CAREPATHrx™
Specialty Pharmacy & Infusion Solutions

This Nursing Policy has been created by CarepathRx solely for its internal use and the use of its contracted clinical partners. All other use of this Nursing Policy is prohibited without express written permission. Published as a Nursing Policy, CarepathRx's clinical partners may adopt this policy subject to the partner's policy adoption processes.

This Nursing Policy has been created using resources that were current as of the "Reviewed" date noted at the beginning of the document. Clinicians should refer to the manufacturer's Prescribing Information (or equivalent), manufacturers' instructions for use and current INS, ACHC, and TJC STANDARDS for the most up-to-date information. While CarepathRx has published this Nursing Policy after a close review of available literature and a clinical review process, given the evolving nature and complexity of modern medical and pharmaceutical products and INS, ACHC, and TJC STANDARDS, CarepathRx does not and cannot warrant or guarantee that this Nursing Policy reflects the objectively best or highest standard of care at any given time.

Nothing within this Nursing Policy is intended to supersede or interfere with any individual clinician's decision-making or professional judgment with respect to the overall treatment plan for an individual patient.

CAREPATHrx™
Specialty Pharmacy & Infusion Solutions

# FLUSHING and LOCKING CATHETERS

**Section:** Nursing
**Compliance:** ACHC Infusion Pharmacy
**INS STANDARDS:** 8, 10, 11, 12, 13, 16, 17, 18, 20, 21, 36, 41, 59
**ACHC STANDARDS:** DRX2-10D, DRX5-1D, DRX5-5E, DRX7-8I, DRX7-21A
**TJC STANDARDS:** IC.02.01.01, MM.05.01.07, MM.06.01.01, MM.06.01.03, NPSG.01.01.01, PC.02.01.01, PC.02.01.03, PC.02.02.05, PC.02.03.01
**Policy ID:** NUR001
**Effective:** 1/1/21
**Reviewed:** 5/1/21
**Revised:** 12/12/22
**Approved by, Title and Date Approved:** Kathleen Patrick, President, 1/1/21, 5/1/21, 12/21/22

## I. POLICY

Flushing and locking of catheters are essential to ensure a well-functioning catheter. Flushing and locking of catheters prevent occlusion due to thrombolytic obstruction or precipitates. Flushing techniques and sufficient flushing volumes are essential to maintain catheter function, to prevent delays in treatment and decrease necessity for replacement. Vascular Access Devices (VADs) are flushed and aspirated for a blood return with each **nursing** VAD assessment. VADs are flushed after each infusion to prevent complications which may arise from incompatible medications and to clear the line. Each lumen of a VAD is locked after the final flush to decrease risk of occlusion. **DO NOT** use Heparin locking solution for Peripheral Intravenous Catheters (PIVCs). **Use only preservative-free solutions with neonates and infants to prevent toxicity. NEVER USE STERILE WATER FOR FLUSHING VADs**

## II. PROCEDURES

A. Supplies for Flushing and Locking:

1. Gloves
2. Preservative-free 0.9% sodium chloride prefilled syringe(s)
3. Locking solution (heparin prefilled syringe) **NOT FOR USE WITH PIVCs or Groshong catheters.** Neonates and pediatric patients (0.5 to 10 units/ml); adults (10units/ml) or **(100units/ml for Implanted Port)**
4. Antibiotic/antimicrobial locking solution, if ordered
5. Antiseptic wipes
6. 10 ml syringe for aspiration of antibiotic/antimicrobial locking solution if one was used

B. Identify patient using 2 identifiers.

C. Review prescriber's order or standard protocol. Verify the medication or solution matches the medication label. Compare medication or solution to prescriber's order and medication label to ensure

right patient, right dose, right route of administration, rate of administration, total volume to infuse, and expiration date.

