MUNSON HEALTHCARE

Exit Next

Magnetic Resonance Imaging (MRI) Safety

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April 2025

Back Exit Next

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

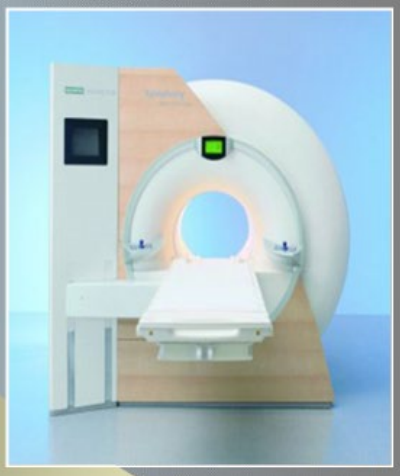
1. Describe basic knowledge of magnetic fields and their influence on objects near them.
2. Describe the importance of safety when working around the MRI scanner.
3. Identify precautions that should be taken to avoid accidents when working near the MRI scanner.
4. Identify precautions that should be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

Back Exit Next

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.



Back Exit Next

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.

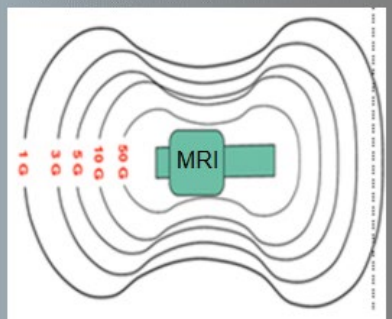
Back Exit Next

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:

Back Exit Next

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

Back Exit Next

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

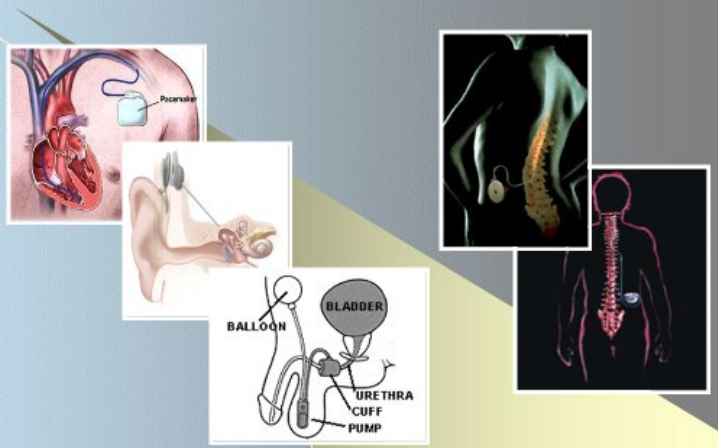
Back Exit Next

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

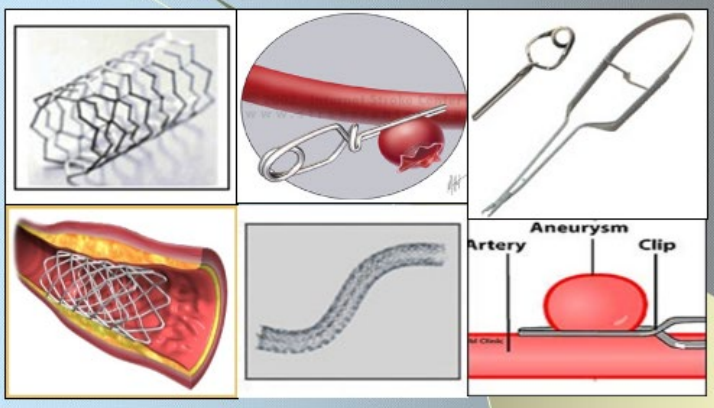


Back Exit Next

Magnetic Field Hazards *(cont.)*

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

Stents and Aneurysm Clips:



Back Exit Next

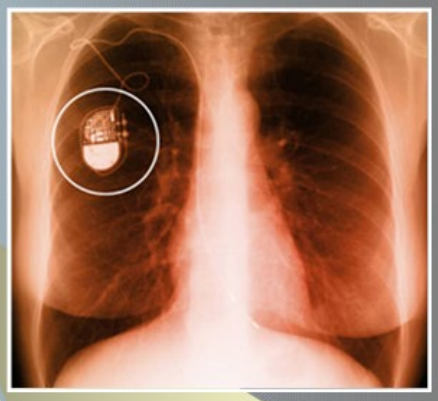
Magnetic Field Hazards *(cont.)*

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.



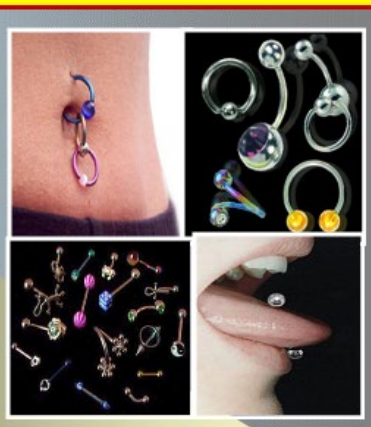
Back Exit Next

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.

Back Exit Next

The MRI Magnet is Always On!

The MRI Magnet is Always On!

The MRI Magnet is Always On!

Back Exit Next

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.)."

Back Exit Next

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

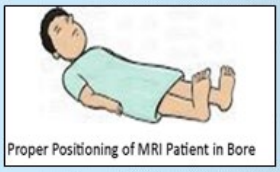
Thermal Injury Protection

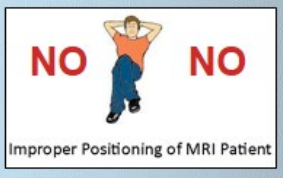
Electrical currents can be induced while in the magnet bore and cause thermal injury.

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

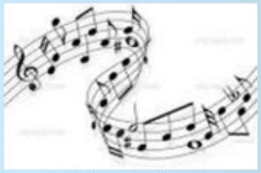
Patient Hearing Protection

- 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.

Back Exit Next

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.



Back Exit Next

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.

Back Exit Next

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.

Progress Page 25 of 32

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?

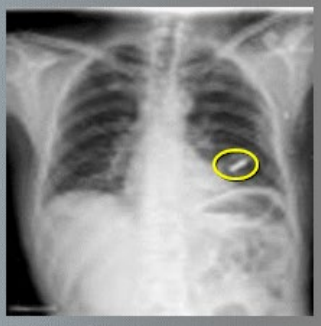
☐ If the patient is in the ER:

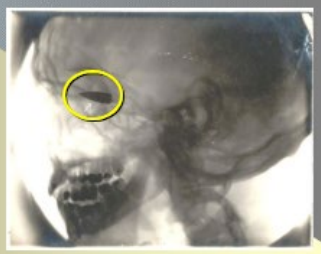
Back Exit Next

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



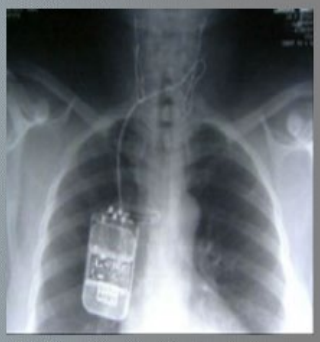


Back Exit Next

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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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

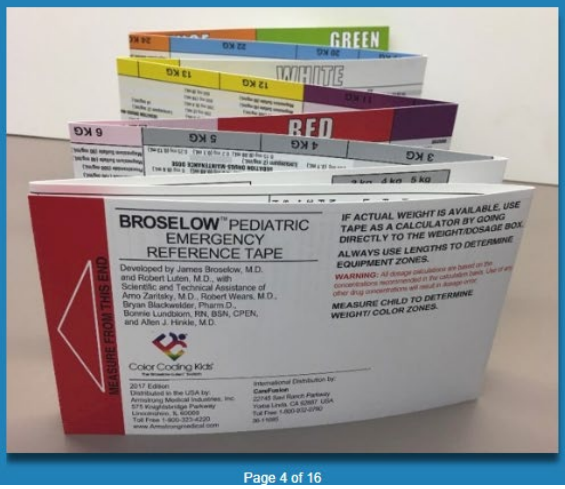
How do I call a Code Blue - Pediatric Medical Emergency?

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

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.)*

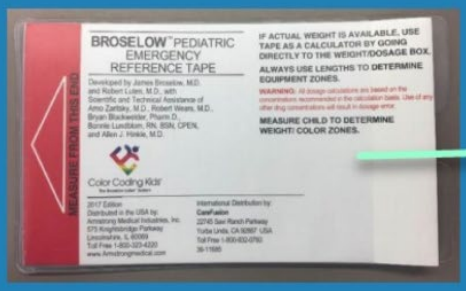
5. Stop your free hand at the bottom of the child's heel (not the toes). The edge of the free hand that lands on the tape adjacent to the child's heels indicates the child's approximate weight **in kilograms** and the child's corresponding color zone.

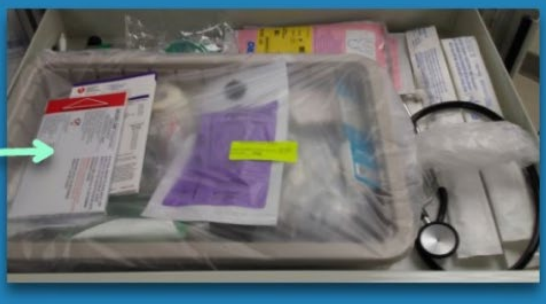
Make sure to measure the child with his/her shoes off.

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):

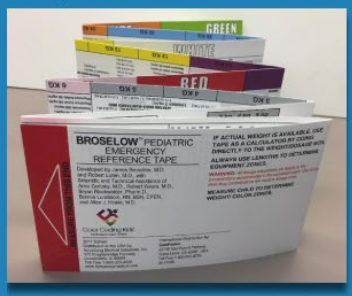
- Emergency Department

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:

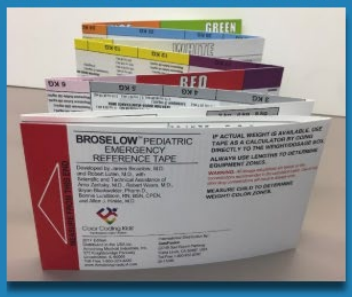


To call a pediatric code, **dial 55555** and tell the operator you have a **Code Blue - Pediatric Medical Emergency.** State your specific location in the hospital (department or unit); if the child is a patient, state room number and provider.

