NxSTAGE®

Training Flipbook

NxSTEPS®

Simple Steps for Success at Home™







Disclaimer

This document is not intended to replace the NxStage System One or PureFlow SL User Guides or Cartridge Instructions for Use and does not include all of the information necessary to use the system safely and effectively. Patients, partners, and providers should review and refer to the System One and PureFlow SL User Guides and Cartridge Instructions for Use for complete information, including all warnings and precautions.

CAUTION: Federal law restricts the NxStage System One and PureFlow SL to sale by or on the order of a physician.

Prepare for Treatment

Keep it Clean



1. dirty, clean, or sterile?
2. aseptic technique
3. personal protective equipment

dirty, clean, or sterile?



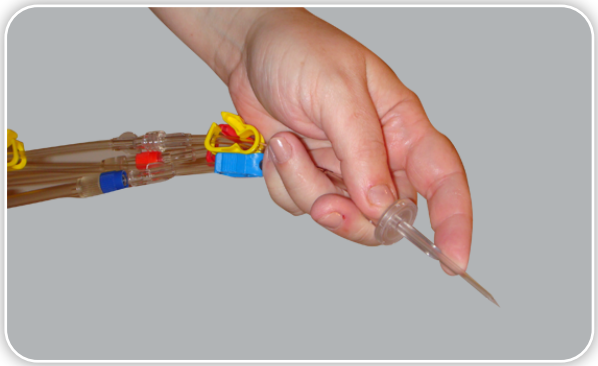
Have the patient identify which items are dirty, clean, or sterile.

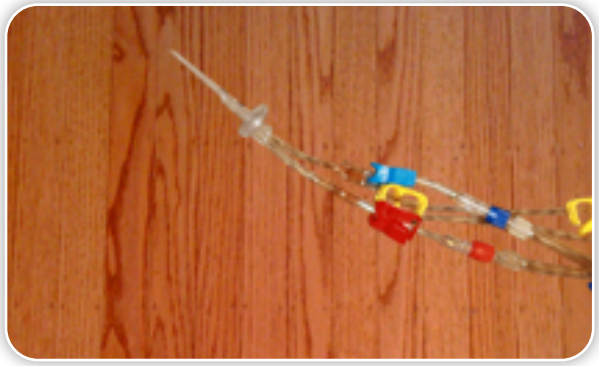
Then review the answers on the next page.

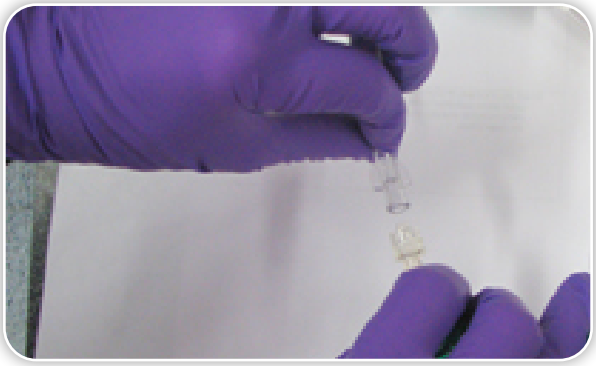
dirty, clean, or sterile?













dirty, clean, or sterile?

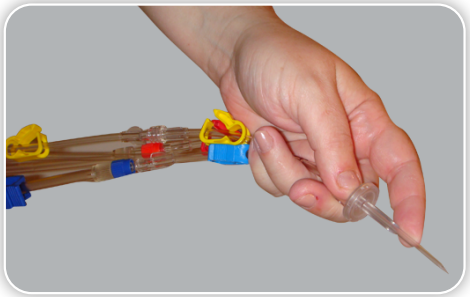


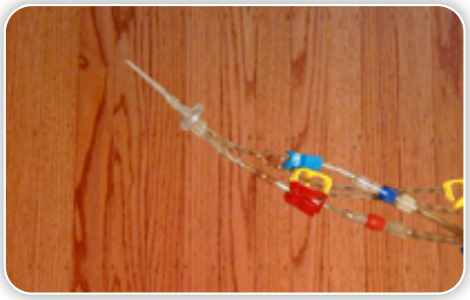
Discuss with the patient why the pictures on the page are considered to be dirty, clean, or sterile.

dirty, clean, or sterile?

Dirty

Has potentially harmful germs





Clean

Reduced number of potentially harmful germs

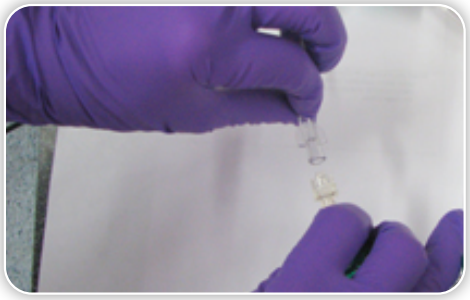




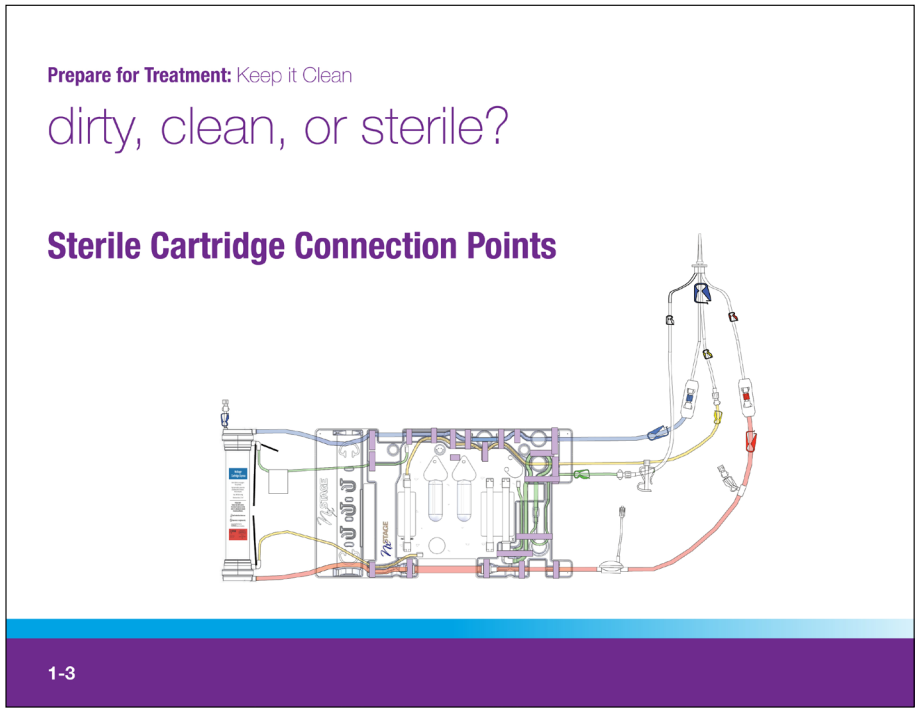
Sterile

Free of all germs





dirty, clean, or sterile?



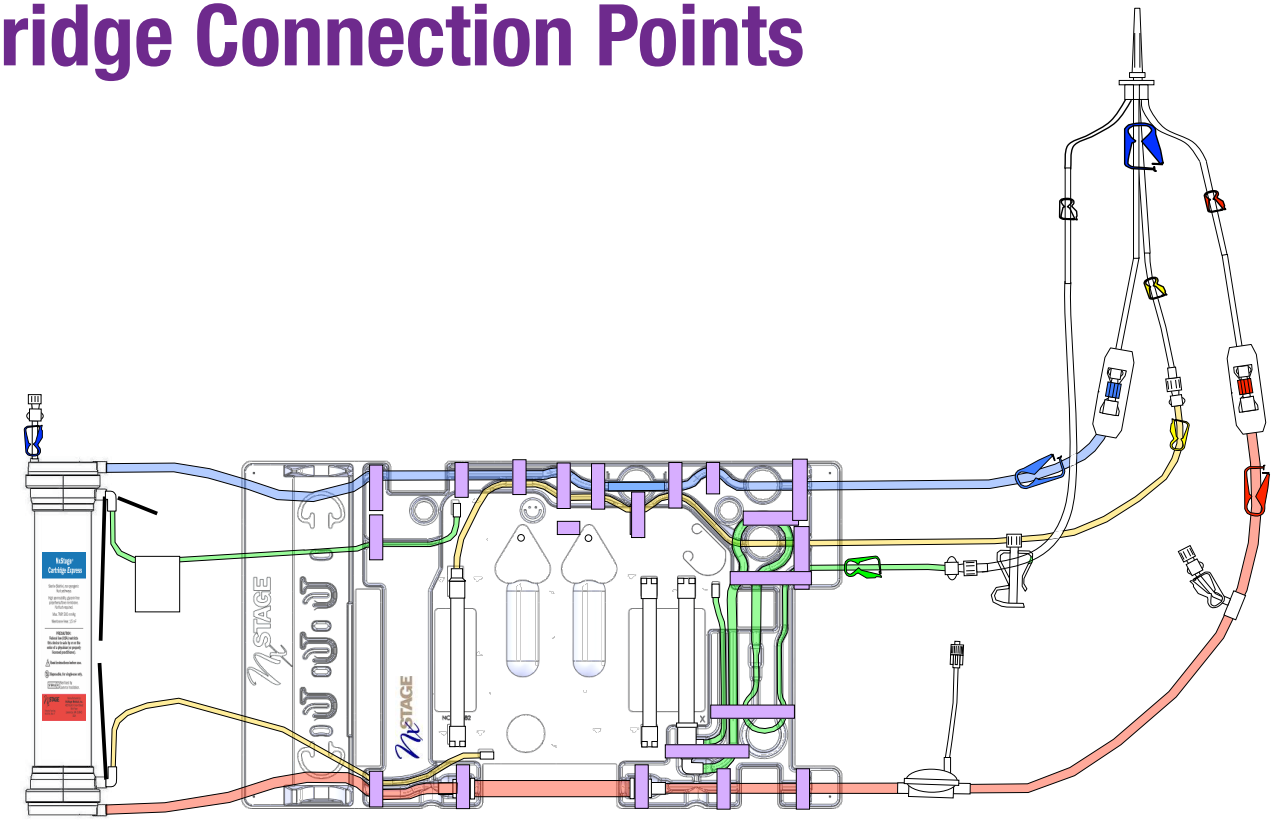
Have the patient identify the Cartridge sterile connection points.

Review the answers on the next page if needed.