D. Perform hand hygiene (refer to CarepathRx (2022). Hand Hygiene, NUR 018).

E. Clean and disinfect work area using an appropriate disinfectant.

F. Explain procedure and educate patient/caregiver:

1. Aseptic technique and hand hygiene
2. Inform patient that they may experience a disturbance in taste odor with flushing. This is thought to be a result of substances leaching from the prefilled plastic syringe due to sterilization methods.
3. How to administer the medication, frequency, route, and dose if patient will be doing self-administration.
4. Signs and symptoms of a reaction
5. Signs and symptoms of access complications
6. Safe storage of medication and supplies
7. Disposal of medications, supplies and equipment
8. The appropriate provider of treatment (the prescriber OR the pharmacist; BOTH the prescriber and the pharmacist) to contact during business hours, the availability of an answering system to receive calls during evenings, nights, weekends and holidays and the accessibility of a Pharmacist, Nurse, and Dietician 24 hours a day, 7 days a week. Notify pharmacy by calling the number listed at the top of the medication label; (Refer to CarepathRx (2022). BEST PRACTICE GUIDELINES, NUR 002; II. ALGORITHM FOR NOTIFICATION OF PHARMACIST AND PROVIDER).

G. Gather all equipment on a clean, disinfected, aseptic field.

H. Inspect equipment and supplies for product integrity and function before use; inspect packaging for damage; inspect vial(s)/cassette/bag for cracks, particulate matter, and clarity of medication. verify expiration date.

I. Immediately prior to equipment assembly, hand hygiene is repeated, and non-sterile gloves are donned.

J. Prepare medications or solutions for infusion according to medication label or package insert.

K. Flushing Procedure:

1. Use aseptic non-touch technique whenever accessing hubs, connectors, or injection ports, and whenever the catheter lumen is opened or connected to other devices

2. Remove alcohol disinfection cap if one was used. Cleanse needleless connector with antiseptic swab, applying vigorous friction to hub for 30 seconds. Allow to dry for 60 seconds.

3. If antibiotic/antimicrobial locking solution was used, withdraw using 10 ml syringe prior to flushing.

4. **DO NOT USE A SYRINGE SMALLER THAN 10 ML TO FLUSH AND CONFIRM PATENCY.**

5. Aseptically attach a 10 ml preservative-free 0.9% Sodium Chloride USP single-use pre-filled syringe to needleless connector. Open VAD clamp. Slowly inject 5-10ml 9% sodium chloride into the VAD and then slowly aspirate for a blood return. **Patients are not taught to check a blood return when flushing a peripheral, midline, PICC line, implanted port, tunneled catheter, or any central catheter.**

6. If no blood return is noted or resistance is met, check to ensure that clamp is open, and set is not kinked. If a blood return still is not obtained, attempt to flush slowly, and reassess for a blood return. If resistance is met or still unable to obtain a blood return, contact prescriber for additional orders.

7. Inject preservative-free 0.9% Sodium Chloride USP using a pulsatile technique of push and pause. Do not forcibly flush.

8. Inject the 0.9% Sodium Chloride USP solution into the lumen. Do not administer the entire contents of the syringe. Prior to injecting the last 0.5 ml of the solution into the lumen, stop and follow the clamping sequence below (step 15).

9. Follow needleless connector product recommendations for clamping sequence in order to prevent blood reflux and reduce the risk of thrombotic occlusion or biofilm formation

    a. MicroClave connector is a neutral displacement connector: no specific clamping sequence
    b. Nexus TKO Anti-Reflux connector: no specific clamping sequence
    c. In the absence of manufacturer's directions, consider the reflux volume for each type and use the following sequence:

        i. Negative displacement–flush, clamp, disconnect
        ii. Positive displacement–flush, disconnect, clamp
        iii. Neutral and anti-reflux–flush, no specific sequence required