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

Summary

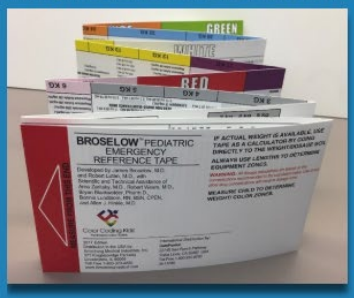
Click on each photo below to review:



- 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

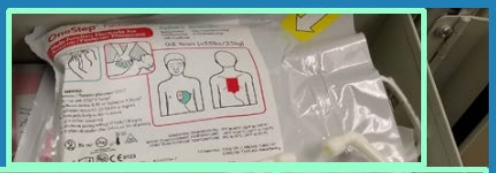
- Oxygen tank with regulator
- Mask fluid shield
- Emergency Cardiovascular Care (ECC) book (hangs from railing)
- Outdate card

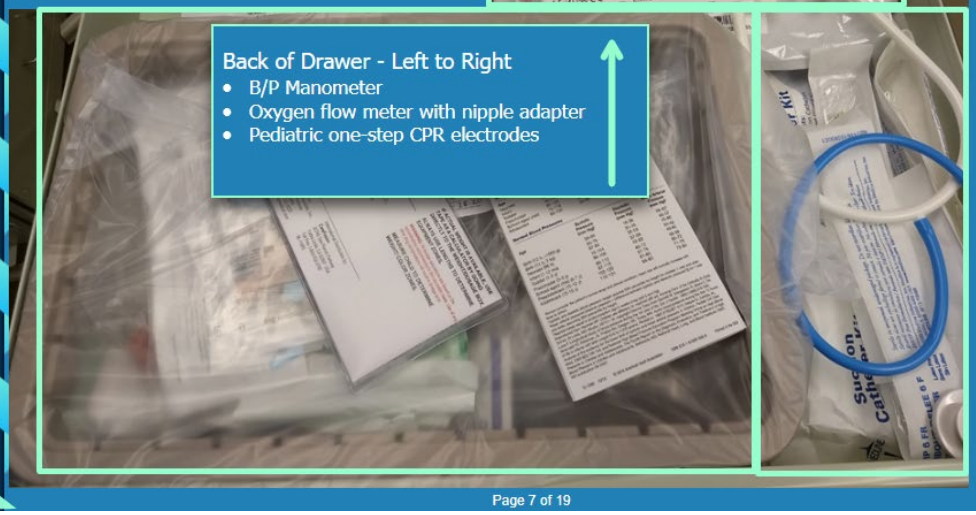
Right Side of Broselow™ Cart

- 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

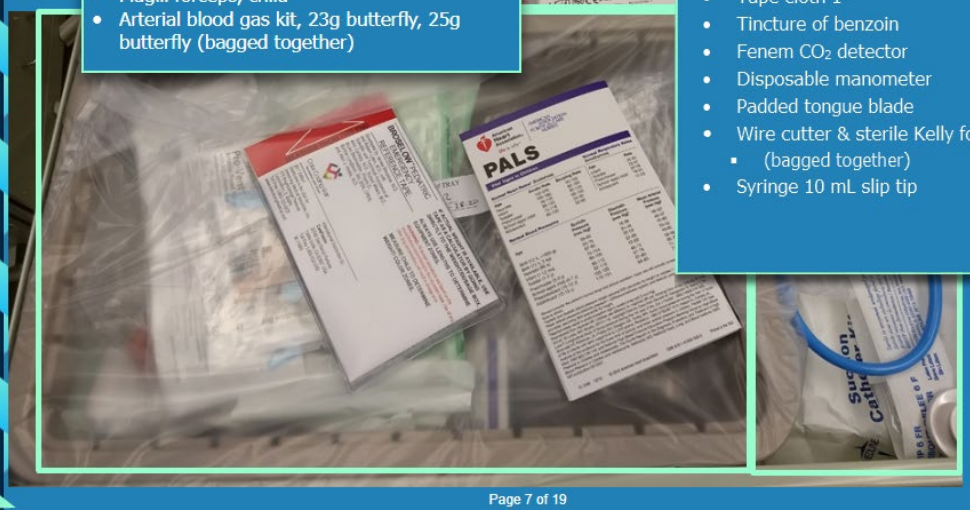
First Drawer - Gray Drawer

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

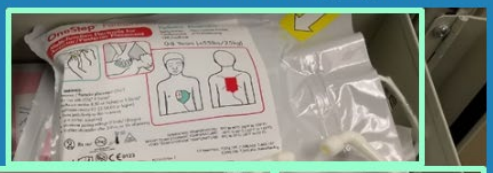
- PALS pocket reference card
  - (lays on top of covered tray)
- Pediatric Broselow™ tape
  - (lays on top of covered tray)
- CO_2 mini stat detector
- Pediatric pulse ox adhesive sensor
- Infant pulse ox adhesive sensor
- Tape cloth ½"
- Tape cloth 1"
- Tincture of benzoin
- Fenem CO_2 detector
- Disposable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

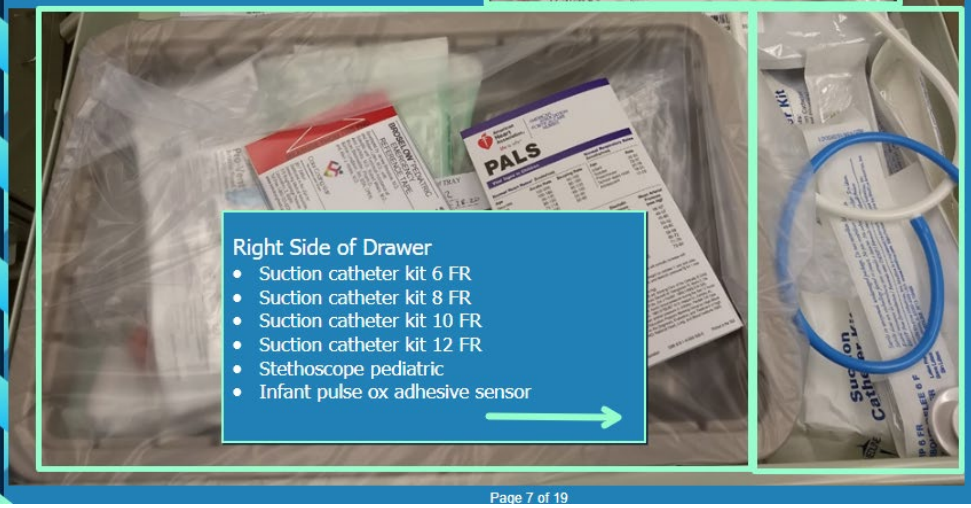


Page 7 of 19

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

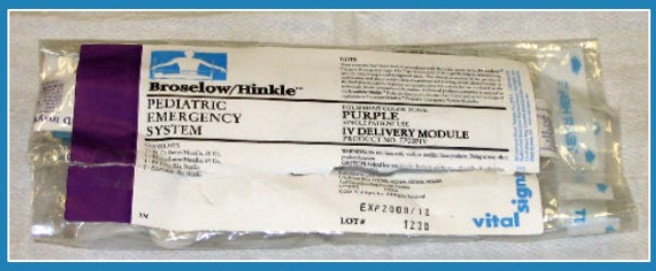
Pediatric non-rebreather mask
Oral airway

Intubation Module

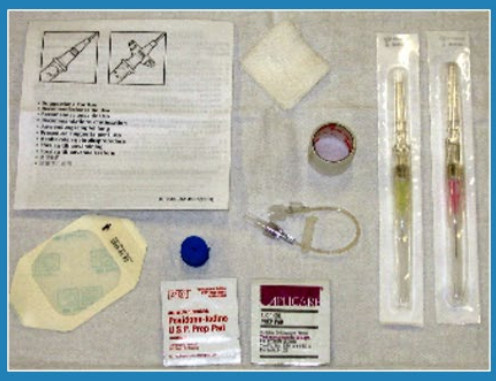
- Endotracheal tube stylet
- Endotracheal tube
- Suction catheter
- Nasogastric tube
- 36" adhesive tape
- Water soluble lubricating jelly packet
- 3" x 3" gauze pad
- Miller laryngoscope blades**

** **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

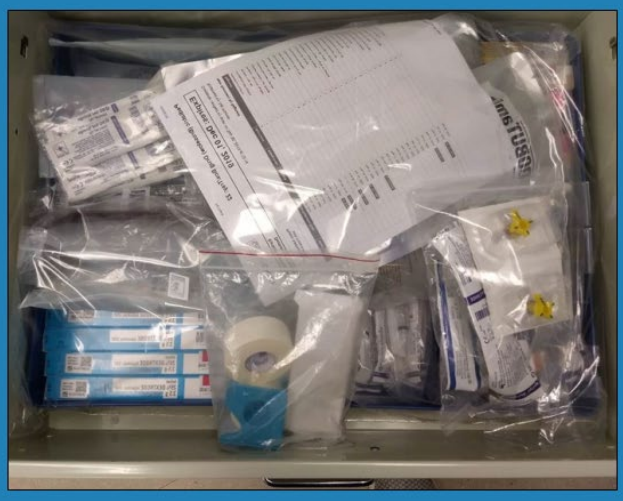


Bottom Drawer

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

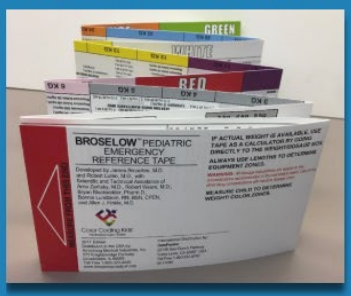


Where's the Defibrillator?

