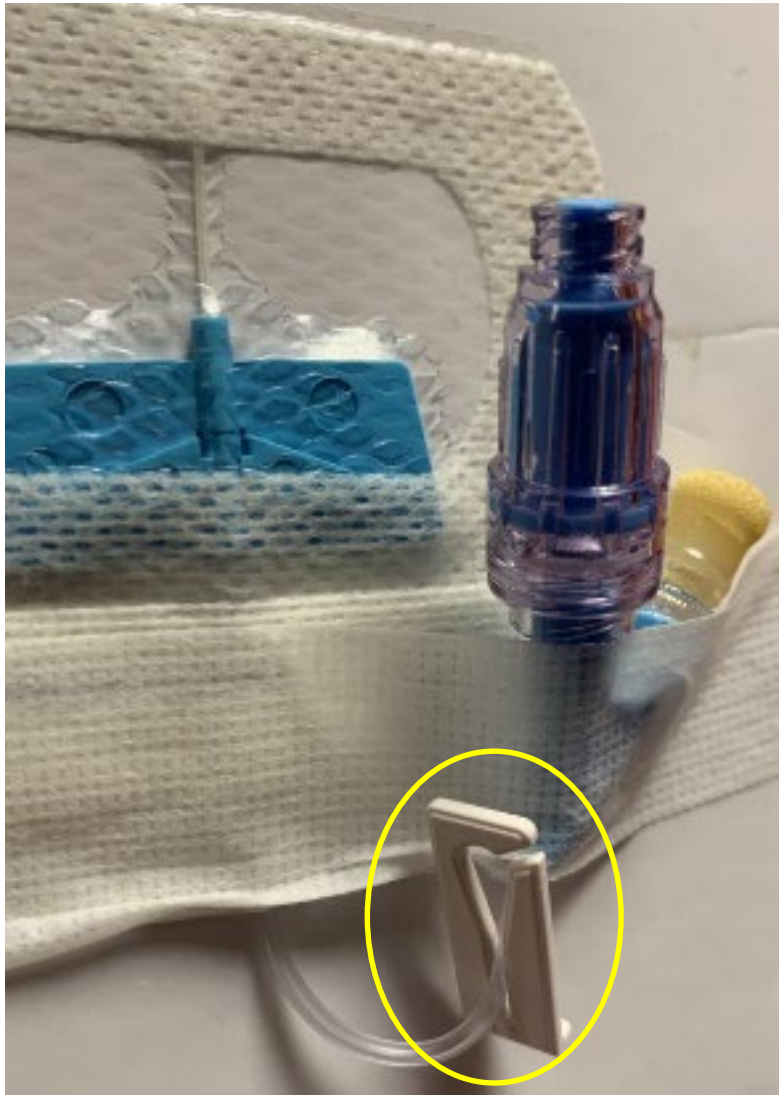
Venous Access Device Flushing and Clamping Sequence: ***Edited for targeted application by CLABSI Task Force***