CAREPATHrx™
Specialty Pharmacy & Infusion Solutions

| CATHETER | PRESERVATIVE-FREE<br>0.9% SODIUM CHLORIDE USP | HEPARIN |
|---|---|---|
| PERIPHERAL | Flush with 5-10ml<br><br>Flush with 5-10ml before and after each medication administration.<br><br>Flush with 10-20ml after initial lab draw or aspiration of blood for any reason. (Do not draw routine labs from peripheral intravenous catheter) | Do not flush/lock with Heparin to maintain catheter patency |
| PICC/MIDLINE<br>*VALVED PICC LINE*<br><br>TUNNELED/NON-TUNNELED CATHETER<br>(Hickman) | Flush with 5-10ml<br><br>Flush with 5-10ml before and after each medication administration.<br><br>Flush with 10-20ml before and after each lab draw or aspiration of blood for any reason (Do not draw routine labs from a Midline catheter) | 5ml Heparin (10units/ml)<br><br>Flush unused lumen(s) of a PICC, midline, tunneled or non-tunneled catheter, with 5ml Heparin (10units/ml) daily only<br><br>***Valved PICC Lines do not require flushing/locking with Heparin to maintain catheter patency** |
| IMPLANTED PORT<br><br>FOR IMPLANTED PORTS THAT ARE NOT CURRENTLY BEING USED FOR INFUSION, REACCESS MONTHLY TO FLUSH AND LOCK | Flush with 5-10ml<br><br>Flush with 5-10ml before and after each medication administration.<br><br>Flush with 10-20ml before and after each lab draw or aspiration of blood for any reason | 5ml Heparin **(100units/ml)** |
| MULTI LUMEN CATHETER<br>&<br>DOUBLE LUMEN IMPLANTED PORT | All lumens need to be flushed per protocol | All lumens need to be locked per protocol |

| | | |
|---|---|---|
| GROSHONG | Flush with 5-10ml<br><br>Flush with 5-10ml before and after each medication administration.<br><br>Flush with 10-20ml before and after each lab draw or aspiration of blood for any reason<br><br>Flush unused lumen with 5-10ml every 7 days | Does not require flushing/locking with Heparin to maintain catheter patency |

10. Close VAD clamp and remove syringe. If patient is not receiving medication and has a Central Venous Access Device (CVAD), proceed to locking procedure below.

11. Discard syringe in appropriate container.

12. If patient is receiving medication, cleanse needleless connector with antiseptic swab for 30 seconds and allow to dry for 60 seconds. Administer medication per policy or manufacturer's package insert and physician orders.

13. Remove gloves and perform hand hygiene.

14. When infusion is complete, perform hand hygiene (refer to CarepathRx (2022). *Hand Hygiene,* NUR 018). Don gloves. Cleanse needleless connector with antiseptic swab applying vigorous friction to hub for 30 seconds. Allow to dry. Attach 10-ml syringe of 0.9% sodium chloride to needleless connector and slowly flush using the pulsatile procedure. **If an IVP medication was administered, flush the lumen at the same rate of injection as the medication to prevent medication bolus.** Close VAD clamp. Proceed to Locking procedure below for CVADs. **PIVCs and Groshong catheters are not locked with Heparin.**

15. Discard syringe and medication bag and administration line in appropriate container.

L. Heparin Locking Procedure (Performed after flushing CVAD):

1. Perform hand hygiene. Don gloves.
2. Cleanse needleless connector with antiseptic swab using vigorous friction for 30 seconds and let dry for 60 seconds.
3. Aseptically attach syringe with Heparin locking solution 5ml (**10units/ml** for PICC, midline, tunneled or non-tunneled catheter) or (**100units/ml** for implanted ports) to needleless connector, open CVAD clamp and slowly administer Heparin locking solution. Do not administer the entire contents of the syringe. Prior to injecting the last 0.5 ml of the solution into the lumen follow the clamping sequence below.
4. Follow needleless connector product recommendations for clamping sequence in order to prevent blood reflux and reduce the risk of thrombotic occlusion or biofilm formation
    a. MicroClave connector is a neutral displacement connector: no specific clamping sequence
    b. Nexus TKO Anti-Reflux connector: no specific clamping sequence

c. In the absence of manufacturer's directions, consider the reflux volume for each type and use the following sequence:

i. Negative displacement–flush, clamp, disconnect
ii. Positive displacement–flush, disconnect, clamp
iii. Neutral and anti-reflux–flush, no specific sequence required

