ED/UC URGENT ACCESS ALGORITHM

Inclusion Criteria:
Actual or impending hemodynamic instability without intravenous access, including sepsis yellow or STAT, and other medical and traumatic emergencies

Exclusion Criteria:
Stable hemophilia patient (give factor first)

Urgent Access Needed

Central line preferred for:
1. Pressors
2. Antibiotics

Peripheral access preferred for:
1. Fluid Resuscitation

Either form of access may be used if it is the only access available in an emergency

Pre-existing central line (e.g. Mediport, Broviac, Power PICC, etc.)?

Yes → See central line algorithm on page 2

No

Altered mental status or impending arrest?

Yes → Consider placing IO* or EJ* while simultaneously attempting PIV and/or consider early central line access

No

Review expertise of team*; identify who is most likely to be successful (e.g. nurse, provider, tech)

! Don't wait to start antibiotic; give fluids and antibiotic simultaneously if necessary

Attempt to place IV

!
- No EMLA
- No Jtips
- No Lidocaine added to Ceftriaxone

5 min

IV attempt successful?

Yes → Give fluids and antibiotic ASAP if indicated → Consider 2nd PIV

No

10 min

While making additional attempt, obtain supplies for Difficult Access Option(s) of choice

45 min

If no access obtained within 45 minutes and antibiotic is indicated, prepare IM Ceftriaxone or IM Cefepime

Access obtained?