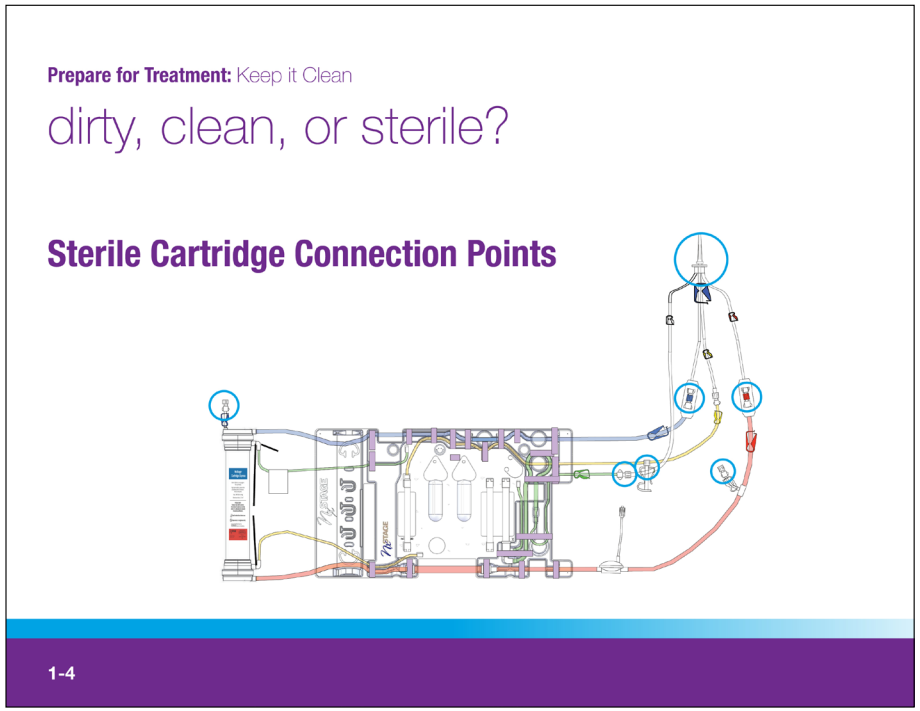
Note: If the Cartridge you are using is different than the one shown, refer to the appropriate Cartridge and point out the sterile locations.

dirty, clean, or sterile?

Sterile Cartridge Connection Points



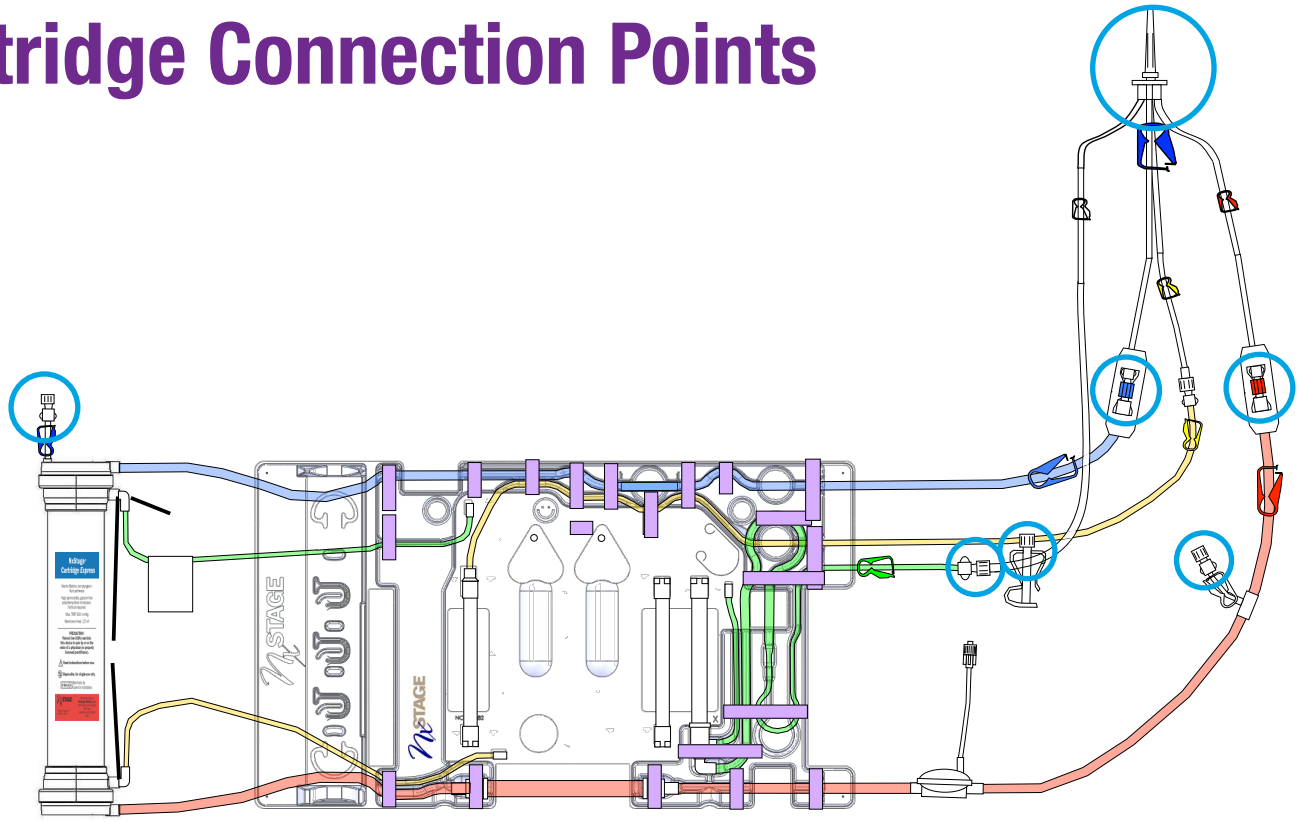
dirty, clean, or sterile?



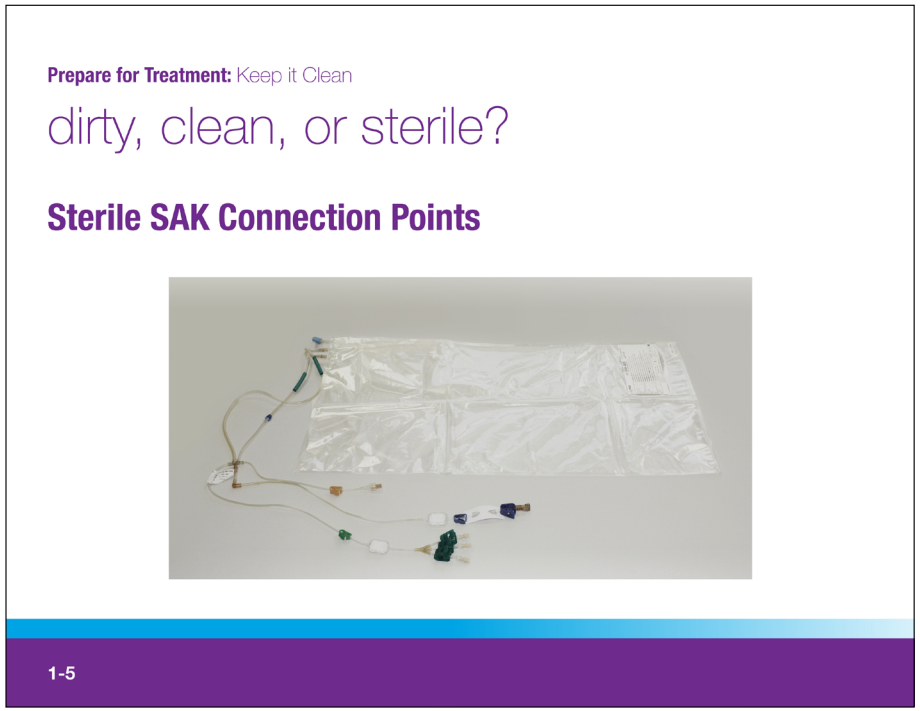
Point out the sterile Cartridge connection points. Using a sample Cartridge, show where these points are on the actual Cartridge.

dirty, clean, or sterile?

Sterile Cartridge Connection Points



dirty, clean, or sterile?

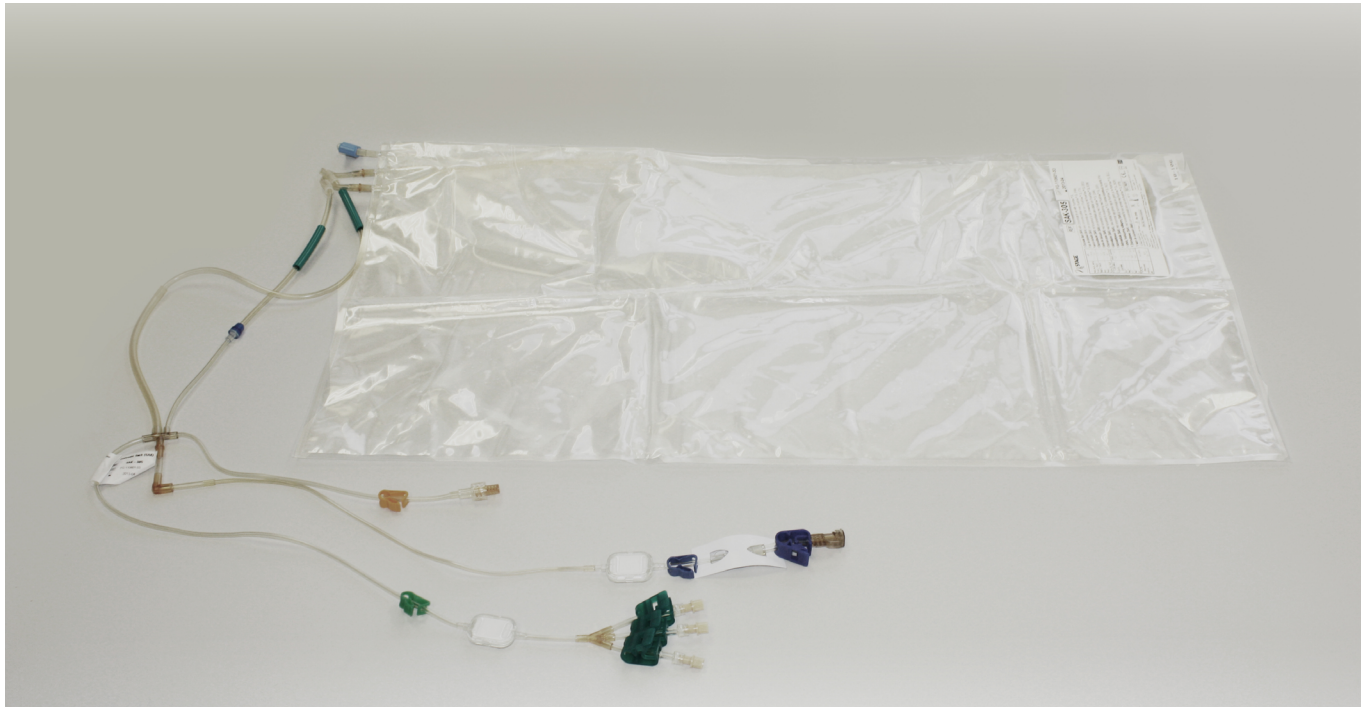


Have the patient identify the sterile SAK connection points.