5. Discard supplies in appropriate container.
6. Remove gloves and perform hand hygiene.

M. Antibiotic Locking Procedure, if ordered (Performed after flushing CVAD):

1. Perform hand hygiene. Don gloves.
2. Cleanse needleless connector with antiseptic swab using vigorous friction for 30 seconds and let dry for 60 seconds.
3. Aseptically attach syringe with Antibiotic locking solution to needleless connector, open CVAD clamp and slowly administer Antibiotic locking solution. Do not administer the entire contents of the syringe. Prior to injecting the last 0.5 ml of the solution into the lumen follow the clamping sequence below.
4. Follow needleless connector product recommendations for clamping sequence in order to prevent blood reflux and reduce the risk of thrombotic occlusion or biofilm formation
   a. MicroClave connector is a neutral displacement connector: no specific clamping sequence
   b. Nexus TKO Anti-Reflux connector: no specific clamping sequence
   c. In the absence of manufacturer's directions, consider the reflux volume for each type and use the following sequence:

      i. Negative displacement-flush, clamp, disconnect
      ii. Positive displacement-flush, disconnect, clamp
      iii. Neutral and anti-reflux-flush, no specific sequence required

5. Discard supplies in appropriate container.
6. Remove gloves and perform hand hygiene.

N. Document:

1. Date and time of administration, route, VAD type and lumen(s)
2. Flush/lock solution and volumes.
3. Patency of lumens.
4. Patient's response to treatment
5. Receipt of education provided (verbal or written)

**REFERENCES**

Infusion Nurses Society. 8th Edition (2021). *Infusion Therapy Standards of Practice*. *Journal of*

*Infusion Nursing, Volume 44.*

Infusion Nurses Society. 2nd Edition (2021). *Policies and Procedures for Infusion Therapy: Home Infusion.*

Infusion Nurses Society. (2020). *INS Point of Care Reference Cards.*

Accreditation Commission for Health Care (7/21/2022). *ACHC Standards*

The Joint Commission. (2022). *Joint Commission Resources E-dition*

CAREPATHrx™
Specialty Pharmacy & Infusion Solutions

# Adult Line Care Standing Orders

| | |
|---|---|
| **Peripheral Line Care** | |
| Catheter change as needed for signs or symptoms of complications or malfunction. | Flush with 5-10ml Saline before and after each medication administration and PRN to ensure patency. |
| **PICC / Midline Care** | |
| Sterile dressing change weekly and PRN for compromised dressing integrity. | Flush each lumen with 5-10ml Saline before and after each medication administration and PRN to ensure patency and follow with 5ml Heparin 10units/ml flush. |
| | Flush each lumen with 10-20ml Saline before and after each lab draw and PRN to ensure patency and follow with 5ml Heparin 10units/ml flush. |
| | Flush unused lumen(s) only with 5ml Heparin 10units/ml daily. |
| **Implanted Venous Access Device Care (Port)** | |
| Huber needle re-access weekly and PRN for signs or symptoms of complications or malfunction. Sterile dressing change with each re-access and PRN for compromised dressing integrity. | Flush with 5-10ml Saline before and after each medication administration and PRN to ensure patency, and follow with 5ml Heparin 100units/ml. |
| | Flush with 10-20ml Saline before and after each lab draw and PRN to ensure patency and follow with 5ml Heparin 100units/ml flush. |
| | Cath Care:<br>Re-access and flush with 5-10ml saline followed by 5ml Heparin 100units/ml monthly and prn for venous access. |
| **Central Line Care (tunneled and non-tunneled)** | |
| Sterile dressing change weekly and PRN for compromised dressing integrity. | Flush each lumen with 5-10ml Saline before and after each medication administration and PRN to ensure patency and follow with 5ml Heparin 10units/ml flush. |
| | Flush each lumen with 10-20ml Saline before and after each lab draw and PRN to ensure patency and follow with 5ml Heparin 10units/ml flush. |
| | Flush unused lumen(s) only with 5ml Heparin 10units/ml daily. |
| **Valved Catheter Care (Groshong/PASV)** | |
| Sterile dressing changes weekly and PRN for compromised dressing integrity. | Flush each lumen with 5-10ml Saline before and after each medication administration and PRN to ensure patency. |
| | Flush unused lumen(s) only with 5-10ml Saline weekly and PRN to ensure patency. |
| | Flush with 10-20ml Saline before and after each lab draw and RPN to ensure patency. |
| | Flush with 5ml Heparin 10units/ml PRN to for sluggish flushing to ensure patency. |