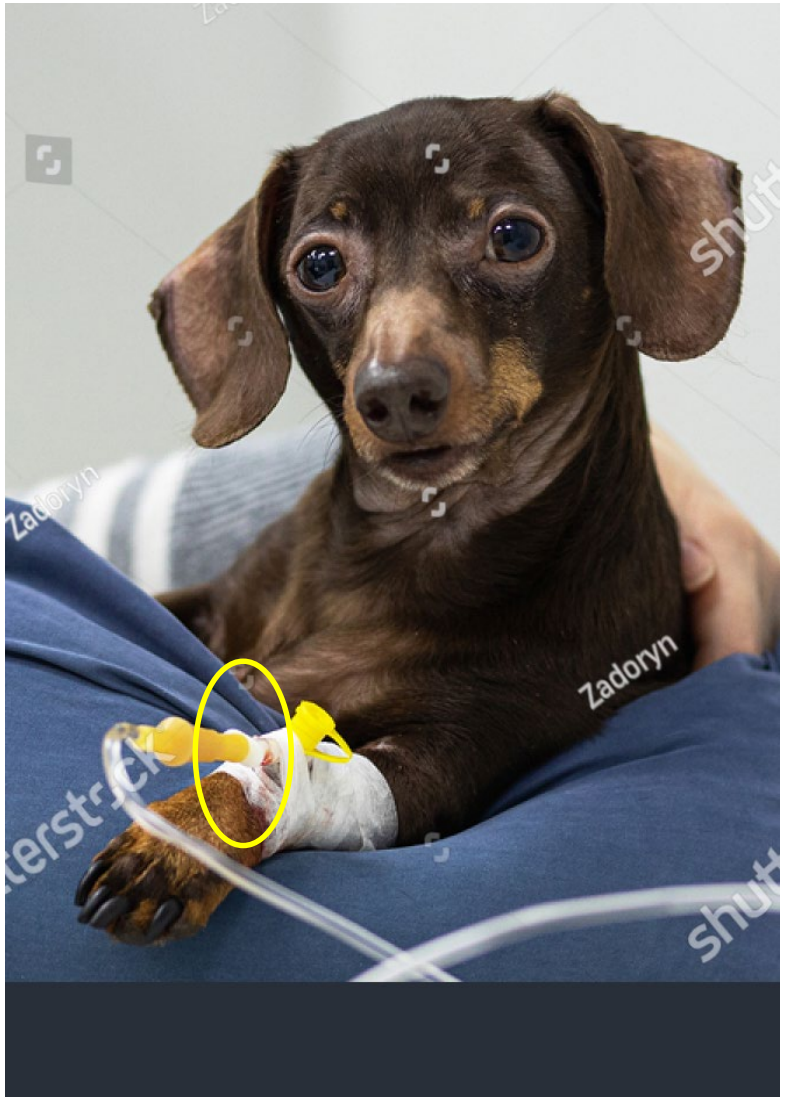
Vascular Access Team

and

CLABSI Task Force

September 15th, 2021





Effective immediately, all venous access lines must be clamped when not in use.

Points of Emphasis

ALL Venous Access Devices (VADs), both peripheral and central, must be clamped when not in use.

This will help prevent potentially life-threatening air embolism, exsanguination, or ***Catheter-Associated Bloodstream Infections.***

PRACTICE ALERT

Clamping Intravenous Catheters When NOT in Use

To prevent patient injury in case of accidental disconnection, all intravenous catheters (central and peripheral) MUST BE CLAMPED when *not in use*.

Unclamped lines could result in:

- **Air embolism**
- **Blood loss**
- **Contamination**

The practice of clamping lines aligns with manufacturer instructions for use and Infusion Nurses Society guidelines.

When flushing and clamping intravenous lines, sequence is important!

PROPER FLUSHING*/CLAMPING SEQUENCE:

Type of Needleless Connector	Flushing/Clamping Sequence
Neutral pressure needleless connector 	Flush → disconnect or clamp in no particular order
Positive pressure needleless connector  	Flush → disconnect syringe → clamp

***Always use push/pause technique or pulsatile flushing when flushing IV lines**

Questions? Contact the IV Team Resource RN on Voalte or on beeper 26571

Helpful information on use of MaxPlus needleless connectors can be found here.