- 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:



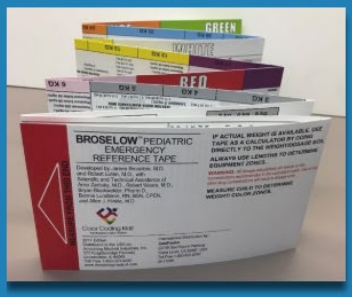
Calling a Code:

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

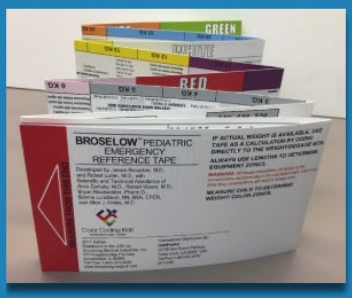
Click on each photo below to review:



- 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

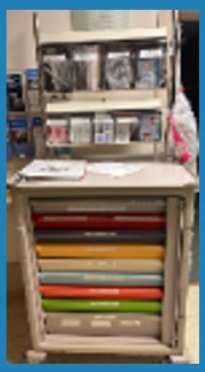
Since there is no Zoll defibrillator on the Broselow™ cart, one should be obtained from the nearest adult crash cart.

- ○ 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

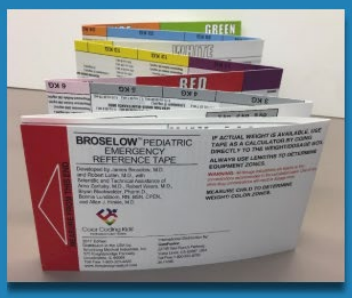
Charlevoix:

- 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.

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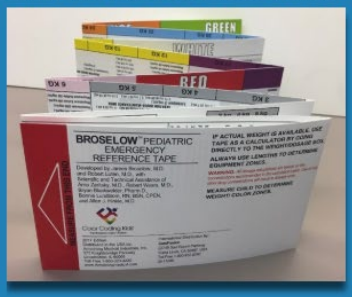
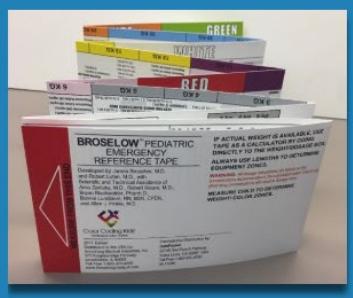


- The Broselow™ tape utilizes a length-based system to help determine the approximate weight of a child, the corresponding medication dosages, and the appropriately-sized equipment needed for the child. The tape is divided into nine colored zones corresponding to different estimated weights.
- It is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

Status Active PolicyStat ID 13403601

Origination	12/11/2015	Owner	Danielle Graber: Mgr Laboratory Services - Phlebotomy
Last Approved	1/24/2024		
Effective	1/24/2024	Area/ Department	Laboratory
Last Revised	1/24/2024	Applicability	Munson Healthcare Systemwide
Next Review	1/23/2026	Tags	Policy

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 18146058

Origination	5/14/2007
Last Approved	5/13/2025
Effective	5/13/2025
Last Revised	5/13/2025
Next Review	5/13/2026

Owner	Heather Tolfree: Mgr Pharmacy - CPS
Area/ Department	Pharmacy
Applicability	MHC Hospital System w/KMHC (MMC, Cadillac, Charlevoix, Grayling, KMHC, Otsego, Manistee, POMH)
Tags	Policy

Extravasation Management

Purpose

To provide evidence-based guidelines and procedures through the use of a Standing Order for the rapid treatment of extravasation injuries due to chemotherapy and other medications.

Definitions

1. **Extravasation:** accidental leakage of a substance (i.e. medication or fluid) into perivascular and subcutaneous spaces. Depending on the type of substance, the degree of injury can range from local irritation to severe tissue necrosis.
2. **Infiltration:** inadvertent administration of a non-vesicant medication or fluid into the surrounding tissue instead of into the intended vascular pathway.
3. **Investigational Chemotherapy:** since little information may be known about the risks of extravasation, treat all investigational chemotherapy as potential vesicants unless data is available stating otherwise.
4. **Irritant:** an agent that can cause pain, swelling, vein irritation, or phlebitis when extravasation occurs.
5. **Non-Vesicants:** an agent devoid of significant irritant or vesicant effects.
6. **Vesicant:** an agent that is capable of causing pain, blistering, ulceration and necrosis upon

extravasation.

7. **Standing Order:** for any patient at a Munson Healthcare (MHC) facility receiving intravenous medications, this protocol may be activated upon extravasation of the medication or fluid.

Procedure

A. The organization maintains evidence-based guidelines/protocols for the management of extravasation injuries due to chemotherapy or other medications.

B. Agent-specific management guidelines/protocols, medications and treatments are readily available.

C. Extravasation management guidelines/protocols medications and treatments are readily available and are reviewed, updated, and approved by the pharmacy and therapeutics committee (P&T) on a regular basis.

D. Training and education, for nursing and pharmacists includes extravasation management.

Education and Competency Assessment

A. Nursing education includes knowledge of common factors known to increase the risk of extravasation, prevention strategies, immediate management, agent specific antidotes, documentation, and adverse event reporting.

B. Nursing education on extravasation management is documented prior to administering chemotherapy.

Preventive Strategies

A. Preventive strategies are implemented for proper maintenance of intravenous (IV) sites, monitoring infusion rates and providing patient and provider education on risks and steps to prevent extravasation.

B. Nursing PERIPHERAL administration recommendations

1. Access
    a. Above the wrist placed under ultrasound guidance (if available), confirm blood return PRIOR to initiation of a vesicant.
    b. Try to avoid hand or wrist site
2. IV Gauge - When possible use 20 gauge or larger

Immediate Management

A. For ALL extravasations, initial treatment includes the following:

B. Immediately STOP and disconnect the infusion (NOT the cannula/needle).

C. Put on gloves (if not already on).

D. Use the cannula/needle to aspirate as much extravasated fluid as possible with a 10 mL syringe. Avoid direct manual pressure to the suspected extravasation site. Leave the cannula

in place until further treatment is determined. DO NOT FLUSH THE LINE.

E. If possible, elevate the extremity and/or encourage movement to facilitate lymphatic resorption of the drug. Avoid placing pressure on the site.

F. Immediately notify the pharmacy for drug therapy orders per protocol with provider co-sign (see Specific Antidotes below). Notify the provider and obtain any additional orders as needed.

G. Retrieve the extravasation kit, if applicable; or contact the pharmacy to obtain agent-specific antidote per order/protocol. If pharmacy is closed, obtain the antidote through the normal after-hours procedures.

H. Initiate agent specific measures per provider order/protocol.

I. Follow the warm or cold pack instructions listed for each specific medication.

J. If an antidote is ordered, the original port may be used to administer the antidote as close as possible to the extravasation site. Remove the cannula/needle to prevent use for further infusions.

K. Assess the patient's pain level and collaborate with the medical staff to determine need for pain management.

L. Mark the affected area. A digital image of the site may be taken as needed.

Specific Pharmacologic Antidotes

A. Click the link for specific extravasation management guidelines:

1. Management of Non-Cytotoxic Extravasations Treatment Algorithm
2. Cytotoxic Extravasation Management Protocol
3. Dexrazoxane Protocol
4. Care of a Suspected Extravasation - Patient Information
5. Chemotherapy Extravasation Supplies
6. Irritant And Vesicant Properties of Anti-Cancer Agents

Documentation and Follow-up

A. Document the extravasation in the medical record consistent with organization-specific procedures as well as enter into the organization's incident tracking system.

B. Notify Risk Management if the extravasation results in nerve impairment or tissue damage requiring surgical intervention.

C. For inpatients, assess the site shift for pain, erythema, induration, or skin breakdown. Document assessment at least every shift for 48 hours.

D. For outpatients, the patient should be provided with information regarding symptoms to report to the provider, how to care for the site, pain management techniques, and the plan for follow-up care.

Adverse Drug Event Reporting

A. Extravasation related events are reported and documented following the hospital's adverse drug event reporting policy and procedure process.

Personnel

A. All clinical staff

References and Related Documentation

1. Joint Commission Standards MM.01.01.03, MM.03.01.03, MM.06.01.01, MM.07.01.03
2. CMS Conditions of Participation §482.23, §482.25
3. Health Care Facilities Accreditation Program (HFAP) 25.01.08, 25.01.19
4. DNV National Integrated Accreditation for Healthcare Organizations MM.7

Authors:
Amanda Kogelman, PharmD, BCOP
Lairyn Kenney, PharmD, BCPS
Julie Botsford, PharmD

Approval Signatures

Step Description	Approver	Date
System Policy Oversight Committee	Terri Fries: Document Mgmt Spec	5/13/2025
System P&T (On Behalf of Each Site)	Cathi Cornelius: Clin Pharmacy Utilization Spec	5/13/2025
Document Owner	Heather Tolfree: Mgr Pharmacy - CPS	5/12/2025

Applicability

Cadillac Hospital, Charlevoix Hospital, Grayling Hospital, Kalkaska Memorial Health Center, Manistee Hospital, Munson Medical Center, Otsego Memorial Hospital, Paul Oliver Memorial Hospital

Standards

No standards are associated with this document

Procedure: Peripherally inserted central catheter (PICC) dressing change

Checklist: Peripherally inserted central catheter (PICC) dressing change

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

Critical Notes

Critical Note for Munson Healthcare:

If using the 3M Tegaderm CHG Securement Device and Dressing:

- Application Reminder: Ensure the CHG impregnated portion of the window is directly over the insertion site.
- Removal Reminder: As you are removing the CHG impregnated portion of the dressing, moisten the area with a few drops of sterile normal saline and wipe with a sterile gauze, or wipe with an alcohol pad.

PICC CVC Device 1877-2100 for PICC Application Video

Critical Note Revised 09/2021

Peripherally inserted central catheter (PICC) dressing change

Objective: To change a PICC dressing according to the standard of care.

Checklist Step	Comments
Y- Meets; N- Does not meet; I- Not Applicable	
__ Gather and prepare the necessary equipment and supplies.	
__ Review the patient's medical record to determine the external catheter length recorded at the time of catheter insertion.	
__ 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 their individual	

communication and learning needs.

