.)*

If respiratory depression occurs while I am assisting with a procedure that requires sedation, I should do all of the following: (Choose all that apply.)

- [ ] Reposition the head/neck by tucking the chin to the chest.
- [x] Provide oxygen therapy, assisting with ventilation, if necessary.
- [x] Insert an oropharyngeal airway, if needed.
- [x] Administer the appropriate reversal agent.

Hypotension

Hypotension is most likely caused by vasodilation, blood loss during the procedure, or a pre-existing condition, but could also be caused by sedation. The cause of the hypotension determines the treatment.

Possible treatments:

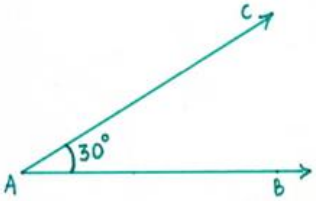
- IV fluid replacement
- Vasopressors
- Blood transfusion
- If you suspect the cause is over-sedation, administer reversal agents per protocol:
  - Flumazenil (Romazicon) for benzodiazepines.
  - Naloxone (Narcan) for opioids.

Nausea and Vomiting

<u>Aspiration is a major concern with the patient receiving sedation</u>.

Treatment for nausea and vomiting:

- Position the patient to prevent aspiration. The preferred position is Semi-Fowlers with the head of the bed at 30 degrees and the patient on his/her side.
- Suction as necessary to maintain a patent airway.
- Administer an antiemetic.
- Patient to remain NPO until awake and alert.



Paradoxical Responses

The desired effect of moderate sedation or analgesia is a relaxed and cooperative patient. The patient is sedated but can be aroused and is able to follow simple commands.

If a patient has a sensitivity to a specific drug, a paradoxical response can occur. Consider a paradoxical response if the patient becomes any of these:

- Agitated
- Uncooperative
- Combative
- Disoriented

Paradoxical Responses *(cont.)*

A thorough patient assessment is imperative to determine the actual cause of the patient's symptoms.

Paradoxical responses are seen more often in patients with a history of alcohol or IV drug abuse (most frequent).

Other causes to consider include:

- Hypoventilation due to hypoxia.
- Inadequate dosing of pain medication during a painful procedure.

Over-sedation

Symptoms:

- Decreased respiratory function (hypoventilation, decreased respiratory rate, or apnea)
- Decreased cardiovascular function (hypotension or dysrhythmias)
- Confusion
- Decreased level of consciousness that can progress to coma
- Depressed/absent cough and gag reflex
- Decreased response to physical/verbal stimuli

Treatment of Over Sedation

Treatment:

- Ensure an open airway.
- Encourage or stimulate the patient to breathe.
- Administer supplemental oxygen to increase or maintain oxygen saturation greater than or equal to 92%.
- Ventilate with ambu bag if spontaneous ventilation is inadequate.
- Administer reversal agents per protocol:
  - flumazenil (Romazicon) for benzodiazepines.
  - naloxone (Narcan) for opioids or narcotics.
- If hypotensive, infuse IV fluids or consider vasopressors.
- Reposition patient to semi-fowlers.
- Consider MRT or RT evaluation, if approriate.
- If patient uses home CPAP/BiPAP, also use it post-procedure.

If the patient does not respond to airway management maneuvers and the reversal agent, call a Code Blue (5-5555)!

Knowledge Check

Symptoms of over-sedation include: (Choose all that apply.)

- [x] Decreased response to stimuli
- [x] Decreased respiratory rate
- [ ] Agitation
- [x] Hypotension

Knowledge Check *(cont.)*

If a patient is in respiratory arrest and does not respond to airway management and reversal agents, I should:

- (●) Call a Code Blue.
- ( ) Call and MRT.
- ( ) Call the provider.

Reporting Requirements

Whenever it is necessary to administer a reversal agent, a VOICE file must be completed. Access the form from the MHC Intranet.

Other complications related to sedation to be reported include:

- Incidents in which the patient slips into a level of sedation that is greater than intended, e.g., moderate to deep sedation.
- Profound hypotension (50% decrease from pre-procedure mean blood pressure)
- Cardiac arrest
- Defibrillation
- Respiratory arrest
- Seizures
- Aspiration
- Medication errors
- Vomiting

Knowledge Check

I must fill out a VOICE file for the following situations: (Choose all that apply.)

- [x] If a patient slips into a deeper level of sedation than intended.
- [x] Profound hypotension
- [x] Medication errors
- [x] If a reversal agent is required to control an adverse reaction, such as respiratory depression.

References

Munson Healthcare Policies and Procedures. (2022, December 16). *Sedation.* PolicyStat.

Munson Healthcare Policies and Procedures. (2021, April 20). *Flumazenil Protocol*. PolicyStat.

Munson Healthcare Policies and Procedures. (2022, February 21). *Standing Order/Protocol for Adult Naloxone (Narcan)*. PolicyStat

Procedural Sedation Medication Guidelines

Lauren Wolf, PharmD, BCPS, BCCCP

December 2025

Goal and Objectives

Goal

This course will increase the participant's knowledge of administering medications for procedural sedation.

Objectives

1. Identify staff who can administer sedation.
2. Select the appropriate medication and dose for reversing over sedation.

Introduction

Dosage guidelines for procedural sedation and reversal agents are approved by the Pharmacy and Therapeutics (P & T) Committee at Munson Medical Center.

These guidelines are intended for initial doses and may be exceeded or decreased according to the patient's history, previous response to sedatives or other clinical circumstances.

Prior to administration, the P & T Committee must review and approve the use of all medications not listed in the approved guidelines.

Guidelines Location

Nurses and Registered Cardiovascular Invasive Specialists (RCIS) should be familiar with medication guidelines before administering sedation. The medication guidelines are attached to the Sedation policy.

Moderate & Deep Sedation/Analgesia Drug Usage Guidelines are listed below. **Print** the document to use as a reference for upcoming questions.

Attachment C: Moderate Sedation/Analgesia Drug Usage Guidelines

A. IVP by RN or ED Trained Pharmacist in the presence of the provider credentialed for moderate sedation

B. Not intended for Neonates - Unless otherwise indicated

Drug	Pharmacokinetics	Drug Dosage & Administration	Precautions / Contraindications
Diazepam (Valium)	Onset: IV: 1-3 min	Adults IV: 5-10mg - no faster	• Titrate to effect. Do not dilute.

Facility-specific IV Push and Infusion Guidelines

Munson Healthcare has an IV Push/Infusion Chart to assist staff with decisions regarding the administration of medications. This chart can be found on the Intranet on the Pharmacy Department site.

The chart contains various topics, including:

- Medications administered by IV push or by infusion.
- Approved medications per department.
- Medications a nurse can give during a Code Blue.
- Medications requiring a physician be present during administration.

NOTE: See the IV Push Chart on the next slide.

MMC IV Push Chart

MUNSON HEALTHCARE
IV MEDICATION ADMINISTRATION GUIDELINES

Definitions	
Level 1	Units with general nursing and monitoring capabilities (ex. med-surg).
Level 2	Intermediate and telemetry units. RNs working on these units have more advanced training and advanced monitc telemetry) are present. Level 2 may be further divided into level 2a (telemetry units) or level 2b (step-down units)
Level 3	Critical and emergency care units (including operating rooms). Licensed clinicians working on these units are trai emergencies and manage critically ill patients. Advance monitoring and treatment resources are readily available.
OB	Birthing units and units dedicated to the care of antepartum and postpartum patients. OB units follow level 1 crite noted.
PEDS	Any unit caring for patients 18 years of age or less. Peds may be further subdivided as **level 1, level 2, and level** criteria above.

Exclusions

- Chemotherapy/antineoplastic agents
- Biologics and immune therapies typically restricted to outpatient administration (ex. Infliximab, vedolizumab)
- Basic IV hydration fluids (ex. 0.9% normal Normosol, lactated ringers)
- Non-intravenous parenterally administere

Who Can Administer Sedation?

Medications for **moderate** sedation may be given by a registered nurse (RN) or registered cardiovascular invasive specialist (RCIS) in the presence of the physician, physician assistant (PA), nurse practitioner (NP), or oral surgeon credentialed in moderate sedation and in advanced airway management.

Who Can Administer Sedation? *(cont.)*

Medications for **deep** sedation, can **ONLY** be administered by a provider credentialed in deep sedation.

- **Exception: Propofol** - a critical care RN may give propofol (Diprivan) IVP for an emergent intubation while a physician is present and performing the intubation.
  - Critical care is defined by the IV Push/Infusion Chart to include these units:
    - ✓ ICU
    - ✓ ED
    - ✓ PACU
    - ✓ OR
    - ✓ A2 (critical)
    - ✓ A3 (critical)
    - ✓ IR

Knowledge Check

A patient is scheduled for a wound debridement at the bedside. The physician orders hydromorphone (Dilaudid) 0.1-0.5mg IV titrated over 1 minute for moderate sedation.

This is an approved dose according to the MMC Moderate Sedation Guidelines.

- (●) True
- ( ) False

Knowledge Check *(cont.)*

A patient is scheduled for a synchronized cardioversion. The physician orders propofol (Diprivan) at 1mg/kg per minute over 60 seconds.

How long do the effects of propofol (Diprivan) last?

- ( ) 1-2 minutes
- (●) 3-10 minutes
- ( ) 12-20 minutes
- ( ) 25-30 minutes

Knowledge Check *(cont.)*

A registered nurse from the ICU can give propofol (Diprivan) IV push with a physician order, if the physician is present in the room, but is not intubating the patient.

- ○ True
- ◉ False

Reversal Agents

- Reversal agents may be indicated when:
  - ➢ The level of sedation is deeper than desired.
  - ➢ The patient's responsiveness or cardio-respiratory status is compromised.
  - ➢ An idiosyncratic reaction occurs.
- If a reversal agent is administered for the undesired effects, a **VOICE** file is required.
- A patient should be monitored for a minimum of two hours after giving a reversal agent.

Commonly Used Opioids

If a patient becomes difficult to arouse with verbal or physical stimuli related to sedation from an opioid, follow the Standing Order/Protocol for Adult Naloxone (Narcan) Protocol. The naloxone (Narcan) protocol can be located:

- Policy website on the Intranet
- Pharmacy website on the Intranet
- Side of the crash cart

Examples of commonly used opioids include:

Codeine	Morphine
Demerol (meperidine)	Norco (hydrocodone + acetaminophen)
Dilaudid (hydromorphone)	Oxycontin (oxycodone)
Dolophine (methadone)	Percocet (oxycodone + acetaminophen)
Duragesic (fentanyl patch)	Sublimaze (fentanyl injection)

naloxone (Narcan) Protocol

The naloxone protocol allows the registered nurse or RCIS to:

- Titrate oxygen to maintain an oxygen saturation of at least 92%.
- Perform further interventions, including the administration of naloxone depending on the patient's mental status and O_2 saturation.
- For patients with oxygen saturations ≥ to 80%, dilute the naloxone 0.4 mg in 9 ml of normal saline and administer in small, 1mL doses following the protocol. This allows for better titration of the dosing [so the patient doesn't over respond to the naloxone and end up in severe pain].
- Give naloxone 0.4 mg **undiluted** for an O_2 saturation below 80% or respiratory arrest.

NOTE: Click the button.

Review the naloxone (Narcan) Protocol

Show Changes

Tag Policy

Standing Order/Protocol for Adult Naloxone (Narcan)

Purpose

To provide a policy for Adult Naloxone (Narcan) standing orders/protocols.

Policy

A. The Protocol for Adult Naloxone (Narcan) shown below, is approved as a standing order and may be initiated by a Registered Nurse (RN) or Licensed Practical Nurse (LPN) without a provider order for any patient if:

1. Patient is difficult to arouse with verbal/physical stimuli **~AND~**
2. Patient is on, or recently was on, opioids or suspected that the patient has consumed opioids

. This protocol is not applicable for end of life/palliative or comfort care/hospice patients. Call provider to clarify if any questions.

C. If criteria above are met then the initiating [illegible] would enter by Physician Order Entry (POE) using

naloxone (Narcan) Points to Remember

- The onset of action for naloxone is within 2 minutes.
- The half-life of naloxone is 30-90 minutes.
- Many opioids have a longer half-life than naloxone, so it is important to monitor your patients closely. A repeat dose of naloxone may be required.

Knowledge Check

A 52-year-old female was admitted post-intervention to her right coronary artery. She received an initial dose of morphine sulfate 2 mg IV push prior to her sheath pull. She continued to complain of discomfort @ 8/10. An additional morphine sulfate 4 mg IV push was administered for discomfort. Respirations are now 5/minute; oxygen saturation is 82%. The patient is not arousable to verbal stimuli, but is arousable to a sternal rub.

Which dose of reversal agent should be initiated?

- (●) naloxone 0.4 mg diluted in 9 mL of normal saline, and give 1 mL IV push
- ( ) naloxone 0.4 mg diluted in 9 mL of nomal saline, and give IV push
- ( ) naloxone 0.4 mg IV push (undiluted)
- ( ) naloxone 0.4 mg diluted in 9 mL of normal saline, and give 2 mL IV push

Treating Over Sedation from a Benzodiazepine

If a patient becomes difficult to arouse with verbal or physical stimuli related to sedation from a benzodiazepine, follow the flumazenil (Romazicon) protocol.

The flumazenil protocol can be located:

- Policy website on Intranet
- Pharmacy website on Intranet
- Side of the crash cart

Commonly Used Benzodiazepines

The most commonly used benzodiazepines are:

alprazolam (Xanax) ★	flurazepam (Dalmane)
chlordiazepoxide (Librium)	**lorazepam (Ativan)** ★
clonazepam (Klonopin)	**midazolam (Versed)** ★
clorazepate (Tranxene)	oxazepam (Serax)
diazepam (Valium) ★	**temazepam (Restoril)** ★
estazolam (Prosom)	triazolam (Halcion)

★ = MMC formulary benzodiazepines

flumazenil (Romazicon) Protocol

The flumazenil Protocol allows the registered nurse or RCIS to:

- Titrate oxygen to maintain an oxygen saturation of at least 92%.
- Perform interventions, including administering flumazenil if the patient is unarousable AND:
  - Oxygen saturation is less than 89% **OR**
  - Respiratory rate is less than 6.
- Initial dose: flumazenil 0.2 mg IV push over 30 seconds

NOTE: Click the button to review the flumazenil protocol; check for repeat dosing and the complete intervention sequence.

Review the flumazenil (Romazicon) Protocol

Show Changes

POMH)

Tag Policy

Flumazenil Protocol

Purpose

Flumazenil (Romazican) protocol for suspected Benzodiazepine overdose in adults.

Policy

Flumazenil Reversal Protocol (Physician Order Required)

Purpose: Flumazenil (Romazicon) protocol for suspected Benzodiazepine Overdose in Adults

Most Common Benzodiazepines

- Alprazolam (Xanax)
- Chlordiazepoxide (Librium)
- Clonazepam (Klonopin)
- Clorazepate (Tranxene)
- Diazepam (Valium)
- Estazolam (ProSom)

Difficult to arouse with verbal/physical stimuli or suspected benzodiazepine overdose

- Page respiratory therapy STAT
- STAT SpO2

flumazenil (Romazicon) Points to Remember

- The onset of action is 1-2 minutes.
- Duration:
  - ➢ Re-sedation occurs after approximately 1 hour (range: 19-50 minutes).
- Many benzodiazepines have a longer half-life than flumazenil, so it is important to monitor your patients closely. A repeat dose may be required.
- Avoid use of flumazenil in patients with chronic benzodiazepine use. Its use may precipitate seizures.

Knowledge Check

You are assigned to an 88-year-old man who arose from a sitting position and had a syncopal episode. He was placed on the stroke unit for telemetry monitoring. At the start of your evening shift, he becomes very agitated. An order is obtained to give him lorazepam (Ativan). He finally falls asleep after 0300. At the end of the shift (0700), you find him difficult to arouse to both verbal and physical stimuli. His respirations are 5/minute and his oxygen saturation is 86%.

Which reversal dosing agent is appropriate for this patient?

- ○ Undiluted naloxone (Narcan) 0.4 mg IV push STAT
- ○ Diluted naloxone (Narcan) 0.4 mg in 9 mL normal saline
- ◉ flumazenil (Romazicon) 0.2 mg IV push over 30 seconds
- ○ flumazenil (Romazicon) 0.4 mg IV push over 30 seconds

Selecting naloxone (Narcan) vs. flumazenil (Romazicon)

When a patient has received/taken both a benzodiazepine and an opioid, and a reversal agent is needed, **give the naloxone first**.

Reasons:

- Opioids are more likely to cause respiratory depression and other adverse effects, such as hypotension.
- flumazenil can cause seizures in patients with a history of long-term use of benzodiazepines.

Knowledge Check

A 21-year-old female patient has returned following endoscopy in the Medical Procedure Room. She received Demerol 75 mg and Versed 7.5 mg during the procedure.

She has a history of taking Xanax 0.25 mg three times per day for anxiety and Vicodin PRN for pain. She was discharged to B2 following an uneventful recovery with an Aldrete score of 8. Respirations are now 5/minute with an oxygen saturation of 85%. The patient is not arousable to verbal stimuli, but does arouse to a sternal rub.

Which reversal agent protocol should be used first?

- (●) naloxone (Narcan) Protocol
- ( ) flumazenil (Romazicon) Protocol

Knowledge Check *(cont.)*

A 21-year-old female patient has returned following endoscopy in the Medical Procedure Room. She received Demerol 75 mg and Versed 7.5 mg during the procedure.

She has a history of taking Xanax 0.25 mg three times per day for anxiety and Vicodin PRN for pain. She was discharged to B2 following an uneventful recovery with an Aldrete score of 8. Respirations are now 5 minute with an oxygen saturation of 85%. The patient is not arousable to verbal stimuli, but does arouse to a sternal rub.

Which dose of Narcan (naloxone) should be administered?

- ( ) naloxone 0.4 mg IV push (undiluted)
- ( ) naloxone 0.4 mg diluted in 9 mL of nomal saline, and give IV push
- ( ) naloxone 0.4 mg diluted in 9 mL of normal saline, and give 2 mL IV push
- (●) naloxone 0.4 mg diluted in 9 mL of normal saline, and give 1 mL IV push

Treating Patients Who Revert to a Deeper Level of Sedation

- Remember, the effects of opioids and benzodiazepines last longer than the effects of the reversal agents.
- Continue to monitor the patient for signs of progression to a deeper level of sedation for a minimum of 2 hours.
- Repeated dosing of the reversal agents may be needed.
- Create and submit a **VOICE** file.

Dissociative Sedation

Dissociative sedation is a trance state where the patient remains awake, but is unaware of pain and will have no memory of the event.

- In comparison to deep sedation, which causes the patient to:
  - Be unarousable, except with repeated or painful stimuli
  - Experience respiratory depression

Ketamine for Dissociative Sedation

Ketamine will be administered by providers credentialed for deep sedation.

1. A pharmacist, nurse, or non-credentialed provider may administer medications for dissociative sedation in the Emergency Department, as long as a provider credentialed for deep sedation, an RN, and a respiratory therapist are ***ALL*** present.
2. Respiratory adverse events, such as apnea or laryngospasm (although uncommon), may still occur, and providers must always be prepared to rescue the patient from a deep sedation state anytime ketamine is administered.
3. Ketamine (IM/IV) is used for dossociative sedation in both children and adults (including the mentally disabled) for medical procedures such as, but not limited to: fracture reduction, laceration repair, abscess drainage, foreign body removal.
4. If Ketamine is administered IM, IV access should be immediately available.

References

Lexicomp. (2023, November 29). *Flumazenil*. Retrieved December 5, 2023.

Munson Healthcare Policies and Procedures. (2021, April 20). *Flumazenil Protocol*. PolicyStat.

Munson Healthcare Policies and Procedures. (2022, February 21). *Standing Order/Protocol for Adult naloxone (Narcan)*. PolicyStat.

Munson Medical Center. (2023, October). *IV push/infusion chart - adult*.

Munson Medical Center Policies and Procedures. (2022, December 16). *Sedation*. PolicyStat.

MUNSON HEALTHCARE

Exit Next

Magnetic Resonance Imaging (MRI) Safety

Heather Davis, RT(R), Radiology
Amy Anderson, RT(R), MR, Radiology

April 2025

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Goal and Objectives

Goal

This course will enable the learner to provide a safe environment for patients and staff who are in the presence of the MRI scanner.

Objectives

1. Describe basic knowledge of magnetic fields and their influence on objects near them.
2. Describe the importance of safety when working around the MRI scanner.
3. Identify precautions that should be taken to avoid accidents when working near the MRI scanner.
4. Identify precautions that should be taken when patients have implantable devices or metallic foreign bodies.

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The MRI Magnet

Magnetic resonance imaging (MRI) is a noninvasive, painless medical test that helps physicians diagnose and treat medical conditions by providing views of the inside of the human body.

The MRI uses a powerful magnetic field, radio waves, and a computer to produce detailed three-dimensional pictures of internal body structures.

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The MRI Magnet *(cont.)*

Most people have had some experience with natural magnets and their attractive forces, such as, attaching papers to a refrigerator door.

The MRI scanner is a large magnet (10,000 lbs.) with a tremendously strong magnetic pull. The magnet in the MRI scanner creates a force field which can affect objects that are close to it. As you approach the MRI scanner, the attractive force field increases rapidly.

The strong magnetic field can have adverse effects on patients and staff who are within the scanner's magnetic force field.

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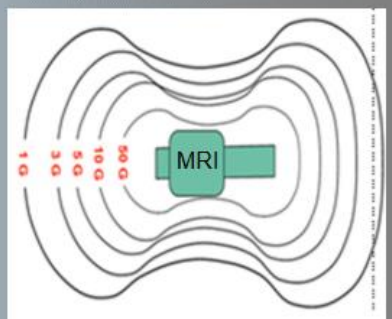
Magnetic Field Hazards

All MRI magnets have a magnetic field that extends into the exam room.

The various distances from the magnet consist of ***GAUSS Lines***, *which measure the attractive force of the magnet at a certain distance.*

As Gauss Line distances decrease, the magnetic field strength increases, until the field is so strong, it can cause any ferromagnetic object* to have a missile effect.



Distance closer, strength higher

*An object attracted by a magnet and can become magnetized.

Back Exit Next

Magnetic Field Hazards *(cont.)*

Ferromagnetic metal alloys usually contain iron, nickel, or cobalt. These elements are found in most metal objects.

Examples of ferromagnetic objects:

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Magnetic Field Hazards *(cont.)*

The Missile Effect

This refers to the capability of the MRI magnetic field to attract a ferromagnetic object into the scanner with considerable force.

It can cause:

- Delayed patient care
- Possible injury to patient or staff
- Possible damage to the MRI scanner
- Approximate cost due to each "missile effect" incident: **$250,000**

It takes **96 hours** to:

- Turn the magnet off
- Remove the object
- Power back up

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The MRI Magnet is Always On!

The MRI Magnet is Always On!

The MRI Magnet is Always On!

Back Exit

Test Your Knowledge

Which of the following items should you remove from your pockets prior to entering the strong magnetic field of an MRI system?

- ○ Scissors
- ○ Safety pin
- ○ House key
- ◉ All of the above

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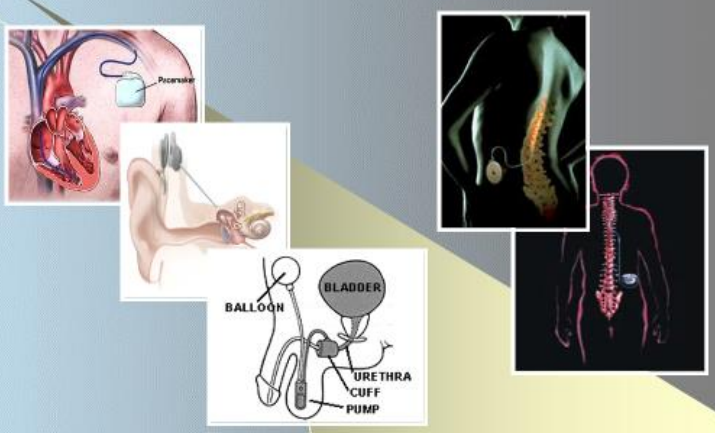
Magnetic Field Hazards *(cont.)*

MRI staff should ensure that implants are **"MR Conditional"** and should instruct patients to immediately report any burning sensations experienced during the scan.

Displacement and Heating of Surgical Implants:

- Cardiac pacemakers
- Neurostimulators
- Pain control pumps
- Penile implants
- Cochlear implants



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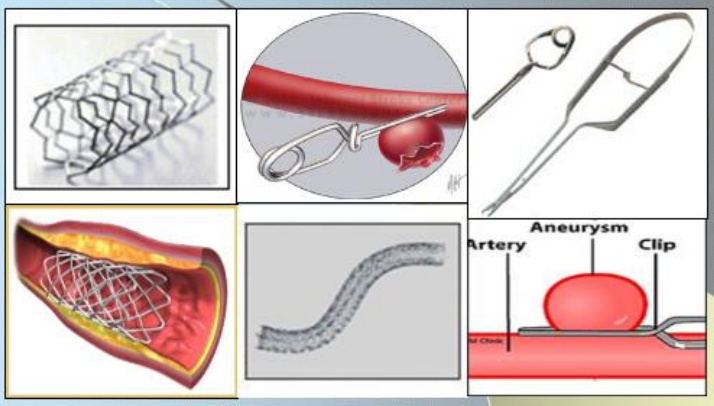
Magnetic Field Hazards *(cont.)*

Displacement (movement) of these implants may cause a life-threatening situation!

Stents and Aneurysm Clips:



Back Exit Next

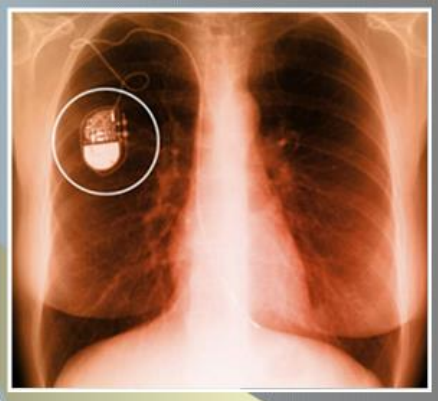
Magnetic Field Hazards *(cont.)*

Electromagnetic Interference with Electronic Devices

Mechanically- or electrically-activated implants may stop or malfunction in the presence of the MRI magnetic field.

Patients with pacemakers have died during or shortly after MRI exams due to disruption of pacemaker function by the MRI system.

Hospital staff with pacemakers or other implanted electronic devices could also be affected, if they come within the strong magnetic field of the MRI.



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Magnetic Field Hazards *(cont.)*

All patients with body piercing jewelry must be screened for jewelry removal before they have an MRI scan!

Risks for these patients include:

- Discomfort or painful sensations due to possible displacement of the jewelry.
- Patient burns due to heat generated from the interaction between the jewelry and the electromagnetic fields.

Back Exit Next

Magnetic Field Hazards *(cont.)*

All patients with transdermal patches must be screened for patch removal before they have an MRI scan.

Transdermal Patches:

Some patients are now wearing trans-dermal patches for medication delivery.

Many of these patches contain aluminum foil or other metallic components which can cause excessive heating, leading to burns in patients undergoing a MRI scan.

Back Exit Next

Magnetic Field Hazards *(cont.)*

All patients with tattoos must be screened before they have an MRI scan.

Tattoos:

Many patients scheduled for an MRI scan will present with tattoos.

These tattoos will be either cosmetic or decorative and can be located anywhere on the body.

Some of these tattoos will contain ferromagnetic material, which can cause heating, swelling, or burning at the tattoo site.

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The MRI Magnet is Always On!

The MRI Magnet is Always On!

The MRI Magnet is Always On!

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Magnetic Field Hazards *(cont.)*

Pregnancy **All pregnant patients must be screened before they have an MRI scan.**

MR imaging is recognized as a beneficial diagnostic tool to assess a wide range of diseases and conditions that affect pregnant women and their fetuses.

MR imaging in pregnant women should only be performed in cases where the referring physician and radiologist agree that the findings of the MRI has the potential to change or alter the care of the mother or fetus and that the benefit outweighs the risk.

The Policies, Guidelines, and Recommendations for MRI Imaging, Safety, and Patient Management issued by the Safety Committee of the Society for MRI imaging states:

"MRI may be used for pregnant women if other non-ionizing diagnostic imaging is inadequate, or if the MRI provides important information that would otherwise require exposure to ionizing radiation (CT, fluoroscopy, etc.)."

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Summary of MRI Hazards

Hazard	Possible Danger
Body-piercing jewelry	Displacement; Heat
Transdermal skin patches	Burning
Tattoos	Burning
Aneurism clips	Displacement
Stents	Displacement
Cochlear implants	Displacement
Penile implants	Displacement
Pacemakers	Malfunction or Stop

Back Next

MRI Patient Safety Labels

Click each label to learn more:

MRI Safe Equipment Label
No Restrictions

MRI Conditional Equipment Label
Equipment needs to be tested prior to use

MRI Unsafe Equipment Label
Equipment is strongly ferromagnetic and must not be used in the scan room

Back Exit Next

Thermal Injury Protection

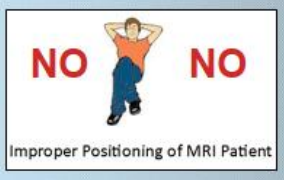
Electrical currents can be induced while in the magnet bore and cause thermal injury.

More tips:

- Cold compresses can be used over heavy tattoos to reduce tissue heating.
- Surface coils should be checked before scanning.
- Unused electrically-conductive materials outside the patient should be removed.

Arms and legs should not cross or touch each other.

Proper Positioning of MRI Patient in Bore



Improper Positioning of MRI Patient

The patient's body should not touch the inner bore of the magnet.

Back Exit Next

Emergency Shutdown (Quenching)

A loss in superconductivity can result in massive heat gain in the magnet, producing cryogen boil-off and release. This is called “quenching.”

- The resulting damage caused by quenching is costly and time-consuming.
- Emergency quenching should be avoided.
- If extended power loss is expected, the magnetic field can be ramped down to prevent quenching. Backup or temporary power should be available at all times.

Back Exit Next

Patient Hearing Protection

- MRI systems can produce a very noisy environment for the patient.
- All patients should be offered hearing protection, especially when using systems which have sound pressures above 99 dB.

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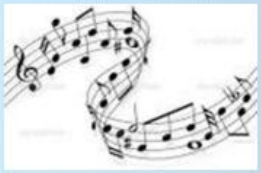
Patients with Claustrophobia - Anxiety - Emotional Distress

- Many patients experience anxiety prior to and during MRI exams. Some may not be able to complete the exam due to claustrophobia.
- It can be helpful to use audio and visual distractions.



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Patients Requiring Immediate Medical Attention

- When a patient needs immediate medical care in the scan room, all responders must have sufficient training in MRI safety.
- This applies to medical/technical staff, as well as police, fire, and security personnel.
- If resuscitation is needed, the patient should be moved from the scanner to a safe area.
- Emergency and disaster plans should be in place and conducted periodically.

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Screening

All **patients** and any **family members** entering the MRI Scanner must be screened by the MRI technologist.

All **ancillary staff** entering the MRI Scanner must verbally be screened by the MRI technologist.

Back Exit Next

Screening Patients

All patients must complete the Magnetic Resonance Imaging Information Form* before they have an MRI scan.

* These forms are not currently used at Grayling Hospital or Otsego Memorial Hospital.

Outpatient

1 of 2

MUNSON HEALTHCARE

Form #4941 (06/21) Page 1 of 2

MAGNETIC RESONANCE IMAGING (MRI) PATIENT INFORMATION / ASSESSMENT

4941

Patient Legal Name: _____
(Last) (First) (Middle Initial)

Date of Birth: ____/____/____ **Age:** _____ **Height:** _____ **Weight:** _____ (lbs.)

Have you had surgery on the area being scanned today: ☐ Yes ☐ No If yes, when? _____

Previous radiology exams on the area being scanned today: ☐ Yes ☐ No

***If yes*, what type of exam:** ____ X-RAY ____ Cat Scan ____ Ultra Sound ____ MRI ____ PET

Briefly describe why your doctor wants this MRI: _____

_____

_____

Back Exit Next

Screening Patients *(cont.)*

All patients must complete the Magnetic Resonance Imaging Information Form* before they have an MRI scan.

* These forms are not currently used at Otsego Memorial Hospital.

Inpatient

1 of 3

MUNSON HEALTHCARE

Form #12254 (06/20)

RN RADIOLOGY MRI CHECKLIST

RN TO COMPLETE WITH PATIENT PRIOR TO MRI

☐ Is the MRI questionnaire filled out and signed by the patient?

☐ Does the patient have any implants?
- o If yes, is the make and model identified?
- o Do you need assistance identifying?

☐ If the patient is in the ER:

Back Exit Next

Screening Patients *(cont.)*

Patients with Metallic Foreign Bodies

- All patients with a history of injury by a metallic foreign body must be screened and evaluated before being placed in the magnetic field of an MRI scanner.
- Examples of metallic foreign bodies:
  - ✓ BBs
  - ✓ Bullets
  - ✓ Pellets
  - ✓ Shrapnel
  - ✓ Buckshot
  - ✓ Eye or body metal fragments

Back Exit Next

Screening Patients *(cont.)*

Patients with Implants

- Information that must be supplied by the patient, a family member, or by hospital staff for a patient with an implant includes:
  - ✓ Make and model of implant
  - ✓ Manufacturer of implant
  - ✓ Date of implant insertion
- Medical Alert Cards: Most people who get an implant receive a medical alert card stating whether or not the implant is MRI compatible. These cards should be checked by the MRI technologist.