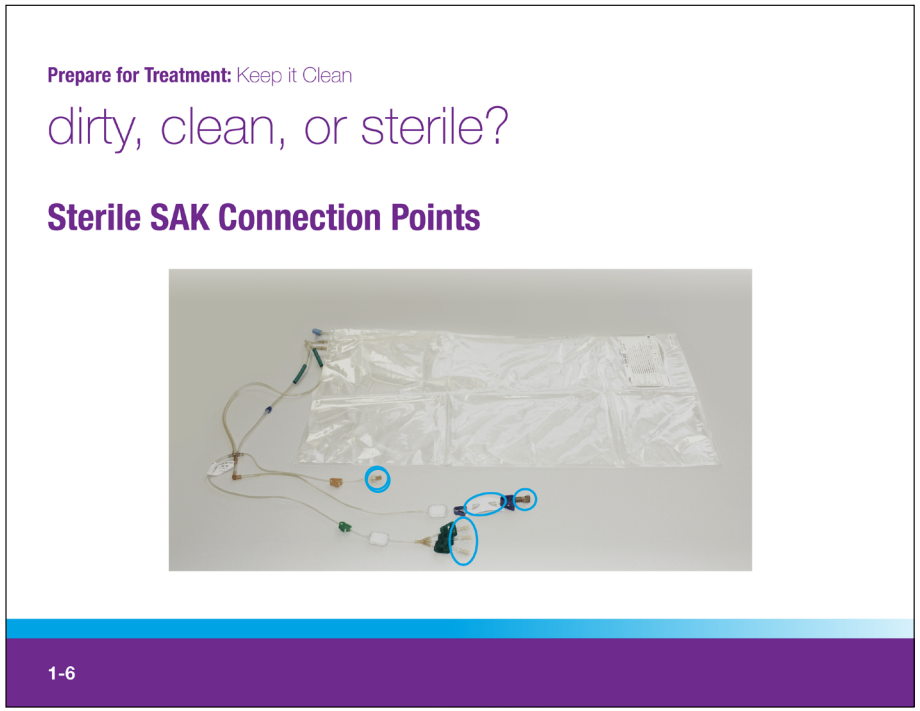
Review the answers on the next page if needed.

dirty, clean, or sterile?

Sterile SAK Connection Points



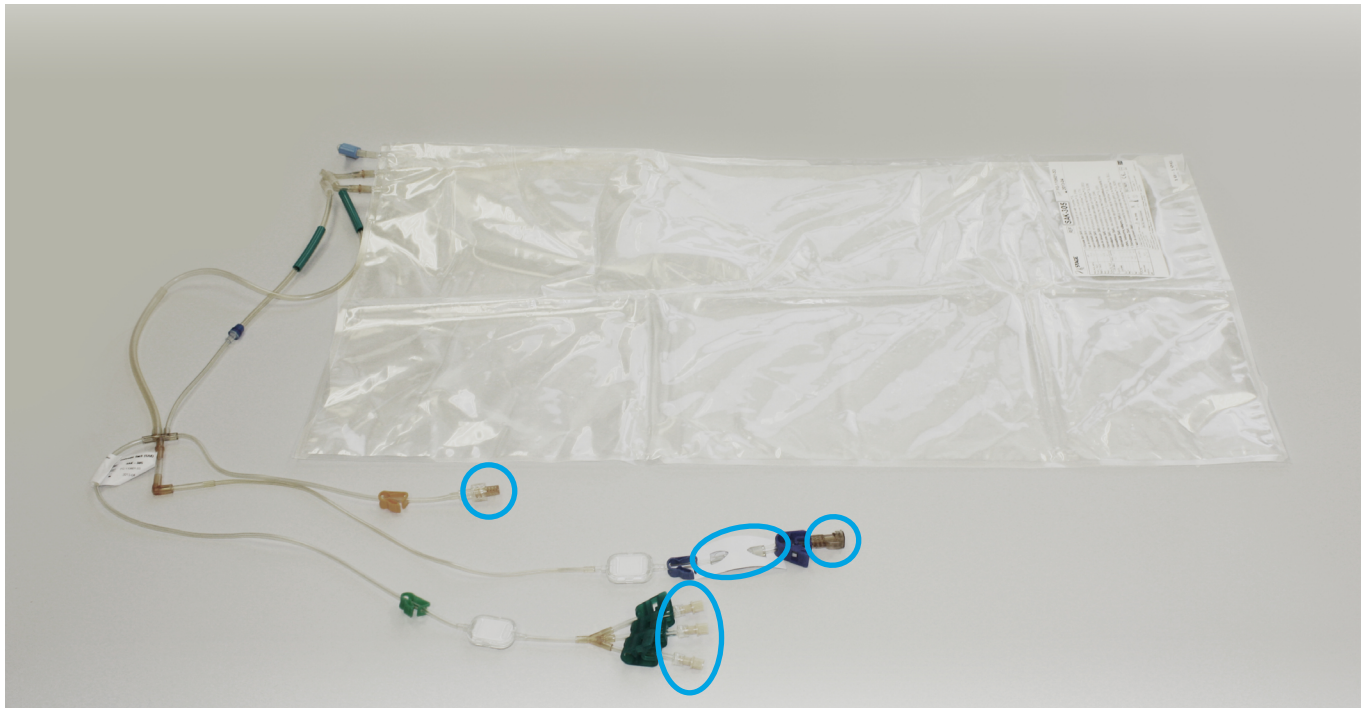
dirty, clean, or sterile?



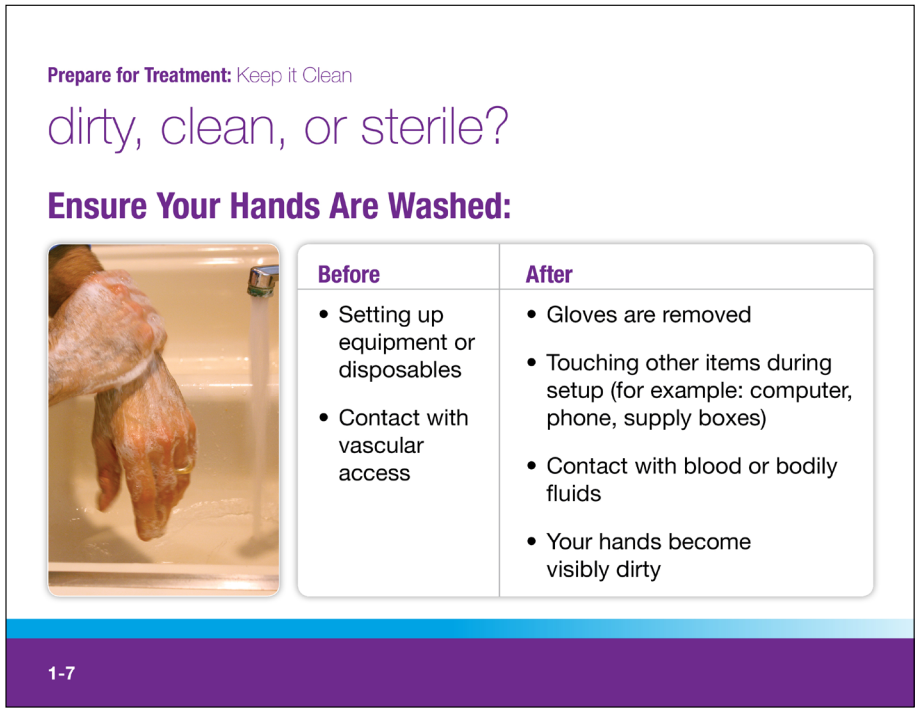
Point out the sterile SAK connection points. Show where these are on the actual connections.

dirty, clean, or sterile?

Sterile SAK Connection Points



dirty, clean, or sterile?



Explain that proper hand-washing is one way patients and care partners maintain aseptic technique during treatment.

Discuss when hands must be washed.

dirty, clean, or sterile?

Ensure Your Hands Are Washed:



Before	After
• Setting up equipment or disposables • Contact with vascular access	• Gloves are removed • Touching other items during setup (for example: computer, phone, supply boxes) • Contact with blood or bodily fluids • Your hands become visibly dirty

aseptic technique



Explain when to wash with soap and water and when it is okay to use an antiseptic hand rub:

- If hands are visibly soiled, they must be washed with soap and water.
- If hands are not visibly soiled, they can be washed with a waterless alcohol-based antiseptic hand rub (with 60-90% alcohol content).

aseptic technique

If hands are visibly dirty, they must be washed with soap and water.



If hands are not visibly dirty, they may be washed with an alcohol-based antiseptic hand rub.



personal protective equipment



Reinforce:

- Why it is important to take precautions.
- When to take precautions.

personal protective equipment

Why

Prevent the spread of germs from person to person.



When

Anytime you might be in contact with blood or bodily fluids.



How

Wear personal protective equipment.





Prepare for Treatment

Access Your Blood



1. needle use and connections
2. care and complications
3. catheter access equipment

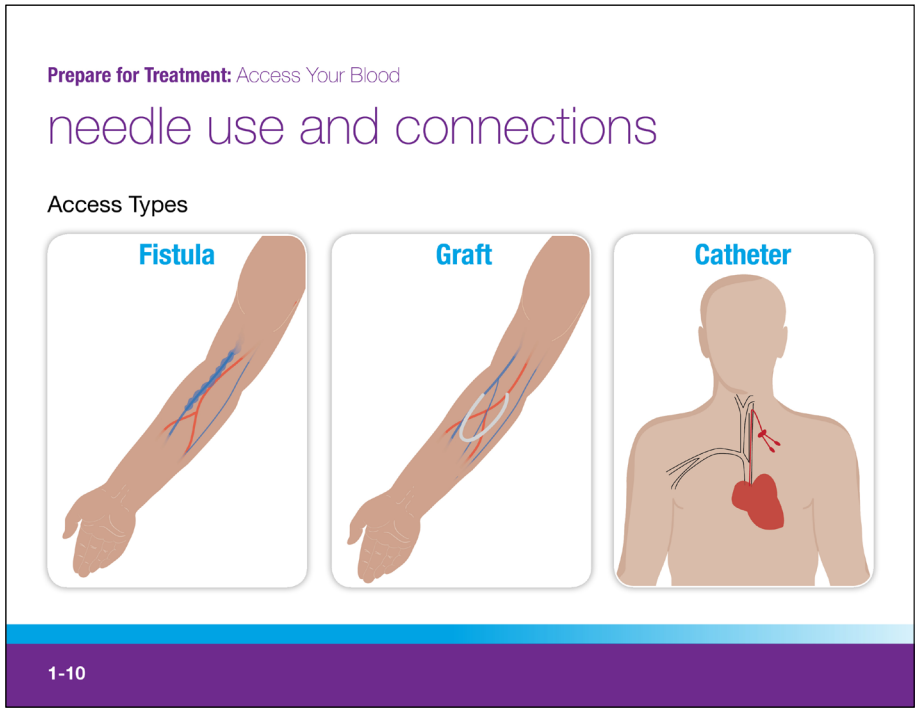
Prepare for Treatment

Access Your Blood



1. needle use and connections
2. care and complications
3. catheter access equipment

needle use and connections



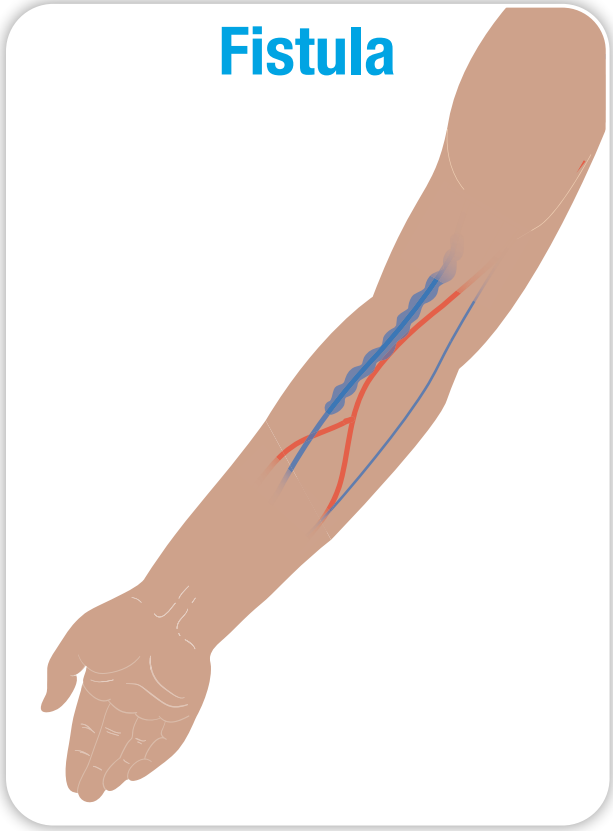
1. Arteriovenous Fistula or AVF: A natural vessel created by surgically connecting an artery and a vein.