__ Raise the bed to waist level before providing care.

__ Perform hand hygiene.

__ Put on a mask.

__ Perform hand hygiene.

__ Assemble the supplies on a sterile drape or towel.

__ Perform hand hygiene.

__ Put on gloves.

__ Position the patient with the arm extended away from the body and with the insertion site below heart level.

__ Visually inspect the entire infusion system.

__ Inspect the catheter–skin junction and surrounding area, and palpate through the existing intact dressing for redness, tenderness, swelling, and drainage. Pay attention to the patient's reports of pain, paresthesia, numbness, or tingling.

__ Remove the existing dressing by beginning at the device hub and pulling the dressing perpendicular to the skin gently toward the insertion site.

__ If you used a chlorhexidine-impregnated sponge dressing, remove and discard it in an appropriate receptacle.

__ Remove and discard the adhesive securement device if present.

__ Inspect the integrity of the catheter and hub.

__ Remove and discard your gloves.

__ Perform hand hygiene.

__ Put on sterile gloves.

__ Use a sterile disposable tape measure or the incremental markings on the catheter to measure the external length of the catheter from hub to skin entry.

__ Clean the patient's skin using an antiseptic agent (alcoholic chlorhexidine gluconate solution containing at least 2% chlorhexidine gluconate preferred; if contraindicated, use an iodophor [such as povidone-iodine] or 70% alcohol). Apply using a single-use sterile applicator containing antiseptic solution. Allow the solution to dry completely without fanning, wiping, or blowing.

__ Apply alcoholic chlorhexidine gluconate solution with an applicator using a gentle back-and-forth motion for 30 seconds. Allow the area to dry completely.

__ Apply povidone-iodine solution using a swab. Begin at the intended insertion site and move outward in concentric circles. Allow the solution to dry completely (typically at least 2 minutes).

__ If applicable, apply a chlorhexidine-impregnated sponge dressing at the catheter base.

__ If applicable, apply an alcohol-free skin barrier product.

__ Stabilize and secure the catheter with an integrated securement device, subcutaneous anchor securement system, tissue adhesive, or adhesive securement device if available. Sutures should be avoided whenever possible.

__ Apply a transparent semipermeable (or gauze and sterile tape) dressing to the insertion site.

__ Measure upper-arm circumference when clinically indicated to assess for the presence of edema and deep vein thrombosis. Take the measurement 10 cm (3.9") above the antecubital fossa, and compare this measurement to the baseline.

__ Label the dressing with the date of the dressing change or the date it's next due to be changed, as directed by your facility.

__ Discard used supplies in appropriate receptacles.

__ Return the bed to the lowest position.

__ Remove and discard your gloves and mask.

__ Perform hand hygiene.

__ Document the procedure.

Procedure: Central venous access device dressing change

Checklist: Central venous access device dressing change

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

Critical Notes

Critical Note for Munson Healthcare

If using the 3M Tegaderm CHG Securement Device and Dressing:

- Application reminder: Ensure the CHG impregnated portion of the window is directly over the insertion site.
- Removal reminder: As you are removing the CHG impregnated area of the dressing, moisten with a few drops of sterile normal saline and wipe with a sterile gauze, or wipe with an alcohol pad.

PICC CVC Device 1877-2100 For CVC Application Video

PICC CVC CHG Device Application Guide

Critical Note Revised 09/2021

Central venous access device dressing change

Objective: To change a central venous access device dressing according to the standard of care.

Checklist Step	Comments
Y- Meets; N- Does not meet; I- Not Applicable	
__ Review the patient's medical record for catheter type, size, tip location, external catheter length, and insertion date. Review the date of the last dressing change. __ 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 their individual communication and learning needs.

__ Raise the bed to waist level before providing care.

__ If you're performing the procedure on an internal jugular or a subclavian site, ask the patient to turn the head away from the site. Have the patient put on a mask (as able) if the access device is a dialysis catheter.

__ Perform hand hygiene.

__ Put on a mask.

__ Perform hand hygiene.

__ Assemble the supplies on a sterile field.

__ Perform hand hygiene.

__ Put on gloves.

__ Inspect and palpate the insertion site through the existing dressing for skin breakdown, erythema, tenderness, swelling, or drainage. If any of these signs are present, contact the practitioner for a collaborative decision about interventions, including access device removal.

__ Remove the existing dressing or integrated securement device by lifting the edge of the dressing or securement device at the catheter hub and gently pulling it horizontal to the skin, toward the insertion site.

__ Discard the dressing in an appropriate receptacle.

__ If a chlorhexidine-impregnated sponge dressing was used, remove and discard it.

__ Assess central venous access device securement. If you're using an adhesive securement device, remove it according to the manufacturer's instructions and discard it in an appropriate receptacle.

__ Assess the catheter-skin junction and surrounding skin. Be aware that skin alterations can appear more subtle in patients with dark skin tones. Use proper lighting and always compare affected areas to nonaffected areas on the patient.

__ Inspect the catheter for cracks, leakage, kinking, pinching, and mechanical problems.

__ Remove and discard your gloves.

__ Perform hand hygiene.

__ Put on sterile gloves.

__ If you suspect catheter dislodgement, measure the external catheter length using a sterile disposable tape measure or the incremental markings on the catheter and then compare it to the external catheter length documented at insertion.

__ Clean the skin around the insertion site using an antiseptic agent. Apply using a single-use sterile applicator. Allow the solution to dry completely without fanning, wiping, or blowing. For alcoholic chlorhexidine gluconate solution, apply with an applicator using a gentle back-and-forth motion for 30 seconds. Allow the area to dry completely. For povidone-iodine solution, apply using a swab. Begin at the catheter insertion site and move outward in concentric circles. Allow the solution to dry completely (typically at least 2 minutes).

__ If the dressing change is being completed on a dialysis catheter, if compatible with the catheter material, and if you aren't using a chlorhexidine dressing, apply povidone-iodine, polymyxin B, bacitracin zinc, or gramicidin ointment (as prescribed) to the catheter exit site.

__ If used in your facility, apply a chlorhexidine-impregnated sponge dressing at the catheter base. Position the sponge dressing with the catheter resting on or near the radial slit of the dressing. Ensure that the edges of the slit touch.

__ Apply a skin barrier product according to the manufacturer's instructions.

__ Secure the catheter with an integrated securement device, subcutaneous anchor securement system,

tissue adhesive, or adhesive securement device if available.

__ If the dressing isn't integrated into the securement device, apply a transparent semipermeable dressing over the catheter insertion site. Alternatively, apply a sterile 4" × 4" (10- × 10-cm) gauze dressing and tape. If the patient has fragile skin, use dressings and tape specially formulated for fragile skin.

__ Discard used supplies in appropriate receptacles.

__ Remove and discard your mask and gloves.

__ Perform hand hygiene.

__ Label the dressing, as directed by your facility.

__ Return the bed to the lowest position.

__ Perform hand hygiene.

__ Document the procedure.

Implanted port accessing

Implanted port accessing

Revised: September 15, 2025

Introduction

An implanted port, also known as a *vascular access device* or *vascular access port*, is a type of central venous access device that's surgically implanted either by a surgeon or an interventional radiologist using local anesthesia. It consists of a Silastic or polyurethane catheter attached to a reservoir covered with a self-sealing silicone septum. The practitioner places the catheter in the central venous system, typically implanting the reservoir in a subcutaneous pocket in the upper anterior chest wall. When using the anterior chest wall isn't feasible, the arm is an alternative site for implantation.[1]

An implanted port is most commonly used when a patient requires some type of long-term IV therapy and an external central venous device isn't appropriate or desirable.[2] It's also an option for a patient who requires infrequent or intermittent vascular access.[1] The port may have one or two lumens, depending on the patient's needs.[2] It can be used immediately after placement has been confirmed; however, some edema and tenderness may persist for about 72 hours, making the device initially difficult to palpate and slightly uncomfortable for the patient. (See *Understanding implanted ports*.) Compared with externalized tunneled catheters, implanted ports have a decreased risk of infection, require minimal maintenance, and have a more discrete design, resulting in a high level of patient acceptance.[3]

A patient who requires repeated computed tomography scanning with contrast may receive an implanted port specially developed to withstand the high pressures of power injectors. Using a power injector requires a specialized access needle and tubing approved for power injection to ensure that the tubing and connections won't rupture or separate.[1]

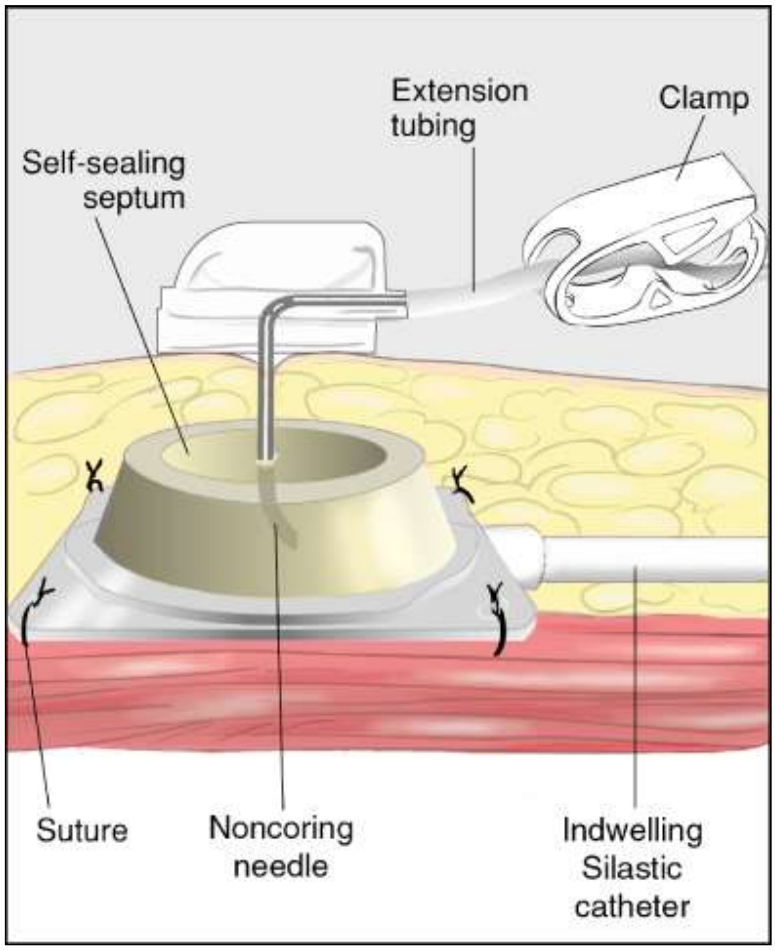
When a patient requires IV therapy, catheter flushing, or blood withdrawal, an implanted port is accessed using a noncoring needle. This type of needle has a deflected point, which slices the port's septum. A nurse, a practitioner, or an appropriately trained patient or caregiver may perform implanted port access, site care, and infusion.[4,5] Accessing the port requires sterile no-touch technique to reduce the risk of vascular catheter–associated infection.[6]