Back Exit Next

The MRI Magnet is Always On!

The MRI Magnet is Always On!

The MRI Magnet is Always On!

Back Exit Next

Safety Considerations

Zones of Exclusion

Joint Commission standards require Radiology to have four zones of exclusion when performing MRI exams.

Click the buttons to discover the zones.

Reception Desk	Patient Dressing Room	MRI Control Room	MRI Magnet Room
Zone 1: General Public	**Zone 2:** Unscreened MRI patients	**Zone 3:** Screened MRI patients and MRI personnel	**Zone 4:** Screened MRI patients under constant direct supervision or trained MR personnel

Back Exit

References

Gould, T., & Edmonds, M. (2010, October 25). How MRI works. In *howstuffworks*. Retrieved September 15, 2022, from https://science.howstuffworks.com/mri.htm

MR safety. (n.d.). In *American College of Radiology (ACR®)*. Retrieved September 22, 2022, from https://www.acr.org/Clinical-Resources/Radiology-Safety/MR-Safety

MR safety. (n.d.). In *The MR Core Research Facility*. Retrieved September 15, 2022, from https://www.mrc.wayne.edu/safety.htm

Munson Medical Center Policies and Procedures. (2022, January 3). *MRI safety*. PolicyStat.

Further Questions? Call Heather Davis, Radiology, ext. 57244

MUNSON HEALTHCARE

Broselow™ Pediatric Resuscitation Cart

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Lauren Holland
Marissa Loud, MMC
Marta Wiesen, MMC

December 2025

Goal and Objectives

Goal

The purpose of this course is to familiarize clinicians with the Broselow™ system and where supplies are located on the pediatric resuscitation cart.

Objectives:

1. Describe how to call a Code Blue - Pediatric Medical Emergency.
2. Describe how to use the Broselow™ pediatric emergency tape.
3. Identify the location of Broselow™ carts throughout your hospital.
4. Identify the location of specific pediatric equipment in the Broselow™ Pediatric Resuscitation Cart based on the child's weight.

Code Blue - Pediatric Medical Emergency

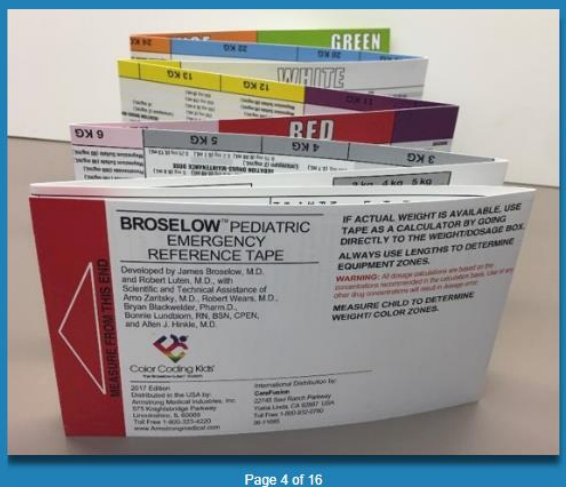
How do I call a Code Blue - Pediatric Medical Emergency?

1. Dial **55555** (POMH staff dial 461 and call the code themselves).
2. Tell the operator you have a Code Blue - Pediatric Medical Emergency.
3. State your specific location in the hospital (department or unit); if the child is a patient, state room number and provider.
4. Code Blue - Pediatric Medical Emergency should be called on children from birth to 18 years of age.

Broselow™ Tape

What is Broselow™ Tape?

- The Broselow™ tape utilizes a length-based system to help determine the approximate weight of a child, the corresponding medication dosages, and the appropriate size equipment needed for that child.
- The tape is divided into nine colored zones corresponding to different estimated weights.

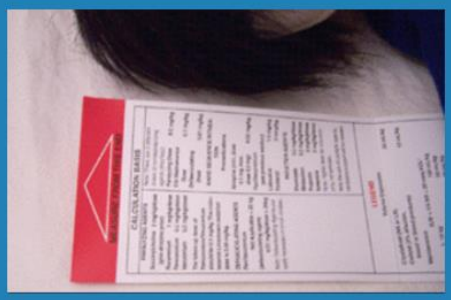


Using Broselow™ Tape

Weights

Directions for Use

1. Place the tape on a flat surface with the color-coded weight side visible.



2. Place the red end of the tape even with the top of the child's head.

**Think 'Red' rhymes with 'Head."*

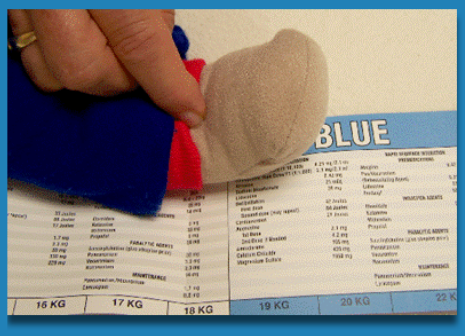
Using Broselow™ Tape *(cont.)*

3. Place one hand at the top, with the edge of your hand resting in the red box at the end of the tape.

4. Run your free hand down the tape from the child's head.
Never measure a child in the seated position.

Using Broselow™ Tape *(cont.)*

5. Stop your free hand at the bottom of the child's heel (not the toes). The edge of the free hand that lands on the tape adjacent to the child's heels indicates the child's approximate weight **in kilograms** and the child's corresponding color zone.

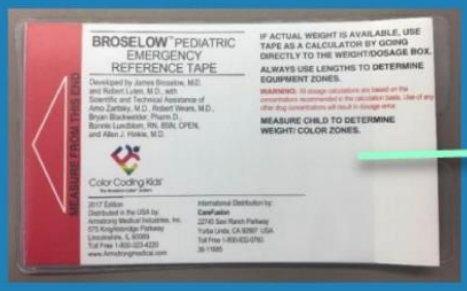


Make sure to measure the child with his/her shoes off.

If the child is longer/larger than can be measured with the tape, stop and proceed as you would with an adult.

Broselow™ Tape Location

The tape is located in the first drawer of the Broselow™ Pediatric Resuscitation Cart.



Medication Tray

The medication tray is found in the bottom drawer of the cart. All medications in the medication tray are listed below*:

Medication	Proposed Stock
Adenosine 6mg/2mL Vial	3
Amiodarone 450mg/9mL Vial	1
Atropine 1mg/10mL Syringe	2
Calcium Chloride 10% 10mL Syringe	1
Dextrose 10% 250 mL IVPB	1
Dextrose 5% 250 mL IVPB	1
Dextrose 5% 100 mL IVPB	1
Epinephrine 1mg/10mL Syringe	3
Epinephrine 1mg/1mL	5
Infant Dextrose 25% 2.5gm/10mL Syringe	2
Lidocaine 100mg/5mL Syringe	1
Magnesium 5 gm/10 mL Vial	1
Naloxone 2 mg/2 mL Syringe	2
Norepinephrine 4mg/4mL Vial	1
Sodium Bicarb 4.2% 2.5 mEq/5 mL Vials	6
Sodium Chloride 0.9% 500 mL IVPB	1

* All medications are subject to shortages
**Medication location may vary slightly in your cart

Knowledge Check 1

To call a Code Blue Pediatric Medical Emergency for any child between the ages of birth and 18 years of age, you would call*

- "0" for the operator
- 55555
- 55550
- 911

*At POMH, staff should dial 461 and page the code themselves.

Knowledge Check 2

When measuring with the Broselow™ Pediatric Emergency Tape, the red end of the tape is placed by the child's head.

- True
- False

Knowledge Check 3

If the child is longer than the Broselow™ tape, what should you do?

- Estimate what weight the child is and go from there.
- Stop and proceed as you would with an adult patient.
- Weigh the patient before performing CPR.

Knowledge Check 4

On the Broselow™ Pediatric Resuscitation cart, where will you find the Broselow™ Pediatric Emergency Tape?

- First drawer of the cart.
- Bottom drawer of the cart.
- On top of the cart.

Knowledge Check 5

On the Broselow™ Pediatric Resuscitation cart, where will you find the medication tray?

- On top of the cart.
- First drawer of the cart.
- Bottom drawer of the cart.

Choose Your Region Below:

This course will now branch off to offer region-specific information. Please choose the appropriate button for the region you work in:

South Region (POMH, Manistee, Cadillac)

Central Region (Munson Medical Center)

East Region (Grayling, OMH, Charlevoix)

South Region

The rest of the course will be specific to the South Region's Broselow™ Resuscitation Carts.

General Information

Cadillac cart

POMH cart

Manistee carts

The second through seventh drawers in the cart contain different color-coded modules based upon the length of the child as identified by the tape. The top and bottom drawers contain general supplies and equipment which can be used for any size patient.

Cart Locations

Cadillac:

- Emergency Department
- Inpatient Unit 3B
- PACU
- Inpatient (2nd floor) Supply Closet

Manistee:

- Emergency Department (trauma bay)
- Surgery

Paul Oliver Memorial Hospital (POMH):

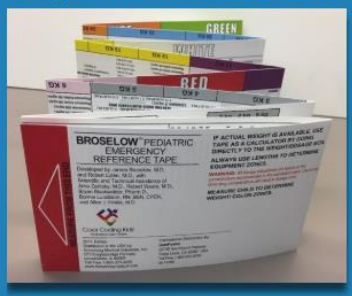
- Emergency Department

Where's the Defibrillator?

- Zoll Defibrillators are not always kept on Broselow™ carts.
- If needed, obtain the defibrillator from the adult crash cart nearest to the emergency location.

Summary

Click on each photo below to review:



To call a pediatric code, **dial 55555** and tell the operator you have a **Code Blue - Pediatric Medical Emergency.** State your specific location in the hospital (department or unit); if the child is a patient, state room number and provider.

- Pediatric code is called for children birth to 18 years of age.
- POMH staff must call 461 and page the code themselves.

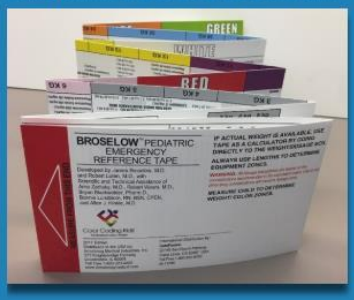
Summary

Click on each photo below to review:

- The Broselow™ tape utilizes a length-based system to help determine the approximate weight of a child, the corresponding medication dosages, and the appropriately-sized equipment needed for the child. The tape is divided into nine colored zones corresponding to different estimated weights.
- It is important to place the red end of the Broselow™ tape even with the top of the child's head. The heel of the child (without shoes) designates the color zone and approximate weight of the child.

Summary

Click on each photo below to review:



- Each drawer in the cart contains different color-coded modules based upon the length/weight of the child as identified by the Broselow™ tape.
  - Pediatric resuscitation cart locations:
    - Cadillac: Emergency Department, Inpatient Unit 3B, PACU, Inpatient (2nd floor) Supply Closet
    - Manistee: Emergency Department (trauma bay), Surgery
    - POMH: Emergency Department
- Many Broselow™ carts do not contain the Zoll defibrillator and should be obtained from the nearest adult crash cart to the emergency location.

Munson Medical Center

The rest of the course will be specific to Munson Medical Center's Broselow™ Resuscitation Carts.

Broselow™ Resuscitation Cart

General Information:

- The second through seventh drawers in the cart contain different color-coded modules based upon the length of the child as identified by the tape. The top and bottom drawers contain general supplies and equipment that can be used for any size patient.
- Pediatric resuscitation cart locations:
  - PACU
  - ED
  - B2 (Post Op area by bed 20)
  - B2 OR
  - Ground Floor PACU
  - Crash Cart Storage on C1
  - MPB
  - Interventional Radiology
  - C3

Top of the Broselow™ Cart

- Latex-free exam gloves (S, M, L)
- Mattress warmer
- Sharps container (attached to back rail)
- Infant resuscitation bag with mask (hangs from IV pole)
- Pediatric resuscitation bag with mask
- Neotech Snorkel suction catheter
- Yankauer suction catheter
- Crash cart return form
- Code Blue sheet and attached critique
- Clipboard with pen
- Pediatric response team call record
- Pediatric sepsis protocol folder
- Pediatric one-step CPR electrodes

Back of Broselow™ Cart

- Back board
- Suction canister (1200 mL)
- Suction tubing (10 ft)
- Connection tubing (3/16″ x 1 1/2″)

Left Side of Broselow™ Cart

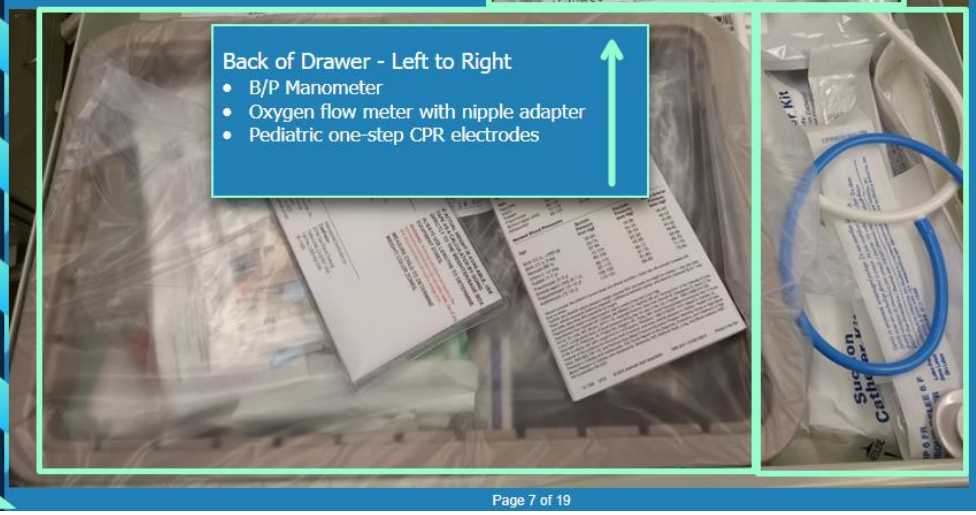
- Oxygen tank with regulator
- Mask fluid shield
- Emergency Cardiovascular Care (ECC) book (hangs from railing)
- Outdate card

Right Side of Broselow™ Cart

- E-Vac portable suction (set-up)
- Wall suction regulator

First Drawer - Gray Drawer

Click in the rectangles to learn the items contained in that area of the **gray** drawer.



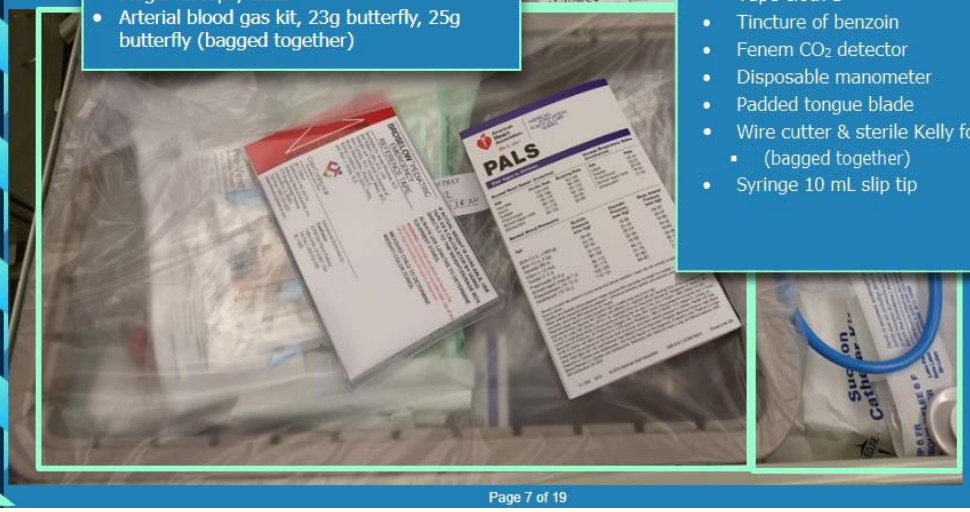
Back of Drawer - Left to Right

- B/P Manometer
- Oxygen flow meter with nipple adapter
- Pediatric one-step CPR electrodes

First Drawer - Gray Drawer

Gray Tray

- Miller size 0
- Miller size 1
- Miller size 2
- Miller size 3
- Macintosh size 0
- Macintosh size 1
- Macintosh size 2
- Macintosh size 3
- Magill forceps, infant
- Magill forceps, child
- Arterial blood gas kit, 23g butterfly, 25g butterfly (bagged together)



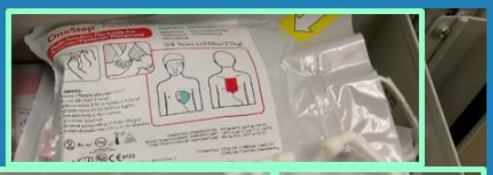
Gray Tray

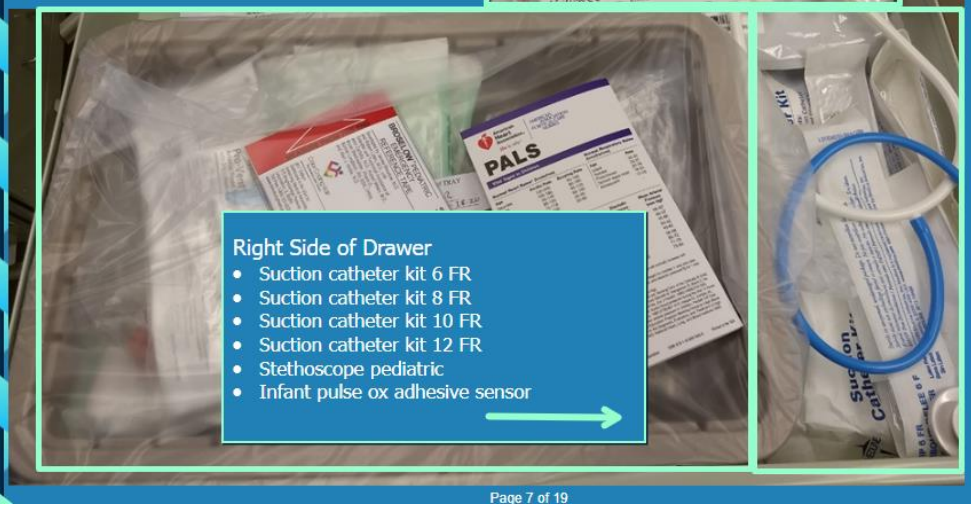
- PALS pocket reference card
  - (lays on top of covered tray)
- Pediatric Broselow™ tape
  - (lays on top of covered tray)
- CO_2 mini stat detector
- Pediatric pulse ox adhesive sensor
- Infant pulse ox adhesive sensor
- Tape cloth ½"
- Tape cloth 1"
- Tincture of benzoin
- Fenem CO_2 detector
- Disposable manometer
- Padded tongue blade
- Wire cutter & sterile Kelly forceps
  - (bagged together)
- Syringe 10 mL slip tip

Page 7 of 19

First Drawer - Gray Drawer

Click in the rectangles to learn the items contained in that area of the **gray** drawer.





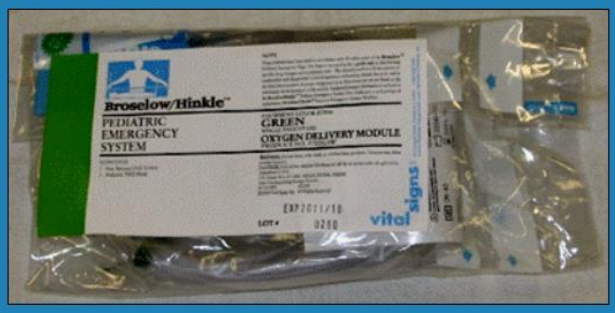
Right Side of Drawer
- Suction catheter kit 6 FR
- Suction catheter kit 8 FR
- Suction catheter kit 10 FR
- Suction catheter kit 12 FR
- Stethoscope pediatric
- Infant pulse ox adhesive sensor

Color-Coded Drawers

Color-coded drawers match the zones on the Broselow™ Tape.
Each drawer contains the appropriately-sized equipment, listed below:

- Oxygen delivery, Intubation, and IV delivery modules
- BP cuff
- Urinary catheter
- Nasopharyngeal and oral airways
- Endotracheal tubes
- Telemetry stickers
- T-connector and $ETCO_2$ airway adaptor
- IV tubing

Oxygen Delivery Module



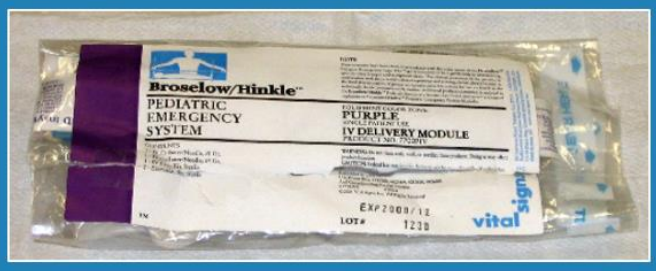
Pediatric non-rebreather mask
Oral airway

Intubation Module

- Endotracheal tube stylet
- Endotracheal tube
- Suction catheter
- Nasogastric tube
- 36″ adhesive tape
- Water soluble lubricating jelly packet
- 3″ x 3″ gauze pad
- Miller laryngoscope blades**

** **NOTE:** **DO NOT** use the laryngoscope blades found in the Intubation Module! **Instead,** use the laryngoscope blades found in the first gray drawer of the cart.

IV Delivery Module



IV catheter needles
IV prep kit, sterile
Extension kit, sterile

Bottom Drawer

Pediatric Medication and Solution Tray

Packaged on top of medication tray in zip lock bags

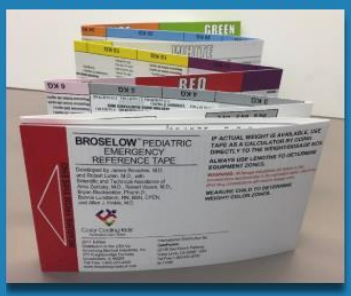
- Tape, adhesive 1″
- Tape, micropore 1″
- Arm board pediatric 2" x 5″
- 3-way stopcock
- Syringe 30 mL luer lock
- Needle 1″ x 23 GA

Where's the Defibrillator?

- Zoll Defibrillators are not kept on the Broselow™ Carts.
- Remember to get the defibrillator from the adult crash cart nearest to the emergency location.

Summary

Click on each photo below to review:



Calling a Code:

To call a pediatric code, **dial 55555** and tell the operator you have a **Code Blue - Pediatric Medical Emergency.** State your specific location in the hospital (department or unit); if the child is a patient, state room number and provider.

- Pediatric code is called for children birth to 18 years of age.
- NICU and Maternity will not call these codes overhead for inpatient infants located in these areas. If this occurs to a visitor in these areas, a Code Blue would be called.

Summary

Click on each photo below to review:

- The Broselow™ tape utilizes a length-based system to help determine the approximate weight of a child, the corresponding medication dosages, and the appropriately-sized equipment needed for the child. The tape is divided into nine colored zones corresponding to different estimated weights.
- It is important to place the red end of the Broselow™ tape even with the top of the child's head. The heel of the child (without shoes) designates the color zone and approximate weight of the child.

Summary

Click on each photo below to review:

Broselow™ Cart:

- Each drawer in the cart contains different color-coded modules based upon the length/weight of the child as identified by the Broselow™ tape.
  - Pediatric resuscitation cart locations: C3, PACU (main level and 2nd floor), OR (2nd floor), ED, MRI, Angio Lab, CPD, and MPB.
- DO NOT use the laryngoscope blades found in the Intubation Module! Instead, use the laryngoscope blades found in the first gray drawer of the cart.
- The Zoll is not on the Broselow™ cart. This should be obtained from the nearest adult crash cart to the emergency location.

Knowledge Check 6

On the Broselow™ Pediatric Resuscitation cart, where will you find the infant and pediatric resuscitation bag(s)?

- First drawer of the cart.
- Hanging from the IV pole.
- Bottom drawer of the cart.

Knowledge Check 7

There is an oxygen tank supplied on each Broselow™ cart.

- True
- False

Knowledge Check 8

When measuring with the Broselow™ Pediatric Emergency tape, the length of the child indicates which color drawer in the Broselow™ Resuscitation cart you will use.

- ○ True
- ● False

Knowledge Check 9

Each colored drawer has the appropriate color-coded intubation module with the correct equipment size for the measured child.

- ○ True
- ● False

Knowledge Check 10

Since there is no Zoll defibrillator on the Broselow™ cart, one should be obtained from the nearest adult crash cart.

- ○ True
- ● False

East Region

The rest of the course will be specific to the East Region's Broselow™ Resuscitation Carts.

General Information

OMH cart & resuscitation pack

The second through seventh drawers in the cart contain different color-coded modules based upon the length of the child as identified by the tape. The top and bottom drawers contain general supplies and equipment which can be used for any size patient.

Grayling cart

Charlevoix cart

Cart Locations

Otsego:

- Emergency Department
- ICU
- Surgery - Instead of a Broselow™ Cart, there is a pediatric resuscitation pack on top of adult crash cart

Grayling:

- Emergency Department
- Outpatient Surgery
- PACU

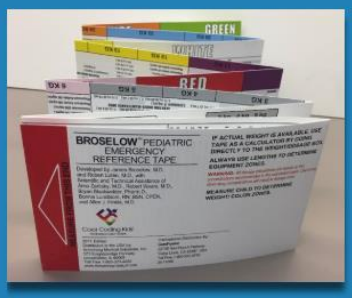
Charlevoix:

- Emergency Department (Triage Room 4)
- OB Storage Room

Where's the Defibrillator?

- Zoll Defibrillators are not always kept on Broselow™ carts.
- If needed, obtain the defibrillator from the adult crash cart nearest to the emergency location.

Summary



To call a pediatric code, **dial 55555** and tell the operator you have a **Code Blue - Pediatric Medical Emergency.** State your specific location in the hospital (department or unit); if the child is a patient, state room number and provider.

- Pediatric code is called for children birth to 18 years of age.

Summary

Click on each photo below to review:

- The Broselow™ tape utilizes a length-based system to help determine the approximate weight of a child, the corresponding medication dosages, and the appropriately-sized equipment needed for the child. The tape is divided into nine colored zones corresponding to different estimated weights.
- It is important to place the red end of the Broselow™ tape even with the top of the child's head. The heel of the child (without shoes) designates the color zone and approximate weight of the child.

Summary

- Each drawer in the cart contains different color-coded modules based upon the length/weight of the child as identified by the Broselow™ tape.
  - Pediatric resuscitation cart locations:
    - Otsego: Emergency Department, ICU, Surgery - Instead of a Broselow™ Cart, there is a pediatric resuscitation pack on top of adult crash cart
    - Grayling: Emergency Department, Outpatient Surgery, PACU
    - Charlevoix: Emergency Department (Triage Room 4), OB Storage Room
  - Many Broselow™ carts do not contain the Zoll defibrillator and should be obtained from the nearest adult crash cart to the emergency location.

References

Munson Medical Center Policies and Procedures. (2025, May 9). *Code Crash Carts for Adult, Pediatric (Broselow™), and Infant Drugs/ Supplies Exchange Procedure*. PolicyStat.

Munson Medical Center Policies and Procedures. (2025, June 5). *Pediatric Response Team Protocol for Pediatric Patients*. PolicyStat.

Vital Signs Inc. *Broselow™ Pediatric Emergency Tape*. (2019). Ed., A. Armstrong Medical Industries, Inc.

EMTALA

COMPLIANCE

FinThrive

In this course, we will:

- Explain the Emergency Medical Treatment and Labor Act (EMTALA)
- Review the EMTALA process
- Discuss EMTALA violations and penalties
- Understand the importance of EMTALA compliance

FinThrive

Introduction

EMTALA violation settlements:

- Failure to provide medical screening examinations
- Failure to stabilize
- Inappropriate transfers
- Failure to transfer
- Failure to accept appropriate transfers

In 1987 approximately 31 million Americans did not have health insurance, and emergency departments across the country were refusing to see, or immediately transferring, patients who were unable to pay—a practice known as "patient dumping."

In response, Congress enacted the Emergency Medical Treatment and Labor Act (aka Anti-Dumping Act) to ensure **all patients receive the same emergency medical care, without discrimination and regardless of their ability to pay.**

Despite the Affordable Care Act, EMTALA provisions are still needed today. The National Center for Health Statistics reports that 31.1 million individuals of all ages did not have health insurance in 2021.

In this course, we will review key elements of the EMTALA statute and process.

Let's get started!

What Is EMTALA?

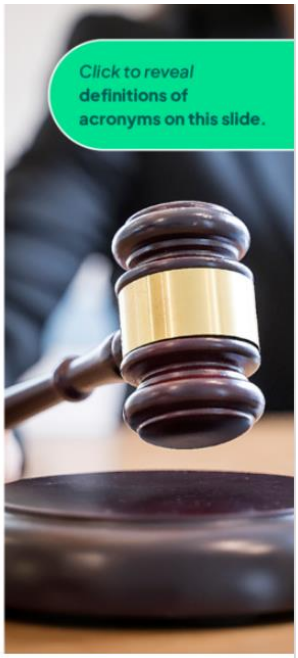
COMPLIANCE

What Is EMTALA?

History

1986	2003	2007
Congress enacts EMTALA as part of COBRA	The revised Final Rule takes effect and CMS establishes the EMTALA TAG taskforce to review regulations, offer application assistance, and solicit input from providers, investigators, state survey agencies, QIOs, and the public	TAG charter expires and some recommendations are implemented while others are left under consideration

Numerous court cases have also changed how EMTALA is applied, and CMS continues to consider revisions and updates to the statute.



What Is EMTALA?

An Obligation

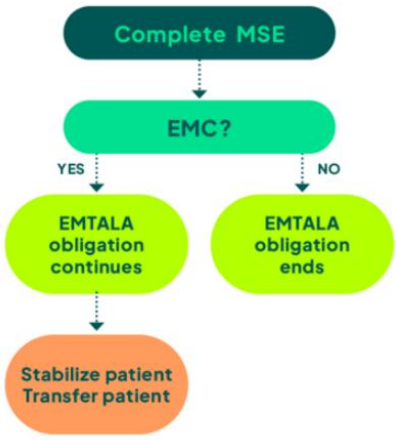
The EMTALA obligation is triggered when an individual requests emergency medical care at a **DED**, or anywhere on the hospital campus, including cancer, children's, long-term care, psychiatric, and rehabilitation hospitals.

Regardless of diagnosis, ability to pay, socioeconomic status, race, religion, disability, or national origin, the hospital is required to provide:

- An appropriate MSE by a physician or QMP
- Stabilizing treatment or an appropriate transfer if an EMC exists

EMTALA obligation ends when:

- A determination is made that no EMC exists.
- The condition ceases to be an EMC.
- The patient has been admitted to inpatient status.
- The patient has been appropriately transferred to another facility.



EMTALA Rule

The term "hospital property" means the main hospital campus (within 250 yards), the parking lot, sidewalks, driveways, and hospital departments, including buildings owned by the hospital. Off-campus facilities (i.e., provider offices) are not included.

Click to reveal **definitions of acronyms on this slide.**

Emergency Medical Condition

The term "emergency medical condition" refers to a condition manifesting itself by acute symptoms of sufficient severity (including severe pain) such that the absence of immediate medical attention could reasonably be expected to result in::

- Placing the health or safety of the patient or unborn child in serious jeopardy
- Serious impairment to bodily functions
- Serious dysfunction of any bodily organ or part

Tip

Under EMTALA, if a minor can request an examination or treatment for an EMC, the hospital is required to determine whether an EMC exists and should not delay awaiting parental consent.

Dedicated Emergency Department

A dedicated emergency department is defined as meeting **one of the following criteria**, regardless of whether the location is on or off the main hospital campus.

DED		
Licensed by the state as an emergency department (ED), including critical access hospitals (CAHs)	Presented to the public as providing care for EMCs on an urgent basis	Provided at least one-third of services as EMC on an urgent basis in the previous calendar year

CLICK HERE TO VIEW A VIDEO ON THE EMTALA COMPLIANCE CHECKLIST.

EMTALA Tip

EMTALA obligation applies to hospital-owned/operated ambulance transports not under emergency medical service (EMS) direction or any ambulances on hospital property.

Q

What defines a DED?

Q&A Exercise

a. Licensed by the state as an emergency room/department

b. Communicated to the public as a place that provides care for EMCs on an urgent basis

c. The preceding calendar year, it provides at least one-third of its visits for treatment of EMCs on an urgent basis

d. All the above

A

What defines a DED?

Q&A Exercise

d. All the above

Rationale:

A dedicated emergency department must either be licensed by the state as an emergency room/department, be communicated to the public as a place that treats EMCs, or at least one-third of its visits provide treatment of EMCs or other urgent care.

EMTALA Process

COMPLIANCE

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EMTALA Process

Medical Screening Exam

An MSE is an ongoing process that begins with triage and continues until a physician or QMP has determined, with reasonable clinical confidence, the presence or absence of an EMC.