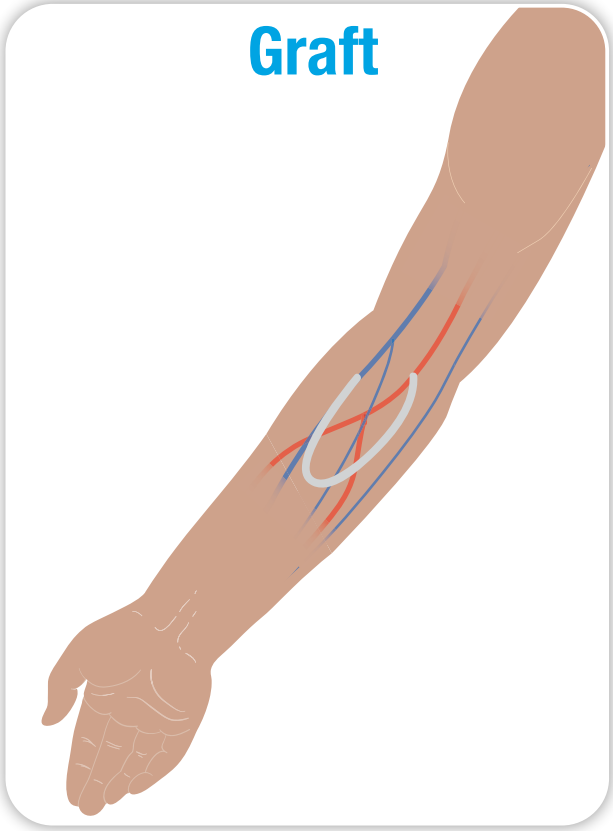
2. Arteriovenous Graft or AVG: A synthetic material used to create a loop connection between an artery and vein.

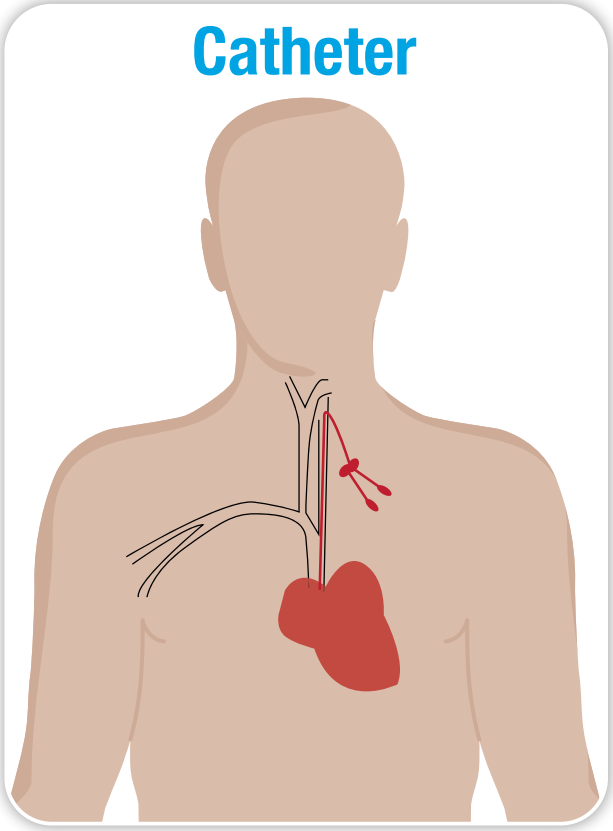
3. Central Venous Catheter: A plastic tube inserted into a large vein, usually in the chest area.

needle use and connections

Access Types







needle use and connections



LOOK

Evaluate the **access extremity** for:

- Swelling, color changes, or elevated temperature.
- Numbness, movement limitations, or changes in function.
- Comparison to opposite arm.

Assess the **access vessel area** for:

- Redness, bruising, or hematoma.
- Rash, breaks in the skin, bleeding, or drainage.
- Tenderness or pain.
- Aneurysm.
- Cannulation sites.

FEEL

Show the patient and care partner how to feel for the pulse or thrill:

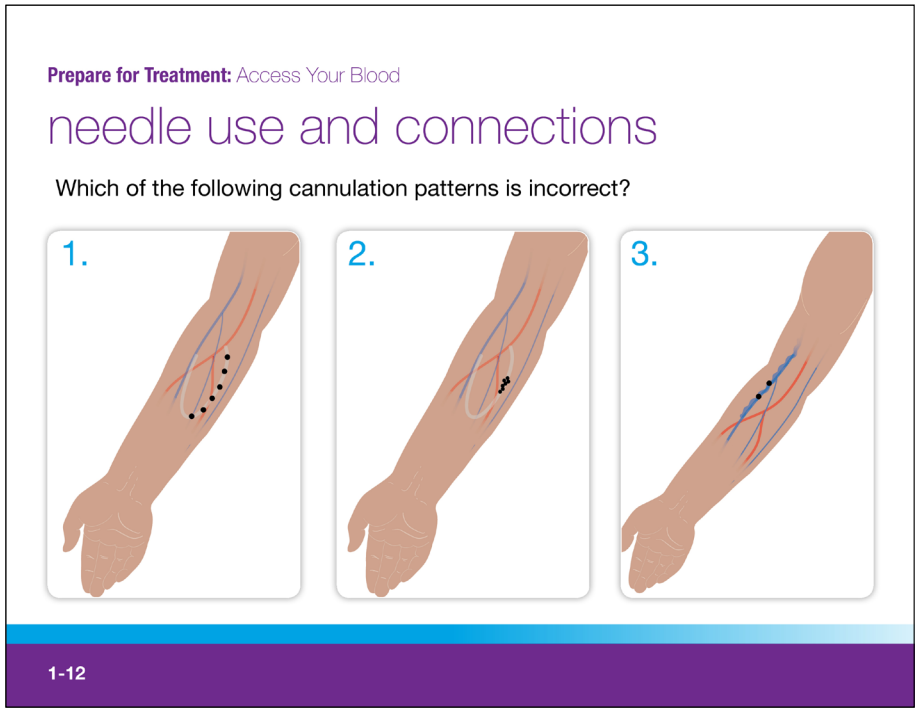
- Locate the arterial anastomosis to feel the pulse.
- Feel the pulse throughout the outflow vessel; it should be easy to compress.

needle use and connections





needle use and connections



Ask the patient and care partner to identify the incorrect cannulation pattern:

1. Rope-ladder technique.
2. “One-site-itis” (incorrect technique).
3. Fistula with buttonhole.

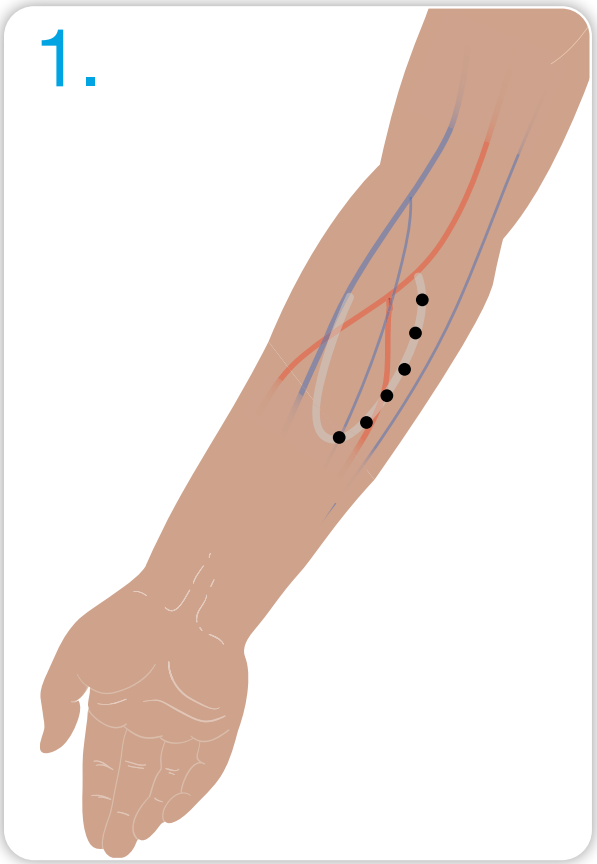
Explain the following:

- Stay approximately 1.5 inches away from anastomosis.
- Space needle sites about 2-3 inches apart.
- Choose the entry site and location of needle tips once fully inserted.
- Look for a straight area that is at least the length of the fistula needle. Avoid curves, flat spots and aneurysms.
- It may be necessary to try several sites to obtain the best location and the desired access pressures.

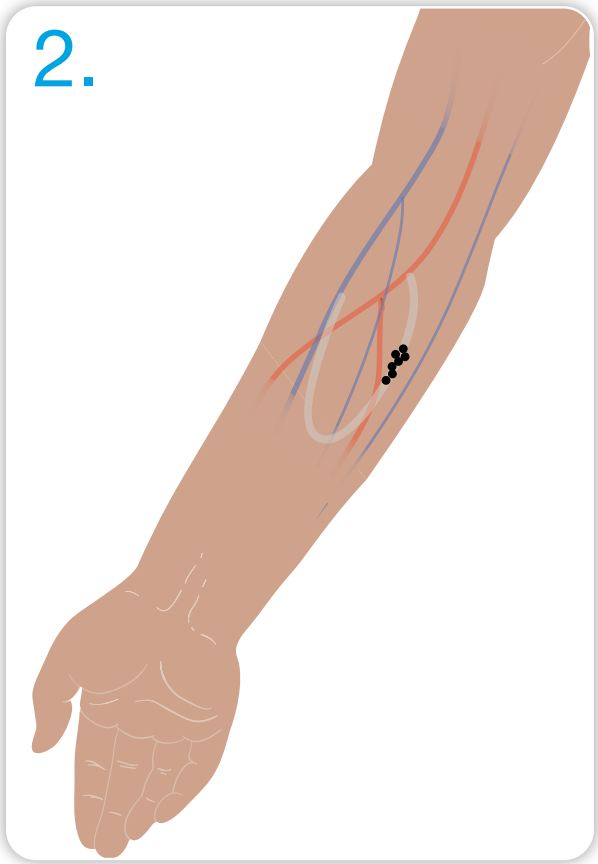
needle use and connections

Which of the following cannulation patterns is incorrect?