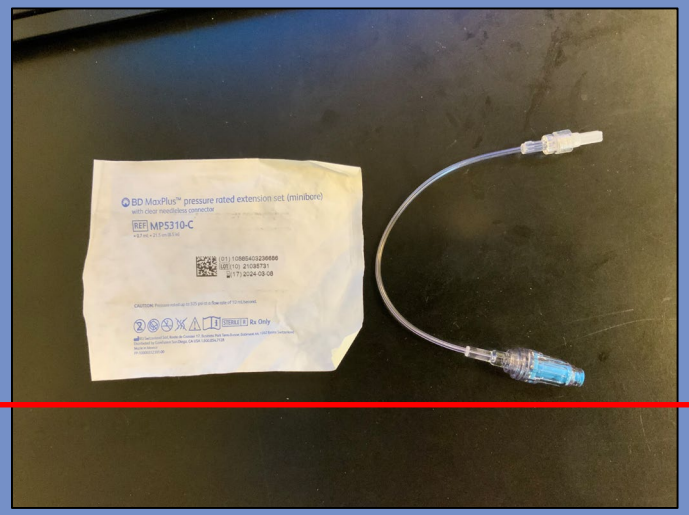
MASSACHUSETTS GENERAL HOSPITAL
PCS QUALITY, SAFETY & PRACTICE

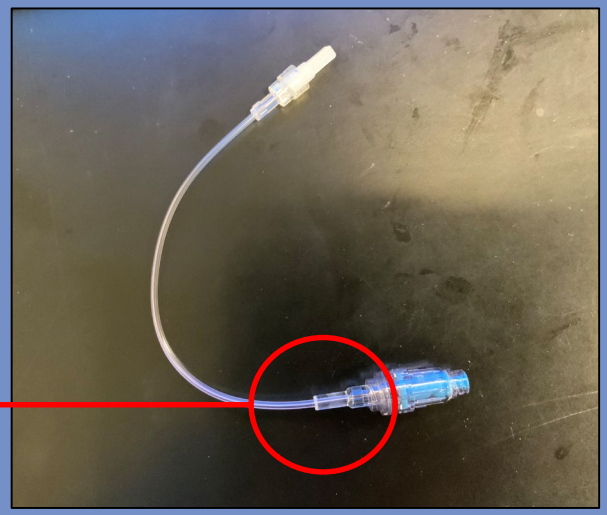
April 8, 2021

Differences between MaxPlus extension sets @ MGH

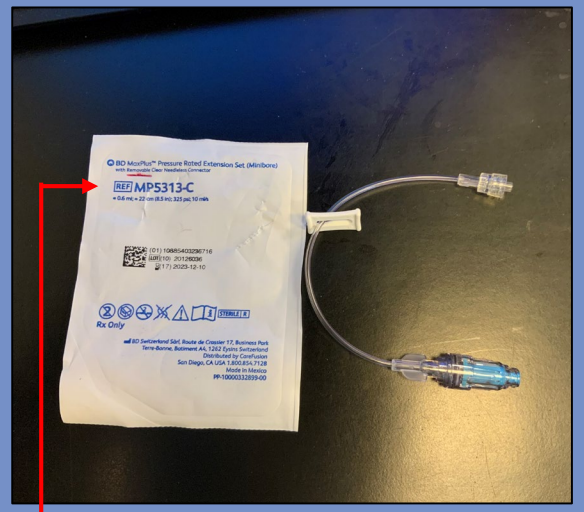
Standard stock item on inpatient units: (No Clamp needed on tubing)
BD MaxPlus minibore ext. set (MP5310-C)

- Needleless connector fused to tubing (Not removable)
- Does not come with a clamp (not needed on extension set since cap is non-removable)
- No distal wing design



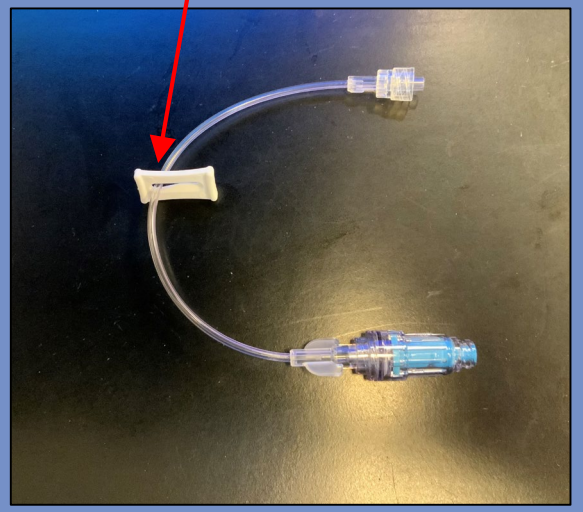


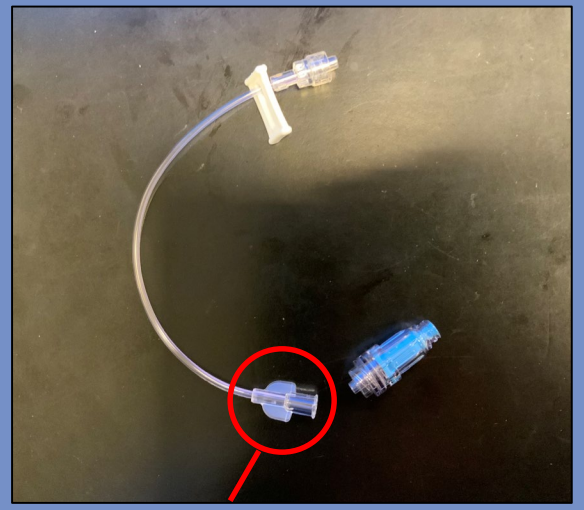
Auto-Sub (Only when above item is on backorder):
BD MaxPlus minibore ext. set with removable needleless connector (MP5313-C)



- Packaging states “Removable connector”

- Comes with a clamp





- Distal wing designed to grip / stabilize tubing when removing needleless connector

When and **Why** Flush?

WHEN:

- VADS are aspirated for blood return and then flushed prior to each infusion.

WHY:

- Any residual blood can serve as a source for infection.