An MSE may require:

- Problem-focused medical history
- Comprehensive physical examination
- Checking vital signs at regular intervals
- Any necessary lab testing or radiological imaging

- Once a patient has presented to a DED, the hospital cannot tell the patient to go to the off-site location for the MSE.
- Unless the off-campus site is already a dedicated ED (DED) of the hospital, as defined under EMTALA regulations, EMTALA requirements do not apply.
- Triage alone is not an MSE.

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EMTALA Process

EMTALA MSE Requirements

- Medical record documentation must reflect continued monitoring according to the patient's needs until it is determined whether or not the patient has an EMC.
- Hospitals and critical access hospitals (CAH) with DEDs are required to conduct an MSE on all individuals who come to the ED, including those suspected of having an infectious disease (e.g., COVID-19). EDs are expected to screen and isolate such patients and contact appropriate health officials for further instruction.
- In some cases, the MSE must be thorough enough to rule out any physical cause. For example, for psychiatric patients or patients who appear intoxicated, an MSE must rule out causes such as trauma, disease, or medication reactions.
- Hospitals must display signs with the EMTALA provision within clear view.

EMTALA Process

Qualified Medical Personnel

MSEs must be performed by a physician or nonphysician QMP working in consultation with a physician.

Nonphysician QMPs performing MSEs must:

- Act in accordance with state and hospital bylaws
- Perform MSEs as described in their job description
- Be within their scope of practice

Physicians must be on-call to back up QMPs.

Examples of QMPs include:

- Physician assistant (PA)
- Nurse practitioner (NP)
- Certified nurse-midwife (CNM)
- Certified midwife (CM)

EMTALA Rule
Medical specialty consults who provided care for an EMC must also provide outpatient follow-up care for that condition regardless of the patient's ability to pay.

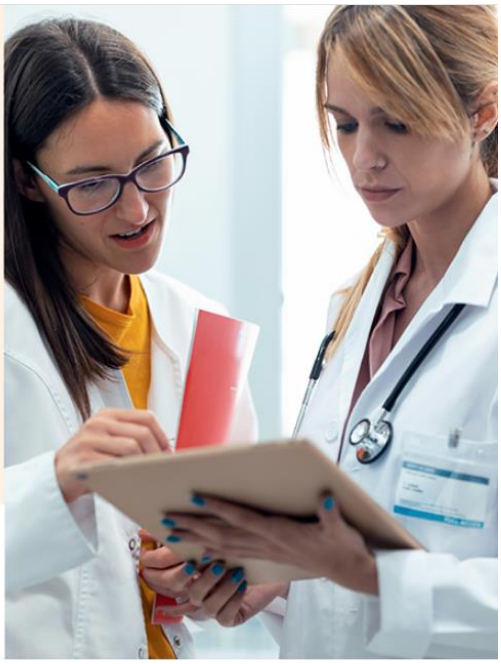
EMTALA Process

On-Call List

Hospitals must maintain an on-call list of medical staff physicians with privileges so that ED staff know which physicians, specialists, and subspecialists (e.g., neurologists), are available.

If an on-call physician fails to respond timely or come to the ED, both the physician and the hospital are in violation of EMTALA. The time the physician is notified and the response (or transfer) time should be documented in the medical record.

The hospital board of directors is accountable to ensure hospital policies meet EMTALA on-call responsibilities, and policies are typically set through staff bylaws or department procedures.



EMTALA Rule
If a hospital offers a specialty service to the public, that service should be available through on-call coverage in the emergency department.

EMTALA Process

EMC - Obstetrics (OB)

A pregnant patient having contractions has an EMC and is only deemed stable when:

- The infant and placenta are delivered.
- Contractions cease.
- A physician, certified nurse-midwife, or other QMP confirms the patient is in false labor.

Considerations for such transfers include:

- Is the patient likely to deliver before they can be transferred safely to another facility?
- Does transfer pose a threat to the health or safety of the patient or the unborn child?

CMS states a pregnant patient in labor cannot be transferred unless they or their legally allowed representative requests a transfer and a physician or QMP in consultation with a physician certifies the benefits to the patient and/or unborn child outweigh the risk of transfer.

EMTALA Process

Stabilizing Care

The EMTALA legal definition of "stabilized" means:

- No material deterioration of the patient's condition is likely from transfer of the individual from a facility or with respect to a pregnant patient who is in labor, to deliver, including the placenta.
- In other words, appropriate medical care and treatment is provided until the EMC is not at risk for deterioration or loss of life or limb.

EMTALA Rule
Of 230 EMTALA-related settlements between 2002 and 2018, psychiatric emergencies accounted for 19% of OIG civil monetary penalties. Failure to provide an MSE or stabilization were the most common citations. Settlement penalties associated with psychiatric emergencies are nearly triple compared to nonpsychiatric cases.

EMTALA Process

Appropriate Transfer

Under EMTALA, transfer must be medically necessary and the transferring hospital must make every reasonable effort to stabilize patients (including unborn infants) and minimize risk throughout transfer.

Transferring Hospital

- Sends all pertinent medical records to the receiving facility
- Provides QMP and/or transportation equipment, including medically appropriate life support measures during the transfer
- Follows other requirements as the Secretary of HHS may find necessary

Receiving Facility

- Has available space and qualified personnel to treat the patient
- Has agreed to accept the transfer and provide appropriate medical treatment
- Promptly reports (within 72 hours) to CMS or the state survey agency when it suspects it may have received an improperly transferred patient

The receiving hospital may refuse the transfer if they do not have the capacity to provide the necessary care and services.

Transfer of Unstable Patient

The EMTALA appropriate transfer rule states if an individual has an **unstable EMC,** the hospital may not transfer the individual unless:

Patient requests transfer

The hospital may transfer a patient with an unstable EMC if the individual/legal representative requests transfer in **writing,** having been informed of EMTALA rules and transfer risk.

EMC requires specialized care

Hospitals with specialized capabilities or facilities (e.g., burn units, trauma centers, neonatal intensive care units) are **required to accept** an appropriate transfer of a patient needing specialized care as space allows.

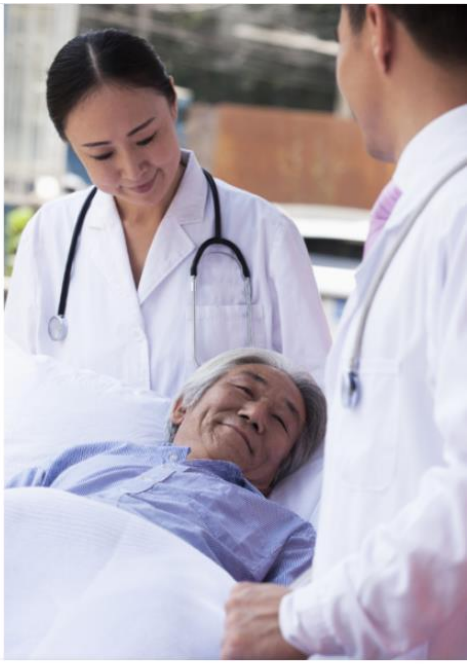
Physician legally certifies transfer

A physician (or QMP with physician cosignature) may certify transfer benefits outweigh risk.

Physician-Certified Transfer

- **Physician certifies transfer benefits outweigh risk.**
  A physician (i.e., a doctor of medicine or osteopathy legally authorized to practice medicine and surgery by the state in which they perform such function or activity) has **certified in writing** that, based upon the information available at the time of transfer, the medical benefits **outweigh the increased risk** to the individual, and in the case of labor, the unborn child, from effecting the transfer.

- **Physician cosigns QMP certification for transfer.**
  A QMP signs the certification form in consultation with a physician who is not physically present in the emergency department at the time the patient is transferred. The physician must cosign the certification form.



EMTALA Process

Refusal of Care or Transfer

An individual, or person acting on behalf of the individual, may refuse further medical exam, treatment, or transfer to another medical facility.

In such instances, under EMTALA, the hospital must:

- Inform the individual or their representative of the risks and benefits of the examination, treatment, or transfer
- Take all reasonable steps to secure **written informed consent** from the individual or representative refusing care

EMTALA Tip
Moving a patient between hospital departments (e.g., ED to radiology) or facilities that have the same Medicare provider number is usually not considered an EMTALA transfer. However, hospitals should have written protocols for movement, especially for nonpatients who suffer problems on hospital property.

Matching Exercise

Match the terms with the descriptions.

RESET SUBMIT

MSE	Exam to establish presence of an emergency medical condition
EMC	Condition with qualifying acute, severe symptoms
Triage	Does not fulfill medical screening exam requirement
QMP	Physician, physician assistant, nurse practitioner, etc.

EMTALA Enforcement

COMPLIANCE

Violation and Penalties

A single occurrence of noncompliance with the EMTALA requirements constitutes a violation and is sufficient for an adverse recommendation. CMS reviews all EMTALA complaints. If a complaint appears to be valid, CMS refers the case to the QIO to investigate.

If the EMTALA violation is proven:

1. CMS initiates the process to terminate the hospital's Medicare provider agreement.
2. To avoid termination, the hospital must submit a corrective action plan (e.g., staff education and training) to CMS within 23 days.
3. The hospital and its corrective action plan may be monitored for 90 days to ensure implementation of the policy and procedure changes necessary to comply with EMTALA.

There is a two-year statute of limitations for civil enforcement of any violation.

Penalties

If the OIG/QIO investigation determines an EMTALA violation has occurred, a fine may be imposed.

Fines are:

- Up to $25,000 per violation for hospitals with fewer than 100 beds.
- Up to $104,826 per violation for hospitals with 100 beds or more
- $50,000 per violation for individual physicians, including on-call physicians

These fines are NOT covered by malpractice insurance.

Hospitals may be sued for personal injury in civil court under a "private cause of action."

A receiving facility, having suffered financial loss as a result of another hospital's violation of EMTALA, can bring suit to recover damages.

In very rare instances, hospitals and physicians have been terminated from Medicare because of EMTALA violations.

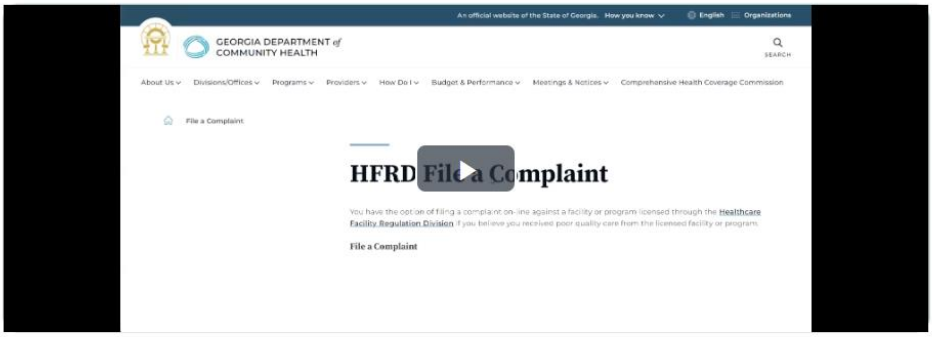
Common Violations

The Supreme Court has ruled no improper financial motive must be proven to find a hospital in violation of EMTALA.

Settlements have been for violations of:

- Failure to screen for an EMC
- Failure to stabilize a patient with an EMC
- Inappropriate transfers of a patient with an EMC
- Failure to transfer a patient with an EMC
- Failure to accept appropriate transfers

Penalties have been up to three times higher for psychiatric and labor- and OB-related citations than for those outside these parameters. (Psychiatric, labor and OB-related patient-dumping complaints account for 36% of all settlements prior to 2019).



Q & A Exercise

Which potential penalty is NOT associated with EMTALA violations?

1. Monetary fines

2. Imprisonment

3. Termination of Medicare provider agreement

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Q & A Exercise

Which potential penalty is NOT associated with EMTALA violations?

2. Imprisonment

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EMTALA Exceptions

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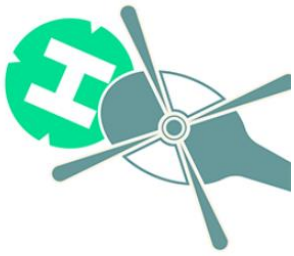

Helipad Use

There are a few exceptions in which EMTALA is not triggered or waived.

Two of these involve helipad use:

EMTALA is not applied when a hospital's helipad is used by an ambulance service or other hospital to transfer an individual to a tertiary hospital, as long as an MSE was performed prior to transporting the individual to the helipad.

If as part of the EMS protocol a helicopter evacuation is activated, the hospital with the helipad does not have an EMTALA obligation if they are not the recipient hospital.

However, EMTALA obligation is triggered when:

- An MSE was not performed prior to transporting the patient to the helipad.
- The patient's condition deteriorates while on the helipad, and medical personnel accompanying the individual request another MSE.
- A request is made by EMS personnel, the patient, or a legally responsible person acting on behalf of the patient for examination or treatment of an EMC.

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EMTALA Exceptions

Major Disaster or Public Health Emergency Waiver

When the president has declared a major disaster or emergency **and** the secretary of HHS has declared a public health emergency, the secretary can determine that a waiver of sanctions is necessary for some hospitals in the emergency area or only hospitals in a portion of the emergency area.

EMTALA sanctions may be waived during the national emergency period for:

- An inappropriate transfer
- Direction or relocation of a patient to receive an MSE
  - At an alternative location pursuant to an appropriate state emergency preparedness plan
  - In the case of public health emergency involving a pandemic infectious disease, pursuant to a state pandemic preparedness plan

EMTALA Exceptions

Major Disaster or Public Health Emergency Waiver

To qualify for an EMTALA waiver, a hospital must implement its disaster protocol and notify CMS it has done so. Under a state of emergency, the waiver only waives EMTALA sanctions for 72 hours from the time the hospital implements its disaster protocol.

If a public health emergency involves a pandemic infectious disease, the wavier will be in effect until the termination of the declaration of the public health emergency.

EMTALA Tip
An EMTALA waiver does not apply to actions brought by individuals or hospitals who allege harm due to EMTALA violations, nor does it waive sanctions for individual physician or receiving hospital if they have capacity to treat the patient.

EMTALA Violation Examples

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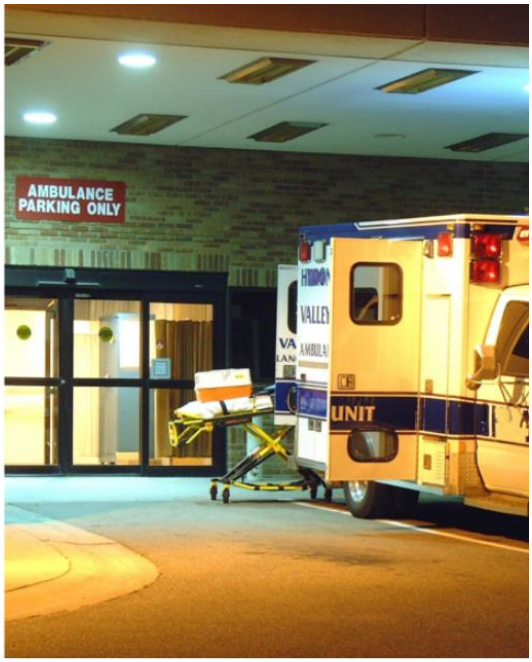
EMTALA Violation Examples

An elderly man arrived at a university hospital emergency department by ambulance. He was complaining of severe jaw pain following a physical assault. His information was not entered into the ED log. He did not receive an appropriate MSE or stabilizing treatment and died in the waiting room.

The hospital agreed to pay a $50,000 fine.



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EMTALA Violation Examples

A middle-aged man presented to the emergency department. He appeared intoxicated and smelled of alcohol. The man was confused, had slurred speech, and was unsteady on his feet. He was belligerent and had vomit all over himself. He wouldn't give his name, and staff were unable to identify him. The nursing staff determined his vital signs were stable, but did not provide a medical screening exam. Instead they sent him to the homeless shelter in a taxi cab without bringing the case to the attention of the emergency room physician.

The man lost consciousness in the cab and was brought back to the hospital by paramedics, where it was determined he had a depressed skull fracture and a large subdural hematoma. While waiting for neurosurgical consultation and surgery to decompress the intracranial bleed, he went into cardiopulmonary arrest and died.

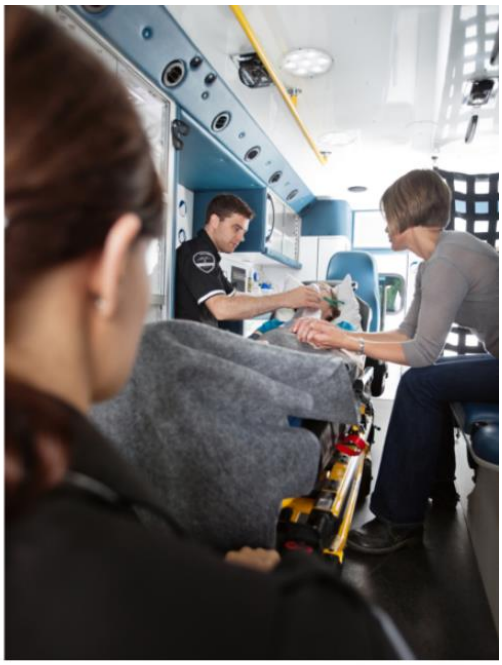
Lab results that became available after his death showed his blood alcohol concentration was 0.07%.

The hospital was found in violation of EMTALA and fined $50,000.

EMTALA Violation Examples

A possible sexual assault victim arrived by ambulance to the emergency department and was sent to another hospital without screening. There was no evidence in the medical record that the receiving hospital was notified or had agreed to accept the patient.

The transferring hospital was fined $25,000.



In Conclusion

COMPLIANCE

In Conclusion

This course provided an overview of the EMTALA statute and its provisions. We discussed the process involved in MSEs to determine whether or not an EMC is present and appropriate transfers. The course also covered EMTALA violations and penalties.

Course Completion

Congratulations

You have now finished the course. Please close the window and exit to complete the postcourse quiz.

We hope you enjoyed the course, and we welcome your feedback. Please enjoy the many other courses that we offer.

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Massive Transfusion Protocol

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Kirsten Scott, DNP, RN, AG-CNS-BC, Clinical Nurse Specialist in ED
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May 2023

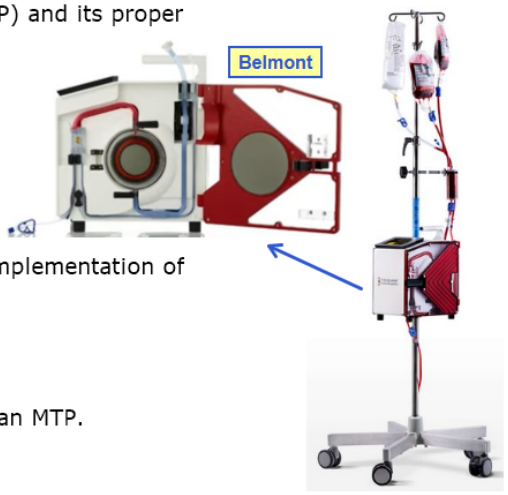
MUNSON HEALTHCARE

Goal

This course will familiarize the learner with the indications for the initiation of the Massive Transfusion Protocol (MTP) and its proper implementation.

Objectives

1. State indications for initiation of the MTP.
2. State the process to initiate MTP.
3. Identify the members of the MTP team.
4. State each MTP team member's role during implementation of the MTP.
5. Verbalize how Trauma Packs are obtained.
6. Identify end points of the MTP.
7. State the process and rationale for canceling an MTP.



Indications for Initiation

A. Massive blood loss with profound hemorrhagic/hypovolemic shock.

B. Triggers:

1. Greater than 6 units packed red blood cells (PRBC's) transfused within 2 hours.
2. Hemodynamically unstable patient with identified or suspected coagulopathy of trauma or disseminated intravascular coagulopathy (DIC).
3. Any time at the discretion of the trauma surgeon/intensivist.
4. Assessment of blood consumption (ABC) score of greater than or equal to 3 (total possible score 4).
   a. Penetrating mechanism (no=0; yes=1)
   b. Emergency department systolic blood pressure less than 90 mmHG (no=0; yes=1)
   c. Emergency department heart rate greater than 120 bpm (no=0; yes=1)
   d. Positive ultrasound FAST exam (no=0; yes=1)
5. Trauma patient who requires more than 1 liter crystalloid to maintain systolic blood pressure greater than 90 mmHG.

MTP Team

Click each button to identify the MTP team members.

MTP Team Leaders

- Trauma surgeon
- Intensivist
- Emergency department (ED) physician
- Anesthesiologist [in OR or Post Anesthesia Care Unit (PACU)]
- Trauma advance practice providers (APP)
- Obstetrician (OB)
- Hospitalist

MTP Clinical Team

MTP Team

Exit

Click each button to identify the MTP team members.

MTP Team Leaders

MTP Clinical Team

- Clinical team:
  - Trauma physician assistant (PA)/nurse practition (NP)
  - ED nurse/ED tech
  - ICU RN
- Clinical pathologist
- Lab blood bank/laboratory personnel
- Pharmacy
- Nursing supervisor/charge nurse
- Vascular Access

How to Initiate the Massive Transfusion Protocol

Exit

Please click each step below:

1. The Team Leader initiates the Massive Transfusion Protocol.
2. A designated staff member calls **55555** to page out MTP overhead and to all responsible parties.
3. A designated staff member enters an order for Massive Transfusion in Cerner.
   - Initiates *Lab - Q 30 min.* immediately
4. A designated staff member locates the MTP supplies. The MTP packet contains MTP specific blood slips and the MTP policy.
5. A designated staff member locates the Belmont. If the MTP is in Maternity, an ED nurse will bring the Belmont.

Responsibilities

Exit

There are 3 areas of responsibility. Please click each area.

General Nursing | **Clinical Pathologist (or Designee)** | **Laboratory Personnel**

- Coordinates Trauma Packs from the Blood Bank at regular intervals and infuse per MTP flowsheet.
- Maintains documentation of transfusions, using the MTP form #10104.
- **Designates one staff member** to maintain communication with Blood Bank personnel during initiation and maintenance of the MTP.

Responsibilities

Exit

There are 3 areas of responsibility. Please click each area.

General Nursing | **Clinical Pathologist (or Designee)** | **Laboratory Personnel**

- Tracks the use and available supply of blood products.
- Advises the clinical team on the use of blood products and pro-coagulants.
- Assists with interpretation of thromboelastography (ROTEM).

Responsibilities

Exit

There are 3 areas of responsibility. Please click each area.

General Nursing | **Clinical Pathologist (or Designee)** | **Laboratory Personnel**

- Confirms patient identity, using two patient identifiers (name, date of birth, or medical record number), before drawing labs.
- If the patient's identity is not known, they will be a John/Jane Doe until the patient's identity is established.
- Labs are repeated every 30 minutes until discontinued by the Clinical Team Leader.

Labs Drawn

Exit

Click each button below:

Labs Drawn upon Initiation of the MTP

- Type and cross (GTAB)
- STAT coagulation profile (PT INR, PTT, fibrinogen, hemoglobin, platelet count)
- STAT Quantitative D-Dimer (requires special tube only be obtained from the lab)
- STAT Basic metabolic profile
- POC ABG's*
- STAT Lactate

***Can be done at the bedside, with the I-STAT.**

Labs Drawn Every Half Hour

Labs Drawn

Exit

Click each button below:

Labs Drawn upon Initiation of the MTP

Labs Drawn Every Half Hour

These labs are drawn every half hour and sent to the lab:

- CBC
- PT, PTT
- Fibrinogen
- Basic metabolic profile
- Ionized calcium
- Lactate

Nursing Roles While Caring for the MTP Patient

Exit

There are 2 roles for the RN while caring for the patient on the MTP.
Click each button to find out more.

MTP Nurse 1 **MTP Nurse 2**

Responsibilities of MTP Nurse 1:

- Document on the MTP Flowsheet: Massive Transfusion Protocol Documentation form #10104.
- Ensure Trauma Pack Blood Slips are filled out.
  - If uncrossmatched unit, provider must sign the form.
- **Designate one person** to communicate with the Blood Bank.

Nursing Roles While Caring for the MTP Patient

Exit

There are 2 roles for the RN while caring for the patient on the MTP.
Click each button to find out more.

MTP Nurse 1 **MTP Nurse 2**

Responsibilities of MTP Nurse 2:

- Maintain transfusions with the Belmont.
- Troubleshoot problems with the Belmont.
- Maintain goal transfusion of 1:1 PRBC to Plasma.
- Clearly communicate time up and time down of each blood product to the documenting nurse.

Transferring the Patient Undergoing MTP to the Next Level of Care

Exit

Responsibilities of the MTP team:

- Accompany the patient to the OR or ICU.
- Maintain documentation on the MTP flowsheet or assist with the Belmont.
- Continue with patient care in the ICU or provide hand-off to the next caregiver.
- Remain with the patient until the MTP is canceled.

Cryoprecipitate is available with Pack 1:

Trauma Pack	Products
1	5 u PRBCs, 5 u plasma, OPTION for cryo (5 u for fibrinogen <150, 10 u for <100)
2	5 u PRBCs, 5 u plasma, 5-pk platelets, OPTION for cryo (5 u for fibrinogen <150, 10 u for <100)
3	5 u PRBCs, 5 u plasma, OPTION for cryo (5 u for fibrinogen <150, 10 u for <100)
4	5 u PRBCs, 5 u plasma, 5-pk platelets, OPTION for cryo (5 u for fibrinogen <150, 10 u for <100)
5	5 u PRBCs, 5 u plasma, OPTION for cryo (5 u for fibrinogen <150, 10 u for <100)
6	5 u PRBCs, 5 u plasma, 5-pk platelets, OPTION for cryo (5 u for fibrinogen <150, 10 u for <100)
7	5 u PRBCs, 5 u plasma, OPTION for cryo (5 u for fibrinogen <150, 10 u for <100)
8	5 u PRBCs, 5 u plasma, 5-pk platelets, OPTION for cryo (5 u for fibrinogen <150, 10 u for <100)
9	5 u PRBCs, 5 u plasma, OPTION for cryo (5 u for fibrinogen <150, 10 u for <100)
10	5 u PRBCs, 5 u plasma, 5-pk platelets, OPTION for cryo (5 u for fibrinogen <150, 10 u for <100)

* For OB: 10 unites cryoprecipitate (for fibrinogen <200) is available for order on every trauma pack.

Lethal Trauma Triad

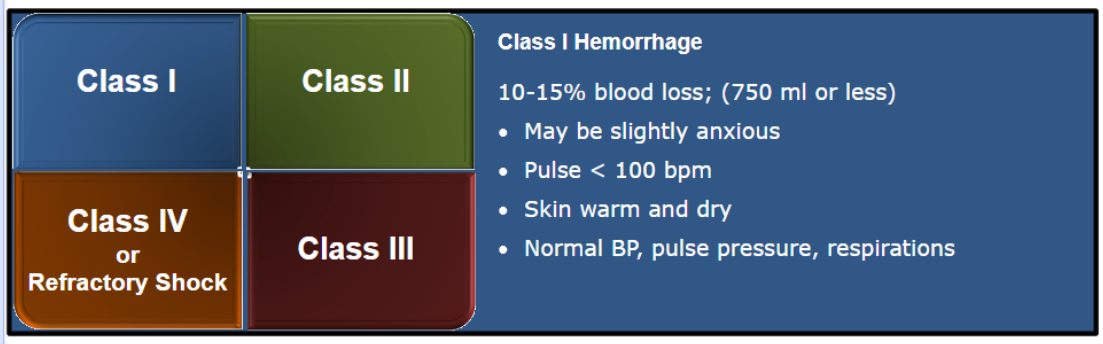
Hypothermia	Coagulopathy	Acidosis
• Reduces enzymatic activity of plasma coagulation proteins, preventing activation of platelets; disrupts coagulation cascade [1]	• May occur due to activation and consumption of coagulation factors (acute DIC) [1]	• Interferes with assembly of coagulation factor complexes involving calcium & negatively charged phospholipids [1]
• Onset at core temp of 34°C (93.2°F) and below [1]	• Secondary to hemodilution from red cell & crystalloid infusions [1]	• Delayed thrombin production → delayed fibrin production → increased risk of fibrinolysis → increased bleeding [1]

1. Cohen, M. & Kutcher, M. (2021, May 28). Coagulopathy associated with trauma. UpToDate. Waltham, MA. Retrieved May 3, 2023, from https://www.uptodate.com/contents/coagulopathy-in-trauma-patients

Classes of Hemorrhagic Shock

Exit

There are 4 classes of hemorrhagic shock.
Please click the button for each class below:



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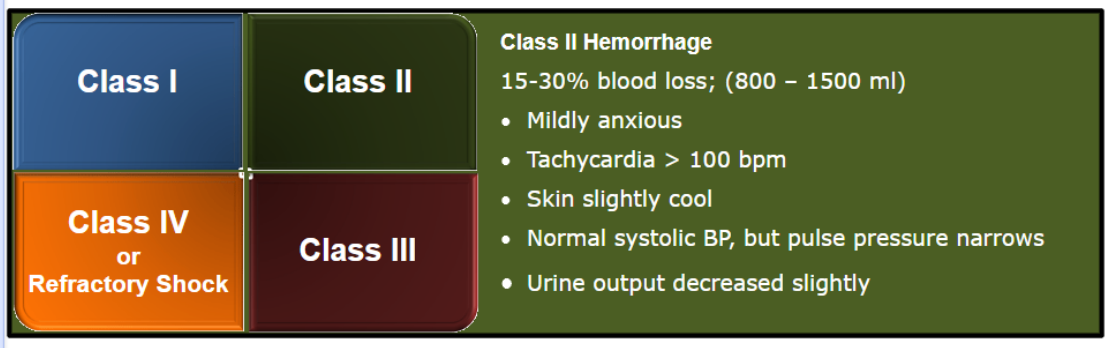

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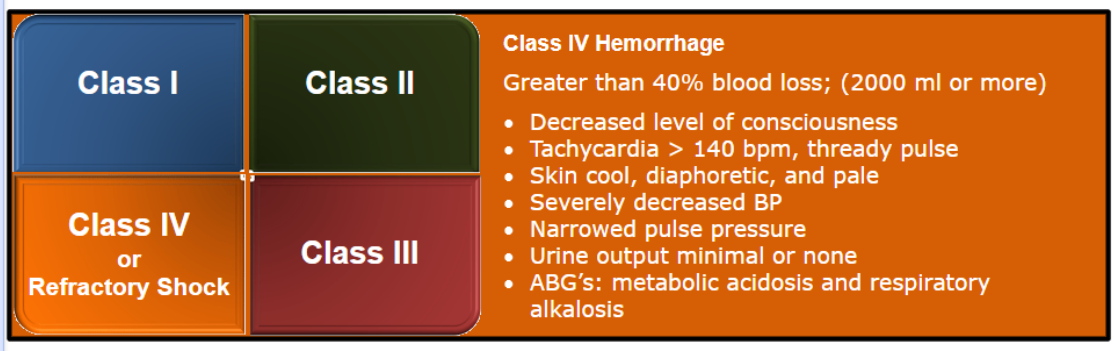

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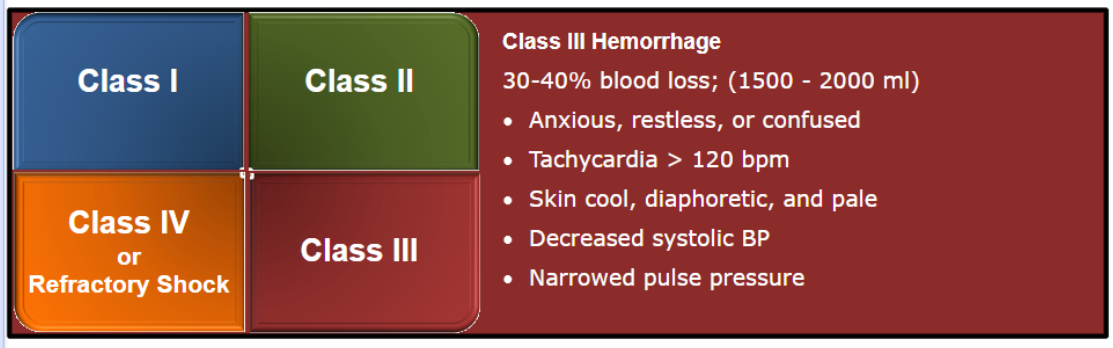

Termination of the Massive Transfusion Protocol

The Physician Team Leader is the only one who can make the decision to terminate the Massive Transfusion Protocol.

Endpoints for termination include:

- Normalization of vital signs
- Normalization/improvement of coagulopathy
- Termination of bleeding
- Failure/futility

When the MTP is terminated, it is essential to call 55555 to announce the status change.

- Various providers and staff are involved, and vital blood products are being prepared and delivered. This announcement is essential for proper allocation and workflow.

Review and Debriefing

- All MTP cases will be reviewed and data collected.
- In certain situations, a follow-up debriefing may occur.
  - Staff can also request a debriefing.
- All staff involved with the case should attend this debriefing.

Cosgriff, N., Moore, E.E., Sauia, A., et al. Predicting life-threatening coagulopathy in the massively transfused trauma patient: hypothermia and acidoses revisited. *J Trauma* 1997; 42: 857-61.

Hess, J.R., Lawson, J.H. The coagulopathy of trauma vs. disseminated intravascular coagulation. *J Trauma* 2006; 60: S12-S19.

Hirshberg, A., Dugas, M., Banez, E., et al. Minimizing dilutional coagulopathy in exsanguinating hemorrhage: a computer simulation. *J Trauma* 2003; 54: 454-61.