◆ ***Hospital-acquired condition alert:*** Keep in mind that the Centers for Medicare and Medicaid Services considers vascular catheter–associated infection a hospital-acquired condition *because it can be reasonably prevented using a variety of best practices.* Make sure to follow evidence-based infection prevention practices, such as performing hand hygiene, preparing the access site properly, and maintaining sterile no-touch technique, *to reduce the risk of vascular catheter–associated infections.*[7,8,9,10,11] ◆

EQUIPMENT

UNDERSTANDING IMPLANTED PORTS

Typically, an implanted port helps deliver intermittent infusions of medication, parenteral nutrition, chemotherapy, and blood products.[10] The patient's skin completely covers the device, reducing the risk of extrinsic contamination. An implanted port consists of a catheter connected to a small reservoir. A septum designed to withstand multiple punctures seals the reservoir. Accessing the port requires insertion of a special noncoring needle perpendicular to the reservoir (as shown below).



Equipment

- Antiseptic pad (alcoholic chlorhexidine or 70% alcohol)[9] [12]
- Antiseptic swabs or applicators (alcoholic chlorhexidine gluconate solution containing at least 2% chlorhexidine gluconate preferred; if contraindicated, use an iodophor [such as povidone-iodine] or 70% alcohol)[13]
- Gloves
- Labels
- Masks
- Safety-engineered noncoring needle (smallest gauge necessary to accommodate the prescribed therapy and length that allows external components to sit level with the skin and securely within the port) with attached extension set tubing[6]
- Securement device
- Sterile 10-mL syringes (or syringes specifically designed to generate lower injection pressure) prefilled with preservative-free normal saline solution[14]

- Sterile drape
- Sterile gloves
- Sterile needleless connector
- Sterile transparent semipermeable dressing (may be chlorhexidine-impregnated)
- Optional: chlorhexidine-impregnated sponge dressing, disinfectant-containing end cap, needle assistive device, ordered IV fluid, prescribed local anesthetic agent and administration equipment, prescribed locking solution (such as prefilled heparinized saline flush solution syringe, 10 units/mL), primed IV administration set, sterile 2" × 2" (5- × 5-cm) gauze, sterile alcohol-free skin barrier product, sterile tape

Some facilities use an implanted port access kit, which contains most of the necessary equipment.

Preparation of Equipment

Inspect all IV equipment and supplies. If a product is 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.[15]

Implementation

- Review the patient's medical record *to determine the type (such as a power-injectable device or single or double port) and location of the implanted port, whether previous access occurred, and the patient's response to the procedure.*[6]
- Ensure that placement of the catheter tip has been confirmed.[16] [17]
- If required by your facility, verify the practitioner's order.
- Determine whether the patient has an allergy or contraindication to the antiseptic, anesthetic, or prescribed solution.[13] [18]
- Gather and prepare the necessary equipment and supplies.
- Perform hand hygiene.[10] [19] [20] [21] [22] [23] [24] [25]
- Confirm the patient's identity using at least two patient identifiers.[26]
- Provide privacy.[27] [28] [29] [30]
- Explain the procedure to the patient and family (if appropriate) according to their individual learning and communication needs *to increase their understanding, allay their fears, and enhance cooperation.*[5] [31]
- Assess the patient's pain tolerance, and discuss preferences for using a local anesthetic before accessing the port.[6] [32] [33]
- Administer a local anesthetic agent, as needed and prescribed, following safe medication administration practices.[32] [33] [34] [35] [36] [37] [38] (See *Easing the pain of accessing an implanted port*.) Also implement nonpharmacologic pain management strategies, such as distraction, relaxation techniques, and breathing exercises, as appropriate.[34] (See the "Pain management" procedure.)

EASING THE PAIN OF ACCESSING AN IMPLANTED PORT

You can ease the pain of accessing an implanted port by administering an anesthetic agent before accessing the port following these steps:

- Obtain and review the practitioner's order.
- Review the patient's medical record for a history of allergy to the prescribed anesthetic.[32] [33]
- Perform hand hygiene.[19] [20] [21] [22] [23] [24] [25]
- Confirm the patient's identity using at least two patient identifiers.[26]
- Provide privacy.[27] [28] [29] [30]

- Provide the patient with information about the selected local anesthetic agent, including the benefits, potential complications, and management.
- Perform hand hygiene.[19][20][21][22][23][24][25]
- Put on gloves, as needed, *to comply with standard precautions*.[39][40][41]

For anesthetic cream

- Apply the recommended amount of anesthetic cream to the implanted port access site.[32][33]
- Cover the area with a transparent semipermeable dressing.[32][33]
- Note the time of application on the dressing with a marking pen.
- After the recommended application time, remove the dressing, wipe off the cream, evaluate the effectiveness of the anesthetic, and assess for any adverse reactions to the anesthetic.[32][33]
- Disinfect the site with an antiseptic solution and then access the port as usual.[32][33]

For an anesthetic dermal patch

- Apply the dermal patch to the intended access site.[32][33]
- Leave the patch on the skin for the recommended application time.[32][33]
- Remove the patch, evaluate the effectiveness of the anesthetic, and assess the site for any adverse reactions to the anesthetic patch.[32][33]
- Disinfect the site with an antiseptic solution and then access the port as usual.[32][33]

For an intradermal anesthetic

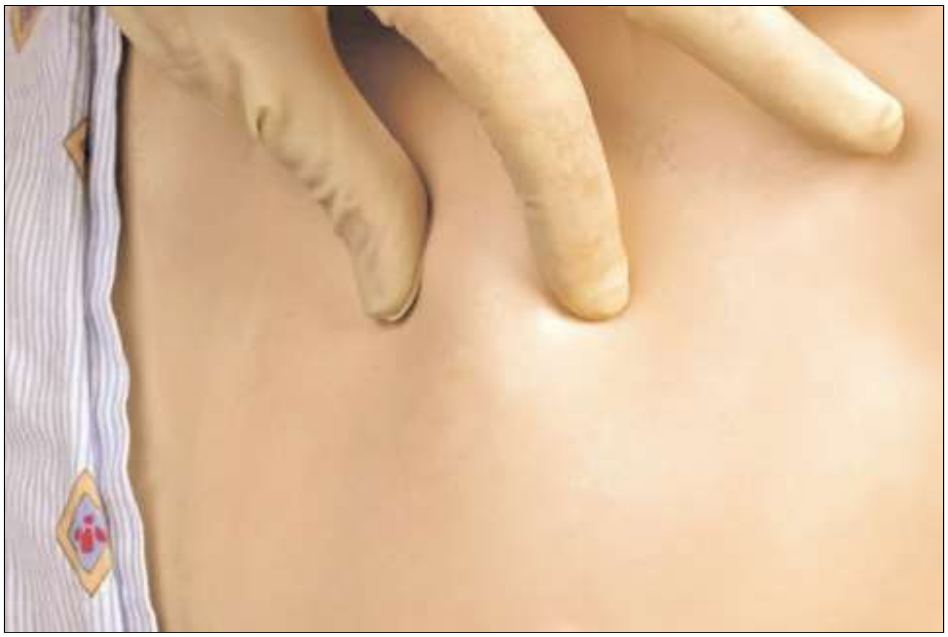
- Disinfect the skin of the intended access site with antiseptic solution and allow it to dry.[32][33]
- Withdraw 0.3 mL of injectable anesthetic into a 1-mL syringe.[32][33]
- Gently insert the needle intradermally above the intended access site with the needle bevel up.[32][33]
- Aspirate to make sure that the needle wasn't inadvertently inserted into a vessel.[32][33]
- Inject 0.1 to 0.3 mL of the anesthetic, forming a wheal at the intended access site.[32][33]
- Remove the needle and discard the syringe in a puncture-resistant sharps disposal container.[32][33]
- Evaluate the effectiveness of the anesthetic, and assess for any adverse reactions.[32][33]
- Disinfect the site with an antiseptic solution and then access the port as usual.[32][33]