Yes → Administer timely IV antibiotic if indicated

No → Administer IM Ceftriaxone or IM Cefepime if indicated

! If possible thrombocytopenia use 23g & apply 10 minutes of direct pressure

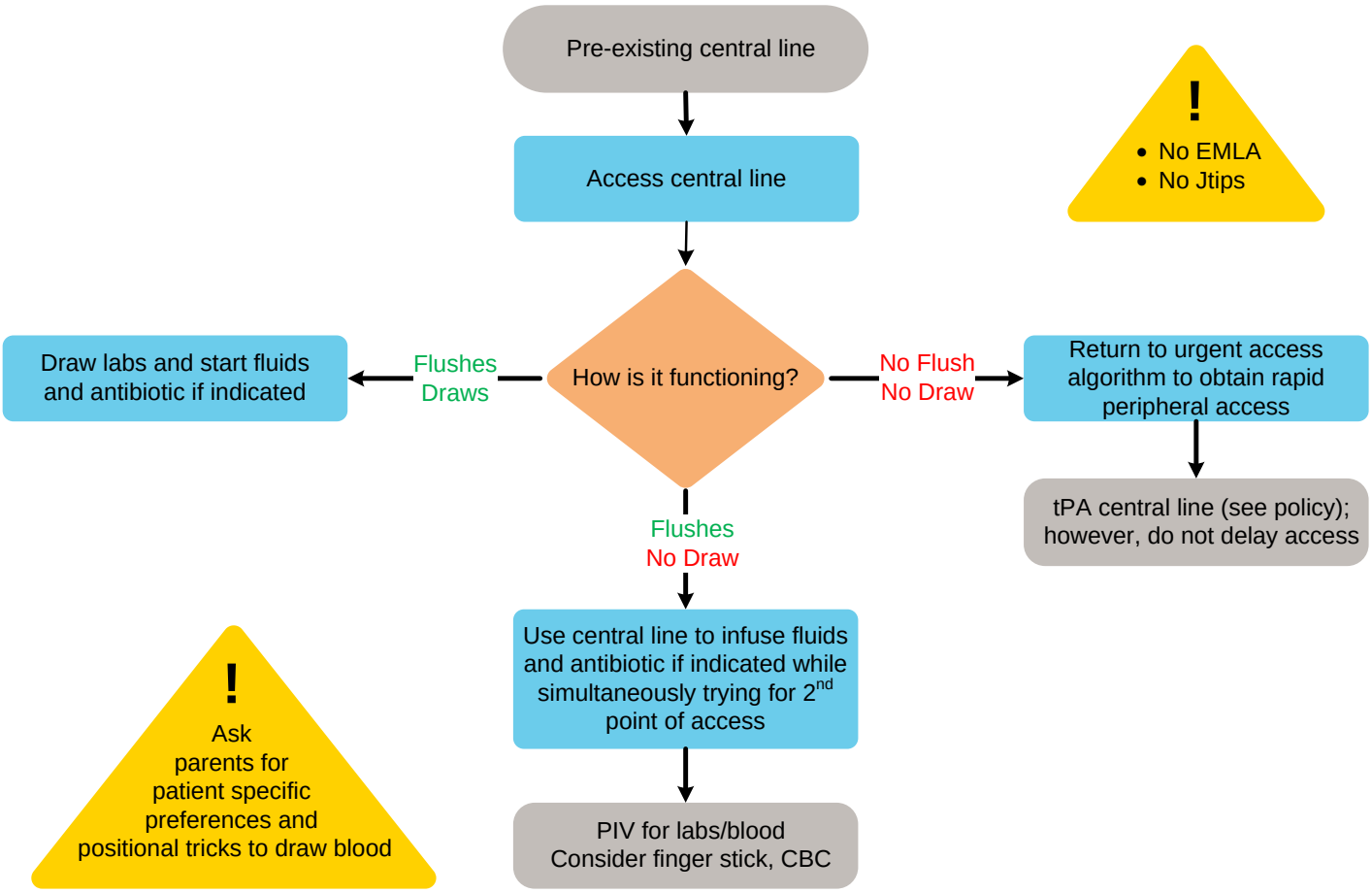
60 min

Difficult Access Options:
- Warming
- 2nd provider
- Consider alternate sites: scalp vein, EJ*, saphenous, umbilical
- Vein finder
- Ultrasound*
- IO*
- IM Ceftriaxone or IM Cefepime
- Consider femoral line/introducer (cordis) if comfortable

Difficult Access Resources:
- Such as charge nurse, resource nurse, anesthesia, NICU, PICU

*See training requirements in ED/UC Urgent Access resource document

ED/UC URGENT ACCESS ALGORITHM FOR PRE-EXISTING CENTRAL LINE



A Power Port/Broviac is the only central line appropriate for high pressure fluids

DIFFICULT ACCESS TIPS & TRICKS

TABLE OF CONTENTS

PIV TIPS & TRICKS

WARMING

- Heel warmers
- Wrap entire extremity in warm blanket
- Warming lamp

POSITIONING

- Lower the extremity to encourage filling of the venous system
- Towel roll under arm for antecubital access

SITE SELECTION & SIZING

- Select the most proximal, largest, and most favorable appearing vein
- Largest gauge is preferred
- Consider using transilluminator for site selection, https://www.youtube.com/watch?v=CGVbo3uKiLU
- A 24g is not appropriate for IV contrast and blood, a 20g is preferred
- The following table shows what is considered a large bore IV based on weight:

	Newborn/ Small Infant (3-5 kg)	Infant (6-9 kg)	Toddler (10-11 kg)	Child (12-31 kg)	Adult (≥ 32 kg)
IV Catheter (G)	22	22	20	18	16

- Be cognizant of the maximum infusion rates based on catheter size as seen in the table below:

IV Gauge	Max Rate in ml/min	500ml bolus	1000ml bolus
24g	20ml/min	25 min	50 min
22g	35ml/min	14 min	28 min
20g	65ml/min	7.5 min	15 min
18g	105ml/min	5 min	10 min
16g	220ml/min	2.25 min	4.5 min
14g	330ml/min	1.5 min	3 min

- Consider rapid infusion catheter (RIC) over existing 20g or larger PIV; RIC may only be placed by provider

SKIN PREP

- Use chloraprep
- 30 second scrub time
- 30 second dry time

ADMINISTERING FLUIDS

- Can run pressors through PIV or IO until central line access can be obtained
- Options for administering fluid rapidly: push pull, pressure bag, rapid infuser/level 1/Belmont
- Run fluids through in line warmer if giving fluids rapidly
- Remember to use a large bore pressure rated T or Y-connector because a standard bore T or Y-connector will slow infusion speed
- See fluid resuscitation guidelines for additional information

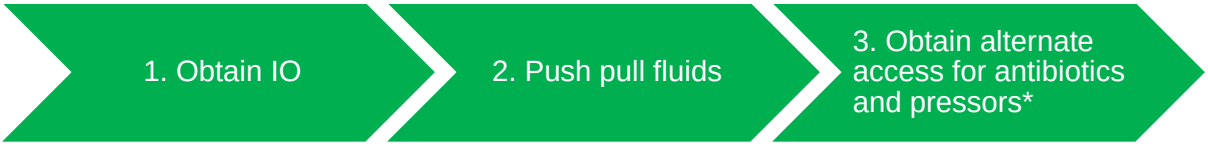
EZIO TIPS & TRICKS

DO NOT DELAY establishing IO access during the resuscitation of a critically ill or injured child if no IV access is already in place.

See Intraosseous Needle Placement Policy for complete list of instructions.