Malone, D.L., Hess, J.R., Fingerhut, A. Massive transfusion practices around the globe and a suggestion for a common massive transfusion protocol. *J Trauma* 2006; 60: S91-S96.

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Philips Monitoring System (MUNSON)

Philips Monitoring System (MUNSON)

Introduction

Central Monitoring System

The Philips Patient Information Center is a regulated medical IT system that:

- Provides continuous monitoring of patient vital signs from admission to discharge.
- Consolidates and communicates vital signs data from monitors and third-party devices to caregivers and to the Electronic Medical Record (EMR) for a complete patient record.

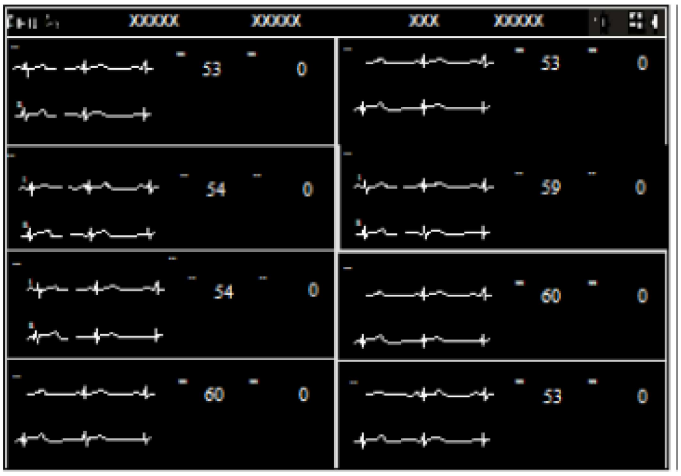
- Supports industry standard interfaces to integrate into existing hospital IT infrastructure and EMR systems while meeting requirements for manageability, serviceability, and security.
- Meets the needs of caregivers on the go by means of remote access to patient vital signs for information anywhere.

Through a combination of advanced alarm management, mobility, and clinical decision support, Philips Patient Monitoring Systems enable reduction of non-actionable alarms, improve workflow efficiency, and facilitate early intervention of patient deterioration to improve patient care and outcomes.

The Information Center software runs on a PC workstation with one or two displays for viewing patient data and accessing clinical applications. A mouse and keyboard are provided for entering and changing patient data and other information. If you position the cursor on a labeled application button and click, the application is immediately displayed on the screen. Note that an on-screen keyboard is not available.

With a touchscreen, you can access patient data by either using the mouse or by touching the item on the screen with your finger or a stylus. The mouse is best for making precise selections and measurements, such as using calipers. The touchscreen is best for actions such as acknowledging alarms, accessing application windows, or recording strips. When using a touchscreen, keep the area free of items that can inadvertently touch the screen. If the touchscreen becomes unavailable for any reason, you can access patient data by using the mouse and keyboard.

The Main Screen displays real-time waves, numerics, and alarms from multiple patients. It can be configured to show up to 64 waves, and contains the following elements:



1 Caption Bar

2 Patient Sectors

 Select the Patient Window button to open the Patient window to Display a real-time view of the current patient's data. You also can choose to do an ECG analysis to view all available ECG leads. The Patient Window provides a real-time view of the patient's waves and numerics. You can view patient data and perform all tasks in the Patient Window. In addition to the waves and numerics, the Patient Window contains the following items:

- The Bed Label Pane - Displays the bed label and ID for the currently selected patient. Select the down arrow to select another patient to view.
- The Print Icon to start a printout of the Patient summary report.
- The Help Icon.
- Alarm message areas – All active alarms and technical alarms display on the top right of the patient window. Status messages are color-coded to indicate the message severity. Orange background indicates high severity. Black background indicates low severity. Select the status message to open System Help in the application window. The Help contains a list of status messages with the possible causes and recommended actions for each message.
- Patient Name - Displays the patient's name. Depending on the length of the complete string and the amount of available space, a minimum number of characters is shown, ending with an ellipsis (...). Three question marks (???) precede the patient's name when there is a problem identifying the patient. For example: Patient data between the Information Center and the bedside does not match. All required information was not entered when the patient was admitted.

Buttons in the sector become visible when you move the cursor into the sector or, if using a touch screen display, when you first touch the sector with a stylus or the tip of your finger. When you place the cursor inside a patient sector, the sector is outlined in an orange border. You can minimize the buttons by moving the cursor into the sector and holding down the **Ctrl** key. While the cursor is inside the sector, the buttons remain minimized until you press the **Ctrl** key again. If you move the cursor out of the active sector and move it back in, the buttons become visible.

 Select the Manage Patient icon, which will allow you to:

- Admit, discharge, and transfer patients.
- Enter or update patient demographic information.
- Manage the equipment associated with the patient.
- Temporarily place the bed in standby.
- Enter a temporary transport location, and/or select the patient's equipment to place in standby.
- Export ECG waveform data to a Philips Holter system for analysis.

To Admit a Patient: Use one of the following methods:

- Manually enter new patient information in the fields in the **Patient Demographics** section by typing a 1-30 character first and last name in the appropriate fields. You can use the TAB key to move from field to field. You can also admit a new patient by entering the MRN.
- Use the **Find Patient...** option to find a patient who is being monitored in another Information center or who has been recently discharged.

You can then choose the patient's gender from a drop-down list. It will default to Male while performing a 12-lead if not assigned. It will default to Female while measuring STE if not assigned. Specify the patients birth date by entering it on the calendar. This will update the age field. Enter the patient's height in the appropriate field. This can be in inches or centimeters according to your policy. Enter the Patient's weight using pounds or kilograms according to your policy. Select "Apply" after verifying all information is correct.

Read all confirmation messages and check patient alarms, settings, and paced status when automatic admission, discharge, or transfer is complete.

Viewing and Adjusting Waves:

When the ECG measurement is on, the first wave displayed is the primary ECG wave. The primary wave is always used for ECG analysis. A rhythm status message displays in the upper right corner of the wave, and an arrhythmia status message displays above and in the center of the wave.

Pleth waves on an Efficia monitor are labeled as SpO2.

Wave Adjustments

You can adjust waves in the patient sector or Patient Window layout by selecting a wave then selecting one or more options described below.

- Change Wave – Select a wave from the list. You cannot select the primary ECG wave.
- ECG Analysis – Available if you select an ECG wave. Select to access the ECG Analysis application.
- Primary Lead – Available if you select the primary ECG wave. Select the primary led from the list.
- Size up or Size down - Select to increase or decrease the size (gain) of the wave (if available).
- Set up ECG – Available if you select an ECG wave. Select to access the **Measurements** application ECG page, where you can change heart rate limits and asystole thresholds.

Manually Transferring a Patient to a New Bed: Transfer data for a patient by performing the following steps:

- Use one of the following methods to open the **Manage Patient** In the sector for the bed that you want to transfer, select the name field or select the **Manage Patient** shortcut button. In the application window task bar, select the **Manage Patient** button.
- Select the **..** button. The **Transfer Patient** dialog box displays a list of available beds in the institutions and units.
- To transfer this patient to another bed within this unit, select the bed from the list of beds in your unit. To transfer this patient to a bed in another unit, first select the unit name, then select a bed from the list.
- Specify whether to clear the sector (remove the bed from the sector) upon transfer by selecting or clearing the **Clear Sector** check box. The system can be configured so that the check box is selected by default. Depending on your unit practices, you may want to clear the check box so the sector is not cleared and the equipment remains assigned to the sector.
- Select "OK".
- Confirm the transfer by selecting the orange "TRANSFER" button.

To Discharge a Patient: Use one of the following methods to discharge a patient.

- Manually discharge a patient in the **Manage Patient** application.
- Discharge a patient directly from the hospital information system or bed management system.

Considerations

Before discharging a patient, note the following:

- Discharging the patient at the Information Center also discharges the patient from the bedside monitor. All monitor and MMS settings (including arrhythmia settings) reset to their defaults.
- When you discharge a patient, the Information Center saves the patient data for all admitted patients. The system stores seven days of data and purges the stored data seven days after discharge.

You can search discharged patient data without readmitting for up to seven days.

- If you readmit a patient, the discharge data is overwritten by new monitoring data as it occurs, and you will only see the full disclosure amount of data.
- Monitoring devices may be set up with predefined configurations called *profiles*. When you discharge a patient, the profile reverts to the default profile configured for the device. Refer to your monitoring device documentation for details. When

you discharge an admitted patient at the Patient Monitor, the Information Center discharges the patient and saves the data.

- *Important* — For MRx monitors, turning off the bedside monitor for more than 10 seconds discharges the patient at the MRx monitor and resets defaults, but it does not discharge the patient from the Information Center; the patient is still admitted at the Information Center. It is important to discharge the patient before turning the monitor off to avoid data being associated with the wrong patient.
- Patients that are discharged while the Information Center is in Local/Disconnected mode will be synchronized upon connection to the primary server.

Warning

Read all confirmation messages and check patient alarms, settings, and paced status when automatic admission, discharge, or transfer is complete.

Measuring ECG:

The electrocardiogram (ECG) measures the electrical activity of the heart and displays it on the

Information Center as a waveform and a numeric. In order to compare measured ECG signals, the electrodes are placed in standardized positions, forming "leads". To obtain ECG signals optimized for use in diagnosis and patient management in different care environments, different lead placements can be used.

Selecting the Primary and Secondary ECG Leads

The telemetry device or patient monitor uses the primary and secondary lead selected at the

Information Center to compute HR and to analyze and detect cardiac arrhythmias.

You should choose a primary and (if using multi-lead monitoring) secondary lead that have the

following characteristics:

- the QRS complex should be either completely above or below the baseline and it should not be biphasic
- the QRS complex should be tall and narrow
- the T-wave should be less than 1/3 the R-wave height
- the P-wave should be less than 1/5 the R-wave height

Documenting Patient Events

Documentation of patient events and procedures is a necessary element of patient care. You can print reports from the PIC iX to paper, electronically via PDF, or both.

Create a Saved Strip

You can create a saved strip with the PIC iX electronic caliper (eCaliper) measurements and comments in any strip tile in Alarm Review, General Review, or specialty review applications.

Note —You must have Full Permission Access to annotate and save a strip to the database.

- Select the strip that you want to annotate.
- Select the Annotate icon. The Saved strip dialog box opens. You can move the dialog box as needed.
- Select a label from the drop-down list to add labels. This field can be customized as needed in Alarm Review.
- Enter text in the second field, up to 30 characters. This value displays in the Comment field for the strip.
- Add eCaliper measurements. Consider changing the wave speed to 50 mm/sec. (Select the speed on the bottom right of the strip, then select a speed from the list.) Click and drag in the strip to and from the desired location in the wave. The measurement is displayed between the vertical lines. In the dialog box, click the measurement label to add the measured value. *Note* — Double-click the measurement to see the caliper bars at any time.
- Select another strip and repeat these steps as needed.
- When you are done, select Save. The measurements are saved to the strip.

Reviewing ECG Waves

Depending on the number of ECG leads and licensing, 3 to 12 waves are available for review. These waves can be reviewed with the other data tiles, such as with events and alarms.

Alarms:

Quickly Viewing Target Events - When reviewing patient data, it is often helpful to quickly view specific types of alarms or events.

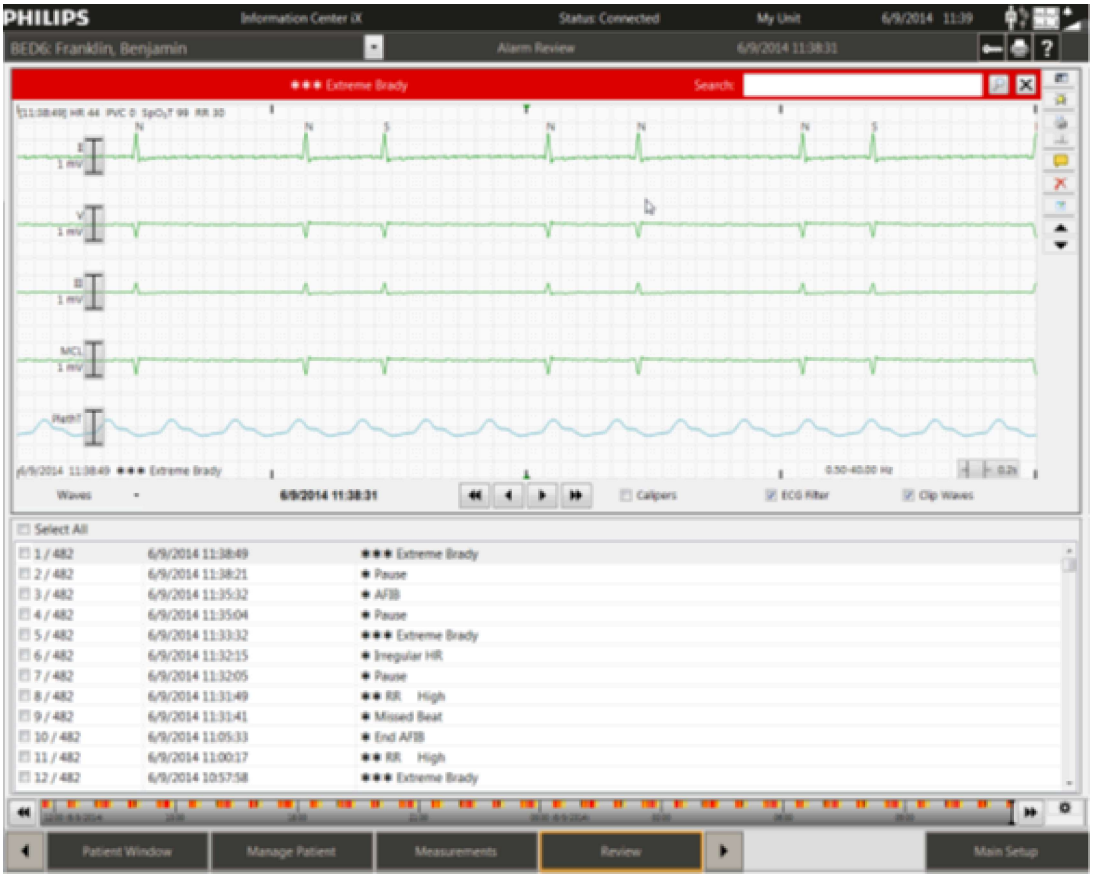
Fast Alarm Review - Select either the Acknowledge key, or the alarm banner in the sector to see alarming waves prior to being available in other applications. Alarm strips can be printed, annotated, or discarded. If you are using secondary notifications, such as with Philips CareEvent, you can manually page an alarm from this application.

Note — The Silence key is called the Acknowledge key.

Alarm Review

Alarm Review always opens with the most recent alarm strip. To review alarms, open Alarm Review from the Review sector button, if configured, or you can open Alarm Review from the main Setup menu or from the Review application menu in any open application. Use the toggle icon to switch between the three different tiles. The tile you prefer can be set up as a default on each host.

- **Tabular** tile – shows a detailed strip with multiple waves and a tabular list of alarms. Use the up and down arrow keys to quickly view alarm strips. This is the factory default tile.
- **Compressed** tile – shows 30 seconds of compressed waves for all strips.
- **Strip Window** tile – a combination of Compressed and Strip tiles.



Reviewing Alarms and Events in Other Applications

Within the factory default review applications (as well as custom applications that were created for your unit), there is a data type called the Event tile. You can use the Event tile to review alarms with other associated data, such as compressed wave storage or graphical trends. Arrhythmia events are also shown, even when a specific alarm is off, such as for yellow level ventricular alarms. The length of the colored box indicates the duration of the event.

- Open the review application. If opened from Alarm Review, the time focus is the selected alarm. If opened from another application, it opens at the current time minus the one minute for storage.
- The Event tile is highlighted below. Note the displayed number of events shown on the right. Alarms are shown with the corresponding color, and arrhythmia events are shown in cyan.

- Clear the check box next to the events you do not want to see. If licensed, specific events can be customized for each review application.
- Move the cursor over any alarm or event to see text that contains the details.
- Select the event to examine its associated waves, trends, and numerics.
- Use the arrow keys in the middle of the tile to quickly navigate to next or previous events.

 Alarms off. Displays next to the numeric when alarms are turned off for the numeric.

 Pause Alarms (Red and/or yellow). **PRESS THIS BUTTON AGAIN TO RESUME ALARMS!**

 Acknowledge/Review Button. Turns off the alarm sound and the sector background changes from blue to black.

 Volume icon. Select to adjust the alarm volume.

Physiological alarms are red and yellow alarms. A red alarm indicates a high priority patient alarm such as a potentially life-threatening situation (for example, asystole). A yellow alarm indicates a lower priority physiological alarm (for example, a respiration alarm limit violation). Additionally, there are short yellow alarms, most of which are specific to arrhythmia-related patient conditions (for example, ventricular bigeminy). Alarm message areas. All active alarms and technical alarms/INOPs display on the top right of the patient sector. A RED warning alerts you to a potential serious outcome, adverse event or safety hazard. Failure to observe a warning may result in death or serious injury to the user or patient. A YELLOW caution alerts you to where special care is necessary for the safe and effective use of the

product. Failure to observe a caution may result in minor or moderate personal injury or damage to the product or other property, and possibly in a remote risk of more serious injury. Technical alarms, or INOPs indicate that the monitoring device cannot measure or detect alarm conditions reliably. If a technical alarm interrupts monitoring and alarm detection (for example, LEADS OFF), the numeric is replaced by a question mark in the sector and Patient Window, and an audible indicator sounds. Technical alarms without this audible indicator indicate that there may be a problem with the reliability of the data, but that monitoring is not interrupted. Most technical alarms are light blue, however there are a small number of technical alarms that are always yellow or red to indicate a severity corresponding to red and yellow alarms.

There can be only one alarm sound annunciating at the Information Center at one time.

- If there is an unacknowledged red level alarm in the presence of any other level alarm, the sound for the red alarm annunciates.
- If there is no unacknowledged red level alarm condition and there is an unacknowledged long yellow alarm in the presence of any other yellow technical alarm (acknowledged or unacknowledged) the sound for the long yellow alarm annunciates.
- If there is no unacknowledged red level alarm or long yellow level alarm condition and there is an arrhythmia or nurse call event, the short yellow (*) alarm sound annunciates.
- If there are no unacknowledged red or long/short yellow alarm conditions and there is any bed with an unacknowledged technical alarm condition, the sound for the technical alarm annunciates.
- If multiple sectors are in alarm, once the highest level alarm is acknowledged in a sector the next highest alarm annunciates.
- An alarm tone indicates the alarm type. There is no sound for soft INOPs/technical alarms.

Other Buttons and Icons:

 **Battery icon.** If there is at least one battery-operated device assigned to this patient, the battery icon indicates the device with the least amount of battery strength. Move your cursor over the icon to view a list of equipment for this patient sorted from the lowest to highest battery charge. The battery icon has five levels: approximately 100% to 80%, 80% to 60%, 60% to 40%,40% to 20%, or -Replace Battery strength. The number of segments indicates the approximate power level.

 **Help icon**. Select to view the online Help application. The Help application is always available and provides context-specific information on using the Information Center applications.

 **Manage Patient icon**. Available in sectors not currently monitoring a patient. Select the icon to access the **Manage Patient** application where you can assign a monitoring device.

The Measurements Button: Provides access to the **Measurements** application, which allows you to:

- Change alarm limits for a patient.
- Turn specific alarms on or off for a patient.
- Adjust measurement settings within a profile.
- Set up telemetry devices.
- Designate which alarms will generate a recording or report or initiate a page.
- View or print an Alarm Summary.
- Configure criteria to trigger alarm advisor notifications.
- View active notifications.

Your choices in the application depend on how your unit is set up and the equipment assigned to the patient.

Paced Mode icon. Indicates the patient's current paced status.

-  On – The icon is white when **Paced Mode** is turned on.
-  Off – The icon is green with an X over it when **Paced Mode** is turned off.
-  Unconfirmed – A red question mark displays over the icon when the patient's paced mode is unknown or in conflict.

The pacer spike color is always white unless the ECG wave is white. If the ECG wave is white, then the pacer spike color is green. Pacer spikes may be configured to display with fixed amplitude for increased visibility.

Important — If **Paced Mode** is set to **Unconfirmed**, the ST/AR algorithm acts as though **Paced mode** is turned on. Select the icon to display a menu where you can turn **Paced Mode** on or off.

Warning - If the patient has a pacemaker, **Paced Mode** must be turned on, enabling the ST/AR algorithm to detect and reject pace pulses (spikes) from the HR count. Otherwise, pace pulses could be detected as beats and the monitor may not alarm for an asystole condition. If the patient does not have a pacemaker, turn **Paced Mode** off to allow the ST/AR algorithm to work most effectively.

 **Print/record Icon**. Depending on your system setup, select this icon to do the following:

- **Record All** — make a delayed recording for all sectors that currently have patient data.
- **Print All** — print a strip for all patients in the unit.
- **Save Strips —** create saved strips for all patients in the unit.

If you select this icon, a message asks you to confirm that you want to proceed with the action. Select **Yes** to confirm. Your system may be set up to just record, record and save a strip, or to just save a delayed strip.

Resuscitation Status Icons:

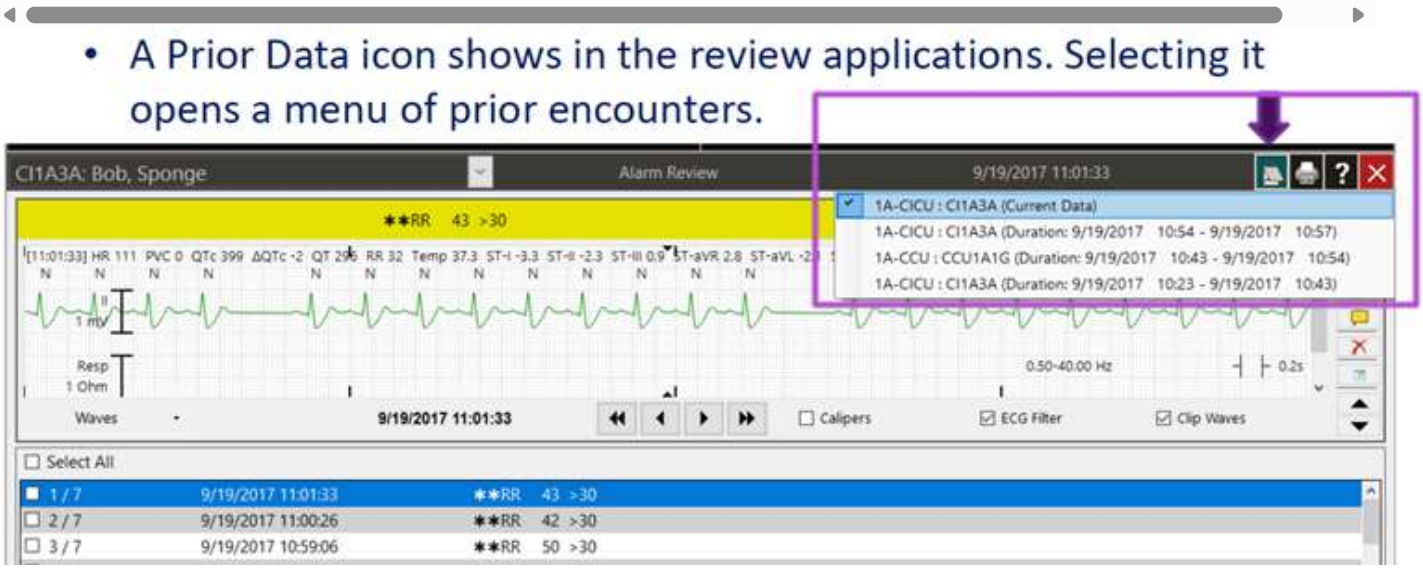
 Do Not Resuscitate. Resuscitation icon. Indicates the patient's current resuscitation status.

 Modified. The icon is solid white when the patient's resuscitation status is set to **DNR** (Do Not Resuscitate). The icon is a white outline when the patient's status is set to **Modified**. The icon does not display if the patient's resuscitation status is set to **Full**. Select the icon to access the **Manage Patient** application where you can change the resuscitation status.

<u>Prior Data:</u>

Patient data can be stored up to 7 days for each patient of Retrospective Review at Central Station. Data stored upon discharge, or from another unit with a transfer, will be shown separately from current data.

« SCROLL »



Once you are into this window –

- The Information Bar at the top turns teal green (states 'Prior Data')
- The only smart key on the bottom task bar will be 'Review'
- Main Screen button becomes 'Current Unit'
- To close the application, use the red X in the upper right or choose the Current Unit button

« SCROLL »

References:

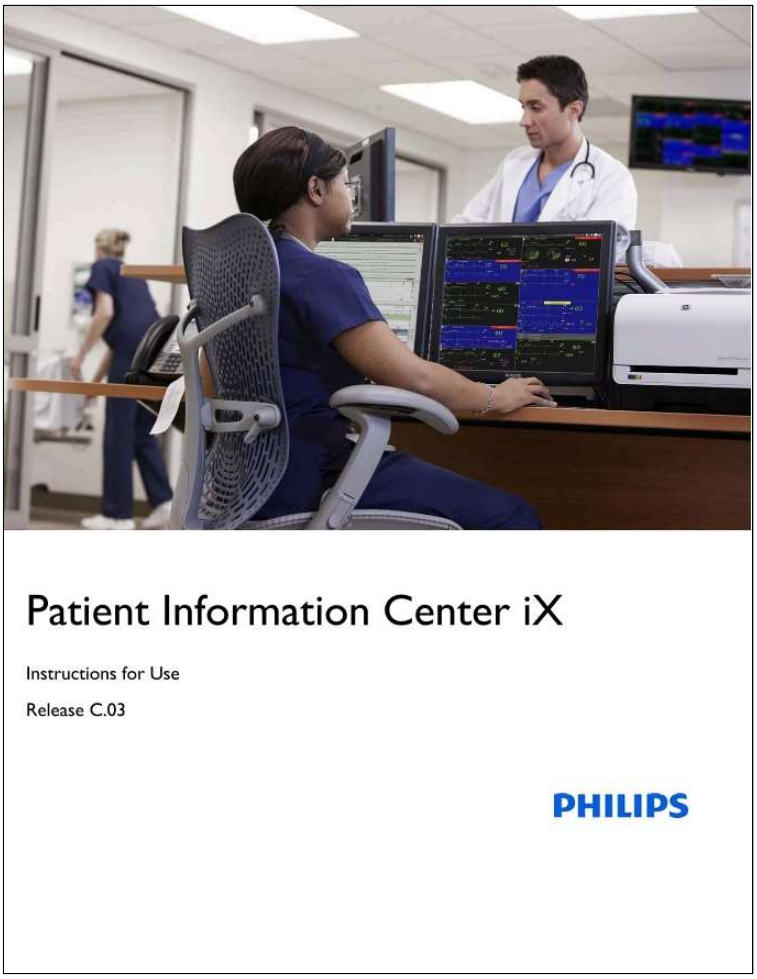
- MX Series QR Codes
- Central Monitoring Station PICiX
  - IFU_-_PIC_iX_Rel_C.03_-_English.pdf- Central station user manual
  - PIICiX Rev C.03 Patient Data Review
- MX40 Telemetry box
  - the MX40 IFU manual link
  - the MX40 quick card reference
- MX400 Large Mounted Monitor
  - IFU MX400-800_IVPM_N0x)Mar2019.pdf User manual
- Invasive pressure Guide
  - Invasive Pressure PDF
- Capnography
  - Capnography Application Guide

Notes

MX Series QR Codes

View image in PDF format.

Philips Monitoring System Manual



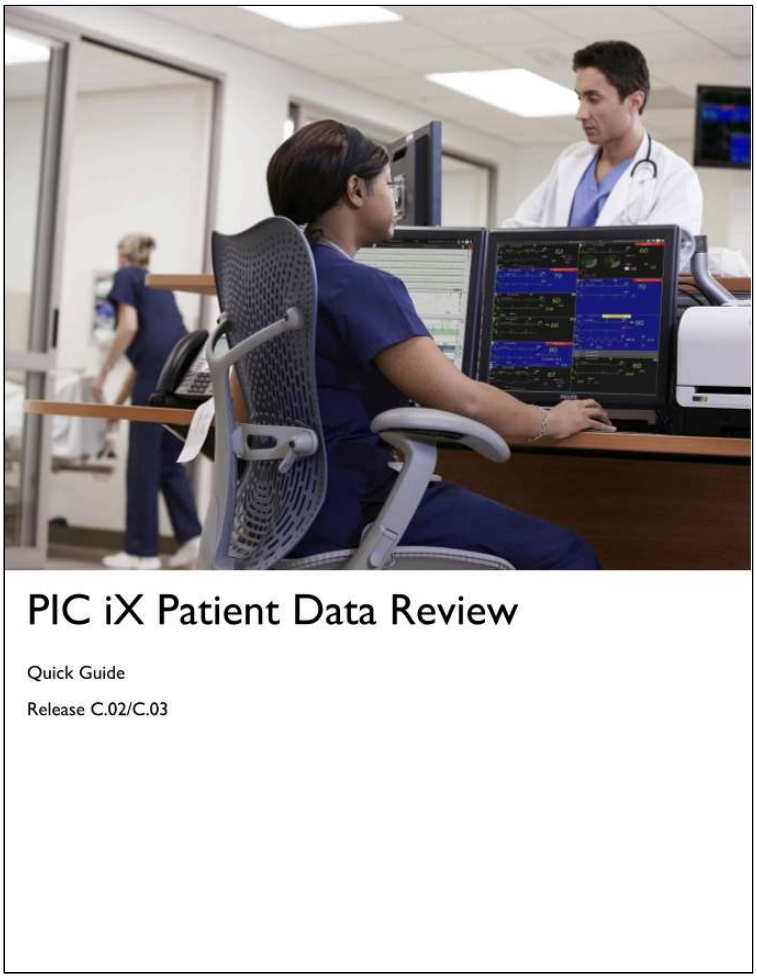
Patient Information Center iX

Instructions for Use

Release C.03

PHILIPS

View image in PDF format.



PIC iX Patient Data Review

Quick Guide

Release C.02/C.03

View image in PDF format.

Car Seat Quick Guide

Car Seat Assessment Record (CAR)
Quick Guide

1. Place baby in car seat.
2. Change Screen to **CAR SEAT TEST.**

3. Touch SmartKey – **START CAR.**
4. Select amount of time for Test Duration *(based on hospital protocol)*.

5. Touch **CONFIRM** key.

CAR is now in progress
Monitoring is continued during CAR.

6. If at any time during CAR you need to exit or stop – press the SmartKey **STOP CAR** and **CONFIRM**.

   At any time you can also switch back to your default monitoring screen by touching **Change Screen**, then touch the back arrow at the top of that menu. *CAR will continue to run in the back ground.*

7. When CAR is complete, the countdown timer (to the far right in the CAR Screen) will turn **RED**.

View image in PDF format.

Procedure: Massive infusion device use

Checklist: Massive infusion using a Belmont infuser device

Evaluator's Name: _____ **Examinee's Name:** _____

Evaluator's ID: _____ **Examinee's ID:** _____

Evaluator's Dept: _____ **Examinee's Dept:** _____

Date: _____ **Meets criteria/Does not meet criteria:** _____

Select Evaluation Method:

☐ Clinical Observation ☐ Documentation Review

☐ Demonstration ☐ Verbalization

Massive infusion using a Belmont infuser device

Objective: To administer a massive IV fluid or blood infusion using a Belmont infuser device according to the standard of care.

Checklist Step	Comments
Y- Meets; N- Does not meet; I- Not Applicable	
__ Verify the practitioner's order.	
__ Review the practitioner's order to make sure that the prescribed infusion solution, rate, and administration route are appropriate for the patient's age, condition, and access device and that the infusion or medication is compatible with other solutions or medications. Make sure the order includes any test results that require monitoring. Address concerns about the order with the practitioner, the pharmacist, your supervisor, the risk management department, or as directed by your facility.	
__ Verify the patient's baseline hematocrit, electrolyte and hemoglobin levels, and results of coagulation and other studies, as ordered.	
__ Review the patient's medical record for history of allergies, as indicated.	
__ Gather and prepare the necessary equipment and supplies.	
__ Perform hand hygiene.	
__ Confirm the patient's identity using at least two patient identifiers.	

__ Provide privacy.

__ Explain the procedure to the patient and family (if appropriate) according to the patient's and family's individual communication and learning needs.

__ Raise the bed to waist level before providing care.

__ Perform a baseline physical assessment. Assess for conditions that can increase the risk of adverse effects of therapy.

__ Insert an indwelling urinary catheter, as ordered, if the patient doesn't already have one.

__ Perform hand hygiene.

__ Put on gloves and, as needed, other personal protective equipment.

__ Make sure that the patient has two patent large-bore IV catheters. If not, insert two IV catheters. If you can't establish venous access, initiate intraosseous access if indicated.

__ Assist the practitioner as needed with insertion of a central venous or pulmonary artery catheter.

__ Assist the practitioner as needed with insertion of an arterial catheter.

__ If you're infusing blood products, perform a pretransfusion blood verification with another qualified health care provider.