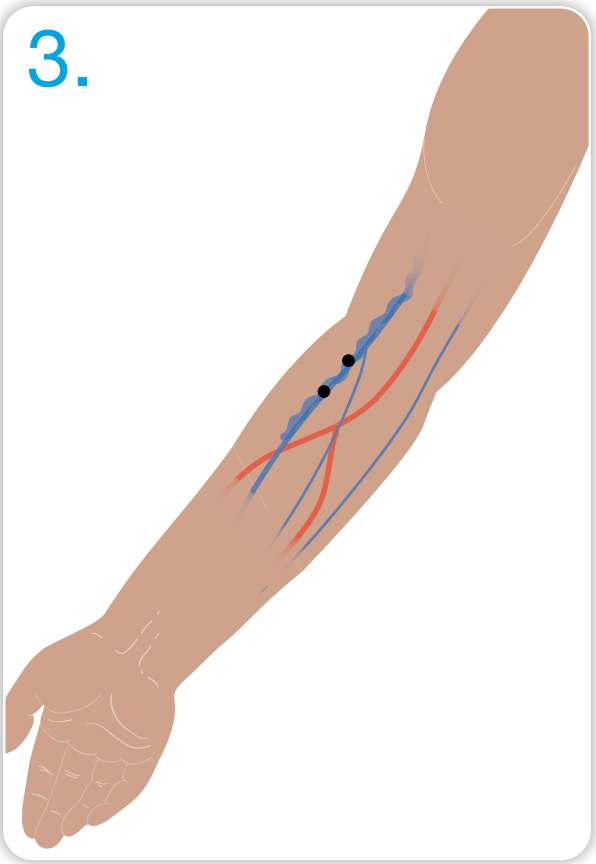
1.



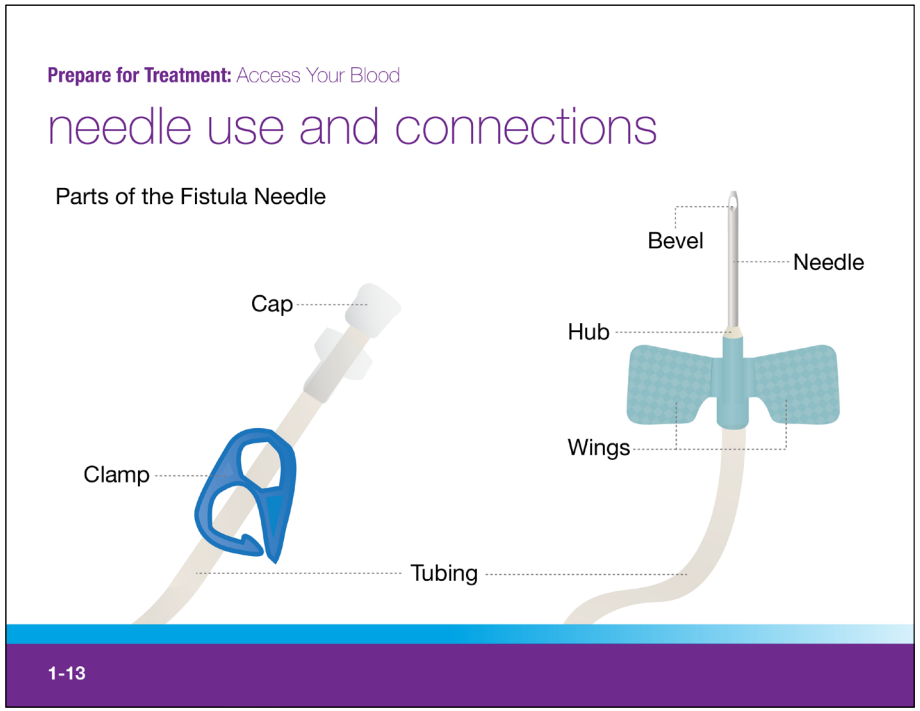
2.



3.



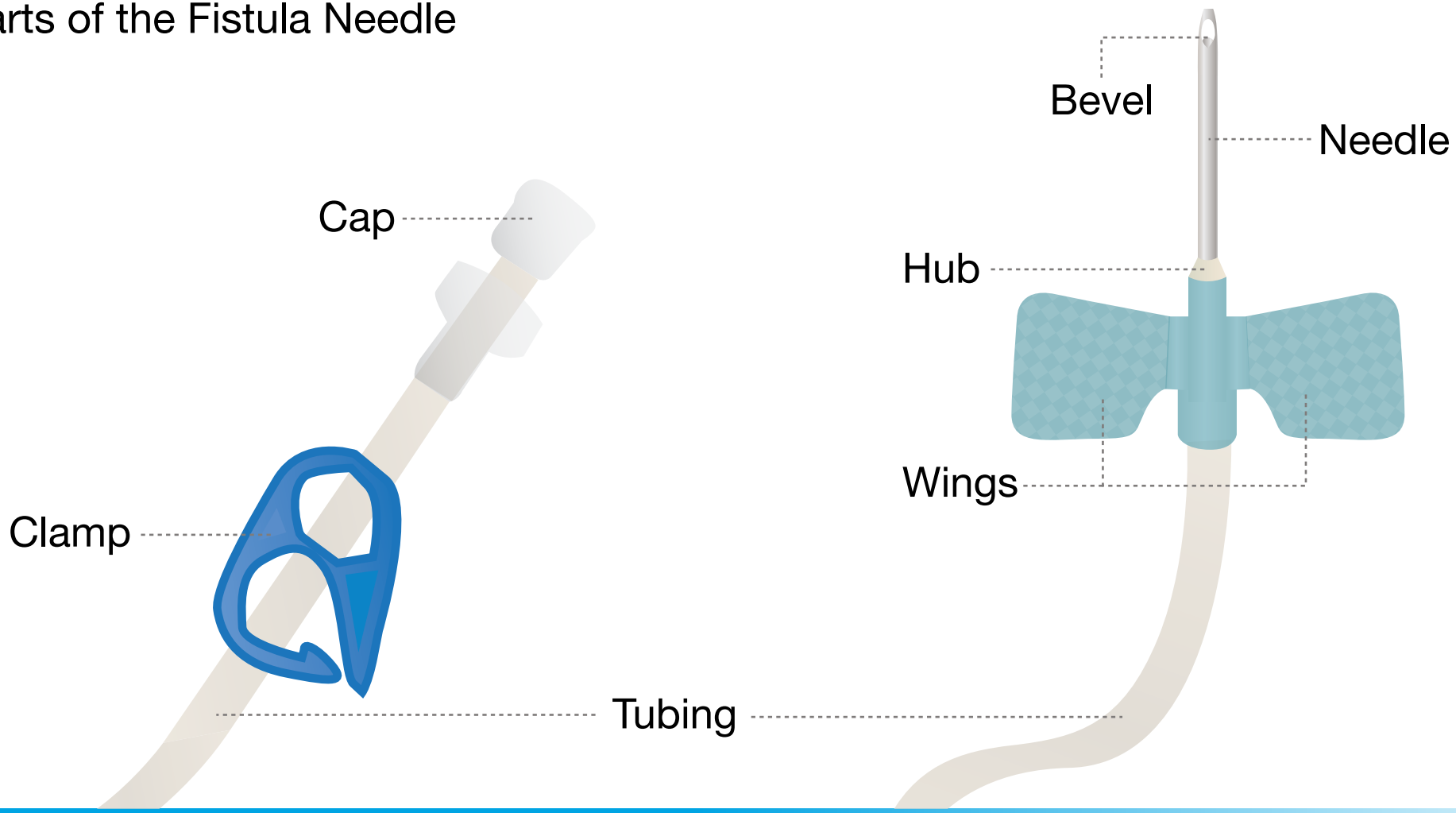
needle use and connections



Review the parts of the fistula needle with the patient and care partner.

needle use and connections

Parts of the Fistula Needle



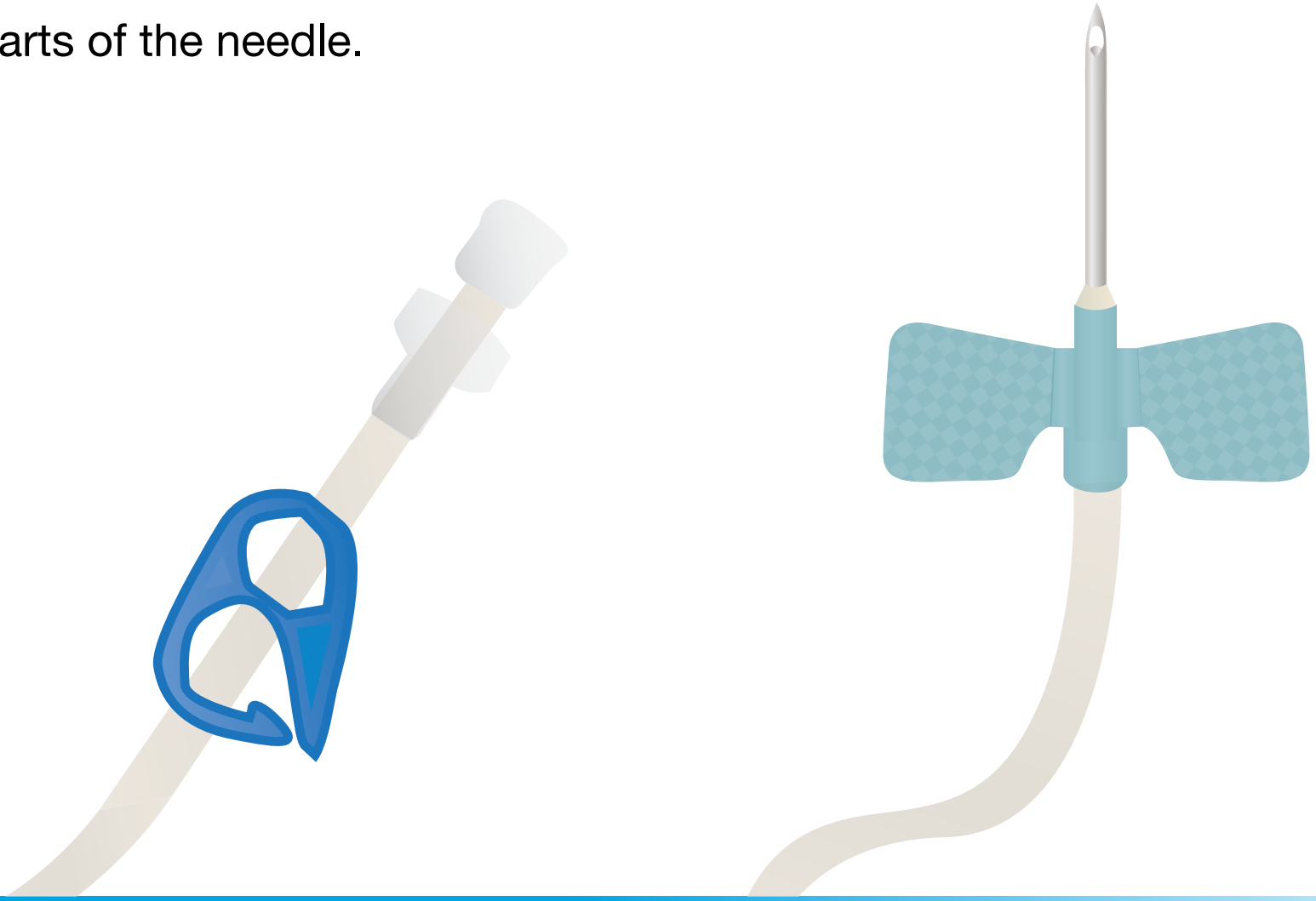
needle use and connections



Have the patient and care partner name the parts of the needle.

needle use and connections

Name the parts of the needle.



needle use and connections



- Demonstrate how to safely remove the needles after dialysis.
- Share these tips with the patient and care partner:
  - Remember that the skin and vessel are staggered; use two fingers to apply pressure to both areas.
  - Do not apply pressure over the needle sites until the needle is completely out of the access.
  - Apply enough pressure to stem blood flow, but not so much that it occludes the vessel.
  - Pressure dressing should be removed a few hours later; remove adhesive bandages the next day.