For topical vapocoolant (skin refrigerant) spray

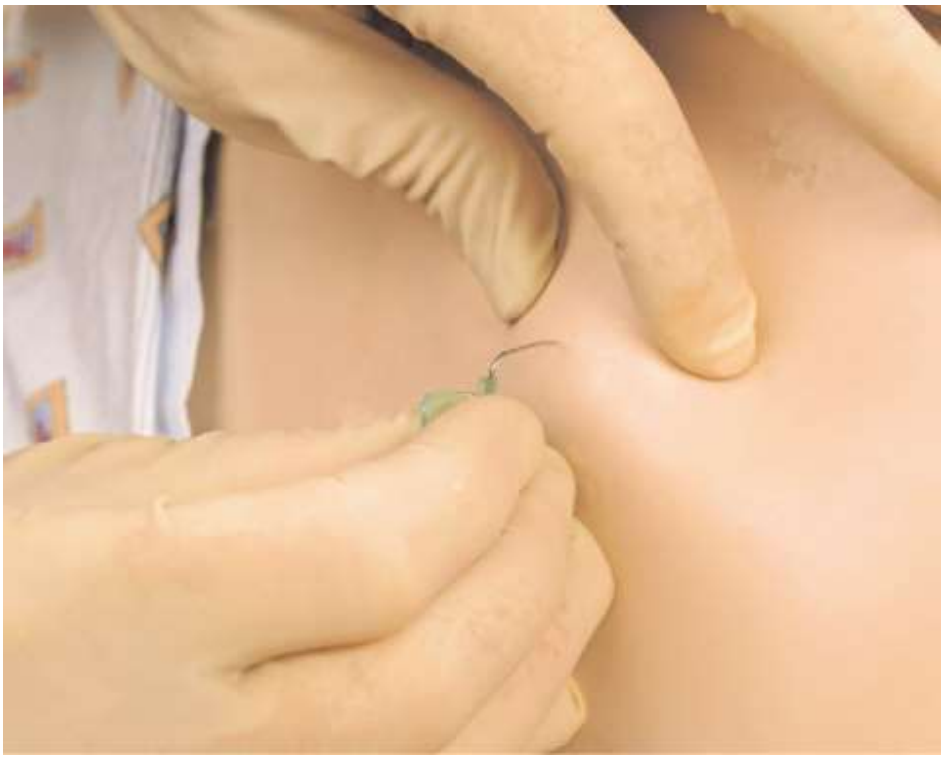
- Disinfect the skin of the intended access site with antiseptic solution and allow it to dry.
- Spray the vapocoolant from the recommended distance at the intended insertion site immediately before cannulation.[42]
- Apply the spray for the recommended number of seconds or until the skin turns white, whichever occurs sooner, *to prevent frostbite*.[42]
- Allow the liquid to evaporate from the skin.
- Access the port as usual.

- If appropriate, raise the bed to waist level before providing care *to prevent caregiver back strain*.[43]
- Perform hand hygiene.[10][19][20][21][22][23][24][25]

- Put on gloves *to comply with standard precautions*.[39] [40] [41]
- Position the patient for comfort with the patient's head turned away from the implanted port.[32] [33] Alternatively, put a mask on the patient.
- Assess the patient's skin overlying the port and the tissue surrounding the port.[32] [33] Observe and palpate for swelling, pain, erythema, and drainage; the presence of chest wall collateral circulation, which may signal occlusion; erosion of the port through the skin; and signs of thrombosis.[6] Don't insert the noncoring needle if any of these findings are present. Instead, notify the practitioner. Be aware that skin alterations can appear more subtle in patients with dark skin tones. Use proper lighting, and always compare affected areas to nonaffected areas on the patient. Prepare to assess all patients accurately by familiarizing yourself with manifestations of common skin findings in patients of all skin tones.[44]
- Palpate and locate the septum; assess for device rotation.[32] [33]
- Remove and discard your gloves.[39] [41] [45]
- Perform hand hygiene.[10] [19] [20] [21] [22] [23] [24] [25]
- Put on a mask.[32] [33]
- Perform hand hygiene.[10] [19] [20] [21] [22] [23] [24] [25]
- Open the supplies and prepare a sterile field using a sterile drape. Using sterile no-touch technique, place the supplies on the sterile field.[6]
- Perform hand hygiene.[10] [19] [20] [21] [22] [23] [24] [25]
- Put on sterile gloves.[32] [33] [39] [41]
- Prepare the implanted port access site with an antiseptic agent (alcoholic chlorhexidine gluconate solution containing at least 2% chlorhexidine gluconate preferred; if contraindicated, use an iodophor [such as povidone-iodine] or 70% alcohol), following the manufacturer's instructions. Apply using a single-use sterile applicator containing antiseptic solution. Allow the solution to dry completely without fanning, wiping, or blowing on the site.[13]
    - For alcoholic chlorhexidine gluconate solution, apply with an applicator using a gentle back-and-forth motion for 30 seconds. Allow the area to dry completely.[13] [46]
    - For povidone-iodine solution, apply using a swab. Begin at the intended insertion site, and move outward in concentric circles. Allow the solution to dry completely (typically at least 2 minutes).[13] [47]
- Attach a sterile needleless connector to the extension set, which is connected to the noncoring needle.[32] [33]
- While maintaining sterility of the syringe tip, attach a syringe containing preservative-free normal saline solution to the needleless connector and then prime the extension set and noncoring needle with preservative-free normal saline solution.[32] [33] Clamp the extension tubing.
- With your nondominant hand, palpate and stabilize the implanted port (as shown below).[32] [33]



- Grasp the noncoring needle with your dominant hand, and insert it perpendicular to the skin (as shown below) through the septum of the port until the needle tip comes in contact with the bottom of the port.[6] Consider orienting the bevel of the noncoring needle in the opposite direction from the outflow channel where the catheter is attached to the port body *to remove a greater amount of protein when flushing with this bevel orientation.*[6] [48] One study suggests that a needle assistive device may improve first-attempt success with insertion of the noncoring needle into the port.[6]



- Unclamp the extension tubing and, if not contraindicated, aspirate slowly for a blood return that's the color and consistency of whole blood *to help confirm device patency.*[6] If you don't obtain a blood return, take steps to locate an external cause of obstruction.[14] Have the patient change position, raise the arms overhead, breathe deeply, or cough *to alter catheter position.* If you still don't obtain a blood return to confirm noncoring needle placement, notify the practitioner.[49]
- If you obtain a blood return, inject preservative-free normal saline solution slowly into the port. Use a minimal volume of twice the internal volume of the implanted port system; a larger volume may be necessary if the implanted port is used for blood sampling, transfusions, parenteral nutrition, contrast media, or other viscous solutions. Don't forcibly flush the device; further evaluate the device if you meet resistance. (See the "Implanted port flushing and locking" procedure.)[14] [32] [33]
- Close the clamp on the extension tubing.
- Remove the syringe and discard it in a puncture-resistant sharps disposal container.[41]
- Secure the noncoring needle *to reduce the risk of needle dislodgement, which reduces the risk of infiltration and extravasation.* Sterile tape strips were found to be effective in a quality improvement initiative.[6] Support the wings of the noncoring needle (if necessary) with sterile gauze; make sure that the gauze doesn't prevent visualization of the needle insertion site.[6]
- If applicable, place a chlorhexidine-impregnated sponge dressing beneath the needle. The edges of the radial slit of the sponge dressing must touch *to maximize antimicrobial action.* Always follow the manufacturer's directions.[10] [50] [51] [52] Oncology guidelines suggest using a chlorhexidine-impregnated sponge dressing around the needle insertion site when the duration of infusions exceeds 4 to 6 hours.[6]
- If the patient is at high risk for skin injury, apply a sterile, alcohol-free skin barrier product, as needed, according to the manufacturer's instructions *to reduce the risk of medical adhesive–related skin injury.*[53]
- Apply a sterile transparent semipermeable dressing over the insertion site, noncoring needle, and upper portion of the extension tubing *to maintain sterility and allow visualization of the needle and insertion site.*[6] [32] [33]
- Perform a vigorous mechanical scrub of the needleless connector for at least 5 seconds using an antiseptic pad. Allow it to dry completely.[9] [12]
- If the practitioner prescribed an IV infusion, attach the primed IV administration set to the needleless connector and begin infusion therapy, as ordered. (See the "Implanted port continuous infusion" procedure.) Trace the IV tubing from the patient to the point of origin *to make sure that you're attaching the tubing to the correct port before beginning the infusion.*[18] [54] [55] Route the tubing in a standardized direction if the patient has other tubing and catheters having different purposes. If multiple IV lines will be used, label the tubing at both the distal (near the patient connection) and proximal (near the source container) ends *to reduce the risk of misconnection.*[18]
- If the practitioner didn't prescribe a continuous infusion, lock the device with prescribed locking solution[6] [14] and, if available at your facility, place a disinfectant-containing end cap on the needleless connector *to reduce the risk of vascular catheter–associated infection.*[12]
- Label the dressing with the current date or the date the dressing is due for changing as directed by your facility. Don't place the label over the access site.[32] [33] [56]
- Discard used supplies in appropriate receptacles.[39] [41] [45]
- Return the bed to the lowest position *to prevent falls and maintain the patient's safety.*[57]
- Remove and discard your gloves and mask.[39] [41] [45]
- Perform hand hygiene.[10] [19] [20] [21] [22] [23] [24] [25]
- Document the procedure.[58] [59] [60] [61] [62]

Special Considerations

- When planning to use an implanted port for power injections, identify the power injection capability at the time of access and immediately before power injection. Use an identification method, such as the unique device identifier noted in a retrievable manner in the patient's health record, an identification card, review of operative procedure report, radiographic scan, or palpation of the port. If using palpation, you must use another method as well because not all power injection capable ports are identifiable by palpation. Before power injection, ensure that all power-injectable implanted ports are accessed with the designated noncoring needle and infusion set.[6]
- Anticipate the use of antimicrobial locking solutions for treatment of a port-related infection or if the patient is at high risk for infection. If you use an antimicrobial locking solution, first withdraw the solution from the port lumen before flushing and discard. *Flushing the lock solution into the patient's bloodstream could increase development of antibiotic resistance and other adverse effects*.[14] [33]
- The Joint Commission issued a sentinel event alert related to managing risk during transition to new International Organization for Standardization tubing standards that were designed to prevent dangerous tubing misconnections, which can lead to serious patient injury and death. During the transition, make sure to trace the tubing and catheter from the patient to the point of origin before connecting or reconnecting any device or infusion, at any care transition (such as a new setting or service), and as part of the handoff process; route tubes and catheters having different purposes in different standardized directions; when there are different access sites or several bags hanging, label the tubing at both the distal and proximal ends; use tubing and equipment only as intended; and store medications for different delivery routes in separate locations.[55]

Patient Teaching

Before discharge to home, provide thorough teaching about procedures as well as follow-up visits from a home health nurse to ensure safety and successful treatment.[5] [6] Tell the patient the type of port that's in place, and explain the importance of carrying a port identification card.

If the patient will be self-accessing the port, explain that the most uncomfortable part of the procedure is the actual insertion of the needle into the skin. When the needle has penetrated the skin, the patient will feel mostly pressure. Eventually, the skin over the port will become desensitized from frequent needle punctures. Until then, the patient may want to use a topical anesthetic. Stress the importance of pushing the needle into the port until the patient feels the needle bevel touch the bottom of the port; many patients tend to stop short of the bottom of the port, leaving the needle bevel in the septum.