__ Remove the administration set from its packaging and inspect it.

__ Install the appropriate administration set into the infusion device according to the manufacturer's instructions.

__ Confirm that the heat exchanger is properly secured.

__ As necessary for infusion of larger volumes of fluid, replace the reservoir chamber with the larger-capacity reservoir. Using sterile technique, remove the reservoir chamber from the administration set by disconnecting the luer connectors.

__ Attach the reservoir holder onto the IV pole and place the larger reservoir into the holder.

__ Attach the three fluid supply tails onto the top of the larger reservoir you plan to use.

__ Connect the larger reservoir to the administration set. Adjust the reservoir holder so that the connection leads underneath the reservoir aren't stretched or kinked.

__ Hang the fluid bag on the IV pole.

__ Close the bag clamps, remove the bag spike cap, vigorously scrub the port with an antiseptic pad, and allow it to dry. Then spike the fluid bag.

__ Repeat the process with additional fluid lines you'll use.

__ Open the bag clamps.

__ Prime the main system by pressing the PRIME button to recirculate 100 mL of fluid at 500 mL/minute.

__ Prime the remainder of the administration tubing: Open the IV fluid bag roller clamp and remove the male luer cap at the distal end of the tubing. Press the PT. LINE PRIME button once to prime at 50 mL/minute and press and hold the button to prime at 200 mL/minute. Press the STOP button after inspecting the tubing for air bubbles. Press the PT. LINE PRIME button again.

__ Perform a vigorous mechanical scrub of the needleless connector on the vascular access device for at least 5 seconds using an antiseptic pad. Allow it to dry completely.

__ While maintaining the sterility of the syringe tip, attach a prefilled syringe containing preservative-free normal saline solution to the needleless connector. Unclamp the catheter and slowly aspirate for a blood return (if not contraindicated) that's the color and consistency of whole blood. If you don't obtain a blood return, take steps to locate an external cause of obstruction.

__ If you obtain a blood return, inject preservative-free normal saline solution slowly into the catheter.

Don't forcibly flush the device; further evaluate the device if you meet resistance.

__ Clamp the catheter and remove and discard the syringe in a puncture-resistant sharps disposal container.

__ Carefully remove the needleless connector from the vascular access device. Perform a vigorous mechanical scrub of the catheter hub for at least 5 seconds using an antiseptic pad. Allow it to dry completely.

__ Trace the IV tubing from the patient to its point of origin.

__ Connect the distal end of the tubing to the patient's vascular access catheter. Route the tubing in a standardized direction if the patient has other tubing and catheters that have different purposes. Label the tubing at both the distal and proximal ends if multiple IV lines will be used.

__ Unclamp the catheter, press INFUSE, and adjust the flow rate, as necessary.

__ Monitor the patient's vital signs every 5 to 15 minutes, as indicated. As the patient's condition stabilizes, monitor vital signs less frequently.

__ Monitor core temperature every 15 to 30 minutes and maintain a core temperature of no lower than 96.8° F (36° C).

__ Assess the patient's hemodynamic parameters every 15 to 30 minutes and urine output every 30 to 60 minutes, as ordered.

__ Inspect the IV sites every 15 minutes.

__ If the patient is receiving blood products, monitor closely for signs of a transfusion reaction.

__ Obtain an arterial blood gas sample, as ordered.

__ When the infusion is complete, change the IV fluid or blood bag.

__ Discard the empty infusion bag in a proper receptacle or, if required by your facility, return it to the blood bank.

__ Obtain blood samples, as ordered, to check hemoglobin level, hematocrit, lactic acid level, and electrolyte levels and for coagulation studies and thromboelastography.

__ Notify the practitioner of critical test results within your facility's established time frame.

__ Return the bed to the lowest position.

__ Discard used supplies in appropriate receptacles.

__ Provide warming measures, such as blankets.

__ Remove and discard your gloves and, if worn, other personal protective equipment.

__ Perform hand hygiene.

__ Clean and disinfect your stethoscope with a disinfectant pad.

__ Perform hand hygiene.

__ Document the procedure.

SoftGuard® Safety Restraint Chair (Munson)

SoftGuard® Safety Restraint Chair (Munson)

Introduction

03/04/2024

Warning - Use of the SoftGuard® Safety Restraint Chair without first reading and thoroughly understanding the instructions could cause injury or death.

Please be aware that the SoftGuard® Safety Restraint Chair is designed for maximum protection and safety when all available restraints are used. The operator's decision to use less than every available restraint strap may increase the risk of
personal injury to the restrained individual.

The SoftGuard® Safety Restraint Chair is intended for the psychiatric, behavioral, and medical environments to protect patients that need to be restrained because they are at risk of hurting themselves or the medical staff. If used properly it can reduce the risk of physical harm to both.

Violent behavior may mask dangerous medical conditions therefore patients must be monitored for and provided with medical treatment if needed. Patients should not be left in the SoftGuard® Safety Restraint Chair for more than two hours and should be under observation during that time. This time limit was established to allow the patient to calm down, and if needed it allows for the medical staff to seek additional medical or psychological help for the patient. This two hour time limit may be extended, but only under medical supervision (Doctor/Nurse). This extended time period must not exceed eight hours and range of motion exercises should be performed regularly. Therefore it is not recommend patients be left in the SoftGuard® Safety Restraint Chair for more than ten hours total.

No belt or strap should be tight enough to restrict any blood flow. The SoftGuard® Safety Restraint Chair must always be used in the upright position.

The SoftGuard® Safety Restraint Chair should never be used as a means of punishment.

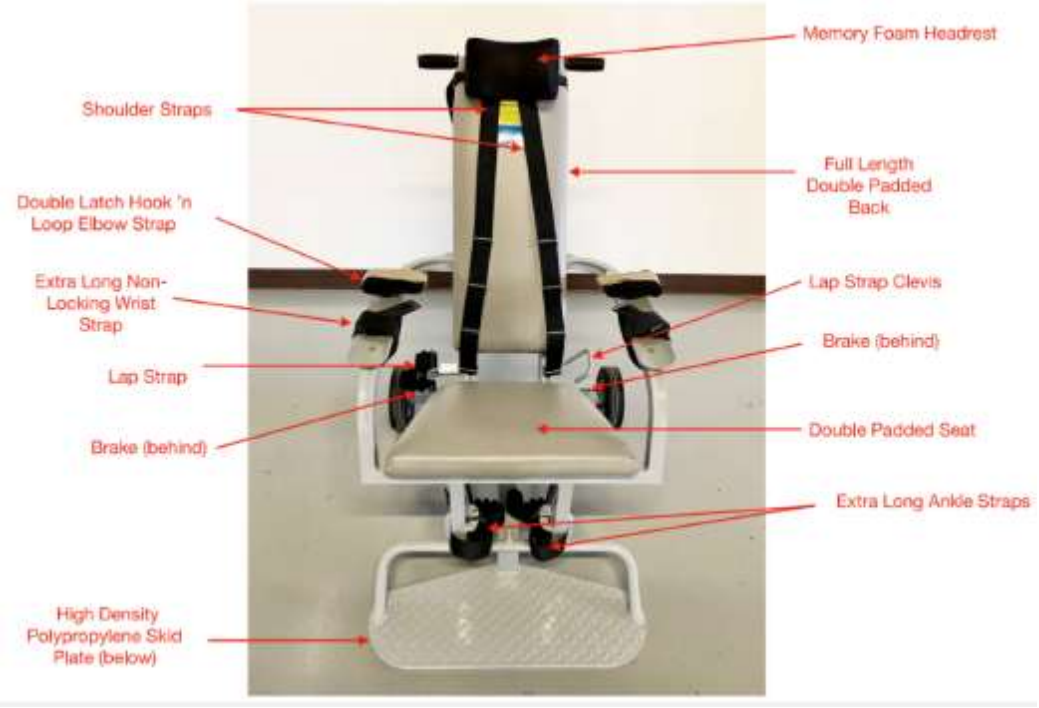
INSTRUCTIONS

Step 1.

Ensure that all of the patient's personal property has been removed include jewelry, glasses, shoes, boots, coat, hat, and belt. They should only be clothed in their shirt, pants, socks, or dress.

Note: Before restraining the patient, make sure all straps are open/loosened. This will reduce the time it takes to attach the straps and make the process safer for both the patient and the medical

Staff.



Step 2.

Set brakes by putting the head of the brake clamp piston into a slot in the wheel hub. It may be necessary to grip the wheel and roll it by hand to properly align the piston head (photo 2). Push the red handle toward the wheel to lock the brake (photo 3). Repeat on the other side.

Photo 2

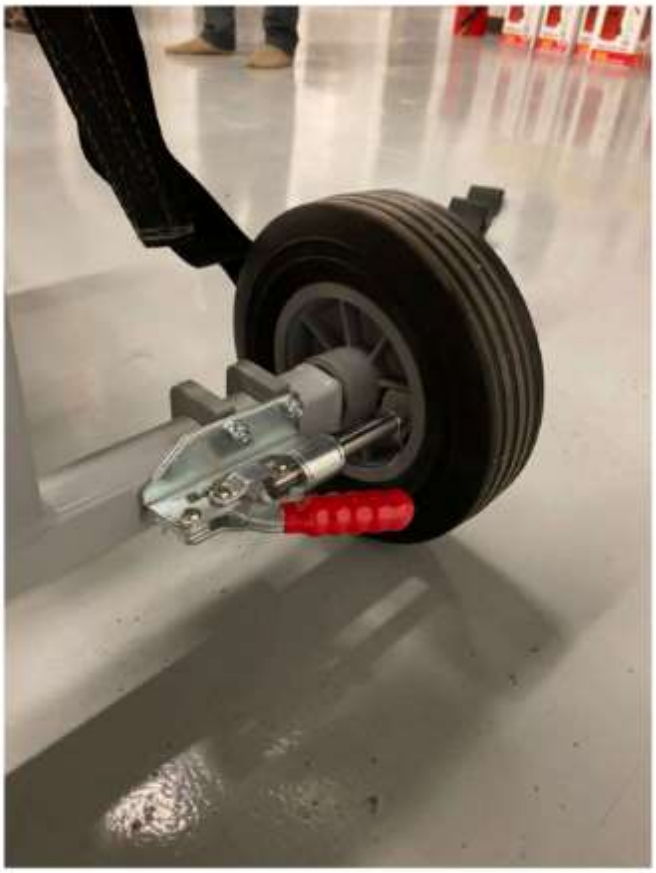


Photo 3

Step 3:

Sit the patient in the chair. Secure the lap belt free looped end in the lap belt clevis (photo 4 & 5) and pull the strap until snug (photo 6).

Note: To loosen the lap belt, push on the cam and pull the strap up (photo 7).

Photo 4

Photo 5

Photo 6

Photo 7

Step 4.

Secure the ankle strap by passing the free end around the front of the ankle securing it to the ankle strap clevis (photo 8).

Photo 8

Pull the ankle strap handle until snug while **making sure the patient's heel is touching the rear of the floot plate** (photo 9).

Photo 9

Repeat on the other ankle (photo 10). Patient's feet should rest firmly on the footplate with their seat reaching the back of the chair seat.

Photo 10

Step 5.

Take one wrist and place that free arm on the arm rest of the SoftGuard® Safety Restraint Chair. Secure the arm with the left arm strap making sure the wrist is down and flat on the arm rest (photo 11). Pull the wrist strap snug.

Photo 11

Note: While tightening the wrist strap, the finger of the person restraining the patient should be placed on the outside of the patient's wrist, between the strap/arm rest slit and the patient's wrist in order to eliminate all possibility of pulling the patient's loose wrist skin ino the slit while pulling the strap tight. This also allows the patient's wrist be held firmly flat on the arm rest during this process.

Place the forearm (elbow) centered over the elbow soft strap. Double latch the hook and loop strap around the free elbow (photo 12 & 13). Repeat the above process for the other arm.

Photo 12

Photo 13

Step 6.

Install the shoulder strap by passing the free ends over the shoulders, under the armpits, and secure them to the shoulder strap clevises located on the back of the chair (photo 14).

Photo 14

Tighten by pulling down on the shoulder strap at the top back of the chair (photo 15).

Photo 15

Do not pull the shoulders back too far when tightening the shoulder straps. Straps must be even and secure on both shoulders (photo 16).

Photo 16

Note: Do not wrap the straps around the chest, head, or neck.

Step 7.

When the patient is fully restrained, retighten the lap belt (photo 17), resulting in a fully restrained patient (photo 18).

Photo 17

Photo 18

Step 8.

As soon as the patient is safely and completely restrained in the chair, the brakes should be immediately released (photo 19 and 20). Movement should not be possible with the patient completely restrained. This will ensure the wheel hubs will not break if there is a need for medical staff to quickly move the chair.

Photo 19

Photo 20

Chair Cleaning Instructions:

The SoftGuard® Safety Restraint Chair will need to be cleaned and sanitized after being used. Recommendations for cleaning all components of the chair include; mizing one cup (8 fl. oz.) of bleach with one gallon of hot water, or an appropriate bleach or non-bleach wipe. Should your organization's specific bacterial or infections control policies require other cleaning methodologies and materials it is advised that the trail be performed on the bottom of the eat to ensure it does not damage the vinyl cover of the seat.

Video Instructions

Click on the link to view open the manufacturer's instructional video page.

Enter the following password: 12nEw15Own3Rs18

Click on Submit to watch the instructional video.

https://restraintchair.com/informational-videos.php

Radiant warmer or incubator use

Radiant warmer or incubator use
Reviewed: December 15, 2025

Introduction

Because the risk of mortality is increased in neonates of all gestational ages who experience hypothermia after delivery, maintaining normothermia (a core temperature of 97.7°F to 99.5°F [36.5°C to 37.5°C]) in nonasphyxiated neonates after birth and through admission and temperature stabilization is crucial.[1] Neonates are more susceptible to hypothermia because they have a high body surface area–to–mass ratio, reduced metabolism per unit area, limited amounts of insulating subcutaneous fat, vasomotor instability, and limited metabolic capacity. A cold-stressed neonate metabolizes brown fat to stay warm; the energy-producing mitochondria in the cells of brown fat enhance a neonate's capacity for heat production.[2]

Brown fat metabolism in a full-term neonate warms the body effectively, but only within a narrow temperature range. Without careful external thermoregulation, a neonate may lose heat and body temperature quickly through all four avenues of heat loss—evaporation, conduction, radiation, and convection. Hypothermia, especially in preterm neonates, is associated with respiratory distress syndrome, metabolic imbalances, intraventricular hemorrhage, and late-onset sepsis.[2] Moderate hypothermia (a core temperature of less than 96.8°F [36°C]) at birth has been recognized as an independent risk factor for death in premature neonates.[1]

External thermoregulation provides a neutral thermal environment that helps a neonate maintain a normal core temperature with minimal oxygen consumption and caloric expenditure. Thermoregulation can be achieved after birth with the use of a thermoregulator, such as a radiant warmer or an incubator.[2] (See *Understanding thermoregulators*.) A radiant warmer typically is used in the delivery room. After transport to the nursery, the neonate can initially be placed on another radiant warmer; if the neonate's temperature doesn't stabilize, the neonate typically is transferred to an incubator. Care of a neonate who is undergoing thermoregulation focuses on monitoring the neonate closely to avoid hyperthermia (temperature greater than 99.5°F [37.5°C]), which increases the risk of mortality and morbidity in both term and preterm neonates.[1]

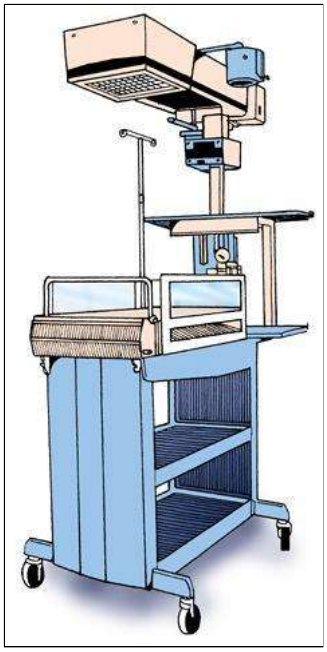
EQUIPMENT

UNDERSTANDING THERMOREGULATORS

Thermoregulators help regulate a neonate's body temperature in various ways. A radiant warmer helps regulate a neonate's body temperature by radiation. An incubator helps regulate a neonate's body temperature by conduction and convection.

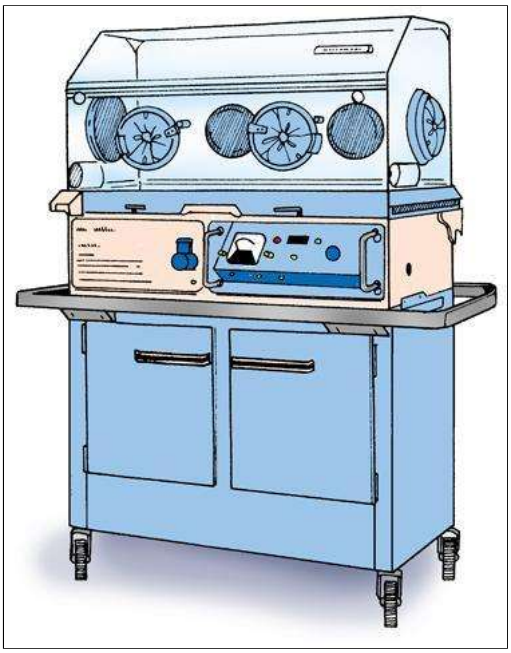
Radiant warmer

A radiant warmer (shown below) contains a biocompatible bed on which to place the neonate. An overhead heater warms the neonate by delivering radiant heat. A skin temperature sensor placed on the neonate monitors the neonate's temperature. Heat output can be controlled manually or automatically. In the manual mode, heat output is regulated by setting the device to a predetermined temperature so that heat output remains constant. In the automatic (or servo control) mode, heat output is regulated using information from the skin temperature sensor attached to the neonate's skin. In this mode, the heat output adjusts automatically to maintain the neonate's temperature. The automatic mode is recommended for continuous thermal support *because it's safer than the manual mode.* The manual mode should be used only for short-term warming.[3]



Incubator

An incubator (shown below) uses forced air circulation to regulate a neonate's temperature by conduction and convection. In the air-control mode, the air temperature is set manually and monitored by a sensor located in a sensor module. In the patient-control mode, the air temperature is regulated by a temperature sensor attached directly to the neonate's skin; the information from the skin temperature sensor controls the heater output to maintain the neonate's skin at a predetermined temperature.



Equipment

- Axillary thermometer[4]
- Blankets
- Linens
- Radiant warmer or incubator
- Reflective adhesive pad
- Skin temperature sensor
- Optional: additional warming devices, personal protective equipment

Preparation of Equipment

Make sure that the radiant warmer or incubator has been cleaned and disinfected properly before use.[5][6] Make sure that all heating and temperature measuring devices are working properly *to decrease the risk of false readings, device malfunction, and potential injury.*[7][8][9][10][11] Prewarm the radiant warmer or incubator, as well as blankets and other linens, before placing the neonate in the device *to minimize heat loss*.

Set the temperature to maintain a neutral thermal environment, *because a neutral thermal environment provides the ideal environmental temperature in which to maintain body temperature within the normal range.* (See *Neutral thermal environmental temperatures*.) Follow the specific manufacturer's instructions for the use of the radiant warmer or incubator. Make sure that alarm limits are set appropriately for the neonate's current condition and that alarms are turned on, functioning properly, and audible to staff.[12][13][14] Keep the radiant warmer or incubator in a draft-free area.

NEUTRAL THERMAL ENVIRONMENTAL TEMPERATURES

Set the air temperature based on the neutral thermal environment and the neonate's age and weight. Smaller neonates in each weight group generally require a temperature at the high end of the corresponding temperature range. In addition, within each age range, the younger the neonate, the higher the temperature required.

Age	Weight	Temperature range
0 to 6 hours	Less than 1,200 g	93.2°F to 95.7°F (34°C to 35.4°C)
0 to 6 hours	1,200 to 1,500 g	93°F to 93.9°F (33.9°C to 34.4°C)
0 to 6 hours	1,501 to 2,500 g	91°F to 92.8°F (32.8°C to 33.8°C)
0 to 6 hours	More than 2,500 g (and greater than 36 weeks' gestation)	89.6°F to 92.8°F (32°C to 33.8°C)
6 to 12 hours	Less than 1,200 g	93.2°F to 95.7°F (34°C to 35.4°C)
6 to 12 hours	1,200 to 1,500 g	92.3°F to 93.9°F (33.5°C to 34.4°C)
6 to 12 hours	1,501 to 2,500 g	90°F to 92.8°F (32.2°C to 33.8°C)
6 to 12 hours	More than 2,500 g (and greater than 36 weeks' gestation)	88.5°F to 92.8°F (31.4°C to 33.8°C)

12 to 24 hours	Less than 1,200 g	93.2°F to 95.7°F (34°C to 35.4°C)
12 to 24 hours	1,200 to 1,500 g	92°F to 93.7°F (33.3°C to 34.3°C)
12 to 24 hours	1,501 to 2,500 g	89.2°F to 92.8°F (31.8°C to 33.8°C)
12 to 24 hours	More than 2,500 g (and greater than 36 weeks' gestation)	87.8°F to 92.7°F (31°C to 33.7°C)
24 to 36 hours	Less than 1,200 g	93.2°F to 95°F (34°C to 35°C)
24 to 36 hours	1,200 to 1,500 g	91.6°F to 93.6°F (33.1°C to 34.2°C)
24 to 36 hours	1,501 to 2,500 g	88.9°F to 92.5°F (31.6°C to 33.6°C)
24 to 36 hours	More than 2,500 g (and greater than 36 weeks' gestation)	89.3°F to 92.3°F (31.8°C to 33.5°C)
36 to 48 hours	Less than 1,200 g	93.2°F to 95°F (34°C to 35°C)
36 to 48 hours	1,200 to 1,500 g	91.4°F to 93.4°F (33°C to 34.1°C)
36 to 48 hours	1,501 to 2,500 g	88.5°F to 92.3°F (31.4°C to 33.5°C)
36 to 48 hours	More than 2,500 g (and greater than 36 weeks' gestation)	86.9°F to 92°F (30.5°C to 33.3°C)
48 to 72 hours	Less than 1,200 g	93.2°F to 95°F (34°C to 35°C)
48 to 72 hours	1,200 to 1,500 g	91.4°F to 93.2°F (33°C to 34°C)
48 to 72 hours	1,501 to 2,500 g	88.2°F to 92.1°F (31.2°C to 33.4°C)
48 to 72 hours	More than 2,500 g (and greater than 36 weeks' gestation)	86.2°F to 91.8°F (30.1°C to 33.2°C)
72 to 96 hours	Less than 1,200 g	93.2°F to 95°F (34°C to 35°C)
72 to 96 hours	1,200 to 1,500 g	91.4°F to 93.2°F (33°C to 34°C)
72 to 96 hours	1,501 to 2,500 g	88°F to 91.8°F (31.1°C to 33.2°C)
72 to 96 hours	More than 2,500 g (and greater than 36 weeks' gestation)	85.6°F to 90.7°F (29.8°C to 32.6°C)
4 to 12 days	Less than 1,500 g	91.4°F to 93.2°F (33°C to 34°C)
4 to 12 days	1,501 to 2,500 g	87.8°F to 91.8°F (31°C to 33.2°C)
4 to 12 days	More than 2,500 g (and greater than 36 weeks' gestation)	84.2°F to 90.7°F (29°C to 32.6°C)
12 to 14 days	Less than 1,500 g	90.7°F to 93.2°F (32.6°C to 34°C)
12 to 14 days	1,500 to 2,500 g	87.8°F to 91.8°F (31°C to 33.2°C)
12 to 14 days	More than 2,500 g (and greater than 36 weeks' gestation)	84.2°F to 87.4°F (29°C to 30.8°C)
2 to 3 weeks	Less than 1,500 g	90°F to 93.2°F (32.2°C to 34°C)
2 to 3 weeks	1,500 to 2,500 g	86.9°F to 91.4°F (30.5°C to 33°C)
3 to 4 weeks	Less than 1,500 g	88.9°F to 92.5°F (31.6°C to 33.6°C)
3 to 4 weeks	1,500 to 2,500 g	86°F to 90.9°F (30°C to 32.7°C)
4 to 5 weeks	Less than 1,500 g	88.2°F to 91.4°F (31.2°C to 33°C)
4 to 5 weeks	1,500 to 2,500 g	85.1°F to 90°F (29.5°C to 32.2°C)
5 to 6 weeks	Less than 1,500 g	87.1°F to 90.1°F (30.6°C to 32.3°C)
5 to 6 weeks	1,500 to 2,500 g	84.2°F to 89.2°F (29°C to 31.8°C)[2]

Implementation

- Verify the practitioner's order.
- Review the neonate's medical record to confirm appropriate bed use based on age, weight, and physiologic need.[4]
- Assess the need for additional warming devices or humidification.[4]
- Gather and prepare the necessary equipment and supplies.
- Perform hand hygiene.[15][16][17][18][19][20]
- Put on personal protective equipment, as needed, *to comply with standard precautions*.[21][22][23] Wear gloves when caring for the neonate until after the neonate's first bath, *because neonates are considered to be contaminated with bloodborne pathogens until they are cleaned of blood and amniotic fluid*.[24]
- Confirm the neonate's identity using at least two patient identifiers.[25]
- Explain the procedure to the neonate's parents or guardians (if present) according to their individual communication and learning needs *to increase their understanding, allay their fears, and enhance cooperation*.[26]
- Remove the neonate's clothing, except for the diaper.

For radiant warmer use

- Place the neonate on the prewarmed radiant warmer. Don't cover the neonate with blankets.[27]
- Make sure that the radiant warmer is in the automatic (servo control) mode, *because it's safer than the manual mode for continuous thermal support*.[3]
- Obtain the neonate's axillary temperature.[1][4]

- Place the skin temperature sensor on the neonate's skin surface; use a surface that's exposed to the radiant warmer. Don't place the sensor beneath the neonate. Follow the manufacturer's instructions for the recommended attachment method.[3]
- Shield the skin temperature sensor with a reflective adhesive pad *to ensure accurate temperature measurement.*[3]
- Monitor the neonate's axillary temperature and the device temperature frequently during temperature stabilization *to avoid hypothermia or hyperthermia.*[4]
- Check the skin temperature sensor attachment frequently, *because poor skin contact may cause poor radiant warmer temperature control.*[3]
- Notify the practitioner if the neonate's temperature fails to stabilize.

For incubator use

- Place the neonate in the prewarmed incubator. Don't cover the neonate with blankets.[4]
- Make sure that the incubator is set in either the patient-control or air-control mode as directed.[4]
- Obtain the neonate's axillary temperature.[1] [4]
- If you're using the air-control mode, set the desired temperature and then adjust the temperature (as needed) based on the neonate's assessed temperature, age, weight, status, and weaning protocols.
- Place the skin temperature sensor on the neonate's skin surface. Follow the manufacturer's instructions for the recommended attachment method.[4]
- Keep the incubator portholes closed, except when you're providing direct patient care *to maintain and conserve heat.*[4] If you must perform procedures outside the incubator, do them under a radiant warmer.
- Place the cover over the incubator *to provide a quiet, dimmed environment for the neonate.*
- Keep noise around the incubator to a minimum as much as possible, *because the incubator amplifies noise.*[28]
- Monitor the neonate's axillary temperature and the device temperature frequently during temperature stabilization *to avoid hypothermia or hyperthermia.*[4]
- Check the skin temperature sensor attachment frequently, *because poor skin contact may cause poor incubator temperature control.*[4]
- Begin humidification, if ordered. Avoid the use of skin emollients during humidification therapy.[4]
- Notify the practitioner if the neonate's temperature fails to stabilize.

Completing the procedure

- Remove and discard your personal protective equipment, if worn.[23]
- Perform hand hygiene.[15] [16] [17] [18] [19] [20]
- Document the procedure.[29] [30] [31] [32]

Special Considerations

- The Joint Commission issued a sentinel event alert concerning medical device alarm safety *because alarm-related events have been associated with permanent loss of function or death.* Among the major contributing factors were improper alarm settings, alarm settings turned off inappropriately, and alarm signals that were inaudible to staff. Make sure that alarm limits are set appropriately and that alarms are turned on, functioning properly, and audible to staff. Follow facility guidelines for preventing alarm fatigue.[14]
- Avoid placing items on top of the radiant warmer or incubator.[2]
- Note that increasing the neonate's calculated fluid requirement may be necessary when a neonate requires treatment with a radiant warmer *to reduce the risk of fluid and electrolyte imbalances.*[33]
- Incubator humidification can be used to improve temperature stability and decrease transepidermal water loss in neonates born at less than 30 weeks' gestation. Strategies for humidification may include:
  - For neonates who weigh less than 1,000 g, humidification of 70% to 80% is recommended for the first week of life, then decreased to 50% to 60% until 30 to 32 weeks.
  - For neonates born at 23 to 27 weeks' gestation, humidification of 85% is recommended for the first week of life. A stepwise reduction to 50% for 21 additional days is then recommended.
  - For neonates born at or before 28 weeks' gestation, humidification of 80% is recommended for the first week of life, followed by a reduction of 10% daily to 40% with a normal temperature for 24 hours.[4]
- Other methods of assisting with temperature control and heat loss include skin-to-skin contact; the use of warmed, humidified oxygen; hats; plastic bubble wrap or bags; thermal mattresses; and warmed diapers and linens.[2] [4] [34] [35]

♦ ***Clinical alert:*** When warming items, be careful not to warm them to a temperature that may burn the neonate. In addition, avoid the use of thermal blankets (such as plastic bubble wrap) with radiant warmers, *because they may cause incorrect skin temperature sensing that results in overheating.*[2] ♦

Complications

Complications associated with radiant warmer or incubator use may include:

- hyperthermia[35]
- insensible water loss
- first-degree burns (attributed to radiant warmer heating of supplies and equipment placed next to a neonate's skin)
- acidosis and resulting respiratory compensation related to warming neonates too quickly
- cold stress and hypothermia, if neonate is warmed inadequately
  - oxygen deprivation
  - hypoglycemia
  - metabolic acidosis
  - rapid depletion of glycogen stores.[7]

Documentation

Documentation associated with radiant warmer or incubator use includes:

- results of temperature assessments
  - route

    - measuring device used
- device used in warming
- settings and controls at the start of therapy and then periodically throughout warming
- response to warming measures
- any temperature adjustments made during warming, including the neonate's response to those changes
- humidification therapy (if used)
- teaching provided to the parents or guardians
    - understanding of that teaching
    - follow-up teaching needed.[4]

Related Procedures

- Warming measures, pediatric

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(Rating System for the Hierarchy of Evidence for Intervention/Treatment Questions)

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    Abstract | Complete Reference

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Rating System for the Hierarchy of Evidence for Intervention/Treatment Questions

The following leveling system is adapted from *Evidence-Based practice in nursing & healthcare: A guide to best practice,* Fifth edition, by Bernadette Mazurek Melnyk and Ellen Fineout-Overholt (2023).

Level I	Evidence from a systematic review or meta-analysis of all relevant randomized controlled trials (RCTs)
Level II	Evidence from well-designed single RCTs (experimental)
Level III	Evidence from well-designed nonrandomized controlled trials (quasi-experimental), systematic reviews of a complete body of evidence, and intervention studies using mixed methods
Level IV	Evidence from well-designed case-control and cohort studies (observational)
Level V	Evidence from systematic reviews of qualitative and descriptive studies
Level VI	Evidence from single descriptive and qualitative studies, evidence-based practice implementation, and quality improvement projects
Level VII	Evidence from expert opinion, expert committee reports, and literature reviews

Data from Gyatt, G., & Rennie D. (2002). Users' guides to the medical literature. American Medical Association; Harris, R. P., et al. (2001). Current methods of the U.S. Preventative Services Task Force: A review of the process. American Journal of Preventative Medicine, 20, 21-35.

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Last Revised	11/7/2025	Applicability	MMC
Next Review	11/6/2028	Tags	Policy

Critical Care Standards

Purpose

To provide a standard for nursing care in the critical care patient population and enhance coordination of care among the healthcare team.

Scope

Critically ill patients receiving care in A2, A3, and the Intensive Care Unit (ICU).

Policy

A. All Registered Nurses (RN) are prepared to:
   1. Utilize corresponding policies and procedures to implement nursing process for patient care.
   2. Respond to urgent and emergent situations.
   3. Perform specialized nursing procedures specific to critically ill patient needs.
   4. Administer care and specialized interventions in the critically ill patient population.
   5. Document care and specialized interventions.

B. Nursing care of critically ill patients in critical care units includes:
   1. Systems Assessments:
      a. Perform and document head-to-toe assessment every 4 hours, unless the patient's condition or physician order indicates alternative frequency.
      b. Including the following:

i. Recent and relevant events and patient outcomes.

ii. Device use, care and management and patient tolerance.

iii. Wound/skin care and management.

iv. Pain assessment and documentation unless patient condition requires a greater frequency. Pain reassessment will occur after treatment (per the Pain Management policy).

v. All individualized care needs for the critically ill patient.

2. Lines/Tubes/Devices
    a. Assessment is completed and documented every four hours including type, station, and status.