**All specific patient orders will supersede standing orders.*

_____

Medical Director Date

CAREPATHrx™
Specialty Pharmacy & Infusion Solutions

## Pediatric Line Care Standing Orders

| | |
|---|---|
| **Peripheral Line Care** | |
| Catheter change as needed for signs/symptoms of complications or malfunction. | Flush with 1-5ml Saline before and after each medication administration and PRN to ensure patency |
| | Flush with 1ml Heparin 10units/ml after each medication administration and PRN to ensure patency. |
| **PICC / Midline Care** | |
| Sterile dressing change weekly and PRN for compromised dressing integrity. | Flush with 1-5ml Saline before and after each medication administration and PRN to ensure patency |
| | Patients with 2.6F or smaller:<br>Flush with 1ml Heparin 10units/ml after each medication administration and PRN to ensure patency.<br>Cath Care: Flush each lumen with 1ml Heparin 100units/ml Monday, Wednesday & Friday. |
| | Patients with 2.7F or larger:<br>Flush with 2ml Heparin 10units/ml after each medication administration and PRN to ensure patency.<br>Cath Care: Flush each lumen with 2ml Heparin 100/units/ml Monday, Wednesday & Friday. |
| **Implanted Venous Access Device Care (Port)** | |
| Huber needle re-access weekly and PRN for signs/symptoms of complications or malfunction. Sterile dressing change weekly and PRN for compromised dressing integrity. | Flush with 3-5ml Saline before and after each medication administration, lab draw and PRN to ensure patency |
| | Patients requiring multiple infusions per day:<br>Flush with 3ml Heparin 10units/1ml after each medication administration.<br>Patients requiring 1 flush per day<br>Flush with 3ml Heparin 100units/1ml daily and PRN ensure patency |
| | Cath Care<br>Flush with 3ml Heparin 100units/ml monthly. |
| **Central Line (tunneled and non-tunneled)** | |
| Sterile dressing change weekly and PRN for compromised dressing integrity. | Flush each lumen with 1-5ml Saline before and after each medication administration, lab draw and PRN to ensure patency. |
| | Patients less than 1 month of age:<br>Daily Infusions:<br>Flush each lumen with 1ml Heparin 10units/ml after each medication administration, lab draw and PRN to ensure patency<br>Cath Care:<br>Flush each lumen with 1ml Heparin 100units/ml on Monday, Wednesday, and Friday. |
| | Patients 1 month of age or older with daily infusions<br>Daily Infusions:<br>Flush each lumen with 2ml Heparin 10units/ml after each medication administration, lab draw and PRN to ensure patency<br>Cath Care:<br>Flush each lumen with 2ml Heparin 100units/ml on Monday, Wednesday, and Friday |
| **Valved Catheter Care (Groshong)** | |
| Sterile dressing changes weekly and PRN for compromised dressing integrity. | Flush each lumen with 3-5ml Saline before and after each medication administration, lab draw and PRN to ensure patency. |
| | Cath Care:<br>Flush each lumen with 5ml Saline weekly. |

***Children under 6 months of age must use single dose, preservative free flushing solutions.*
**All specific patient orders will supersede standing orders.*

_____
Medical Director Date