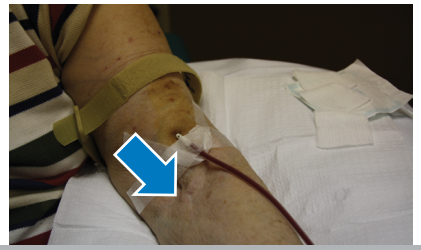
needle use and connections

1.



Put on clean gloves and use aseptic technique

2.



Pull out first needle following angle of insertion

3.



Place gauze over the access site

4.



Use two fingers to hold pressure on the access site

5.



When bleeding stops, cover the site with bandages or gauze and tape

6.



Dispose of needle in an approved sharps container

Repeat the process for the second needle.

care and complications



Share these guidelines for proper access care:

- Avoid wearing anything tight on the access arm such as watches, bracelets, or tight sleeves.
- Avoid sleeping on the access arm.
- Never allow a blood pressure cuff to be placed on the access arm.
- Do not allow an inexperienced person to draw blood from an access.
- Always protect the access, it is the “lifeline”.

care and complications

To properly care for your access, **avoid** the following:



Wearing anything tight on the access arm



Sleeping on the access arm

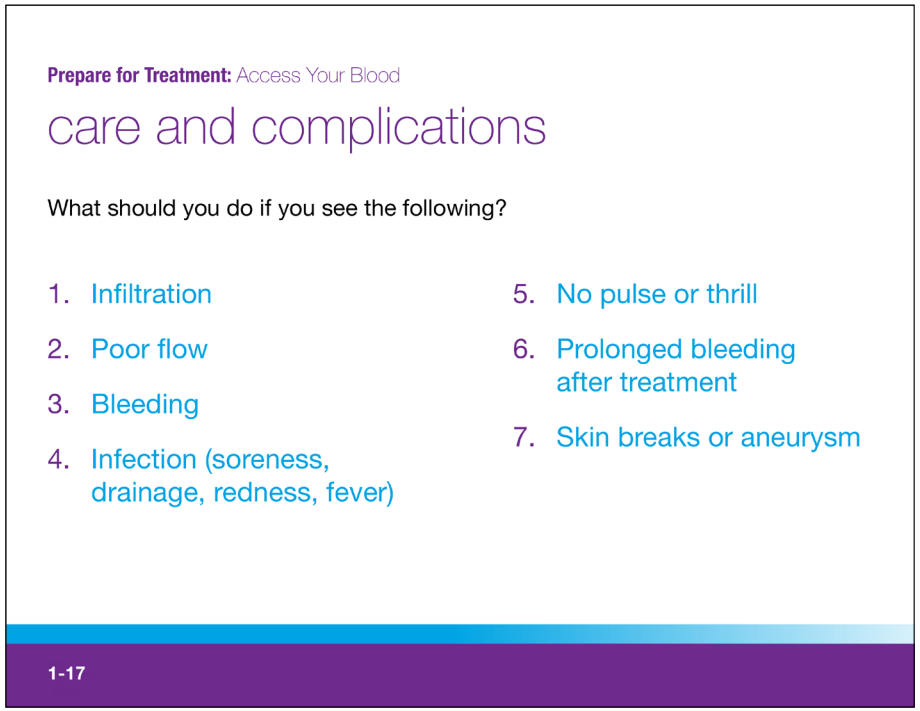


Placing blood pressure cuff on the access arm



Nondialysis personnel drawing blood from access

care and complications



Discuss how to handle complications.

1. Infiltration:
   - Stop TREATMENT and adjust needle. Do not rinse back blood.
   - Do not recannulate until swelling subsides.
   - Apply ice intermittently for the first 24 hours, then apply heat.
   - Discuss with physician the use of a short-term central venous catheter to continue subsequent treatments.

2. Poor flow:
   - Check blood pressure; treat hypotension if present.
   - Decrease the blood flow.
   - Stop TREATMENT, and adjust the needle.
   - Consider re-cannulation.

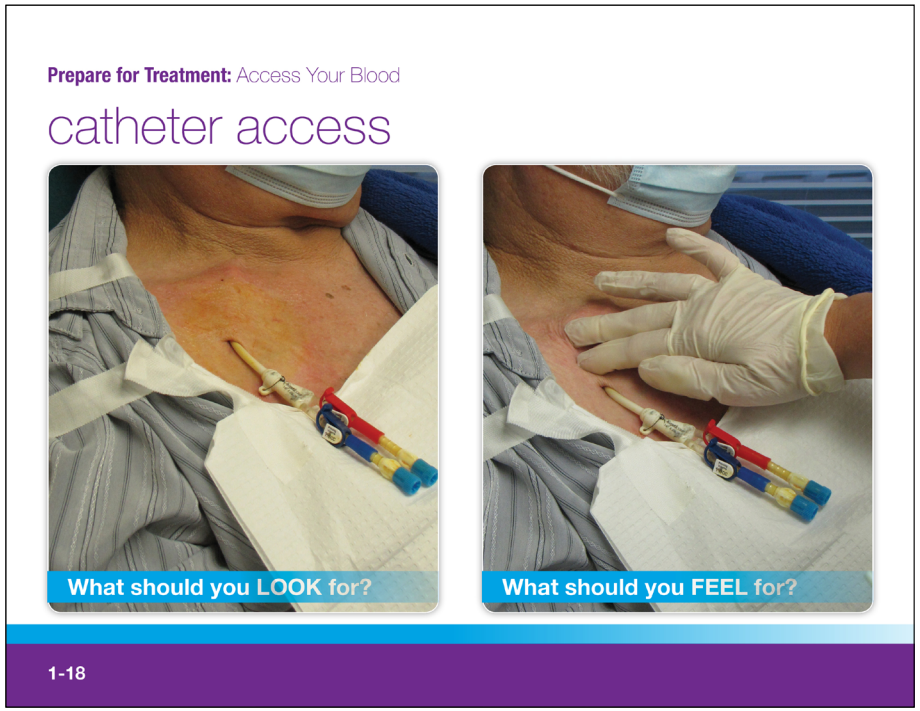
3-7. Contact your dialysis center.

care and complications

What should you do if you see the following?

1. Infiltration
2. Poor flow
3. Bleeding
4. Infection (soreness, drainage, redness, fever)
5. No pulse or thrill
6. Prolonged bleeding after treatment
7. Skin breaks or aneurysm

catheter access



Look for:

- Intact catheter without cracks or holes.
- Securely taped, clean, dry dressing.
- Present and secured caps.
- Closed clamps.
- A well-healed catheter exit site, with the absence of:
  - Redness.
  - Swelling.
  - Discoloration or bruising.
  - Drainage.
  - Bleeding.
  - Evidence of catheter migration (visible cuff).

Feel to make sure the catheter is not sore to the touch.

catheter access

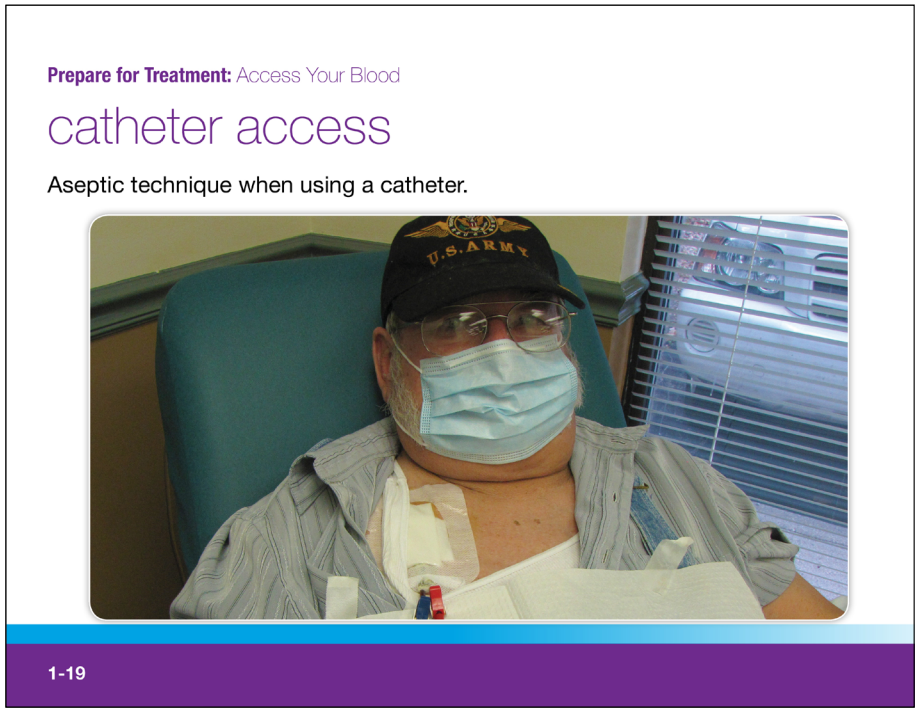


What should you LOOK for?



What should you FEEL for?

catheter access



Explain that the patient and care partner should use proper aseptic technique when accessing a central venous catheter, including gloves, masks. Everyone in the room during the procedure must wear a mask.

catheter access

Aseptic technique when using a catheter.



catheter access



Explain the possible complications of catheter use:

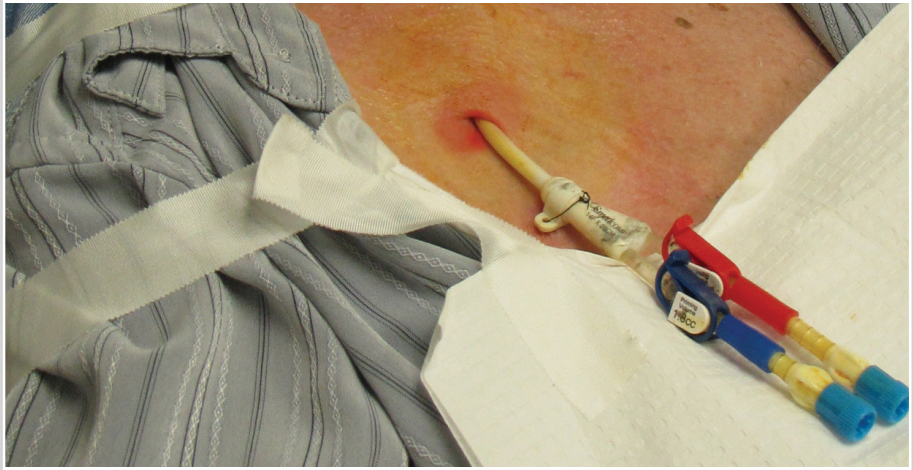
- Infection (report it to the dialysis center).
- Poor blood flow. Can be treated by:
  - Lowering blood flow rate.
  - Changing body position.
  - If experiencing multiple alarms, end treatment and rinse back blood.

Emphasize to patient and care partner that proper aseptic technique lowers the risk of infection.