See below policy regarding routine flush of central venous catheters

https://hospitalpolicies.ellucid.com/documents/view/15623

Table 1 - Adult Central Venous Access Device (CVAD) In Use

Type of CVAD	Volume of Saline per Lumen	Frequency per Lumen
PORT ACCESSED – IN USE • Port-a-caths • Power Ports • Pas- ports	• Minimum 10mL and maximum 20 mL Normal Saline following a medication infusion • Minimum 20mL and maximum 30 mL Normal Saline following a blood sample or blood transfusion • Minimum 10mL and maximum 20 mL Normal Saline *at least* every 24 hours	After completion of any infusion or blood sampling or at least every 24 hours.
TUNNELED CATHETERS – IN USE • Hickman/Broviac	• Minimum 10mL and maximum 20 mL Normal Saline following a medication infusion • Minimum 20mL and maximum 30 mL Normal Saline following a blood sample or blood transfusion • Minimum 10mL and maximum 20 mL Normal Saline at least every 24 hours	After completion of any infusion or blood sampling or at least every 24 hours.
SMALL BORE TUNNELED CATHETERS - IN USE	• Minimum 10mL and maximum 20 mL Normal Saline following a medication infusion • Minimum 20mL and maximum 30 mL Normal Saline following a blood sample or blood transfusion • Minimum 10mL and maximum 20 mL Normal Saline at least every 24 hours	After completion of any infusion or blood sampling or at least every 24 hours

Table 1 - Adult Central Venous Access Device (CVAD) In Use

TRIALYSIS CATHETER - IN USE A hemodialysis catheter with 3 lumens. **The "pigtail" lumen is treated as small bore tunneled catheter.** The dialysis lumens are labeled and managed by HD **If there are questions, contact Dialysis Nursing x63700**	• Minimum 10mL and maximum 20 mL Normal Saline following a medication infusion • Minimum 20mL and maximum 30 mL Normal Saline following a blood sample or blood transfusion • Minimum 10mL and maximum 20 mL Normal Saline at least every 24 hours	After completion of any infusion or blood sampling or at least every 24 hours
PICCS AND POWER PICC (e.g. Bard Power PICC) **IN USE**	• Minimum 10mL and maximum 20 mL Normal Saline following a medication infusion • Minimum 20mL and maximum 30 mL Normal Saline following a blood sample or blood transfusion • Minimum 10mL and maximum 20 mL Normal Saline at least every 24 hours	After completion of any infusion or blood sampling or at least every 24 hours

Table 1 - Adult Central Venous Access Device (CVAD) In Use

Type of CVAD	Volume of Saline per Lumen	Frequency per Lumen
PHERESIS CATHETERS – IN USE **Pheresis catheters are large bore catheters used in bone marrow transplant and in BTS apheresis procedures,** they are managed BTS nursing and oncology unit staff. **NOTE**: • May be confused with a Hickman or dialysis catheter. • Certain Pheresis catheters may be used for HD **Caution:** concentrated anticoagulant used in Pheresis catheters must be withdrawn prior to catheter use.	• Minimum 10mL and maximum 20 mL Normal Saline following a medication infusion • Minimum 20mL and maximum 30 mL Normal Saline following a blood sample or blood transfusion • Minimum 10mL and maximum 20 mL Normal Saline at least every 24 hours	After completion of any infusion or blood sampling or at least every 24 hours
MULTI-LUMEN NON-TUNNELED CATHETERS – IN USE	• Minimum 10mL and maximum 20 mL Normal Saline following a medication infusion • Minimum 20mL and maximum 30 mL Normal Saline following a blood sample or blood transfusion • Minimum 10mL and maximum 20 mL Normal Saline at least every 24 hours	After completion of any infusion or blood sampling or at least every 24 hours
MIDLINES – IN USE These catheters are not central lines; They are inserted into an upper extremity and the catheter tip ends in the basilic, cephalic, or brachial vein distal to the shoulder.	• Minimum 10mL and maximum 20 mL Normal Saline following a medication infusion • Minimum 20mL and maximum 30 mL Normal Saline following a blood sample or blood transfusion • Minimum 10mL and maximum 20 mL Normal Saline at least every 24 hours	After completion of any infusion or blood sampling or at least every 12 hours, when used for intermittent infusion

CENTRAL LINE FLUSHING AND LOCKING: INFORMATION FOR PEDIATRICS

HEPARIN FLUSHING REQUIRES AN ACTIVE ORDER THAT INCLUDES DOSE AND FREQUENCY

Flush: manual injection of 0.9% sodium chloride or so-called normal saline (NS) in order to clean the catheter.
Lock: injection of a limited volume of heparin following the catheter flush, for the period of time when the catheter is not used, to prevent intraluminal clot formation and/or catheter colonization.