- IO access can be performed safely in **all ages** and can be often achieved in 30-60 seconds.
- IO delivers fluids and medications to the central circulation in seconds.
- **Most often, the blue IO needle will be the appropriate size. The weight based sizing on the needle packaging can be misleading.**

- Infusion of fluids/medications may require pressure. Back pressure from the IO catheter generally exceeds 300mmHg. Start infusion with a pressure system (pressure bag, push-pull/LifeFlow, or rapid infuser). Start slow and increase rate incrementally. Max rate for IO is 40- 80ml/min(2400-4800ml/hr).



* Delivery by infusion pump is difficult due to pressure alarms

- Check for signs of infiltration posterior to insertion site (fluids will collect posteriorly).
- Continually assess site during infusion.
- If no EZIO needle is available, manual IO needles are available in the code cart.

SITES

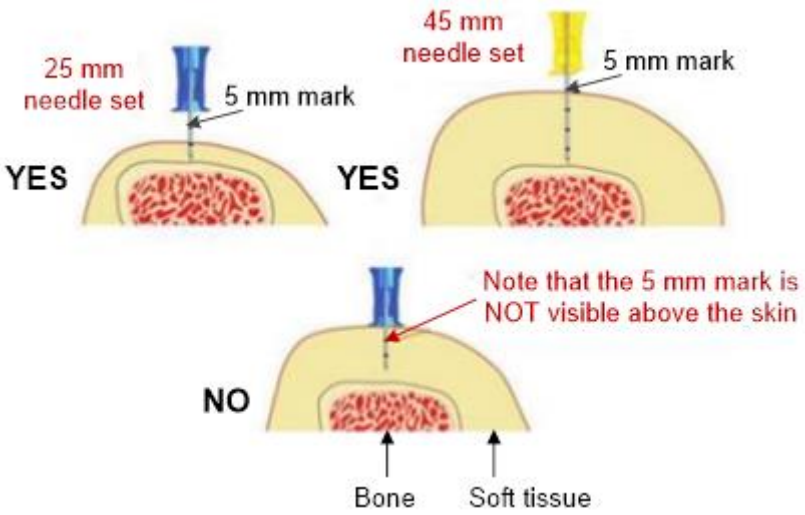
1 Bone 1 Attempt!

- Proximal tibia (medial tibial plateau, just below the growth plate)
  - Position leg with slight external rotation
  - Identify tibial tuberosity (just below knee joint)
  - 1-3cm (1 finger width) below and medial to tibial tuberosity
- Distal tibia just above the medial malleolus
- Distal femur
- Anterior superior iliac spine
- Proximal humerus (best in post-pubescent adolescents and adults)

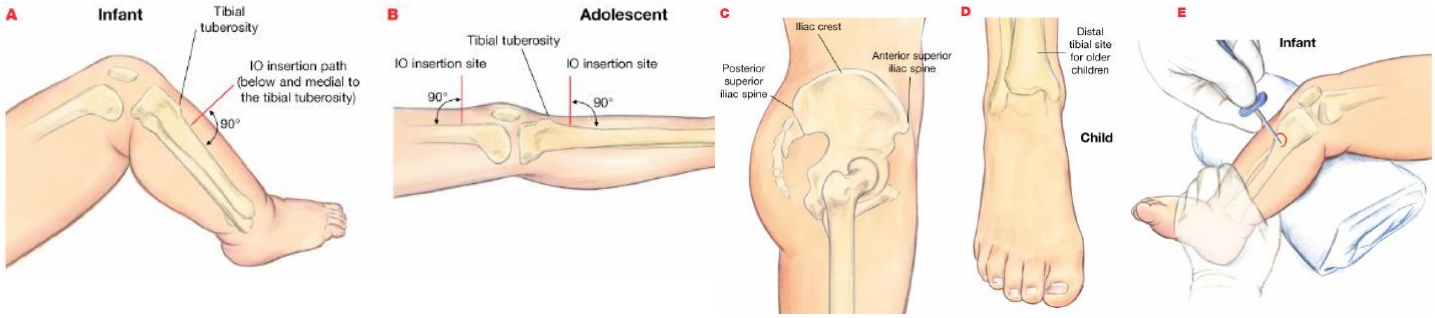
PLACEMENT TIPS & TRICKS

Choose your site and prep skin as you would for PIV placement.

- Place needle through skin perpendicular to the bone to confirm proper needle size, there should be at least one black line (on needle) visible once the needle is placed through the skin to the bone.



- Penetrate the bone cortex by squeezing the trigger and applying gentle consistent downward pressure.
- Release trigger when a sudden give, or pop is felt upon entry to the medullary space and the desired depth is obtained. *A second pop suggests penetration of the posterior bone cortex, which means you have gone too far*.
- Once in place the needle should stand like a nail in a board (no wiggling).
- Aspirate bone marrow to verify correct space.
- Strong flush catheter with 10-20ml flush to ensure patency (if patient is awake this will be painful). If slow, flush with another 10-20mls.