3. Vital signs:
    a. Blood pressure, heart rate, respiratory rate, and pulse oximetry with oxygen delivery method are monitored and recorded hourly, unless otherwise ordered or the patient's condition indicates alternative frequency.
    b. When titrating medications, vital signs are documented according to medication order titration guidelines.
    c. Temperatures are recorded at a minimum of every 4 hours unless otherwise ordered or the patient's condition indicates alternative frequency. Temperatures are recorded hourly when warming or cooling measures are used.
        i. All patients with abnormal temperatures are assessed for potential complications related to hypothermia or hyperthermia.
        ii. RN may initiate warm blankets, commercial warming devices, and/or fluid warmer on any patient with a rectal or core temperature of less than 35.6°C. Provider must be notified.
        iii. RN may initiate cooling blankets on any patient with a rectal or core temperature of greater than 38°C if antipyretics and other means of external cooling have been ineffective. Provider must be notified.
        iv. The fluid warmer may be used for any patient with a rectal or core temperature of less than 35.6°C.

4. Hemodynamic monitoring:
    a. Electrocardiogram (ECG) monitoring is established upon arrival and maintained throughout hospitalization.
    b. Invasive line pressures are documented every hour unless otherwise ordered or the patient's condition indicates alternative frequency. This includes but is not limited to: arterial blood pressure (ABP), central venous pressure (CVP), pulmonary artery pressure (PAP), pulmonary capillary wedge pressure (PCWP), Intracranial pressure (ICP), cerebral perfusion pressure (CPP).

c. Arterial lines and pulmonary artery catheters must always be transduced. Exception: during magnetic resonance imaging (MRI) testing.

d. Transport monitoring: Minimum transport monitoring of critical care patients will include continuous ECG, blood pressure, and oxygen saturation monitoring. Arterial lines and pulmonary artery catheters must always be transduced, even during transport. Additional monitoring may be held or continued during transport.

5. Respiratory:
    a. Airway or endotracheal tube (ETT) station is documented every four hours.
    b. ETT is repositioned every four hours and prn in collaboration with Respiratory Therapy (RT).
    c. An RN may extubate a patient upon a physician's order or per protocol, with RT at the bedside.
6. Fluid volume status and intake & output (I&O):
    a. Patients require strict hourly I&O with daily weights unless otherwise ordered or the patient's condition indicates alternative frequency.
7. Nutrition:
    a. The goal is to start nutrition within 24 hours of admission, based on patient condition. Diet/nutrition is monitored daily, including type of nutrition, source and patient tolerance. RN may initiate dietary consult as needed.

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Approval Signatures

Step Description	Approver	Date
System Policy Oversight Committee	Terri Fries: Document Mgmt Spec	11/7/2025
CNO	Tamara Putney: VP and CNO Patient Care Services	11/7/2025
Mgr Nursing Services	Amber Bowers: Mgr Nursing Services	11/5/2025
Document Owner	Brendan Franklin: Dir Nursing Critical Care & Stroke	11/5/2025

Applicability

Munson Medical Center

Standards

No standards are associated with this document

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Origination	12/13/2023	Owner	Jennifer Standfest: CNO
Last Approved	6/3/2025	Area/ Department	Nursing
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Last Revised	6/3/2025		
Next Review	6/2/2028		

Cardiac Telemetry Monitoring

Purpose

To enhance patient safety and clinical consistency by outlining continuous cardiac monitoring guidelines, arrhythmia detections and overall alarm management.

Definitions

1. **Cardiac Monitoring/Telemetry Monitoring:** Continuous cardiac rhythm display at the bedside and/or transmitted to a central monitoring console that can provide alarms or print/save rhythm strips.
2. **Telemetry Technician:** Licensed or unlicensed staff member with training and competency in electrocardiogram (ECG) rhythm interpretation.
3. **Telemetry Observer:** An individual assigned to listen for and/or observe specific visual cues with the intention of escalating information to a resource trained to assess and/or intervene in a specific situation.

Policy

A. An order is needed to initiate and discontinue cardiac monitoring. Orders should specify any parameters and any circumstances in which the patient can be temporarily or permanently removed from monitoring.

B. When initiating cardiac monitoring, the following identifiers are used:

    1. 10-digit account number
    2. Last Name, First Name (NOTE: This will automatically pull through ADT feed if 10-digit account number is entered correctly)

C. The Registered Nurse (RN) is responsible to:
    1. Initiate and maintain continuous monitoring and to perform initial review and adjustment of settings and alarm parameters.
    2. Regularly review and interpret cardiac rhythm and document findings in the chart.
    3. Assess need for continued cardiac monitoring daily, using provider orders or protocol, where applicable.
    4. Report clinically relevant abnormalities identified on review or by alarm/event review to the provider. Abnormalities include but are not limited to:
        a. Any new dysrhythmia (i.e., tachy or brady arrhythmia exceeding alarm)
        b. Heart block
        c. New atrial fibrillation or flutter or inadequate rate control of these rhythms
        d. Ventricular tachycardia/fibrillation
        e. Supra-ventricular tachycardia
        f. Any symptomatic patient with a dysrhythmia
        g. Any dysrhythmia requiring immediate treatment
    5. Initiate code response or other facility specific rapid response protocols or appropriate emergency interventions
    6. The RN may delegate tasks to appropriately trained support personnel. These may include, but are not limited to: equipment preparation, skin preparation, electrode application/reapplication, application of monitoring equipment.

D. Where present, telemetry technicians may review and adjust specific settings and alarm parameters and may interpret cardiac rhythms, complete specific documentation, and shall report abnormalities to the RN.
    1. The technician will monitor each telemetry unit for ventricular tachycardia, ventricular fibrillation, asystole, tachycardia and bradycardia, low battery and lack of rhythm. The telemetry technician will contact the nurse with findings.
    2. A telemetry log may be kept on each unit with pertinent info such as the patient's name, dominant rhythm, assigned nurse and the direct phone number(s) for the assigned care team.

E. A telemetry technician and/or any RN not directly responsible for the patient's care who observes events or responds to alarms at the bedside or central monitoring station will notify the primary nurse of any changes in the patient's condition, monitor settings, or alarm parameters.

F. Where present, telemetry observers are identified 24 hours a day. The telemetry observer may perform other clerical duties that do not remove them from direct view or audio of the monitor. The observer will arrange for another trained observer or nurse to fill the role temporarily if needed for breaks or to perform other job duties away from the area.

G. Any support personnel should consult with/notify the appropriate individual (eg., telemetry observer or technician, RN, etc.) prior to removing a patient from monitoring for showering,

procedures/testing or discharge.

Electrode and Lead Placement, Battery Replacement

A. Electrodes are applied according to Lippincott Procedures - Cardiac monitoring (lww.com) instructions found online. Electrodes shall be changed daily and as needed (PRN) or in accordance with manufacturer recommendations.

B. Lead placement should be confirmed at the beginning of each shift, along with verification the monitor / transmitter is functioning properly and that suitable battery life remains.

C. Battery change should occur minimally when “low battery” signal appears, or with approximately 25% battery life remaining.

Lead Selection

A. Lead II is generally selected as the standard monitoring lead.

B. For a standard 5 lead system, V1 is commonly selected as the second lead. An alternate lead may be selected based on which provides a clearer trace, more prominent or upright waves, or by which a particular area of the heart can be better monitored.

Cleaning

A. Upon discontinuation of telemetry monitoring, the telemetry unit and electrodes are cleaned per manufacturer instructions.

Cardiac Rhythm Waveforms and Documentation

A. A rhythm strip will be measured, interpreted, and documented per the following guidelines:

1. Rhythm interpretation is ongoing and documented as part of the nursing assessment
2. Inpatient care (critical, intermediate, or telemetry care departments) at admission, each shift with initial RN assessment, and with any significant change in rhythm or significant symptoms
3. Emergency Department (ED) at admission and with any life-threatening rhythms or significant changes in patient condition
4. Rhythm waveform documentation should include the name of identified rhythm, heart rate, PR/QRS/QT intervals where applicable, and the name of the RN or Telemetry Technician performing the documentation.

Monitoring Guidelines

A. HR alarms will be set appropriately to the patient's baseline HR, rhythm, clinical condition or treatment plan by an RN or Telemetry Technician.

B. If a monitored patient has a pacemaker, the pacemaker detection function of the cardiac monitor must be turned ON

Refer to Munson Healthcare (MHC) entity specific intravenous (IV) Medication Guidelines and/or consult with pharmacy for information related to risk of prolonged QT interval and for IV medication administration and required monitoring.

C. QT interval monitoring functions of the cardiac monitors may be utilized by the RN/Tele Tech as an adjunct to patient / rhythm assessment. A patient with a baseline prolonged QT or on a medication that has the potential of prolonging the QT interval may have orders for more frequent QT measurements.

D. ST segment monitoring and ST mapping functions of the cardiac monitors may be utilized by the RN/Tele Tech as an adjunct to patient assessment. (Note: some clinical conditions make it difficult to achieve accurate ST monitoring i.e., atrial fib or flutter with an irregular baseline, ventricular pacing, left bundle branch block. Consider turning ST monitoring off in these conditions).

E. Silencing Alarms:

    1. A trained telemetry observer or technician or a registered nurse may silence clearly erratic/false alarms such as those caused by motion or artifact while requesting evaluation by clinical personnel.
    2. A lethal rhythm alarm may be silenced by a Telemetry Technician or RN after the RN evaluates the rhythm and/or patient condition.

Alarm Settings and Clinical Management

A. The Clinical Engineering department has oversight for the testing and maintenance of clinical devices to ensure accurate settings, proper operation, and detectability of alarms.

B. Monitor settings are configured according to manufacturer recommendations to enhance patient safety. A copy of all configuration settings is maintained by the Clinical Engineering department. These settings may only be changed with approval of the Cardiac Monitoring Steering Committee or the Cardiac Monitoring Alarm Committee, with the endorsement of the Clinical Leadership Council.

C. Arrhythmia monitoring will be on and audible for all monitored patients, with the exception of patients who are receiving end of life care, where death is anticipated and an order for comfort care is present.

D. Alarm volume should be set audibly so that nursing staff is able to hear and respond appropriately to non-critical and critical alarms. It is the responsibility of the bedside nurses, the unit coordinator, and other clinical staff to maintain the appropriate alarm volume which decreases noise pollution for patients and visitors, while ensuring prompt staff notification of alarm situations.

E. Select alarm parameters are unlocked and able to be adjusted on an individual basis by the RN, Telemetry Technician, or other licensed clinician within their scope of service.

F. All monitor alarm settings should be adjusted to reflect patient or condition specific values and should be reviewed and adjusted (if indicated) at admission, each shift, and as needed by the RN and/or Telemetry Technician.

    1. The nursing staff member will determine the appropriate response to the alarm; however, the nurse is responsible to confirm findings, verify patterns, and evaluate

interpretations through patient assessment. The response to an alarm may include but is not limited to silencing the alarm, recording the strip, and/or initiating emergency interventions.

2. In the event of a Code Blue or Cardioversion, an event strip will be documented containing the initiation of the event and documentation of changes in rhythm continuing through termination of efforts. As an alternative, a strip from the defibrillator may be used to record the events of the Code Blue.

G. Patient care staff are familiar with alarm settings, policies and procedures.

Transfer/Discharge Procedure

A. At the time of transfer/discharge, the patient MUST be discharged from the bedside and/or central monitoring console, and when applicable, have their encounter be dissociated from the electronic health record (EHR).

B. Refer to manufacturer instructions for use for specific steps to transfer or discharge patient.

Transport Monitoring

A. An RN (or in some cases, a paramedic) shall accompany the patient for transport if the patient is in critical condition, hemodynamically unstable and/or on continuous vasoactive infusions.

B. Other monitored patients transported by unlicensed staff will be monitored remotely by the telemetry technician, telemetry observer, or RN. A portable phone will be assigned and in the possession of the staff member closest to/responsible for the patient at all times. Monitoring staff will use this phone to communicate emergency conditions and request immediate assistance for the patient.

Reference

1. Wiegand, D. L. (Ed.). (2017). AACN Procedure Manual for High Acuity, Progressive, and Critical Care (7th ed., pp. 467-476). St. Louis, MO: Elsevier.

Keywords

Cardiac, Telemetry, Monitoring, Tele Tech

Approval Signatures

Step Description	Approver	Date
System Policy Oversight Committee	Terri Fries: Document Mgmt Spec	6/3/2025
CNO Council	Jennifer Standfest: CNO [AM]	6/2/2025

Document Owner	Jennifer Standfest: CNO [AM]	6/2/2025

Applicability

Cadillac Hospital, Charlevoix Hospital, Grayling Hospital, Munson Medical Center, Otsego Memorial Hospital

Standards

No standards are associated with this document

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LAB GEN: Patient Identification for Laboratory Specimen Collection

Purpose

To provide accurate identification of patients, eliminating related medical errors and patient harm. Identification (ID) of the patient is an on-going process that begins when the patient enters the hospital and continues throughout the patient's stay. To maintain and facilitate patient care and safety and to ensure accurate and reproducible laboratory results, the labeling of laboratory samples will be consistently completed at the point of care.

Definition

1. **Point of Care:** within close proximity of the draw site; meaning at the patient's bedside or similar area (i.e. next to the drawing chair).

Policy

A. Patients are identified by two (2) identifiers at the point of care. All samples are adequately and permanently labeled immediately upon collection at the point of care.

Identification Guidelines

A. Two aspects of patient ID must be verified prior to specimen collection:
    1. **Inpatients (includes Emergency Room (ER) patients)**

a. Scan the patient's ID band located on the patients' wrist or ankle with the PDA system. Ask the patient to state their legal name (First & Last) and date of birth (DOB). Compare their response to the information on the PDA system & patient ID band.

b. If the PDA system is unavailable compare Sunquest label or chart sticker to the patient ID band located on the patients' wrist or ankle. Ask the patient to state their legal name (First & Last) and DOB. Compare their response to the information on the Sunquest label or chart sticker & patient ID band.

c. Note: For patients who are unable to verbalize two aspects of ID, verify ID with a caregiver or family member whenever practical.

2. **Outpatients**

    a. Ask patient to state the following information:

        i. Name: (First and Last legal)??

        ii. DOB

    b. Verify this information with that on all paperwork provided including the lab requisition(s).

Labeling Guidelines

A. Immediately upon collection all samples must be permanently labeled with two patient-specific identifiers:

    1. Affix a sunquest label, chart sticker, or hand write full legal name and second unique ID number (medical record #). If the medical record # is unknown or is not available, acceptable 2nd identifiers are the patient's DOB, account number, office chart number, social security number.

    2. Affix labels vertically down blood tubes and horizontally across other collection containers.

B. If second label is required, the first permanent label may be covered but not removed. Double check full name and date of birth when applying second label.

C. Samples must be labeled in the patient's presence. Do not move samples or allow patient to leave the area before labeling the samples.

Pretransfusion Specimen Labeling Guidelines

A. Immediately upon collection pretransfusion blood specimens are labeled at the time of specimen collection in the presence of the patient with:

    1. Patient's first and last name

    2. Unique identification number (medical record #)

    3. Date and time of collection

    4. Initials of individual collecting the specimen if not Sunquest label

B. Sunquest Label, Chart Label, or hand labeled with black or blue ink is acceptable for labeling pretransfusion specimens.

C. Pretransfusion blood specimen collectors are recorded in the laboratory information system. All phlebotomists have a Tech ID code unique to employee. For non-laboratory staff collections, initials of collector are recorded in the laboratory information system as a comment.

Additional Information on Specimen Container(s) when Applicable

A. Specimen Source (such as cultures)

B. Collection Duration (12 or 24 hours for timed urine specimens)

C. Collection Time for Serial Draws (30 minutes, 1 hour, 2 hours, 3 hour)

D. Tube Number in Order of Draw (#1, #2, #3 for spinal fluid tubes)

E. Preservative Added (acetic acid preservative added to a 24-hour urine container)

Glass Slides

A. Glass slides must be labeled with the patient name. A second identifier is preferred, but the name only is acceptable.

Approval Signatures

Step Description	Approver	Date
System Policy Oversight Committee	Terri Fries: Document Mgmt Spec	1/24/2024
Lab Medical Director	William Kanner	1/24/2024
Document Owner	Danielle Graber: Mgr Laboratory Services	10/20/2023

Applicability

Cadillac Hospital, Charlevoix Hospital, Grayling Hospital, Kalkaska Memorial Health Center, MHC Corporate (Home Health, Dialysis, NMSA, etc.), Manistee Hospital, Munson Medical Center, Otsego Memorial Hospital, Paul Oliver Memorial Hospital

Standards

No standards are associated with this document

Status **Active** PolicyStat ID **15845233**

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Next Review	5/20/2027		

Trauma Team Activation

Purpose

To provide a guide for activating the trauma team.

Guidelines

The Trauma Team will be activated to deliver patient care to the injured patient based on the severity of the trauma.

Level I and Level II Trauma Team Activations

A. This system will be activated by the emergency department physician (EDP) or the emergency department (ED) charge nurse upon the receipt of pre-hospital notification with a patient that meets trauma triage criteria for a Level I or Level II trauma team activation (See Activation Criteria below). Patients who arrive with no pre-hospital notification will be activated based on the set criteria by triage personnel.

B. The EDP or the ED charge nurse will inform the ED unit clerk of the need to activate the trauma team.

C. The unit clerk will call the operator and provide him/her with the level to be activated, the age of the patient, if patient is greater than 20 weeks gestation, and the estimated time of arrival (ETA) of the patient.

D. In addition, the operator will send out the burst page for the level activated (see procedure below).

E. Alternatively, the unit clerk or Patient Care Coordinator may send out the trauma activation page directly from the charge desk.

F. The operator and the ED unit clerk will log the time of each call made in the trauma team

activation process as well as the date and level of each team activation on the trauma log.

G. All group team notifications will be made from the operator or the ED Patient Care Coordinator by text page to the trauma activation group. These group pages will include the level of trauma team activation, approximate age, gender, mechanism of injury, estimated time until arrival, and destination located in the ED.

H. The following personnel and/or departments will be notified by the group page from the operator:

1. Trauma surgeon.
2. Trauma Advanced practice providers (APP).
3. Munson operator (to evaluate actual group page delivery).
4. ED charge nurse (to evaluate actual group page delivery).
5. Anesthesia (early awareness of potential need for an Operating Room [OR]) – *Level I only, if needed.*
6. Radiologist (early awareness of need for priority read).
7. Radiology on-call Tech (early awareness of possible call-in).
8. Computed Tomography (CT) Tech (see protocol).
9. Respiratory Therapy (expected ED response at time of patient ETA for airway assistance - if patient does not require intubation the therapist can resume previously scheduled activities) – *Level I or intubated patient only.*
10. Blood bank (early awareness of possible need for uncross-matched blood).
11. Phlebotomist(s) (expected ED response at time of ETA for blood draw).
12. Administrative supervisor / admissions coordinator (early awareness of potential staff needs in OR/Intensive Care Unit [ICU] and/or ED resuscitation assistance, family notification).
13. ICU charge nurse (early awareness for staffing/possible bed placement).
14. Security (early awareness of potential need for increased response need depending on associated risk factors, also accounting of valuables as needed [PRN]).
15. Trauma program manager (patient tracking).
16. The pediatrician on call will be paged on all patients age less than 15 years of age.

I. **Note: This system will allow departments and individual key staff members to be prepared for the need of an expedited response based on the needs of the trauma patient when the EDP, ED charge nurse or trauma surgeon contacts them.**

J. Additional notifications required, based on the patient type or presentation, will be done by the EDP or the ED unit clerk at the request of the EDP, ED charge nurse or trauma surgeon.

1. Neurosurgeon with all patients demonstrating signs of imminent brain herniation and/or CT scans with potentially operable lesions
2. Orthopedic surgeon with all open or unstable fractures
3. Obstetrics (OB)/Gynecologist (GYN) with all pregnant trauma victims

4. OB nurse with tocolytic monitor for any patient with pregnancy 20 weeks.
5. Pediatrician on all trauma patients age less than 15 years of

K. All Level III (trauma consult) requests will be activated by the EDP and will be documented for time, date, level and response by the unit clerk.

L. The EDP will be designated as the leader of the trauma team, until the arrival of the trauma surgeon. After arrival of the trauma surgeon, the EDP will assist the team as needed.

M. The EDP will assume responsibility for the patient's airway. If difficulties arise or are anticipated, anesthesia will be paged for assistance.

Activation Criteria

Level 1 Trauma Team Activation

A. **Patient to be seen by the trauma surgeon within 15 minutes after arrival to ED.**

B. ED physician/charge nurse will activate based on information received on incoming Emergency Medical Services (EMS) radio calls.

C. Injury occurred within last 24 hours:

1. Airway
    a. Intubated patients transferred from the scene.
    b. Patients in need of an emergent airway.
    c. Inhalant injury with threat of airway involvement.
2. Breathing
    a. Respiratory Compromise (respiratory rate [RR] less than 10 or greater than 29).
3. Circulation
    a. Hemodynamic Compromise (systolic blood pressure [SBP] less than 90)
    b. Age 65 and older:
        i. SBP less than 110
        ii. Heart rate (HR) greater than SBP
    c. *Pediatric specific (less than 15 years of age):*
        i. *Age less than 1 with SBP less than 60.*
        ii. *Age 1-10 with SBP less than 70 + 2X age.*
        iii. *Age greater than 10 with SBP less than 90.*
4. Deficit
    a. Altered Mentation (Glasgow Coma Scale [GCS] less than 9)
5. Secondary Survey: Anatomic

a. Gunshot wound (GSW)/Penetrating injury of head, neck, chest, abdomen, back.
b. Flail chest.
c. Unstable pelvic fracture.
d. Open or depressed skull fractures.
e. Trauma Paralysis.
f. Amputation proximal to wrist or ankle, crushed, or mangled extremity.

6. Trauma Transfer
    a. Receiving blood products to maintain vital signs.
    b. With or ongoing respiratory compromise (unstable).
    c. Hemodynamic compromise.
    d. Neurologic compromise.
7. EDP discretion.

Level 2 Trauma Team Activation

A. **Patient to be seen within 2 hours after arrival to ED**
B. Injury occurred within last 24 hours
    1. Anatomic injury
        a. Altered Mentation: GCS 9-13.
        b. Penetrating injury of extremities unless hemodynaically unstable.
        c. Burns
            i. Total Body Surface Area greater than 20%.
            ii. Electrical or lightning injuries.
            iii. Full thickness circumferential burns.
        d. Greater than or equal to 2 proximal long bone fractures (humerus or femur).
        e. Major degloving.
        f. Limb threatening injury.
        g. Focal neurological abnormality resulting from trauma.
    2. Mechanism of injury
        a. Motorcycle, All Terrain Vehicle (ATV), snowmobile, watercraft, animal rider.
            i. Rider vehicle separation.
            ii. Victim run over.
            iii. Significant impact at greater than 20 mph.

b. Motor Vehicle Crash (MVC) with:
    i. Ejection from vehicle.
    ii. Death of occupant in same vehicle.
    iii. High speed greater than or equal to 50 mph upon impact.
    iv. Prolonged extrication greater than 20 minutes.
    v. Major intrusion of passenger compartment.
c. Falls greater than 20 feet.
    i. *Pediatric specific:*
        a. *Falls greater than 10 feet or 3X child's height.*
d. Drowning if associated with trauma or unknown mechanism (if unstable, level 1 activation).
e. Hangings (if unstable, level 1 activation).
f. Pregnancy w/abdominal trauma/abdominal pain.
g. Other outside trauma transfers.
h. EDP discretion.

Trauma Consult

A. **Patient to be seen during the emergency department phase of care.**
    1. Trauma transfers without hemodynamic compromise that do not meet Level I or Level II activation criteria.
    2. ED Physician discretion.
    3. Greater than 2 rib fractures requiring admission or ANY # of rib fractures greater than 65 years of age requiring admission.

Trauma Patients Requiring Admission to ICU

A. All trauma patients requiring ICU admission must be evaluated by a surgical service. Additionally, all trauma patients requiring ICU admission must have a tertiary exam completed within 24 hours of admission to the unit. Care will transition to the Surgical Critical Care (SCC) service for patients requiring critical care. Patients admitted to the ICU as overflow do not require SCC consult. The exception to this process is an isolated injury managed by the medicine service with a surgical service already involved (ex orthopedic surgery).

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Attachments

Trauma Team Activation Criteria Adult & Pediatric--active.docx

Approval Signatures

Step Description	Approver	Date
System Policy Oversight Committee	Terri Fries: Document Mgmt Spec	5/20/2024
Mgr Trauma Program	Sarah Helveston: Mgr Trauma Program	5/20/2024
Document Owner	Kerry Kole: Medical Director	5/17/2024

Applicability

Munson Medical Center

Standards

No standards are associated with this document

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Last Revised	2/20/2024	Tags	Procedure
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Trauma Team Roles

Purpose

To define the number, type, positions and responsibilities of the trauma team members in order to facilitate an orderly, complete and cooperative response to the injured patient.

Role and Responsibilities

The responsible parties are to know and carry out their duties as defined below. Cooperation, support, and communication among team members is essential to an effective resuscitation of the injured patient.

Emergency Department (ED) Physician

A. **Responsibilities:**

1. Cooperates with the ED charge nurse in defining trauma team activation level, possible need to upgrade level of activation, need for trauma surgeon consultation.
2. Dons required protective gear; enforces use of protective gear by trauma team.
3. Coordination of care until the trauma surgeon arrives and assumes care.
4. Gives report to the trauma surgeon and/or Advanced Practice Provider (APP) if they were not present for Emergency Medical Services (EMS) arrival
5. Assesses airway; secures the airway if needed; identifies need for anesthesiologist consultation.
6. Performs the primary and secondary surveys as needed, and is the physician of record for procedures done by the trauma APP in the absence of the trauma surgeon.

Trauma Surgeon (Team Leader)

A. **Responsibilities:**

1. Arrive at the bedside within the time limits set by the trauma team activation policy.
    a. Level I: 15 min. Level II: 60 min.
2. Inform the scribe nurse of arrival so that time is recorded on the trauma flow sheet.
3. Dons required protective gear and enforces the use of protective gear by other trauma team members.
4. Receives report from EMS, the ED physician (EDP), or the trauma APP and assumes responsibility for patient care.
5. Directs and coordinates care among team members and controls people and noise in the room.
6. Identifies consultants who need to be called.
7. Directs or assists the trauma APP with procedures; is the physician of record for procedures done by the trauma APP in his/her presence.
8. Approves the release of trauma team members when no longer needed
9. Communicates status of patient to family.
10. Communicates with EDP decision to downgrade/upgrade.
11. Decides when to stop MTP.
12. Communicates with operating room (OR) to release room.

Trauma APP

A. **Responsibilities:**

1. Informs scribe nurse of arrival so that arrival time is recorded on the trauma flow sheet.
2. Arrival time requirement for Level I activations is 15 minutes; 30 minutes for Level II activations.
3. Dons required protective gear as necessary.
4. Performs primary and secondary surveys.
5. Obtains from EMS or ED physician, performs primary and secondary surveys, and carry out interventions as needed; reports findings to scribe and trauma team leader.
6. Orders necessary tests and diagnostics.
7. Performs FAST Exam.

Primary Nurse/Scribe

A. **Responsibilities:**

1. Document pre-hospital report information on the Munson Medical Center (MMC)

trauma flow sheet.

2. Dons required protective gear and enforces the use of protective gear by other trauma team members.
3. Documents arrival times of all trauma team members.
4. Documents patient assessment data on the trauma flow sheet.
5. Documents procedures performed, vital signs, Glasgow Coma Scale (GCS) (hourly on Level I trauma patients, include peripheral neuro exam), and input/output (I/O) totals
6. Accompanies patient to all tests and procedures with a monitor until released by the trauma surgeon/designee.
7. Communicates with patient, family; facilitates communication among team.
8. Documents arrival of consulting physicians, or ancillary staff (social work, pharmacist).
9. Eventually assumes total care of the stable patient.
10. Prior to assuming care, handoff between primary Registered Nurse (RN) and secondary RN must occur to review patient assessment at bedside and documentation

Secondary Nurse/Bedside Nurse

A. **Responsibilities:**

1. Dons required protective gear
2. Performs primary and secondary surveys (per Trauma Nursing Core Course (TNCC)/Advanced Trauma Care for Nurses (ATCN) criteria).
3. Assists with disrobing patient, attaches electrocardiogram (ECG) monitoring leads, attaches blood pressure (BP) cuff and pulse oximeter, ensures there are two large bore intravenous (IV), and that they are functioning, ensures proper warming techniques have been instituted as needed, assists with procedures as needed.
4. Inserts nasogastric tube and Foley catheter as needed, obtains temperature, and assists primary nurse with transport to tests/diagnostics as needed.
5. Is released when trauma surgeon, designee, or primary nurse has deemed appropriate to do so.

Respiratory Therapist

A. **Responsibilities:**

1. Dons required protective gear
2. Confirms administration of oxygen, attaches pulse oximeter probe if not already done.
3. Assists with airway management; confirms airway placement of prehospital intubations by use of carbon dioxide (CO2) monitor and auscultation

4. Secures airway per hospital protocols
5. Assists with intubation at direction of EDP, anesthesiologist, or trauma surgeon
6. Confirms airway placement by auscultation and by use of CO2 monitor
7. Supplies mechanical ventilator and set up as directed
8. Assists with securing of nasogastric tube

ED Nursing Assistant

A. **Responsibilities:**

1. Dons required protective gear
2. Assures personal protective equipment (PPE) and lead is available to staff outside trauma room door
3. Assists with:
    a. Clothing removal
    b. Attaching vital sign monitoring equipment,
    c. Acquiring necessary equipment if not readily available
    d. Ensure level I fluid warmer available and ready for use
    e. Transport of patient to necessary tests/diagnostics
    f. Sending fluid samples to laboratory
    g. Clean up and restocking of room once resuscitation is complete

ED Paramedic

A. **Responsibilities:**

1. Dons required protective gear
2. Assures PPE and lead is available to staff outside trauma room door
3. Can assume same role as secondary or bedside nurse

Laboratory Personnel/Phlebotomist

A. **Responsibilities:**

1. Dons required protective gear
2. Obtains trauma panel as per protocol (utilizes I-STAT for all level I traumas when appropriate)
3. Obtains other needed lab studies
4. Performs 12 lead ECG

Anesthesia Services

A. Anesthesia services must be available within 15 minutes of request.

1. This response applies to all ED, OR, and inpatient requests.

B. The attending anesthesiologist must be present within 30 minutes of request for all operations.

ED Unit Clerk

A. **Responsibilities:**

1. Reports to the trauma room once activation has been initiated.
2. Logs into computer prior to patient arrival.
3. Moves patient to bed in computer if registration has not done so.
4. Notifies staff of patient arrival via overhead paging system.
5. Orders all tests as instructed by emergency department physician, trauma surgeon, or trauma APP
6. Communicates with radiology staff to coordinate timing of Computed Tomography (CT) scans or other radiological tests.
7. Notifies blood bank of need for blood products

Radiology Technician

A. **Responsibilities:**

1. Dons required protective gear
2. Ensures that appropriate film cassettes are available and ready for use; processes the films taken as ordered by the physician.
3. Does not leave until released by the trauma team when no longer needed during the resuscitation phase

Registration Clerical Staff

A. **Responsibilities:**

1. Reports to trauma bay when trauma has been activated.
2. Obtains patient information from EMS and verifies with patient if able, or with family when present.
3. If patient is unresponsive or unable to verify information and there is no family available, the patient is registered as a "Doe" until family is available to identify patient.
4. Applies identification band to patient, prints patient identification labels and chart
5. Applies labels to chart.
6. Updates patient information once patient has been stabilized.

Procedure

Standards of Nursing Care

A. Obtain pre-hospital report and document on the trauma flow sheet
    1. Mechanism of injury
    2. Medications, medication allergies, tetanus status
    3. Vital signs to include at least BP, heart rate (HR), respiratory rate (RR), GCS
    4. Field assessment of injuries
    5. Arrival time to ED

B. For transferred patients, obtain report from referring facility and record:
    1. Mechanism of injury
    2. Medication and allergy information, tetanus status, next of kin notification
    3. Time of arrival and vital signs on arrival at first facility and at time of telephone report
    4. Initial diagnostic studies and impression
    5. Initial laboratory test results
    6. Procedures performed, type and volume of resuscitation fluids administered, any medications administered
    7. Estimated time of arrival to Munson ED

C. Spinal precautions are to be maintained on all patients until cleared by EDP, trauma surgeon, or trauma APP. Bed is to remain straight at all times. If patient clinically requires the head of bed elevated, use reverse Trendelenburg. Do not create a bend in the patient.

D. Auscultate breath sounds and monitor respiratory rate and effort, observe pulse oximeter readings

E. Have suction available with attached yankauer tip

F. Maintain ECG monitoring throughout stay in emergency department, diagnostic areas, and during transport to definitive care

G. Record initial vital signs; repeat and record vital signs every five minutes or as frequently as needed report findings to scribe and notify team leader if readings are abnormal compared to norms for patient age

H. Perform a brief neurologic examination including level of consciousness, pupillary reactions, and limb movement and sensation. Document the results of these exams.

I. Monitor and actively maintain thermal homeostasis in trauma patients
    1. Warmed IV fluids
    2. Warmed Blankets
    3. Bair Hugger™

4. Set up and infuse all blood components on appropriate warmers

J. Monitor patient for changes in neurological status and offer emotional support as appropriate. Orient patient to surroundings and procedures.