If the patient is receiving an infusion at home, teach the patient and family about checking the dressing daily. Also teach the patient how to dress and undress to avoid pulling at the needle site and how to protect the site during bathing and when wearing a seat belt. Instruct the patient and family to report pain, burning, stinging, or soreness at the site immediately and to stop the infusion and report wetness, leaking, or swelling at the site.

Answer questions from the patient and family (if appropriate). Allow them to teach-back and demonstrate the procedure skills they have learned to evaluate their understanding.[5]

Complications

Complications associated with accessing an implanted port may include:

- localized infection
- systemic infection
- skin breakdown. (See *Troubleshooting an implanted port*.)

TROUBLESHOOTING

TROUBLESHOOTING AN IMPLANTED PORT

Follow these tips to troubleshoot an implanted port.

Inability to flush or draw blood

- Check for external mechanical causes by assessing the entire infusion system from the administration set to the access site under the dressing; ensure that the extension tubing or IV administration set isn't clamped or kinked, the needleless connector isn't obstructed or malfunctioning, and the port isn't malpositioned.[49]
- If the port is located in the patient's upper anterior chest wall, move the patient's arm, shoulder, and head and attempt to aspirate for blood. Notify the practitioner if you're able to aspirate only when the patient is in a certain position. The patient may need to be evaluated for pinch-off syndrome of the catheter.[49] [63] Collaborate with the practitioner to manage pinch-off syndrome, if present.[49]
- Verify that the correct needle length was used and that the needle is properly placed. Replace the needle, as needed.[49]
- Keep in mind that occlusion can occur as a result of external or internal mechanical obstruction. Chemical occlusions can result from drug precipitates or lipid residue. Thrombotic occlusions can result from fibrin deposits or blood clots (thrombosis).[49]
- For suspected chemical occlusion, attempt to aspirate to clear the port or tubing of visible precipitate. Review the patient's medication record and collaborate with the pharmacist to determine the appropriate intervention or catheter clearance agent.[49] Administer a catheter clearance agent, as prescribed; the instilled volume should be based on the port system's priming volume. Allow the agent to dwell for 20 to 60 minutes. After the appropriate dwell time of the particular catheter clearance agent, aspirate and discard the degradation products before flushing the port to assess patency.[49]
- For suspected thrombotic occlusion, the practitioner should assess the risks and benefits of thrombolysis to determine whether port removal and replacement is indicated. If ordered, instill low-dose alteplase, as prescribed.[49] After the appropriate dwell time, aspirate and discard the degradation products before flushing the port to assess patency.[49]
- For persistent or recurring unresolved occlusion, consult with the practitioner about performing a contrast study.[49]

Infiltration or extravasation

- Stop the infusion immediately.[64] [65]
- Assess for a dislodged catheter, a dislodged noncoring needle, or a rupture or leak from the external catheter.[33]
- Aspirate for blood. Don't attempt to flush; doing so could move additional medication into the surrounding tissue.[65]
- Disconnect the administration set and then aspirate fluid from the port using a small syringe.[65] Don't aspirate with extravasation of contrast media.[65]
- Remove the noncoring needle.[64]

- Assess the insertion site and surrounding skin. Outline the area of suspected infiltration or extravasation with a skin marker to assess progression. If directed by your facility, photograph the area to identify progression or exacerbation of tissue injury.[65]
- Estimate the volume of fluid that has escaped into the tissue based on the rate of injection or infusion and the time of your last assessment.[65]
- Notify the practitioner about the event. Treat the site, as ordered or as directed by your facility.[65]
- Apply dry, cold compresses (as directed) for deoxyribonucleic acid (DNA)–binding agents and valproate to induce vasoconstriction, which will localize the medication in the tissue and reduce inflammation. Apply dry, warm compresses (as directed) for non-DNA-binding agents to induce vasodilation, which will increase local blood flow and disperse the medication through the tissue.[65]
- If needed, administer the appropriate antidote, as prescribed.[65] Guidelines recommend nonpharmacologic interventions such as surgical washout for extravasation of acidic and alkaline medications.[65]
- Assess the infiltration or extravasation site initially and regularly using a standardized tool or definition chosen by your facility. Monitor the site, as needed, based on the severity of the event and the care venue. Assess change using measurement, photography, or both. Monitor skin integrity, pain level, and sensation.[65]

Local infection

- Assess the skin surrounding the port and noncoring needle for erythema, edema, pain, tenderness, drainage, elevated body temperature, fluid in the subcutaneous pocket, induration over the pocket, and skin breakdown.[8]
- Monitor the patient's temperature and vital signs.
- Notify the practitioner of signs and symptoms of localized infection.[8]
- Obtain culture specimens, as ordered.[8]

Systemic infection

- Monitor the patient's temperature and vital signs.
- Notify the practitioner of signs and symptoms of systemic infection.
- Before starting antimicrobial therapy, draw paired blood samples for culture from the port and a peripheral vein.[8]
- Administer antibiotics, as prescribed (after obtaining culture specimens).

Extrusion

- Notify the practitioner that the port reservoir is extruding and is visible through the patient's skin to determine whether port removal is required.

Documentation

Documentation associated with accessing an implanted port includes:

- date and time of noncoring needle insertion
- type of topical anesthetic (if used)
- assessment findings
  - implanted port location
  - appearance of the site
- needle gauge and length

- number of attempts
- presence of a blood return
- any unexpected outcomes
    - interventions performed
    - response to those interventions
- details of the infusion (if initiated)
    - type
    - amount
    - rate
    - method
- amount and type of flush solution used
- lack of resistance when flushing
- tolerance of the procedure
- teaching provided to the patient and family (if applicable)
    - understanding of that teaching
    - follow-up teaching needed.

This procedure has been reviewed by the Academy of Medical-Surgical Nurses.

AMSN Academy of Medical-Surgical Nurses

Related Procedures

- Implanted port accessing, home care
- Implanted port accessing, pediatric
- Implanted port blood sampling
- Implanted port blood sampling, home care
- Implanted port blood sampling, pediatric
- Implanted port bolus injection, home care
- Implanted port continuous infusion
- Implanted port continuous infusion, pediatric

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(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)
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.

Procedure: Peripherally inserted central catheter (PICC) insertion

Checklist: Peripherally inserted central catheter (PICC) insertion

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

Peripherally inserted central catheter (PICC) insertion

Objective: To insert a PICC 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 patient's medical record for a history of allergies, including to latex, local anesthetics, and antiseptics, and for contraindications to PICC insertion.	
__ If required by your facility, confirm that informed consent has been obtained and is in the patient's medical record.	
__ Gather and prepare the necessary equipment and supplies.	
__ Conduct a preprocedure verification.	
__ Verify that the laboratory and imaging studies have been completed as ordered. Notify the practitioner of any unexpected results.	
__ Obtain assistance from a second person who has undergone proper training.	
__ Close the door to the room and put a sign on the door that states STERILE PROCEDURE IN PROGRESS—DO NOT ENTER.	
__ 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 their individual communication and learning needs.

__ Provide the patient with information related to the PICC insertion procedure. Teach about measures to prevent vascular catheter–associated infections, including hand hygiene.

__ Use a central venous access catheter insertion checklist.

__ Raise the bed to waist level before providing care.

__ Perform hand hygiene.

__ Place the patient in a supine flat position, with the arm extended at a 90-degree angle away from the body. If necessary, raise the head of the bed for patient comfort.

__ Assess the patient's upper extremities and chest for a contraindication to PICC placement.

__ If you're using ultrasound, disinfect the probe with an antiseptic wipe and place a disposable cover on it.

__ Perform hand hygiene.

__ Put on gloves.

__ Apply ultrasound gel to the patient's arm and use the probe to locate the veins, arteries, and nerves.

__ Without a tourniquet, assess veins for size, path, shape, and compressibility.

__ Mark the expected insertion site on the outer aspect of the arm.

__ Remove the ultrasound gel from the patient's skin using a gauze pad.

__ Using a clean disposable measuring tape, measure the upper-arm circumference of the selected extremity.

__ Measure the distance from the intended insertion site to the desired terminal tip location depth.

__ Clean the intended insertion site with a washcloth and soap and water if it's visibly soiled and dry with a towel.

__ If needed, remove excess hair from the insertion site using single patient–use scissors or disposable-head surgical clippers.

__ If you're using a topical anesthetic cream, as ordered, apply it to the insertion site following safe medication administration practices, cover the site with a transparent semipermeable dressing, label the dressing, and wait the allotted time. Return the bed to its lowest position, remove your gloves, and perform hand hygiene. After the wait time has passed, raise the bed to waist level, perform hand hygiene, put on gloves, remove the dressing, wipe off the cream, and evaluate its effectiveness.

__ Remove and discard your gloves.

__ Perform hand hygiene.

__ Place a fluid-impermeable pad under the arm.

__ Put on a surgical head cover, protective eyewear, and a mask.

__ Perform hand hygiene.

__ Disinfect your work area using a facility-approved disinfectant and then allow it to dry.

__ Prepare a sterile field using a sterile drape.

__ Set up the PICC supplies on the sterile field.

__ If you didn't use a topical anesthetic, prepare a local anesthetic injection, as ordered.

__ Label all medications, medication containers, and other solutions on and off the sterile field.

__ Perform hand hygiene.

__ Put on a sterile gown and two pairs of sterile gloves.

__ Follow the manufacturer's instructions for using the stylet wire and, if necessary, altering the device length.

__ Prepare the catheter according to the manufacturer's recommendations, and flush the device and extension set (if needed) with preservative-free normal saline solution.

__ Place the catheter on the sterile field.

__ Place a sterile drape under the patient's arm. Place the drape under the shoulder if you're using the external jugular site.