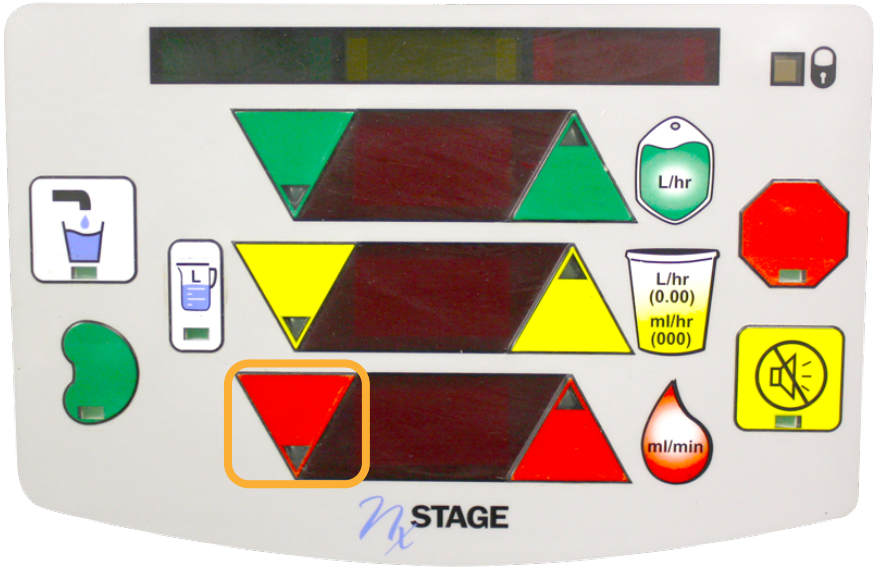
catheter access

Catheter Complications

Infection



Poor Blood Flow



Prepare for Treatment

Interpret Your Prescription



1. dialysis prescriptions and cycler
2. changes to cycler settings

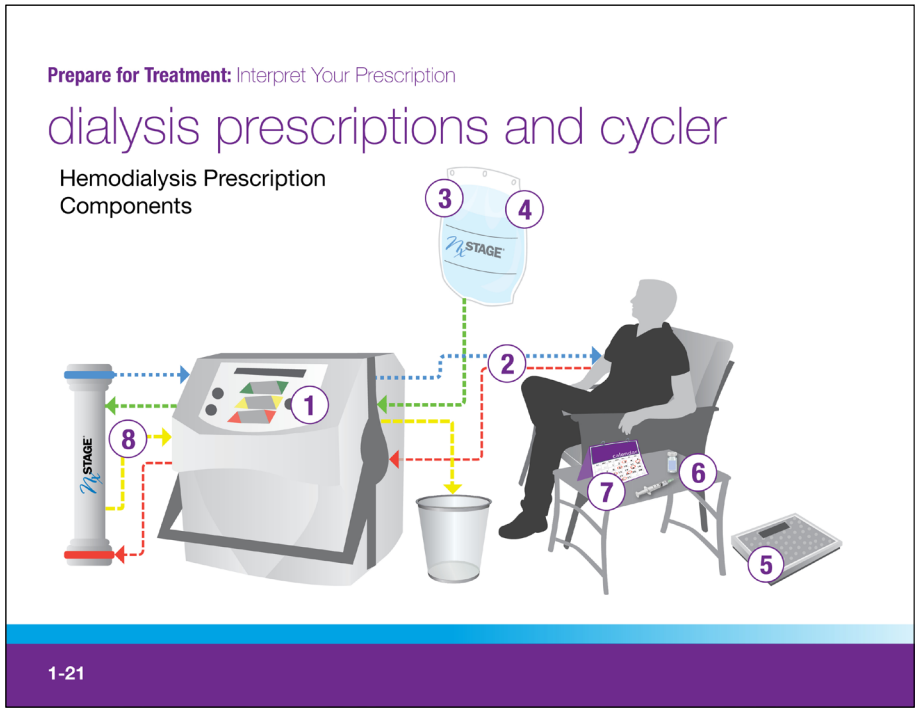
Prepare for Treatment

Interpret Your Prescription



1. dialysis prescriptions and cycler
2. changes to cycler settings

dialysis prescriptions and cycler

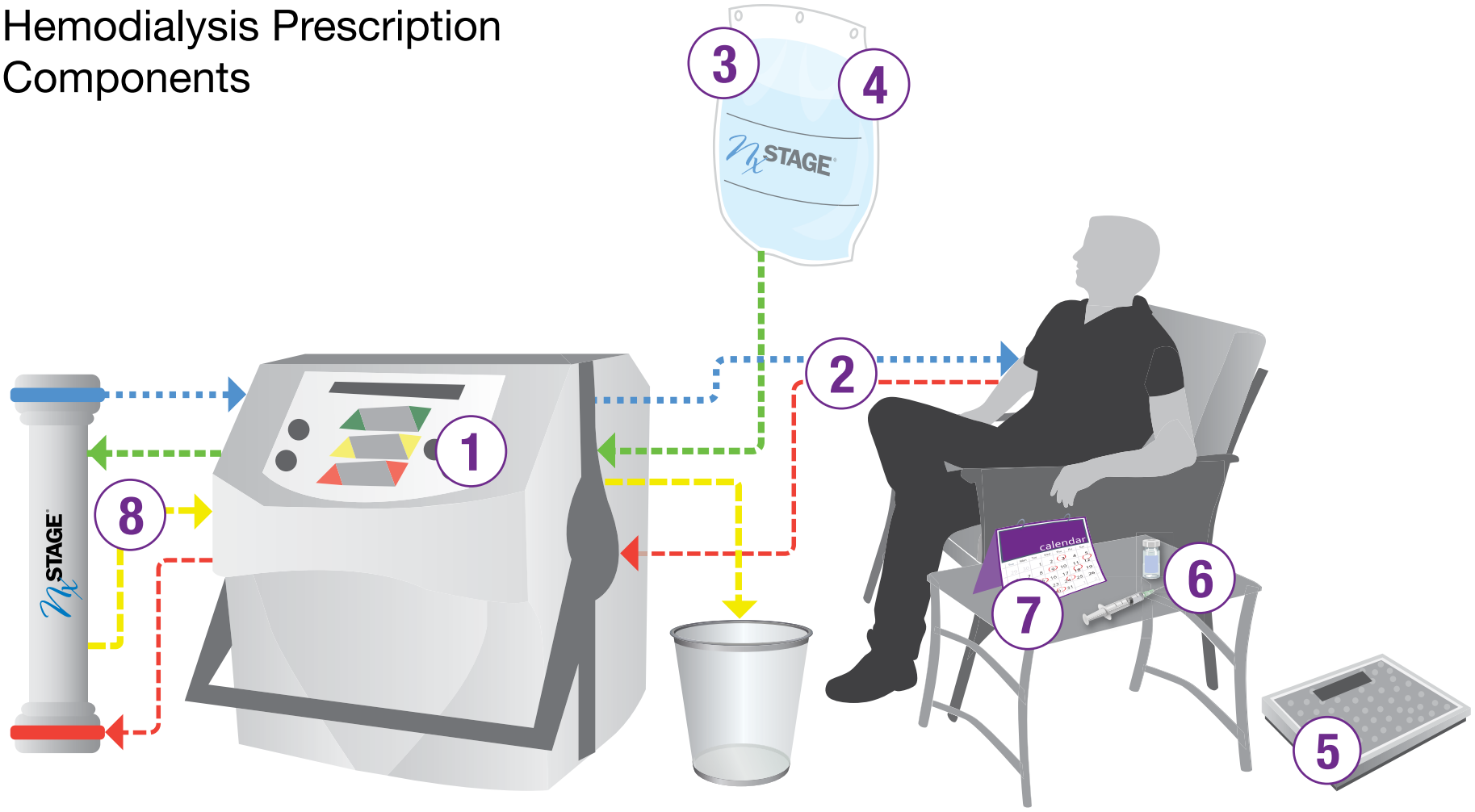


Review the components of the patient's hemodialysis prescription:

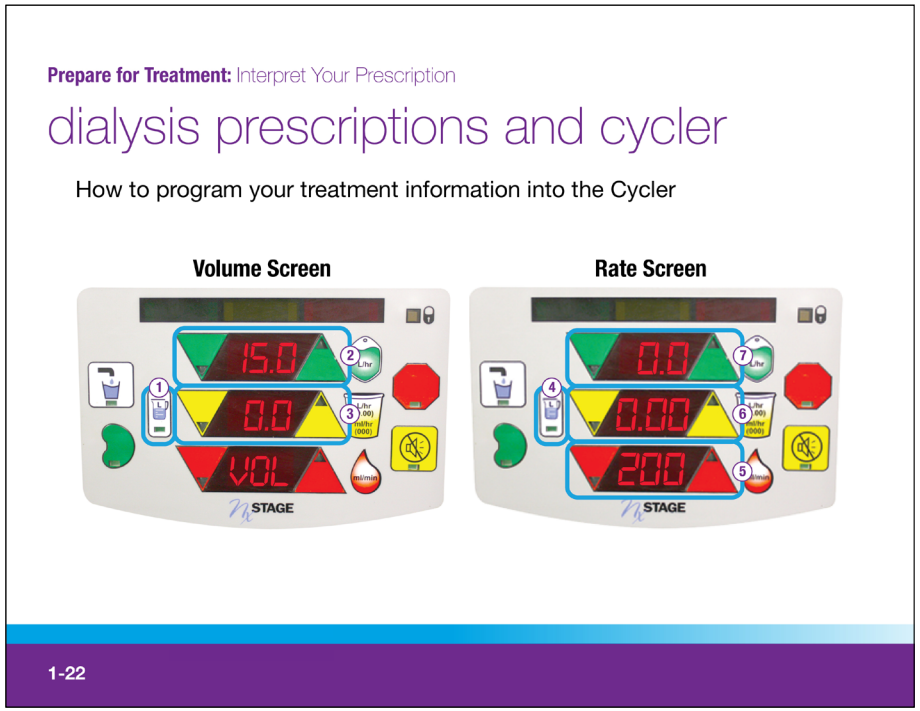
1. Flow fraction (FF)
2. Blood flow rate (BFR)
3. Dialysate volume
4. Dialysate composition
5. Dry weight
6. Heparin dose and other Medications
7. Frequency
8. Fluid removal (ultrafiltration)

dialysis prescriptions and cycler

Hemodialysis Prescription Components



dialysis prescriptions and cycler



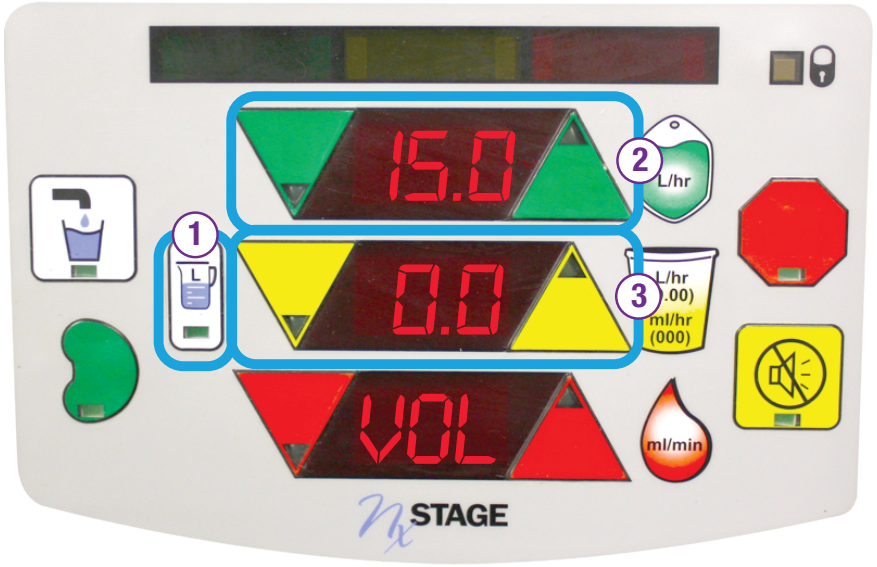
Show how to enter the patient's prescription into the Cycler. As you demonstrate, share these tips:

- The Rate screen is the default (or home) screen.
- ① Enter volume first, then rate.
- ② On the volume screen, work from top to bottom ③ (green then yellow).
- ④ On the rate screen, work from bottom to top (⑤ red, then ⑥ yellow, then ⑦ green).
- The volume screen reverts back to rate screen after 50 seconds of inactivity or for Cycler software 4.9 or higher per System Setting #77; the patient or care partner may need to toggle back to the Volume screen again to finish entering total weight to remove.
- The Green Status Window shows flow fraction and total treatment time after all required data is entered on the Rate and Volume screens. If the patient sees a flow fraction that doesn't match their prescription and/or a treatment time of 99:59, he/she has not correctly entered all required data.