K. Assess for pain and treat accordingly. Remind team leader of the need for analgesics.

L. Assess for anxiety and administer appropriate medications as per the team leader

M. Do not insert a urinary catheter if there is blood at the meatus or perineal bruising.

N. Record strict I/O (blood products and IVF included). Document in EHR (non MTP patients) when time allows.

O. Document medications in EHR (non MTP patients) when time allows

P. Provide patient's family with timely reports on patient's status and allow them to visit as soon as possible. Family members may be present during resuscitation at the discretion of the team leader.

Q. Never throw away clothing that has been removed from the patient, unless team leader instructs you to do so and family and/or law enforcement allows.

R. Always accompany the patient to the next definitive care area within the hospital after a complete handoff report has been provided to the care provider.

S. **If ED paramedic is present, NA may be excused.**

Document ID: 038.P001

Approval Signatures

Step Description	Approver	Date
System Policy Oversight Committee	Terri Fries: Document Mgmt Spec	2/20/2024
Mgr Trauma Program	Sarah Helveston: Mgr Trauma Program	2/15/2024
Document Owner	Kerry Kole: Medical Director	2/14/2024

Applicability

Munson Medical Center

Standards

No standards are associated with this document

Status **Active** PolicyStat ID **19277028**

Origination	3/20/2012	Owner	Christine Peplinski: Mgr Stroke Program
Last Approved	11/12/2025	Area/ Department	Nursing
Effective	11/12/2025	Applicability	MMC
Last Revised	11/12/2025	Tags	Guideline
Next Review	11/11/2028		

Stroke Care

Purpose

To provide a process for stroke care.

Background

The vision of the stroke care program is to reduce the incidence of stroke in Northern Michigan through public education and to optimize quality outcomes through collaboration and innovation.

The mission of the stroke program at Munson Medical Center (MMC) is to deliver the best evidence-based care to the patient with a stroke according to the guidelines established by the American Stroke Association.

Scope

The scope of the services is for patients who are 18 years of age and older presenting to the Emergency Department (ED) with acute stroke-like symptoms within 24 hours of last known well. Patients with acute stroke symptoms who arrive within 4.5 hours of last known well are considered for thrombolytic. Patients presenting with acute stroke symptoms with a last known well of 24 hours or less may be considered for neurointervention.

Policy

Stroke Team

A. **Core stroke team members**: The role and responsibilities of these members are to oversee the stroke program, this includes program compliance with evidence-based practice guidelines for

stroke and close monitoring of stroke metrics for process improvement opportunities with reporting to the Stroke Interdisciplinary Team.

1. ED Medical Director
2. Medical Director of the Stroke Program
3. Director of the Endovascular Stroke Program
4. Neurocritical Care Lead Provider
5. Stroke Program Lead Advanced Practice Provider
6. Nursing Director Critical Care and Stroke
7. Stroke Program Manager
8. Stroke Program Clinical Coordinator

B. **Acute Stroke Team members**: If a patient has an apparent stroke and symptom onset is less than 24 hours, the triage or ED charge nurse will notify the stroke team members by the use of the Stroke Protocol Burst Page.

1. ED physicians
2. ED charge registered nurse (RN)
3. ED staff nurses

C. **Ad hoc stroke team member**:

1. Stroke Neurology
2. Neuro-interventionalist on call.
3. Neurosurgery Advanced Practice Provider (APP) working with the Neuro-interventionalist

Procedure

Triage ED Nurse

A. The triage nurse will identify patients with focal neurological complaints with an onset of less than twenty-four CT hours and complete a focused neurological examination.

1. Subjective focal neurological complaints include:
    a. Aphasia
    b. Ataxia
    c. Cranial nerve palsy
    d. Dysarthria
    e. Diplopia
    f. Hemiparesis
    g. Sensory loss
    h. Visual field deficits

2. Alternatively, the ED charge nurse may be alerted by Emergency Medical Services (EMS) about an incoming patient with focal neurological complaints.

Initial Management

A. The patient is quickly assessed by a provider.

B. Routine orders may be initiated by nursing staff:

1. Complete vital signs, Pulse Oximetry
2. Peripheral intravenous (IV), oxygen, cardiac monitor
3. Bedside glucose
4. Labs: complete blood count (CBC) with diff, prothrombin time (PT)/partial thromboplastin time (PTT), basic metabolic, international normalized ratio (INR), Troponins, Magnesium Level, Phosphorus, Hepatic function, fibrinogen level, Urinalysis, Pregnancy test (serum) if female is of childbearing age
5. Electrocardiogram (EKG)

C. Patients should remain on strict no orals (NPO) while in the ED unless they successfully pass the bedside swallowing screen completed by the nursing staff. The nursing staff will document the results of the screening. This should be done for all stroke and suspect stroke patients.

D. If indicated, nasogastric (NG) tubes, urinary (Foley) catheters, and arterial lines should be placed before thrombolytic administration.

E. Evaluation will be performed by an ED provider including history, physical, and neurological exam. The National Institute of Health Stroke Scale (NIHSS) will be completed. Evaluation will be facilitated by using the "Stroke Protocol Resource Packet" located in designated areas. The stroke packet consists of an Inclusion/Exclusion Thrombolytic Checklist, Stroke Candidate Process Flow, NIHSS Documentation, Swallow Screen, Stroke Alert Nurse Checklist, Talking Points for Stroke/Thrombolytic for Acute Stroke Patient Fact Sheet, stroke neuro checklist and vital sign documentation flow sheet.

F. Blood pressure (BP) management before thrombolytic;

1. If a potential candidate for thrombolytic has a systolic BP greater than 180 or a diastolic BP greater than 105 for more than two or more readings 5-10 minutes apart, the medical management will be found in the ED Stroke PowerPlan or the Stroke MRT PowerPlan.
2. If one of these does not bring the systolic BP less than or equal to 185, and the diastolic BP less than or equal to 110, the patient will no longer be considered a thrombolytic candidate.
3. Post Thrombolytic BP management may include Vasopressors (see attached guideline) when ordered. BP parameters post thrombolytic less than 180mmHg systolic for the first 24 hours after administration of thrombolytic.

G. For ischemic stroke patients who will not receive thrombolytic:

1. BP treatment should be withheld unless systolic BP is greater than 220 mmHg or

diastolic BP is greater than 120 mmHg, as long as there are no concomitant medical conditions requiring treatment (e.g. aortic dissection)

2. BP management may include vasopressors when ordered. (See attached guideline.)

Imaging

A. A non-contrast head Computed Tomography (CT) scan should be performed within 20 minutes of arrival at the ED. As soon as the patient is identified as a potential thrombolytic and or thrombectomy candidate the physician or nursing staff will notify the charge nurse. The clerk will convey this information to the CT radiology department for CT scanning by the Burst Page and/or ED PowerPlan.

B. The head CT should be read by a qualified radiologist within 35 minutes of the patient's arrival.

C. CT angiogram imaging will be performed on patients presenting with acute stroke symptoms with a last known well of less than 24 hours.

D. CT Perfusion imaging will be completed on those patients presenting with acute stroke symptoms with a last known well of less than 24 hours.

Endovascular Intervention

A. If the patient has a last known well time of less than 24 hours and Computed Tomography Angiography (CTA)/Computed Tomography Perfusion (CTP) suspicious for large vessel occlusion (LVO) consultation with the Neuro-interventionalist takes place.

B. A decision is made by the neuro-interventionalist for potential endovascular intervention candidacy. The ED provider and/or the Neurosurgical APP relay pertinent information to the neuro-interventionalist.

C. Once a decision is made for intervention an Interventional Radiology (IR) Stroke page is called notifying the IR team of a patient in the ED or nursing unit.

D. Written consent is obtained. The consent contains the risks and benefits of intervention.

E. Hand-off is completed between IR and ED.

F. Post procedure the patient is admitted to the Intensive Care Unit (ICU).

G. Monitoring post procedure:

1. Vital signs will be obtained and recorded every 15 minutes for 2 hours, then every 30 minutes for 6 hours, then every hour for 16 hours.
2. Swallow screen: This will be performed before any oral intake.
3. Neurological checks: These will be performed and documented by nursing staff using the Stroke Protocol Packet (6910). Neurological checks will be completed with the same frequency as vital signs as indicated above.
4. The patient will be observed for signs of intracerebral hemorrhage (ICH), including neurological worsening, decreasing mental status, acute hypertension, nausea, vomiting, diaphoresis, or new headache.
5. The patient will require an ICU bed.

Determining Candidacy for Thrombolytic

A. The emergency physician will review all labs and EKG and repeat a brief neurological assessment. Findings are reviewed with the patient and family members.

B. The Inclusion/Exclusion Checklist is completed by the physician for eligible candidates.

C. ***Obtaining consent***

1. The potential benefits and risks of thrombolytic therapy will be discussed with the patient and family members. The risk of ICH and other bleeding will be specifically discussed. Documentation of the discussion and the final decision of the patient/family are adequate and written consent is not necessary.

D. ***Administration of Thrombolytic***

1. In appropriate patients, the goal is tenecteplase administration within 45 minutes of arrival. The thrombolytic will be obtained and mixed by the pharmacist according to the manufacturer's instructions. Actual weight will be obtained when possible.
    a. A peripheral IV should be placed before tenecteplase administration; preferably an 18 gauge in the antecubital.
    b. Type and screen should be sent to all patients receiving thrombolytic.
    c. Patient should be on bed rest except for assisted use of the bedside commode 24 hours after infusion.
    d. No IM injections for 24 hours after administration
    e. If a subcutaneous injection is prescribed (e.g. insulin), pressure should be held at the site for 10 minutes.
    f. Medications: Withhold any anticoagulant or drugs that have a predominant effect on platelets.
2. Following thrombolytic administration, no nasogastric tube, foley catheter, or invasive lines/procedures for 24 hours unless clinically indicated.

E. ***Monitoring during and after thrombolytic administration***

1. **Vital signs**
    a. BP will be obtained and recorded every 15 minutes for 2 hours, then every 30 minutes for 6 hours, then every hour for 16 hours.
    b. The physician will be notified immediately if systolic BP is greater than 180 or less than 120, diastolic BP is greater than 100 or less than 60, HR is greater than 120 or less than 50, or respiratory rate is greater than 24.
2. **Swallow screen**: This will be performed before any oral intake.
3. **Neurological checks**: These will be performed and documented by nursing staff using the thrombolytic flow sheet. Neurological checks will be done with the same frequency as vital signs as indicated above.
4. The patient will also be observed for **signs of ICH**, including neurologic worsening, decreasing mental status, acute hypertension, nausea, vomiting, diaphoresis, or new

headache.

5. The patient will be observed for other **signs of bleeding and adverse drug reactions**: gingival oozing, ecchymosis, petechiae, bleeding at IV or arterial puncture sites, abdominal/flank pain, hemoptysis, hematemesis, shortness of breath (SOB)/rales/rhonchi, arrhythmias, or anaphylaxis (angioedema).
6. The patient will require an ICU bed.
7. The thrombolytic flow sheet will be handed off to the receiving unit.

F. ***BP management after thrombolytic administration***

1. BP **should** be maintained at systolic BP less than 180mmHg, diastolic BP less than 105mmHg
    a. **If systolic BP greater than 180 or diastolic BP greater than 105 mmHg follow the medical management in the ED Stroke PowerPlan or Stroke MRT PowerPlan.**
    b. **If diastolic BP is greater than 140 for two or more readings 5 -10 minutes apart follow the medical management in the ED Stroke PowerPlan or Stroke MRT PowerPlan.**

G. ***Management of bleeding complications***

1. For active bleeding from arterial or venous puncture sites, apply direct mechanical pressure.
2. For any suspected severe or life-threatening hemorrhage, immediately notify the provider.
3. **For suspected ICH (decreasing level of consciousness (LOC), neurological worsening, acute hypertension, nausea, vomiting, or new headache):**
    a. Obtain immediate CT head
    b. Redraw STAT labs: type and cross (if not already drawn), PT, PTT, platelet count, and fibrinogen.
    c. Arrange for cryoprecipitate from the blood bank.
4. **If ICH present:**
    a. Consider giving cryoprecipitate.
    b. Consult Neurosurgery
    c. Consider Hematology consult
    d. Consider serial head CT to assess progress
5. For severe non-neurological hemorrhage, obtain appropriate imaging, correct thrombolytic state, and obtain appropriate medical or surgical consult.

H. ***Disposition***

1. Patients who have received thrombolytic will be admitted to an ICU bed.
2. Hemodynamically unstable patients will be admitted to an ICU bed.

3. All other acute stroke patients, other than those patients who are admitted with palliative care, will be admitted to a monitored bed preferably on A7.

I. ***Monitoring of Thrombolytic Data***

1. Meetings to review thrombolytic cases are scheduled.
2. Team members include Stroke Neurology, ED Physician Champion, Stroke Program Manager, Stroke Coordinator, ED Manager, ED Educator, EMS, and others as appropriate.
3. The team reviews and discusses cases with designated follow-up to practitioners who were involved in the care.

Hemorrhagic Stroke

A. If non-traumatic hemorrhagic stroke is suspected, initial management is similar to acute ischemic stroke: IV access, oxygen, cardiac monitor, and labs (CBC, PT/PTT), with Type & Screen sent on all anticoagulated patients. Physician assessment and CT head should be performed with the same urgency (i.e. within 20 min arrival) as non-hemorrhagic stroke.

B. Patients on anticoagulation or anti-platelet agents, see the Emergent Reversal of Anticoagulated Patients Protocol.

C. ***BP control***

1. Patients presenting with a systolic BP of 150 to 220 mmHG, acute lowering of systolic BP to 140 mmHG is safe. Goal blood pressure recommendations per Stroke Neurology, Neurocritical Care and or Neurosurgery service.

D. ***Swallow Screen***

1. Patients should remain on strict NPO while in the ED unless they successfully pass the bedside swallowing screen which is completed by the nursing staff. The nursing staff will document the results of the screening. This should be done for all stroke and suspect stroke patients.

E. ***Neurosurgery consultation***

1. Any surgical management, intracranial pressure monitoring, and further medication management will be based on neurosurgery recommendations.

F. ***Neurocritical Care consultation***

1. Provide recommendations for care and treatment as needed.

G. ***Monitoring***

1. Assess for electrolyte abnormalities, seizures, vasospasms, and signs of neurological change.
2. Consider repeat CT scans to monitor ongoing bleeding and other complications.

H. ***Disposition***

1. Patients with hemorrhagic stroke will be admitted to the ICU or A7 Stroke Unit unless palliative care/end-of-life is requested by the family or patient advocate.

2. For patients with a new hemorrhagic stroke that is felt to be of aneurysmal origin (i.e. subarachnoid hemorrhage [SAH]) the Neuro-interventionalist on call will be consulted.

Document ID: 070.G027

Attachments

Inpatient ICH Process.docx

Vasopressor in AIS protocol Final.docx

Approval Signatures

Step Description	Approver	Date
System Policy Oversight Committee	Terri Fries: Document Mgmt Spec	11/12/2025
Dir Nursing Critical Care & Stroke	Brendan Franklin: Dir Nursing Critical Care & Stroke	11/11/2025
Mgr Nursing Services	Kirsten Scott: Mgr Nursing Services	11/11/2025
Document Owner	Christine Peplinski: Mgr Stroke Program	11/10/2025

Applicability

Munson Medical Center

Standards

No standards are associated with this document

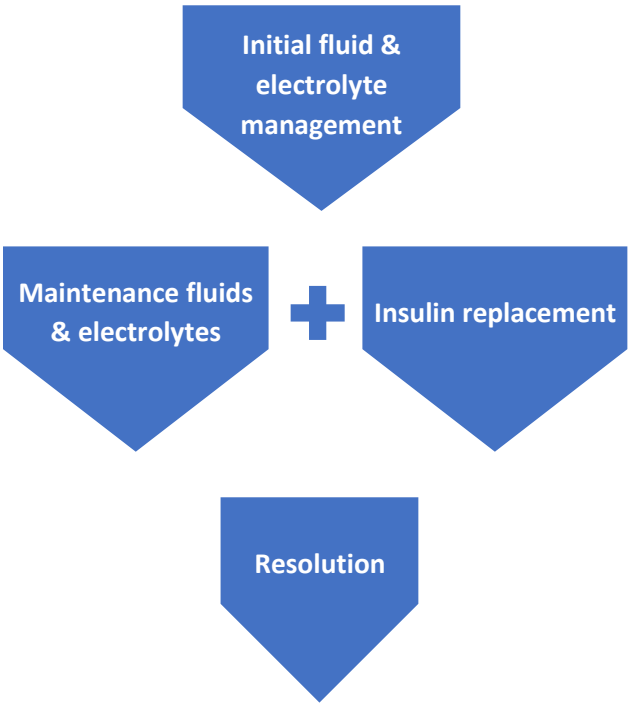
Reference Text:

Diabetic Ketoacidosis (DKA); Adult

This power plan is intended for use in individuals 22 years of age and up. It may also be used in individuals 18-21 years of age if care will not be primarily directed by a pediatric hospitalist (i.e. community hospital admissions, ICU-level care).

Last updated: 4/3/2024

I. DKA TREATMENT SUMMARY – QUICK REFERENCE



Initial Management
- Fluid resuscitation
- Electrolyte replacement

Acidosis Treatment
- **Two-bag method**
- Continuous insulin infusion

Transition to Subcutaneous Insulin
- **Requires 2-hr overlap with IV insulin**
- Upon DKA resolution
- Resumption of diet

Quick Reference for Nursing

Regular insulin (IV)

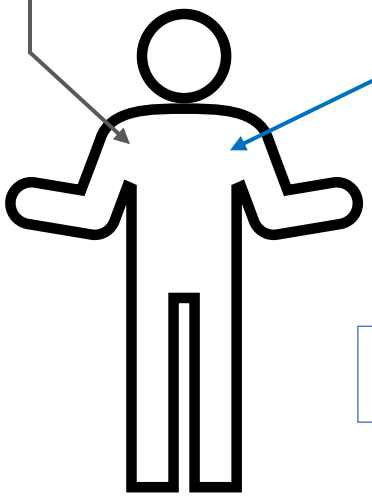
Q1H BG

0.9% NaCl or 0.45% NaCl ± 20 mEq/L KCL

D10 + 0.45% ± 20 mEq/L KCL

Clinical Scenario		Action Required
-	**…Default rate (no bolus, no titration)**	**Infuse at 0.1 unit/kg/hr**
IF	…BG 71-99 mg/dL	-PAUSE INSULIN- *Check BG Q15min until >100. To resume insulin, ensure Bag 2 is running at full rate*
IF	…BG ≤ 70 mg/dL or symptomatic HYPOglycemia	-PAUSE INSULIN- *Follow hypoglycemia protocol. To resume insulin, ensure Bag 2 is running at full rate*
IF	…Patient has persistent or recurrent HYPOglycemia	-CALL PROVIDER- *May consider decreasing insulin rate to 0.05 unit/kg/hr*
IF	…BG does NOT decrease by ≥100 mg/dL within the first two hours	-CALL PROVIDER- *May consider increasing insulin rate to 0.15 unit/kg/hr*
IF	…Potassium < 3.3 mmol/L	-PAUSE INSULIN & CALL PROVIDER- *Replace potassium per DKA electrolyte replacement protocol*

Blood glucose (mg/dL)	DKA Bag 1 rate (mL/hr)	DKA Bag 2 w/Dextrose rate (mL/hr)	TOTAL rate (mL/hr)
STANDARD			
BG >250	250	0 (zero)	250
BG 150-250	125	125	250
BG < 150	0 (zero)	250	250
FLUID RESTRICTED			
BG >250	125	0 (zero)	125
BG 150-250	75	125	200
BG < 150	0 (zero)	250	250



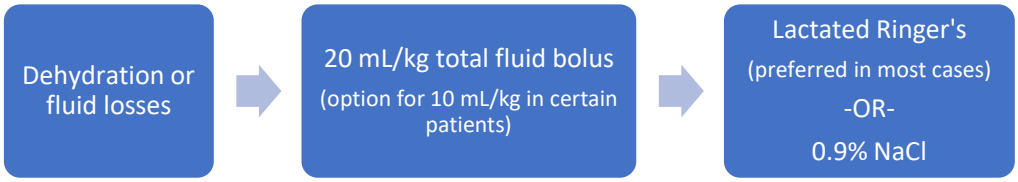
Potassium Level (mmol/L)	Parenteral (as potassium chloride IVPB)
< 3.3	Total dose: 80 mEq over minimum of 4 hours, *AND* 1. PAUSE insulin 2. Call provider to discuss before resuming
3.3 - 3.5	Total dose: 60 mEq over minimum of 3 hours
3.6 - 3.9	Total dose: 40 mEq over minimum of 2 hours
4 - 5.2	Total dose: 20 mEq over minimum of 1 hour
> 5.5	Call provider

Q4H BMP+ Mg + Phos

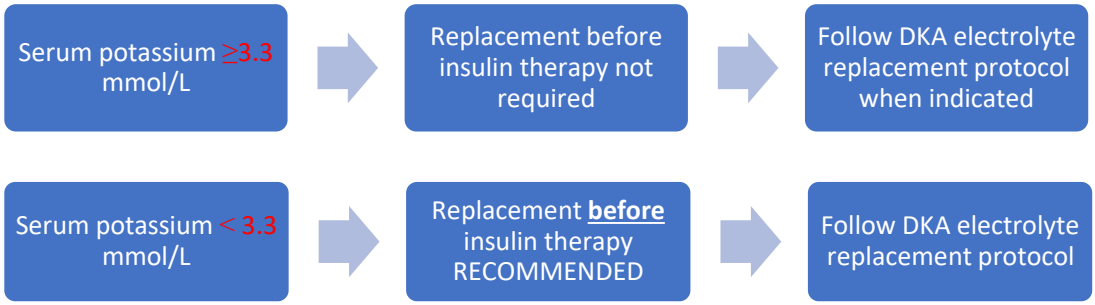
PLUS magnesium + phos replacement

II. DKA TREATMENT DETAILS

A. INITIAL FLUID MANAGEMENT:



B. INITIAL ELECTROLYTE REPLACEMENT:



C. IV INSULIN INFUSION

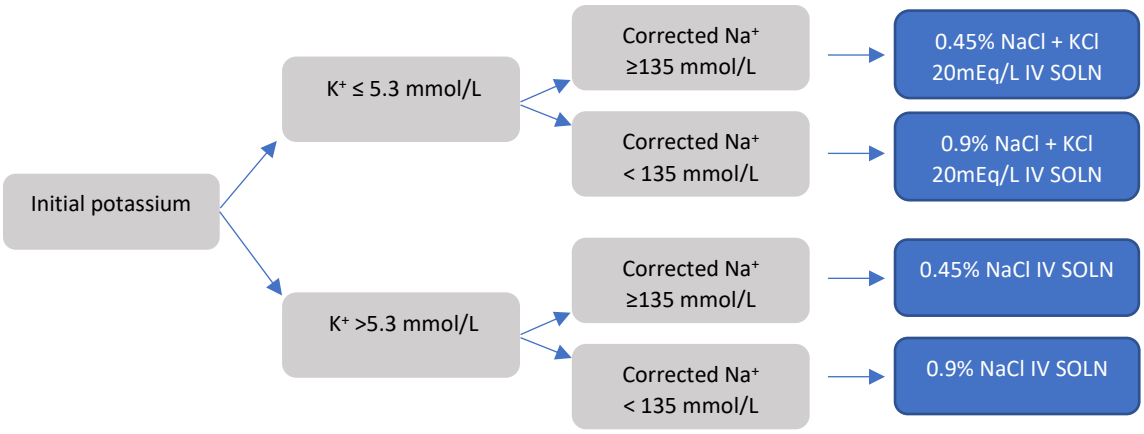
Clinical Scenario		Action Required
-	**…Default rate (no bolus, no titration)**	**Infuse at 0.1 unit/kg/hr**
IF	…BG 71-99 mg/dL	-PAUSE INSULIN- *Check BG Q15min until >100.* ***To resume insulin, ensure Bag 2 is running at full rate***
IF	…BG ≤ 70 mg/dL or symptomatic HYPOglycemia	-PAUSE INSULIN- *Follow hypoglycemia protocol.* ***To resume insulin, ensure Bag 2 is running at full rate***
IF	…Patient has persistent or recurrent HYPOglycemia	-CALL PROVIDER- *May consider decreasing insulin rate to 0.05 unit/kg/hr*
IF	…BG does NOT decrease by 100 mg/dL within the first two hours	-CALL PROVIDER- *May consider increasing insulin rate to 0.15 unit/kg/hr*
IF	…Potassium < 3.3 mmol/L	-PAUSE INSULIN & CALL PROVIDER- *Replace potassium per DKA electrolyte replacement protocol*

D. TWO-BAG MAINTENANCE FLUIDS:

DKA Bag 1 and DKA Bag 2 w/Dextrose are connected to two different IV pumps and connected to each other via Y-site to be administered through one IV line.

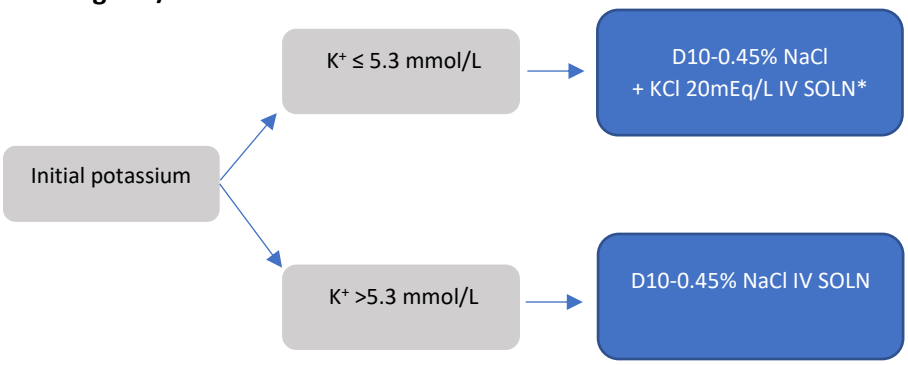
Provider to order bag 1 and bag 2 at same time as insulin drip, according to initial electrolytes:

DKA Bag 1



Corrected serum sodium = Na + 0.016(blood glucose – 100)*

DKA Bag 2 w/ Dextrose



***Solution requires compounding by pharmacy. If pharmacy unavailable to compound, may utilize D10/0.45 NaCl with electrolyte replacement per protocol.**

Bag 1 & 2 titration

1. Standard rate

Blood glucose (mg/dL)	DKA Bag 1 rate (mL/hr)	DKA Bag 2 w/Dextrose rate (mL/hr)	TOTAL rate (mL/hr)	Functional Dextrose
BG >250	250	0	250	0%
BG 150-250	125	125	250	5%
BG < 150	0	250	250	10%

2. Fluid restriction

Blood glucose (mg/dL)	DKA Bag 1 rate (mL/hr)	DKA Bag 2 w/Dextrose rate (mL/hr)	TOTAL rate (mL/hr)	Functional Dextrose
BG >250	125	0	125	0%
BG 150-250	75	125	200	6.25%
BG < 150	0	250	250	10%

E. ONGOING ELECTROLYTE REPLACEMENT (SEE **APPENDIX 1**)

1. Nurse to order and replace per *DKA Electrolyte Replacement Protocol using the Nursing – DKA Electrolyte Replacement care set*. **If patient not eligible for replacement protocol, provider to order all electrolyte replacement.**

F. TRANSITION TO SUBCUTANEOUS INSULIN

1. Patients will be transitioned from IV insulin to long-acting subcutaneous (basal) insulin when ALL of the following criteria are met:
    a. pH > 7.3
    b. Anion gap < 12
    c. Serum bicarbonate > 15
    d. Blood glucose < 200
    e. Beta-hydroxybutyrate < 5 or trending down
    f. Patient is tolerating PO and ready to resume full diet
2. Nurse to call provider when criteria are met to help facilitate transition to next step in DKA management.
3. **Continue insulin infusion and IV fluids for TWO hours after administration of subcutaneous long-acting (basal) insulin.**

III. DKA TREATMENT RATIONALE

A. Definitions

1. Diabetic ketoacidosis (DKA): An acute metabolic complication of diabetes. DKA is characterized by metabolic acidosis and ketone body derangements (e.g., ketosis) resulting from a profound or absolute lack of insulin in the body. Though hyperglycemia is usually associated with DKA, a minority of patients with DKA will have euglycemia (normal blood glucose).
2. Two-bag system: An approach to DKA management that uses two maintenance fluid solutions (one WITH and one withOUT dextrose), allowing insulin to run at a set rate. In clinical trials, the two-bag system has led to faster DKA resolution, less hypoglycemia, and faster anion gap closure compared to conventional (i.e., methods with insulin titration) approaches.

Table 1. Common diagnostic criteria for DKA. Adapted from *Diabetes Care*. 2009;32(7):1335-1343.

	DKA		
	Mild	***Moderate***	***Severe***
Glucose (mg/dL)*	>250	>250	>250
Arterial pH	7.3 to 7.25	7.24 to 7	<7
Serum bicarbonate (mEq/L)	18 to 15	15 to 10	<10
Urine ketones	Positive	Positive	Positive
beta hydroxybutyrate (mmol/L)	3 to 4	4 to 8	>8
Anion gap	>10	>12	>12
Mental Status	Alert	Alert/drowsy	Stupor/coma

*Blood glucose may be normal in patients with *euglycemic DKA.*

B. Initial fluid & electrolyte management

1. Fluid resuscitation: Patients with DKA frequently present with significant dehydration from GI losses and decreased oral intake. Many of these patients will require IV fluids prior to insulin initiation.
    a. Aggressive fluid resuscitation with 0.9% NaCl may cause renal tubular acidosis. In prospective clinical trials, this has been shown to cause or worsen acidemia and hyperkalemia, leading to increased incidence of AKI and need for renal replacement therapy.[1-4]
    b. The use of a balanced crystalloid such as Lactated Ringer's (LR) solution may be preferred for DKA management. *Prospective clinical data show that use of balanced crystalloids lead to faster time to DKA resolution and faster time to IV insulin discontinuation compared to 0.9% NaCl.*[5,6]
    c. Despite theoretical concerns, LR is NOT contraindicated in hyperkalemia, acute renal failure, or lactic acidosis, and is indeed preferred over 0.9% NaCl in these settings.
    d. Relevant contraindications to LR may include elevated intracranial pressure, metformin-associated lactic acidosis, overt liver failure, and severe hypercalcemia.
2. Electrolyte replacement: Correction of electrolyte derangements, especially hypokalemia, is recommended prior to the initiation of insulin. Since insulin therapy will decrease potassium further, the cutoffs for potassium replacement are *higher* in DKA compared to other diseases. *Serum potassium levels < 3.3 mmol/L should be repleted before insulin is started.* See **Appendix 1** for more information.

C. IV insulin infusion

1. IV insulin is required to correct the underlying pH abnormalities in DKA. Insulin secondarily lowers blood glucose when elevated.
2. As opposed to a one-bag system, *the two-bag system for DKA treatment does NOT require insulin titration.* Boluses of IV insulin are NOT recommended with the two-bag system.

D. Two-bag maintenance fluids

1. Treatment of DKA with the two-bag system has been tested in prospective, randomized clinical trials in adults.[7,8] Pertinent findings include:
    a. Faster normalization of blood pH
    b. Faster closure of the anion gap
    c. Fewer instances of significant hypoglycemia
    d. Less IV insulin administered in total
    e. No increase in length of hospital stay
2. Standard nomenclature will be adopted throughout MHC for the naming of Bag 1 and Bag 2 on labels and smart pump infusion devices:
    a. Bag 1: "DKA Bag 1"
    b. Bag 2: "DKA Bag 2 w/Dextrose"
3. ***DKA Bag 1 and DKA Bag 2 w/Dextrose are connected to two different IV pumps & connected to each other via Y-site, to be administered through one IV line.***
4. There are four (4) options for DKA Bag 1. The choice between these four options is dependent on:
    a. Initial serum potassium, **and**
    b. Corrected serum sodium
5. There are two (2) options for DKA Bag 2 w/Dextrose. The choice between the two may be dependent on either initial or subsequent serum potassium levels.
6. Maintenance fluid titration:
    a. Standard: the total, combined rate of DKA Bag 1 and DKA Bag 2 w/Dextrose is always equal to **250mL/hr.** The specific rates of Bag 1 or Bag 2 will be titrated by nursing per hourly glucose measurement.
    b. Fluid restriction: the total, combined rate of DKA Bag 1 and DKA Bag 2 w/Dextrose is NOT constant. The specific rates of Bag 1 or Bag 2 will vary between 125 and 250 mL/hr and will be titrated by nursing per hourly glucose measurement.

E. Ongoing electrolyte replacement

1. Prompt recognition and treatment of evolving hypokalemia and other electrolyte derangements is crucial in DKA management, as patients frequently present with electrolyte depletion and insulin therapy may have dramatic effects on serum electrolyte balance.
2. Electrolytes will be supplemented throughout the treatment window by the nursing-driven by the DKA Electrolyte Replacement Protocol and monitored with Q4H BMP laboratory measurement.
3. See **Appendix 1** for the *DKA Electrolyte Replacement Protocol*

F. Transition to subcutaneous insulin

1. Biochemical markers: DKA resolution is marked by normalization of blood pH, anion gap, and blood glucose.
2. Symptoms: Nausea, vomiting, and pertinent GI symptoms from presentation are resolved. Patients are able to tolerate meals.