__ Prepare the insertion site using an antiseptic agent (alcoholic chlorhexidine gluconate solution containing at least 2% chlorhexidine gluconate preferred; if contraindicated, use an iodophor [such as povidone-iodine] or 70% alcohol). Allow the solution to dry completely without fanning, wiping, or blowing. For alcoholic chlorhexidine gluconate solution, apply with an applicator using a gentle back-and-forth motion for 30 seconds. Allow the area to dry completely. For povidone-iodine solution, apply using a swab. Begin at the intended insertion site and move outward in concentric circles. Allow the solution to dry completely (typically at least 2 minutes).

__ Apply a single patient–use tourniquet about 4" (10 cm) above the antecubital fossa. Check for an arterial pulse.

__ Remove and discard your outer set of gloves.

__ Place a full body drape over the patient from head to toe, covering everything except the insertion site. Alternatively, if the patient can't tolerate having the face covered, tent the drape and have the patient wear a mask or turn the head away from the insertion site.

__ If you're using ultrasound, place a sterile probe cover on the ultrasound probe. If you're using a locator system, follow the manufacturer's directions for use.

__ Conduct a time-out immediately before starting the procedure.

__ If you're using ultrasound, apply sterile ultrasound gel to the probe and use it to locate the appropriate vein as well as the adjacent artery and nerve. Verify the vein is nonpulsatile and compressible.

__ If you didn't use topical anesthetic cream, anesthetize the area with a local anesthetic, following safe medication administration practices.

__ While visualizing the vessel, perform a venipuncture using the microintroducer needle. Observe for a blood return.

__ Put the ultrasound probe down on the sterile field.

__ Reduce the angle of the microintroducer needle and stabilize it.

__ Insert the guidewire into the microintroducer needle and advance it carefully.

__ Remove the microintroducer needle gently.

__ If necessary, make a small skin nick at the insertion site.

__ Thread the dilator-introducer over the guidewire until you're sure the tip is well within the vein.

__ Remove the guidewire and place it on the sterile field.

__ Release the tourniquet.

__ Confirm the preinsertion measurement for the desired catheter insertion depth.

__ Carefully separate and remove the dilator from the introducer while holding the introducer still.

__ If you're using a locator system, activate it and follow the manufacturer's directions, or use electrocardiogram-guided technology. Advance the catheter at a slow, steady pace until it's in position at the premeasured length.

__ If you aren't using a tip-locator system, withdraw the stylet wire from the catheter lumen using air embolism precautions.

__ Attach a prefilled syringe with preservative-free normal saline solution and aspirate for a blood

return. If you obtain a blood return, flush the catheter.

__ Peel the introducer away from the catheter while pulling away from the insertion site.

__ If appropriate, connect a primed extension set to the catheter hub.

__ Attach a needleless connector to each lumen.

__ Apply a disinfectant-containing end cap to the end of the needleless connector, if available.

__ Secure the catheter with an integrated securement device, subcutaneous anchor securement system, tissue adhesive, or adhesive securement device, if available. Guidelines recommend an additional securement method beyond the primary dressing. Sutures should be avoided whenever possible.

__ Apply a sterile 2" × 2" (5- × 5-cm) gauze pad directly over the site (if necessary) and a sterile transparent semipermeable dressing over the gauze pad.

__ Lock the catheter with the prescribed locking solution or as directed by your facility.

__ Return the bed to the lowest position.

__ Discard used supplies in appropriate receptacles.

__ Remove and discard your gloves and personal protective equipment.

__ Perform hand hygiene.

__ Label the dressing with the date you performed the procedure or the date the dressing is next due to be changed as directed by your facility.

__ Obtain a chest X-ray, if ordered.

__ Perform hand hygiene.

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

__ Clean and disinfect reusable equipment according to the manufacturer's instructions.

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

__ Perform hand hygiene.

__ Document the procedure.

Procedure: Peripherally inserted central catheter (PICC) removal

Checklist: Peripherally inserted central catheter (PICC) removal

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

Peripherally inserted central catheter (PICC) removal

Objective: To remove a PICC according to the standard of care.

Checklist Step	Comments
Y- Meets; N- Does not meet; I- Not Applicable	
__ Verify the practitioner's order.	
__ 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 their individual communication and learning needs.	
__ Raise the bed to waist level before providing care.	
__ Perform hand hygiene.	
__ Place the patient in a supine flat or Trendelenburg position, unless contraindicated.	
__ Assess the patient's vital signs, oxygen saturation level using pulse oximetry, and neurologic status.	
__ Perform hand hygiene.	
__ Put on gloves and, as needed, other personal protective equipment.	

__ Trace the catheter from the patient to the point of origin.

__ Discontinue any IV infusions, and document the volume infused.

__ Place a fluid-impermeable pad under the patient's arm.

__ Teach the patient how to perform the Valsalva maneuver, unless contraindicated.

__ Instruct the patient to turn their head away from the insertion site, if able.

__ Stabilize the catheter at the hub with one hand.

__ Carefully remove the dressing with your other hand, beginning at the device hub and gently pulling the dressing perpendicular to the skin toward the insertion site.

__ If a securement device holds the catheter in place, remove the device. If sutures are securing the catheter, carefully cut and remove them.

__ Assess the site for signs of infection, including swelling, drainage, redness, and inflammation. Be aware that skin alterations can appear more subtle in patients with dark skin tones. Use proper lighting, and always compare affected areas to nonaffected areas on the patient.

__ Apply gauze to the insertion site and slowly withdraw the catheter using gentle, even pressure. If you meet resistance, don't remove the catheter forcibly.

__ If you meet resistance during catheter removal, stop the removal procedure, cover the catheter site with a sterile dressing, perform interventions, reattempt removal after 15 to 30 minutes, and consult with the practitioner, as needed.

__ As you withdraw the final catheter segment, have the patient perform the Valsalva maneuver. If contraindicated, use the Trendelenburg or left lateral decubitus position or have the patient hold the breath, as applicable.

__ Apply manual pressure to the site and just above the site with a sterile gauze pad for a minimum of 30 seconds or until you achieve hemostasis.

__ Cover the site with petroleum-based ointment and a sterile dressing.

__ Assess the integrity of the removed catheter. Measure and inspect the catheter. If you note damage, notify the practitioner immediately and monitor for signs and symptoms of catheter embolism.

__ Return the bed to the lowest position.

__ Instruct the patient to remain in a flat or reclining position, if able, for 30 minutes after removal.

__ Monitor the patient's vital signs, oxygen saturation level using pulse oximetry, and neurologic status according to the patient's condition and as recommended by your facility. Compare to baseline findings.

__ Discard used supplies in appropriate receptacles.

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

__ Perform hand hygiene.

__ Document the procedure.

Procedure: IV - Peripheral IV Placement Using Ultrasound (MUNSON)

Checklist: IV - Peripheral IV Placement Using Ultrasound (MUNSON)

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

IV - Peripheral IV Placement Using Ultrasound (MUNSON)

Revised 6.20.2025
☐Verify patient identification and provider order.
☐Explain procedure to patient and obtain verbal consent.
☐Perform hand hygiene. Use aseptic technique and observe standard precautions throughout procedure.
☐Gather supplies: gloves, ultrasound machine, individual packets of sterile ultrasound gel, gauze, tourniquet, chloraprep, primed extension set, IV cannula (may need to use longer 1.88" 20g), transparent dressing and tape.
☐Position patient for comfort and equipment for visualization.
☐Clip excess hair if indicated.
☐If unable to locate vein for cannulation, apply sterile gel to ultrasound probe and use ultrasound to visualize vein by positioning probe at a 90 degree angle to the skin surface with transducer perpendicular to patient.
☐Locate arteries and veins by moving the probe over the vessels and analyze the compression quality of the vessel walls.
☐Don gloves.
☐Disinfect site using chloraprep for 15 seconds or alcohol for 30 seconds. Allow to dry for 30 seconds.
☐Apply sterile ultrasound gel to probe and position probe at site to visualize vein, **taking care not to contaminate intended puncture site.**
☐Locate arteries and veins by moving the probe over the vessels and analyze the compression quality of the vessel walls. Consider depth of vein when choosing device. Do not attempt veins deeper than 1.5cm. Use longer 1.88" device to ensure 2/3 of catheter length will reside in vein after insertion. (Vessels deeper than 0.5cm have increased risk for inadvertent infiltration due to use of short catheters.)

☐Clean gel from patient's arm.
☐Perform hand hygiene.
☐Apply bead of ultrasound gel to probe and cover with TSM dressing or probe cover and avoid contamination of area that will come in contact with patient's skin.
☐Glove. Apply tourniquet. Disinfect site.
☐Apply sterile ultrasound gel to probe or skin and position probe at site to visualize vein.
☐Using non-dominant hand, center the probe on the access site with vessel appearing between depth markings on ultrasound screen. Verify it is nonpulsatile.
☐Using dominant hand, insert cannula bevel-up, through the skin at an angle appropriate for the vein depth while observing needle enter the vein on ultrasound. Move the ultrasound probe and needle in the same direction, keeping the needle tip in view on the screen as the catheter approaches the vein. Observe dimpling of tissue and vein wall as needle tip approaches and enters the lumen of the intended vessel. Keep gel and probe away from the sterile catheter. (Tip of catheter stylet will appear as white dot on the screen).
☐Align the path of the needle to enter the centermost superficial area of the vein wall and observe the needle tip entering the lumen of the vein.
☐Observe for blood return within flashback chamber. If pulsatile, abort procedure and apply pressure for at least 5 minutes to area until hemostasis achieved.
☐Lower angle of cannula and continue to advance cannula slightly into the vein. Follow progress of needle/cannula with ultrasound.
☐Holding stylet steady, advance cannula off stylet and into vein until cannula hub is situated against the skin. Release the tourniquet.
☐Secure extension tubing. Optional: If blood is to be drawn from device, see policy for blood sampling. Using sterile 4x4, remove excess ultrasound gel. Repeat chloraprep if necessary.
☐Apply securement device and transparent dressing over insertion site to anchor cannula. Label with date, initials, gauge, and length of the device.
☐Secure primed extension tubing and flush. Ensure ease of flush and verify blood return.
☐Discard supplies in appropriate receptacles. Remove gloves and perform hand hygiene.
☐Disinfect ultrasound machine.
☐Document in electronic medical record