CONTRAINDICATIONS

- Fractures or crush injuries near the access site
- Fragile bone conditions ie: Osteogenesis Imperfecta (OI)
- Previous attempts to establish access in same bone
- Infection present in overlying tissue

TRAINING SPECIFICATIONS

- Nurses: with documented competency
- Providers: yes
- Techs: no

EXTERNAL JUGULAR (EJ) VENOUS ACCESS TIPS & TRICKS

The external jugular vein provides another portal to the venous circulation and is no different than extremity PIV access.

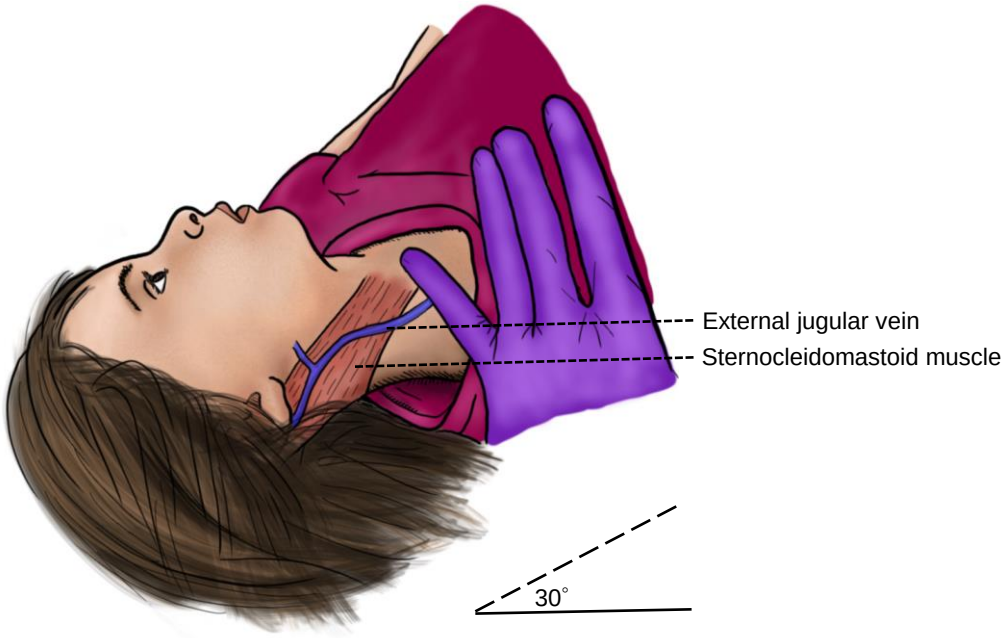
- The external jugular vein begins at the level of the mandible and it runs obliquely across and superficial to the sternocleidomastoid muscle.
- 2 sets of valves within the EJ: one at the entrance of the subclavian vein and the other 4cm above the clavicle in an adult. The exact location in children varies.
- **Enter the skin parallel to the vein and then access the EJ from the side rather than the top since it has poor underlying support and is easily compressed.**

Place the child in a 30° head down position (Trendelenberg) with the head turned away from the side to be accessed. Patient's left-side is preferred site for EJ placement if potential ECMO candidate.

Auscultate bilateral breath sounds before and after the procedure.

Identify the external jugular vein.

- Cleanse venipuncture site using chloraprep sponge with vigorous side-to-side prep and allow to dry.
- Lightly place a finger of the non-dominate hand just above the clavicle to produce a tourniquet effect.
- Use the thumb of that same hand to pull traction above the puncture site.
- Puncture the vein midway between the angle of the jaw and the clavicle and cannulate the vein in a shallow and superficial manner.
- Dress as you would a PIV. Add large bore connector and consider adding extension tubing for easier access.