Use the push/pause technique for flushing and locking central venous catheters.
Consideration should be given to flush CVC lumens connected to low rate infusions or so-called KVO's to promote catheter patency and prevent occlusion.
Do not flush any catheter with a syringe less than a 10 mL syringe size, as the increased pressure will raise the risk for catheter fracture.
We will no longer use 100u/mL heparin when de-accessing implanted ports.

TYPE OF CVL	CVL or PATIENT SIZE	FLUSH VOLUME 0.9% NaCl	LOCK SOLUTION AND VOLUME	FREQUENCY and NOTES
Implanted Port *Inpatient*	Less than 40 kg	3-5mL	3 mL 10 U/mL heparin	Q24H and prn after completion of infusion or blood sampling
	40 kg or more	5-10 mL	5 mL **0.9% NaCl NO HEPARIN**	Q6H and prn after completion of any infusion or blood sampling
Non-tunneled and Tunneled Central Venous catheters	Less than 40 kg	Less than 40 kg	3 mL 10 U/mL heparin	Q24H and prn after completion of any infusion or blood sampling
	40 kg or more	5-10 mL	5-10 mL **0.9% NaCl NO HEPARIN**	Q6H and prn after completion of any infusion or blood sampling
PICCs, Power Injectable PICCs	2 F Catheter	1 mL	1 mL 10 U/ml heparin	Q12H and prn completion of infusion or blood sampling
PICCs, Power Injectable PICCs	≥2.6 F Catheter	3-5 mL	2-3 mL 10U/mL heparin	Q12H or after completion of infusion or blood sampling
	40 kg or more	5-10 mL	5-10mL **0.9% NaCl NO HEPARIN**	Q6H and prn after completion of any infusion or blood sampling
ALL Pediatric Central Lines Terminal Flushing and Locking	Less than 40 kg	5 mL	3 mL 10 U/mL heparin	At discharge
	40 kg or more	5-10 mL	5 mL 10 U/mL heparin	At discharge

Neonatal CVC Flushing and Locking

TYPE OF CENTRAL VENOUS CATHETER	FLUSH VOLUME 0.9% NaCl	LOCK VOLUME Heparin 1OU/ml	FREQUENCY and NOTES
Non-tunneled and Tunneled Central Venous Catheters	1-2 ml	1-2 ml	Q12H and prn after completion of any infusion or blood sampling Use 1 ml minimum; may increase volume as irndicated by priming volume of extension tubing
Peripherally Inserted Central Catheters (PICC)	1-2 ml	1-2 ml *Single-lumen PICCs are not locked* *Unused lumens of double-lumen PICCs may be locked in certain situations*	Q6H and prn after completion of any infusion or blood sampling Use 1 ml minimum; may increase volume as irndicated by priming volume of extension tubing *Please refer to Neonatal PICC Guideline*
Umbilical Venous Catheter (UVC)	1-2 ml	1-2 ml *Unused lumens of double-lumen UVCs may be locked in certain situations*	Q6H and prn after completion of any infusion or blood sampling Use 1 ml minimum; may increase volume as irndicated by priming volume of extension tubing *Please refer to Umbilical Venous Catheters Management Guidelines*

Key CLABSI prevention measures

Perform hand hygiene

Needleless connector: disinfect **including the threads** with alcohol wipe (Chlorhexidine for PICU patients > 2 months of age) for a minimum of 15 seconds prior to **each** access

The above step can be bypassed if Curos cap has been in place for at least one minute

Flush using push/pause technique, which creates turbulence and therefore is the most effective way to clear a central line

New Admission

Patients being admitted to MGH with an existing VAD should have needleless connectors changed at time of initial assessment

In Conclusion…

- **Use** • Use proper hand hygiene
- **Clamp** • Clamp when not in use
- **Flush** • Flush after each access
- **Use** • Use push/pause flushing technique
- **Scrub** • Scrub the hub
- **Use** • Use Curos caps on all peripheral and central ports when a CVC is in place

References

- MGH Ellucid
- Infusion Nurses Society, INS Infusion Therapy Standards of Practice, 8th edition, 2021
- Infusion Nurses Society, Policies and Procedures, 2016