3. Transition to SQ insulin: To prevent relapse, insulin therapy **MUST** continue after the acute treatment phase. **Continue insulin infusion and IV fluids for TWO hours after administration of subcutaneous long-acting (basal) insulin.**

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APPENDIX 1: DKA ELECTROLYTE REPLACEMENT PROTOCOL

Purpose

To provide a plan for replacing potassium, magnesium, and phosphorus during the acute management of diabetic ketoacidosis in adults.

Criteria for use*

1. Patients must be monitored by continuous telemetry
2. To be used exclusively within the Adult DKA PowerPlan subsequent to a provider order
3. To be discontinued at the time of IV insulin discontinuation
4. Serum creatinine is ≤ 2.5 mg/dL and patient not on renal replacement therapy

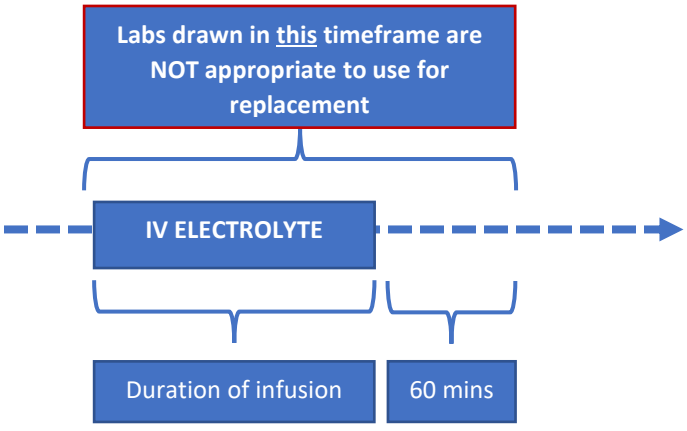
**If patient not eligible for replacement protocol, provider to order all electrolyte replacement.*

Process and Product Selection

1. Nurse to order electrolyte replacement in PowerChart based on potassium, magnesium, or phosphate protocol below.
    a. PowerChart search term: "Nursing - DKA Electrolyte Replacement"
    b. Ordering provider: "Nurse, per protocol"
2. Nurse to discontinue electrolyte replacement protocol when IV insulin is discontinued
3. Parenteral product selection will be guided by site formulary, availability, and MHC system electrolyte policies:
    a. MHC High-Alert Medications Policy
    b. Parenteral Potassium Supplementation Policy- Adult
4. Enteral administration is preferred where indicated

Monitoring

1. Scheduled BMP will be ordered for all patients every 4 hours
2. Nursing to order additional serum potassium levels as directed in *Potassium Replacement Protocol*
3. Replace electrolytes based only on appropriate serum measurements. To be an appropriate measurement, the lab draw must meet the following criteria:
    a. Lab NOT drawn during IV replacement of the electrolyte (electrolytes contained in maintenance IV fluids do not count)
    b. Lab drawn at least 60 minutes after administration of the electrolyte replacement, including oral (PO) replacement



Potassium Replacement Protocol

Replacement rate: 10 mEq/hr. If patient is monitored via continuous telemetry AND has a condition that requires more rapid supplementation, the administration rate shall not exceed 20 mEq/hr.

Potassium Level (mmol/L)	Enteral	Parenteral (as potassium chloride IVPB)	When to recheck level
< 3.3	Use IVPB replacement	Total dose: 80 mEq over minimum of 4 hours, *AND* 1. PAUSE insulin 2. Call provider to discuss before resuming	At next appropriate time until K >3.3 mmol/L *(see graphic above)*
3.3 – 3.5	Use IVPB replacement	Total dose: 60 mEq over minimum of 3 hours	At next appropriate time after replacement has finished *(see graphic above)*
3.6 – 3.9	40 mEq PO/NG x 1 dose Do not give both PO and IV replacement	Total dose: 40 mEq over minimum of 2 hours Do not give both PO and IV replacement	At next appropriate time after replacement has finished *(see graphic above)*
4 – 5.2	20 mEq PO/NG x 1 dose Do not give both PO and IV replacement	Total dose: 20 mEq over minimum of 1 hour Do not give both PO and IV replacement	At next appropriate time after replacement has finished *(see graphic above)*
> 5.5	Call provider		

Magnesium Replacement Protocol

Replacement rate: 1 gram/hour

Magnesium Level (mg/dL)	Parenteral (as magnesium sulfate IVPB)	When to recheck level
≤ 1.5	Total dose: 4 grams over minimum of 4 hours	At next appropriate time after replacement has finished *(see graphic above)*
1.6-1.9	Total dose: 2 grams over minimum of 2 hours	At next appropriate time after replacement has finished *(see graphic above)*

Phosphate Replacement Protocol

Replacement rate: 15 mmol over 1 hour

Phosphorus Level (mg/dL)	Enteral	Parenteral (as sodium phosphate IVPB)*	When to recheck level
< 1.5	K-Phos Neutral 2 tabs q2hr x3	15 mmol x3 doses	At next appropriate time after replacement has finished
1.5 – 1.9	K-Phos Neutral 2 tabs q2hr x2	15 mmol x2 doses	At next appropriate time after replacement has finished

*Solution requires compounding by pharmacy.

Owner: Pharmacy
Reviewed: 4/2024
Reference attached to: DKA IV Glucose Management order

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Pediatric Diabetic Ketoacidosis (DKA) Nursing Reference

PROVIDER DRIVEN PROTOCOL

Please contact provider for order changes

Inclusion Criteria

1. Hyperglycemia (blood glucose > 200 mg/dL)
2. Ketosis (Beta Hydroxybutyrate (BHOB) > 1 mmol/L)
3. Metabolic acidosis (venous pH < 7.3) or serum bicarbonate < 15 mEq/L

Initial Management

Initial Fluid Bolus

- 10 mL/kg bolus of 0.9% sodium chloride
- Infuse over 1 hour

Maintenance Fluids

- To be present before hanging insulin drip
- **Bag 1:** 0.9% Sodium Chloride +/- Potassium*
- **Bag 2:** Dextrose 10% / 0.9% Sodium Chloride +/- Potassium*
- *Depending on serum potassium level. See Electrolyte Abnormalities below
- When blood glucose is less than 300 mg/dL, the dextrose containing solution will need to be y-sited into the sodium chloride solution
- Fall in blood glucose should not exceed 100 mg/dL/hr
- The two bags will be titrated based on blood glucose and rate of blood glucose fall to maintain the blood glucose within goal
- Fluid entries are found in Plum Pump under "DKA Bag 1 PED" and "DKA Bag 2 w/Dextrse PED"

Insulin Drip

- Do NOT bolus insulin
- Insulin infusion should be started AFTER initial fluid bolus is complete
- Maintain insulin drip at a constant rate. If blood glucose concentration decreases too quickly (> 100 mg/dL/hr) or falls too low (< 100 mg/dL), notify provider
- Infuse as a primary line

Call provider for the following	**Laboratory monitoring**
• HR > 190 bpm or < 80 bpm • All lab results; including: ○ Potassium < 3.5 mmol/L or > 5.5 mmol/L • Mental status change • Sudden onset of headaches or worsening headaches	Every hour • Blood glucose • If blood glucose > 570 mg/dL or < 20 mg/dL, nurse to enter order for “glucose-whole blood” Every four hours • BMP, Phosphorus, pH, Beta-hydroxybuterate

Owner: Pharmacy
Updated 5.21.2024
Reference Text attached to: Nursing – Peds DKA Instructions order

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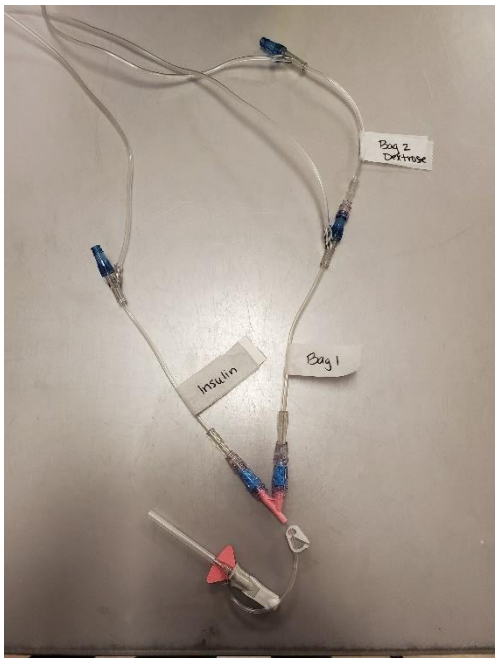
Setting up Fluids and Insulin

- Insulin must go at the site closest to the patient
- Do not Y insulin into fluids
- Fluids may be Y-sited together at one port
- Each fluid and insulin needs to be on its own pump
- Leave 2nd line empty for blood draws and intermittent IV medication administration



Fluid Management

Fluid rates to be adjusted per provider order

Fluid Deficit Calculation

a. Calculate fluid deficit from the table below

Degree of Dehydration	Fluid Deficit
Mild	5 % = 50 mL / kg
Moderate	8 % = 80 mL / kg
Severe	10% = 100 mL / kg

_____ kg x _____ mL/kg = _____ mL (a)

b. Total amount of fluid received in bolus = _____ mL (b)

c. Calculate remainder of fluid deficit: subtract (b) from (a)

Deficit from table (a) _____ mL - bolus dose (b) _____ (mL) = _____ (mL) (c)

d. Calculate maintenance fluid requirements for next 48 hours

200 mL/kg for first 10 kg

+ 100 mL/kg for next 10 kg

+ 40 mL/kg for kg greater than 20 kg

= _____ (mL) (d)

e. Calculate total fluids required for the next 48 hours: add (c) to (d) = _____ mL (e)

f. Determine hourly rate: divide (e) by 48 hours = _____ mL/hr

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Maintenance Fluid Management Guidance (to be used for titration during all phases & electrolyte abnormalities)				
Blood Glucose (mg/dL)	**% Rate from Bag 1** (Saline + electrolytes)	**% Rate from Bag 2** (Dextrose / Saline + electrolytes)	**Final Dextrose Concentration**	**Insulin Infusion Rate** (units/kg/hr)
> 300	100 %	0	0	0.1
200-300	50 %	50 %	5 %	0.1
100-200	0	100 %	10 %	0.1
< 100	Provider discretion • Decrease insulin drip rate to as low as 0.05 units/kg/hr and/or • Increase glucose infusion rate by increasing D10 fluid rate (up to 2x maintenance) or • Change to D12.5/NS at 100% total rate			

Initial Fluid Management Using the 2-Bag Method (initial 4-6 hours of management)

Bag 1: 0.9% Sodium Chloride + / - Potassium*

Bag 2: Dextrose 10% / 0.9% Sodium Chloride + /- Potassium*

*Depending on serum potassium level. See Electrolyte Abnormalities below

Fluid rates to be adjusted per provider order

Continued Fluid Management Using the 2-Bag Method (after the initial 4-6 hours of management)

Can continue using the original fluids or fluids may be changed to contain 0.45% sodium chloride instead (See Electrolyte Abnormalities section below).

Fluid rates to be adjusted per provider order

Electrolyte Abnormalities

Potassium abnormalities

- Initial serum potassium to guide maintenance fluid selection. Provider may elect to increase potassium content of maintenance fluids if patient becomes hypokalemic.
- Monitor for adequate urine output while replacing potassium

Serum Potassium	Potassium in the maintenance fluids
Greater than 5.5 mmol/L	None
3.5 – 5.5 mmol/L	20 mEq/L K-Acetate + 13.6 mmol/L K Phosphate
Less than 3.5 mmol/L *On initial assessment do not start insulin drip until K above 3.3 mmol/L	30 mEq/L K-Acetate + 20.4 mmol/L K Phosphate Anticipate this to continue even after K+ within normal limits to maintain normal levels.

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Chloride abnormalities
After initial 4-6 hours may consider changing both bags of maintenance fluids to contain 0.45% sodium chloride to decrease amount of chloride being administered.

DKA Resolution & Insulin IV to SQ Transition

Signs of DKA Resolution	
Correction of acidosis • Sodium bicarbonate >18 mEq/L • pH >7.3	Tolerance of diet • No vomiting, tolerating ice chips, appears ready to eat
Serum glucose < 300 mg/dL	BHOB < 1 mmol/mL

***There should be an overlap of at least 2 hours with intermediate- or long-acting insulin/basal insulin, but can consider shorter overlap of 1 hour with addition of rapid-acting insulin/bolus insulin per provider between administration of subcutaneous insulin and discontinuation of intravenous insulin. Exact overlap duration per provider order.

Common Calculations

Anion gap = Na – [Cl + HCO3]

Corrected sodium = Na + 1.6 [(glucose – 100)/100]

Osmolality = 2[Na] + [BUN]/2.8 + [Glucose]/18

Cerebral Edema

- Patients being treated for DKA are at high risk for development of cerebral edema
- Notify provider if any of these signs or symptoms are observed

Signs and Symptoms	Risk Factors
• Headache • Alterations in neurological status (restlessness, irritability, increased drowsiness, incontinence, deterioration of GCS) • Vomiting • Bradycardia • Hypertension • Pupillary changes	• Age < 5 years • Severe acidosis • Serum osmolality > 350 mOsm • Elevated BUN • Failure of serum sodium to rise with treatment • Large volume of rehydration fluids (> 40 mL/kg) • Use of sodium bicarbonate

General patient care, psychiatric patient

General patient care, psychiatric patient
Reviewed: February 24, 2025

Introduction

The World Health Organization reports that nearly one billion people have a form of mental illness, such as depression, anxiety, substance use disorder, bipolar disorder, schizophrenia, schizoaffective disorder, or neurocognitive disorder.[1] [2] A patient with a chronic medical condition, such as autoimmune or heart disease, hypothyroidism, or diabetes, is at increased risk for mental illness; likewise, certain mental illnesses may increase a patient's risk of developing a medical condition or of that condition worsening.

A patient with a mental illness may have a limited ability to follow treatment recommendations because the symptoms of the psychiatric disorder (such as memory loss, fear, hopelessness, or anxiety) can impact a patient's ability to adhere to treatment, and the patient may incorrectly be labeled as nonadherent. By recognizing and addressing signs and symptoms of mental illness and by ensuring that all patients—including those with mental illness—receive holistic care, nurses and other practitioners can improve patient outcomes.[2]

The following procedure provides general guidelines only.

Equipment

- Optional: facility-approved assessment tools

Implementation

- Perform self-reflection to identify any bias or negative attitude you may harbor against patients with psychiatric disorders. *Identifying biases is the first step to providing holistic care.*[2]
- Evaluate the patient's safety. Implement suicide or other precautions when indicated *to maintain patient safety*. (See the "Suicide precautions" and "Special nursing observation, psychiatric patient" and "Ligature risk assessment" procedures.)
- Use effective communication techniques *to build a relationship with the patient.*[2]
  - Introduce yourself to the patient and explain your role.[3]
  - Maintain a professional demeanor, even when faced with difficult patient behaviors.[2] (See the "Difficult behavior management" or "Violent and assaultive behavior management" procedure.)
  - Use patient-centered and gender-neutral language as appropriate. Don't make assumptions about the patient's gender or sexual orientation. Ask the patient about pronouns.[3]
  - Encourage the patient to verbalize emotions and concerns and to ask questions.[2]
  - Use active listening, and then summarize what you heard *to make sure you understand what the patient is saying.*[2]
  - Use appropriate language in all interactions *to reduce the stigma of mental illness.*[2] (See *Using language to reduce stigma*.)

USING LANGUAGE TO REDUCE STIGMA

Many commonly used words or phrases related to psychiatric illness can cause fear or marginalize patients. Be sure to choose words carefully and avoid stereotyping or labeling. Keep the following guidelines in mind:[2] [4]

- Using slang or jargon, including terms such as crazy, nuts, or psychotic, isn't appropriate. Instead, refer to the patient as having a mental illness.
- Don't use words with a negative connotation, such as addict or alcoholic. Instead, refer to the patient as having a substance use disorder.
- It's inappropriate to describe the patient as schizophrenic. Instead, describe the patient as having schizophrenia.
- Don't use the phrases "committed suicide," "unsuccessful suicide attempt," or "failed suicide attempt." Instead, use such phrases as "died by suicide" or "attempted suicide."
- Report the results of alcohol and drug screenings as negative or positive, not clean or dirty.

- Provide trauma-informed care, regardless of whether there's a known history of trauma. *Many mental illnesses are related to past trauma, such as violence, abuse, or neglect.*[5] (See *Six key principles to trauma-informed care*.)

SIX KEY PRINCIPLES TO TRAUMA-INFORMED CARE

Although providing trauma-informed care isn't a step-by-step procedure, certain principles can help you care for a patient with attention, sensitivity, and awareness. These six principles can help guide your care:

1. Safety calls for you to provide both physical and psychological safety.

2. Trustworthiness and transparency include providing privacy, confidentiality, and anticipatory guidance.

3. Peer support calls for empowering the patient rather than trying to "fix" an issue for the patient.

4. Collaboration and mutuality promote viewing the patient as an active partner in the patient's care.

5. Empowerment and choice call for you to offer choices to the patient and to respect the patient's choices.

6. Cultural, historical, and gender issues require that you address all facets of a patient's identity in a sensitive and appropriate manner.[6] [7] [8]

- Orient the patient to the equipment, the environment, and potential alarms, as needed, *to reduce confusion and anxiety*.[2]
- Modify the environment as possible and needed *to make the patient more comfortable.* Dim the lights, reduce noises, and provide other interventions that promote calm.[2]
- Use patience and compassion when confronted with frustrating behaviors.[2]
- Help orient the patient to time and place by updating patient boards, opening and closing blinds as appropriate, and giving verbal reminders, as needed.[2]
- Promote rest and sleep by limiting nighttime interruptions as able.[2]
- Assist as needed with activities of daily living.[2]
- Encourage visitation and provide familiar and comfort items as needed *to elevate the patient's mood*.[2]

- Complete facility-approved assessments for mental health concerns, including substance use and signs and symptoms of withdrawal, as indicated.[2]
- Evaluate the patient's medication regimen *to ensure the patient is receiving all necessary medications and to look for potential causes of new signs and symptoms*.[2]
- Communicate effectively within the interdisciplinary team *to advocate for the patient's needs*. Ask for assistance when needed.[2]
- Consult appropriate mental health specialists as needed and appropriate.[2]
- Document the procedure.[9] [10] [11] [12]

Special Considerations

- Remember that psychiatric illnesses range from mild to severe. Not all patients will experience psychosis or dangerous behaviors, such as aggression.[2]
- Hospitalization can exacerbate a mental illness, causing symptoms (such as hallucinations, mania, delusions, or depression) that were well-controlled before hospitalization to reappear.[2]

Documentation

Documentation associated with providing general patient care for a patient with a psychiatric illness includes:

- interventions performed
  - response to interventions
- facility-approved assessment results
- consults obtained
- teaching provided to the patient and family (if applicable)
  - understanding of that teaching
  - follow-up teaching needed.

References

(Rating System for the Hierarchy of Evidence for Intervention/Treatment Questions)

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Rating System for the Hierarchy of Evidence for Intervention/Treatment Questions

The following leveling system is adapted from *Evidence-Based practice in nursing & healthcare: A guide to best practice,* Fifth edition, by Bernadette Mazurek Melnyk and Ellen Fineout-Overholt (2023).

Level I	Evidence from a systematic review or meta-analysis of all relevant randomized controlled trials (RCTs)
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Level VII	Evidence from expert opinion, expert committee reports, and literature reviews

Data from Gyatt, G., & Rennie D. (2002). Users' guides to the medical literature. American Medical Association; Harris, R. P., et al. (2001). Current methods of the U.S. Preventative Services Task Force: A review of the process. American Journal of Preventative Medicine, 20, 21-35.

Postpartum hemorrhage management

Postpartum hemorrhage management

Revised: February 24, 2025

Critical Notes!

Although ACOG states Cytotec is contraindicated for patients with a history of previous cesarean birth, Munson Medical Center's PowerPlan includes the use of Cytotec for any postpartum hemorrhage.

Introduction

The American College of Obstetricians and Gynecologists (ACOG) defines postpartum hemorrhage as cumulative blood loss (intrapartum and postpartum) of 1,000 mL or greater or blood loss accompanied by signs or symptoms of hypovolemia within 24 hours after a cesarean or vaginal delivery.[1] This level differs from the more traditional definition of an estimated blood loss of greater than 500 mL after a vaginal delivery or greater than 1,000 mL after a cesarean delivery.[1][2] Despite this revision, blood loss of greater than 500 mL with a vaginal delivery should be considered abnormal and warrants further investigation.[1]

Postpartum hemorrhage is classified as primary or secondary. Primary postpartum hemorrhage occurs before delivery of the placenta and within the first 24 hours after delivery; secondary postpartum hemorrhage occurs 24 hours to 12 weeks after delivery. Primary postpartum hemorrhage is commonly caused by uterine atony, lacerations, retained placenta, abnormally adherent placenta (accreta), coagulation defects (disseminated intravascular coagulation), or uterine inversion.[1] Causes of secondary postpartum hemorrhage include subinvolution of the placental site, retained products of conception, infection, and inherited coagulation defects.[1]

Abnormal findings—such as heavier lochia than anticipated, displaced or boggy fundus, bladder distention, decreased urine output, blood clots, vital sign alterations (such as decreased blood pressure, increased heart rate, and increased respiratory rate), altered level of consciousness, skin changes (such as pallor, cyanosis, and clamminess), or visible vaginal hematoma or laceration—call for initiating interventions and notifying the patient's practitioner.[2][3] A facility-approved, evidence-based tool can offer help in identifying and treating postpartum hemorrhage.[4]

Equipment

- Emergency equipment (code cart with emergency medications, defibrillator, handheld resuscitation bag with mask, intubation equipment)
- Facility-approved disinfectant
- Facility-approved pain assessment tool
- Gloves
- Hemorrhage supply kit[4]
- Indwelling urinary catheter insertion kit
- IV administration set

- Oxygen delivery equipment
- Prescribed IV fluids
- Prescribed medications
- Pulse oximeter and probe
- Supplemental oxygen
- Venous blood sampling supplies
- Vital signs monitoring equipment
- Optional: blood or blood product administration set, blood products, gram scale, intrauterine balloon tamponade catheter, IV catheter insertion kit, large-bore (16G to 18G) IV catheter, list of dry weights, other personal protective equipment, prescribed pain medication, vacuum-induced postpartum hemorrhage device

Preparation of Equipment

Inspect all equipment and supplies or have another staff member assist you. If a product has expired, is defective, or has compromised integrity, remove it from patient use, label it as expired or defective, and report the expiration or defect as directed by your facility. Make sure that emergency equipment is functioning properly and readily available.

Implementation

- Gather and prepare the necessary equipment and supplies, or have another staff member assist you.
- Notify the practitioner and anticipate orders.[3]
- Verify the practitioner's order.
- Review the patient's medical record for a history of bleeding or allergies to any medications.
- Perform hand hygiene.[5][6][7][8][9][10]
- Confirm the patient's identity using at least two patient identifiers.[11]
- Provide privacy.[12][13][14][15]
- Explain the procedure to the patient and family (if appropriate) according to their individual communication and learning needs *to increase their understanding, allay their fears, and enhance cooperation.*[16]
- Raise the bed to waist level before providing care *to prevent caregiver back strain.*[17]
- Perform hand hygiene.[5][6][7][8][9][10]
- Put on gloves and, as needed, other personal protective equipment *to comply with standard precautions.*[18][19][20]
- Massage the patient's uterine fundus. Use one hand to anchor the lower uterine segment just above the symphysis while the other hand massages the fundal area.[1][21] (See the "Fundal assessment, postpartum" procedure.) As you massage, assess for clots, tissue, or both and note the amount of bleeding.[3] Quantify blood loss.[2] (See the "Quantifying blood loss, obstetric patient" procedure.)
- Request that a staff member bring a hemorrhage supply kit into or near the patient's room.[3][4]
- If not done already, activate the hemorrhage response team, as necessary, *for severe hemorrhage.*[4]
- Monitor the patient's vital signs at a frequency determined by your facility and the patient's condition.
- Ensure that the patient has adequate IV access. (See the "IV catheter insertion" procedure.) Administer IV fluids, as prescribed.[21] Consider inserting a second IV catheter if necessary.[3]
- Administer supplemental oxygen, as ordered or as directed by your facility. (Guidelines recommend 10 L/minute via oxygen face mask.)[3] (See the "Oxygen administration"

procedure.)
- Monitor the patient's oxygen saturation level by pulse oximetry *to evaluate the effectiveness of oxygen therapy.*
- Obtain venous blood samples for laboratory studies, such as type and crossmatch, complete blood count, coagulation screen, and urea, creatinine, and electrolyte levels, as ordered.[3] (See the "Venipuncture" procedure.)
- Notify the practitioner of critical test results within your facility's established time frame *so that the patient can be treated promptly.*[22]
- Perform (if permitted in your facility) or assist the practitioner with a pelvic examination and bimanual compression, as appropriate.[1][23][24][25] To perform bimanual compression, follow these steps:
  - Perform hand hygiene.[5][6][7][8][9][10]
  - Put on gloves.[18][20]
  - Place one hand inside the patient's vagina, form a fist, and push upward in the direction of the patient's anterior vaginal fornix.
  - Place your other hand on the patient's abdominal wall, and push downward behind the patient's uterus, pulling it forward and toward the symphysis pubis.
  - Press your hands together to compress the patient's uterus.
  - Maintain pressure until the patient's uterus contracts and remains retracted.[26]
- Screen for and assess the patient's pain using facility-defined criteria that are consistent with the patient's age, condition, and ability to understand.[27]
- Treat the patient's pain, as needed and ordered, using nonpharmacologic, pharmacologic, or a combination of approaches. Base the treatment plan on evidence-based practices and the patient's clinical condition, medical history, and pain management goals.[27]
- Insert an indwelling urinary catheter, if ordered, *to empty the patient's bladder and assist with more accurate intake and output measurements.* (See the "Indwelling urinary catheter [Foley] insertion, assigned female at birth" procedure.)[3]
- Monitor intake and output (including blood loss) hourly *to evaluate the patient's fluid balance.*[3]
- Administer uterotonic medication, as ordered, following safe medication administration practices and noting the medication's onset, duration, adverse effects, and contraindications.[1][3][28][29][30][31] Uterotonic medication should be the first-line treatment for postpartum hemorrhage caused by uterine atony.[1] (See *Medical management of postpartum hemorrhage*.)

MEDICAL MANAGEMENT OF POSTPARTUM HEMORRHAGE

This table presents common uterotonic drugs used to treat postpartum hemorrhage as well as administration information and nursing considerations for each drug. Note that all of these drugs may cause nausea and vomiting. Emergency medications should be available for immediate use on all obstetric units.[4]

Drug	Dose	Frequency	Pharmacokinetics	Nursing considerations
Oxytocin	10 to 40 units IV in 500 to 1,000 mL of prescribed IV solution;[1][32] 10 units IM[1]	Continuous (IV)	Onset: Immediate Duration: 1 hour	• Don't administer an undiluted rapid IV infusion, *because it may cause hypotension.*[1]

Methylergonovine	0.2 mg IM; possibly given by mouth (PO)[1]	Every 2 to 4 hours	Onset: 7 to 15 minutes Duration: 3 hours	• Don't administer if the patient is hypertensive.
Carboprost tromethamine	0.25 mg IM; possibly given intramyometrially (into the muscular wall of the uterus)[1]	Every 15 to 90 minutes; eight doses maximum	Onset and duration: Mostly unknown; peaks in 15 to 30 minutes	• Don't administer if the patient has asthma. • Use cautiously if the patient has liver, kidney, or cardiac disease.[1] • Note that diarrhea, vomiting, fever, headache, bronchoconstriction, tachycardia, and uterine rupture may occur.
MiSOPROStol	400 to 1,000 mcg sublingually[33] 600 to 1,000 mcg PO, or rectally[33]	All routes: One dose only	Peak concentration: • Sublingual administration reaches peak concentration within 30 minutes and lasts approximately 3 hours.[26] • Oral administration reaches peak concentration within 30 minutes, undergoes first-pass metabolism, and therefore has a shorter time of peak concentration (declines quickly within 2 hours) than sublingual administration.[26] • Rectal administration reaches peak	• Don't administer if the patient has a history of allergy to prostaglandins.[1] • Oral and rectal administration is not preferred as the medication has a slower onset and lower bioavailability than sublingual administration.[33] • Monitor temperature closely as pyrexia is a concern at these doses.[26]

			concentration within an hour, and has a peak concentration time of up to 4 hours.[26]	

- Administer tranexamic acid IV or by mouth, if ordered, following safe medication administration practices.[1] [28] [29] [30] [31] [34] *Tranexamic acid is an antifibrinolytic agent that inhibits clots from dissolving thereby reducing bleeding.*[26]
- Elevate the patient's legs to a 20- to 30-degree angle *to increase venous return.*
- Administer blood products, as indicated and ordered. (See the "Blood and blood product transfusion" procedure.) A massive blood transfusion may be ordered *to treat severe hemorrhage.*[1] [35] (See the "Massive blood transfusion" procedure.)

◆ ***Hospital-acquired condition alert:*** Keep in mind that the Centers for Medicare and Medicaid Services considers a blood incompatibility error a hospital-acquired condition *because it can be reasonably prevented using a variety of best practices.* Make sure to follow evidence-based practices, such as carefully identifying the patient and blood sample for compatibility testing and participating in a two-person verification process before blood or blood product administration *to reduce the risk of incompatibility errors.*[36] [37] ◆

- If uterotonic medications and uterine massage fail to sustain uterine contractions and control hemorrhage satisfactorily, assist with intrauterine tamponade using a commercially available intrauterine balloon tamponade catheter or uterine packing.[1] [38] (See the "Postpartum hemorrhage management using a tamponade catheter" procedure.) Alternatively, when appropriate and if used at your facility, assist with management using a vacuum-induced device.[26] (See the "Postpartum hemorrhage management using a vacuum-induced device" procedure.) Assist with uterine artery embolization if necessary and ordered.[1] If bleeding continues, prepare the patient for surgical intervention, as ordered, *because vascular ligation, uterine compression sutures, or hysterectomy may be necessary to control bleeding.*[1] [3] [21]
- Consider additional consults or transfer to a higher level of care, as appropriate.[4]
- Reassess and respond to the patient's pain by evaluating the patient's response to treatment and progress toward pain management goals. Assess for adverse reactions and risk factors for adverse events that may result from treatment.[27]
- Provide emotional support to the patient and family members.
- Discard used supplies in appropriate receptacles.[18]
- Remove and discard your gloves and, if worn, other personal equipment.[18]
- Return the bed to the lowest position *to prevent falls and maintain the patient's safety.*[39]
- Perform hand hygiene.[5] [6] [7] [8] [9] [10]
- Put on gloves and, as needed, other personal protective equipment *to comply with standard precautions.*[18]
- Clean and disinfect other reusable equipment according to the manufacturer's instructions *to prevent the spread of infection.*[40] [41]
- Remove and discard your gloves and, if worn, other personal protective equipment.[18]

- Perform hand hygiene.[5][6][7][8][9][10]
- Document the procedure.[42][43][44][45]
- As necessary, participate in a team debriefing after severe postpartum hemorrhage.[4]

Special Considerations

- Ultrasonography can help diagnose a retained placenta.[1]
- Dilation and curettage may be necessary if ultrasonography reveals retained products of conception.[23]
- Calcium gluconate 100 to 1,000 mg IV may be indicated if the patient has been receiving magnesium sulfate.[3]
- Nonpneumatic antishock garments may be indicated as a temporary measure to control bleeding until advanced care is available.[21][46]

Patient Teaching

Teach the patient and family members about the cause and implications of the patient's postpartum hemorrhage if applicable. Emphasize the need for excellent prenatal care for future pregnancies. Teach the patient and family members about the signs and symptoms of postpartum hemorrhage during hospitalization and after discharge that would necessitate immediate care.[4]

Complications

Complications associated with postpartum hemorrhage may include:

- anemia
- death
- dilutional coagulopathy
- fatigue
- lactation issues
- myocardial ischemia
- orthostatic hypotension
- postpartum depression.[47]

Emergent surgical intervention and, possibly, hysterectomy are sometimes necessary if medical management fails.[1][47]

Documentation

Documentation associated with postpartum hemorrhage includes:

- assessment findings
  - vital signs
  - oxygen saturation levels
  - total volume of blood loss
- IV catheter insertion
  - timing
  - placement
  - catheter gauge
  - number of attempts
  - type and amount of fluids infused
  - type and amount of blood products infused (if applicable)
- indwelling urinary catheter insertion
  - amount, color, and appearance of the urine returned
  - accurate intake and output measurements
- medications administered

    - administration route
    - dosage
    - response to the medication
    - any adverse effects
- practitioner notification
    - date and time
    - name of the practitioner notified
    - prescribed interventions
    - response to those interventions
- other interventions
    - response to those interventions
    - blood samples taken
    - test results obtained
- type of emotional support given to the patient and family members
- teaching provided to the patient and family (if applicable)
    - understanding of that teaching
    - follow-up teaching needed.

Related Procedures

- Carboprost tromethamine administration for postpartum hemorrhage
- Oxytocin administration, postpartum
- Perineal care, postpartum
- Postpartum hemorrhage management using a tamponade catheter
- Postpartum infection care
- Uterine atony management

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