Positioning of patient for cannulation of internal or external jugular (Trendelenberg position)

CONTRAINDICATIONS

- C-spine precautions in place

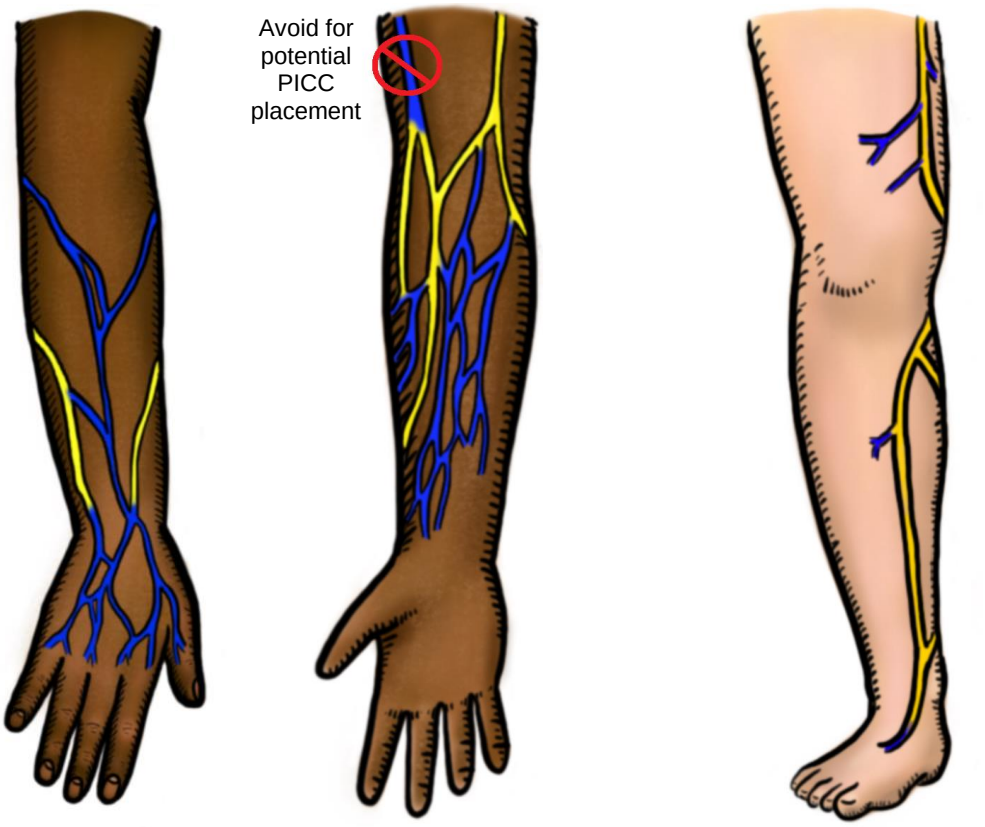
TRAINING SPECIFICATIONS

- Nurses: yes
- Providers: yes
- Techs: no

ULTRASOUND GUIDED PIV TIPS & TRICKS

Consider ultrasound for any peripheral access including EJ. Ultrasound can aid in accessing deeper veins that are not visible or palpable.

Know your anatomy. Knowing where the veins are will speed up the time it takes to get access. See suggested access points highlighted in yellow below.



Yellow access points are suggested

Make sure you have long enough catheters to access the deeper veins. Veins that are 1 cm deep will require at least a 1 ¾ inch IV catheter. Have a supply of longer IV catheters. Also, think outside of the box, you can get the saphenous high up on the leg, near the knee.

Avoid medial aspect of upper arm; reserve the cephalic vein for potential PICC line.

Know your resources: PICC team and anesthesia are the hospital experts on ultrasound guided access.

When drawing blood cultures use sterile gel.

TRAINING SPECIFICATIONS

- Nurses: with documented competency
- Providers: yes
- Techs: no

CENTRAL LINE ACCESS, MEDIPORT TIPS & TRICKS

First always determine if it's a power-port. Power-ports have 3 bumps in triangle formation and require a special power port needle. If time allows, you can also check Epic LDA report for line type and size.

When preparing to access the mediport, waste 4 ml's from the sterile syringe, priming tubing. This allows the ability to pull back blood without flushing.

Do not push against resistance.

Withdraw Heparin in mediport.

If the mediport does not draw, then flush with the saline and reattempt to draw blood.

If you are having difficulty drawing the blood, ask the parent/patient if there are any positional tricks that have helped with blood draws.

RELATED DOCUMENTS

CHCO CLINICAL POLICIES & PROCEDURES

- Peripheral Intravenous (PIV) Catheter: Placement, Care, and Removal
- Intravenous (IV) Therapy and Medication Administration
- Intraosseous Needle Placement
- Fluid/Blood Warmers and Rapid Infusers: Set-Up, Use and Maintenance
  - Fluid Resuscitation Guidelines

REFERENCES

1. Castro, D. EZ-IO Insertion. 2015. Available at: https://www.slideshare.net/drcastro75/ezio-50225283. Accessed August 30, 2018.
2. American Heart Association. Vascular Access Procedures. 2006. Available at: https://co.grand.co.us/DocumentCenter/View/613/Vascular-Access-Procedures. Accessed August 30, 2018.