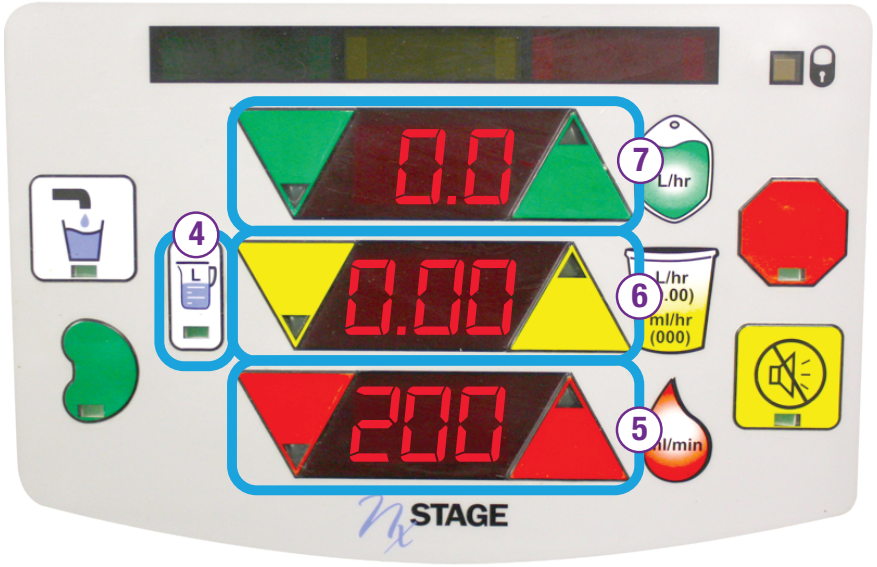
dialysis prescriptions and cycler

How to program your treatment information into the Cycler

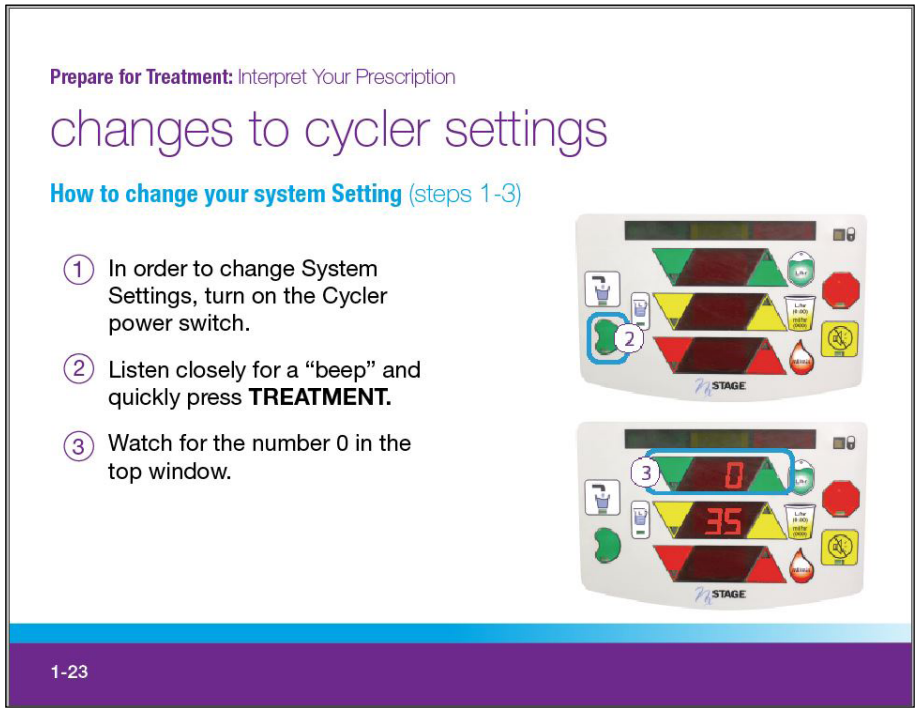
Volume Screen



Rate Screen



changes to cycler settings



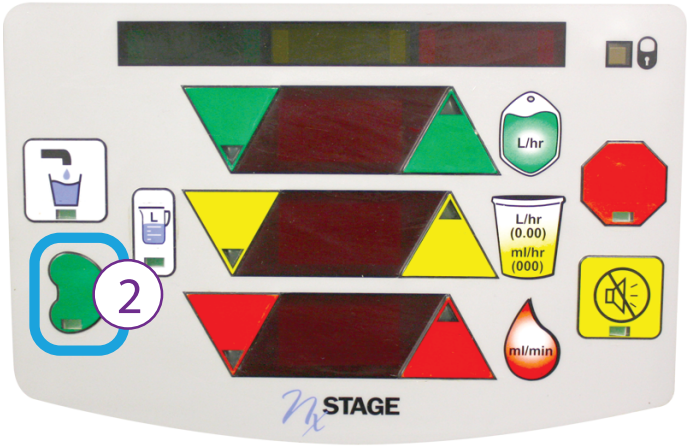
Walk the patient and care partner through the process of changing system settings.

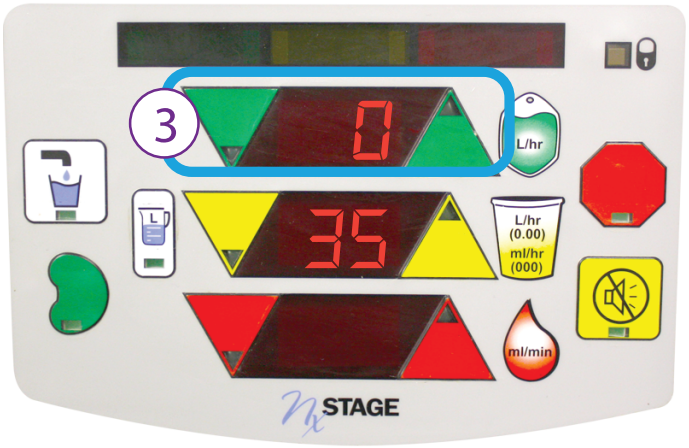
Remind the patient to follow his/her physician's prescription and dialysis center's instructions when changing system settings.

changes to cycler settings

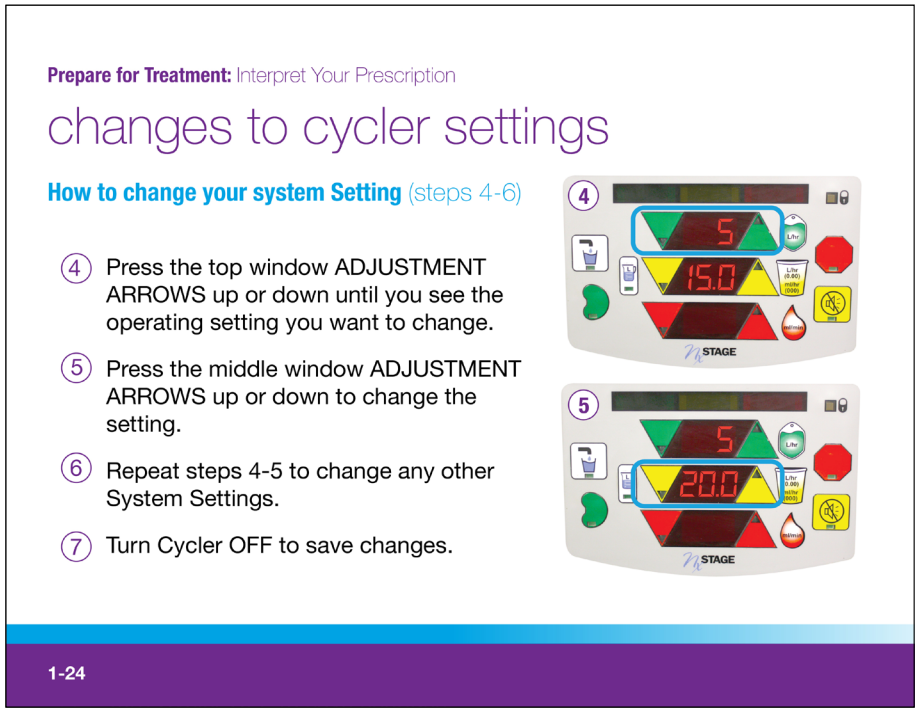
How to change your system Setting (steps 1-3)

1. In order to change System Settings, turn on the Cycler power switch.
2. Listen closely for a “beep” and quickly press **TREATMENT**.
3. Watch for the number 1 in the top window.





changes to cycler settings



Walk the patient and care partner through the process of changing system settings.

Remind the patient to follow his/her physician's prescription and dialysis center's instructions when changing system settings.

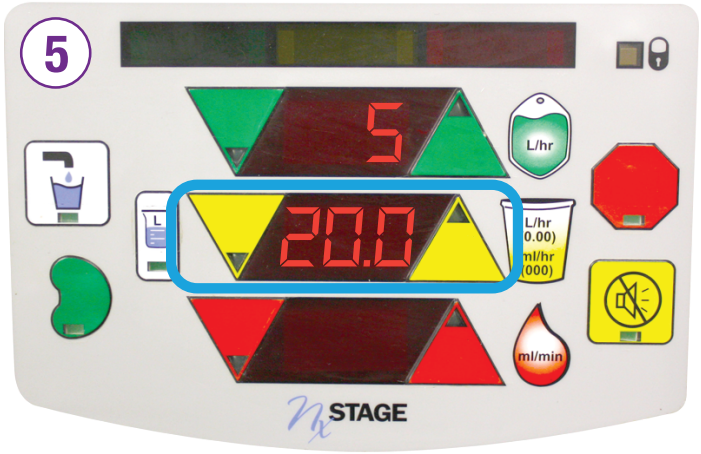
Remind patient to turn the Cycler power OFF in order to proceed with treatment.

changes to cycler settings

How to change your system Setting (steps 4-6)

4. Press the top window ADJUSTMENT ARROWS up or down until you see the operating setting you want to change.
5. Press the middle window ADJUSTMENT ARROWS up or down to change the setting.
6. Repeat steps 4-5 to change any other System Settings.
7. Turn Cycler OFF to save changes.





Complete Your Treatment

Use the System One™ Cycler



1. cycler components and major controls

Complete Your Treatment

Use the System One Cycler



1. cycler components and major controls

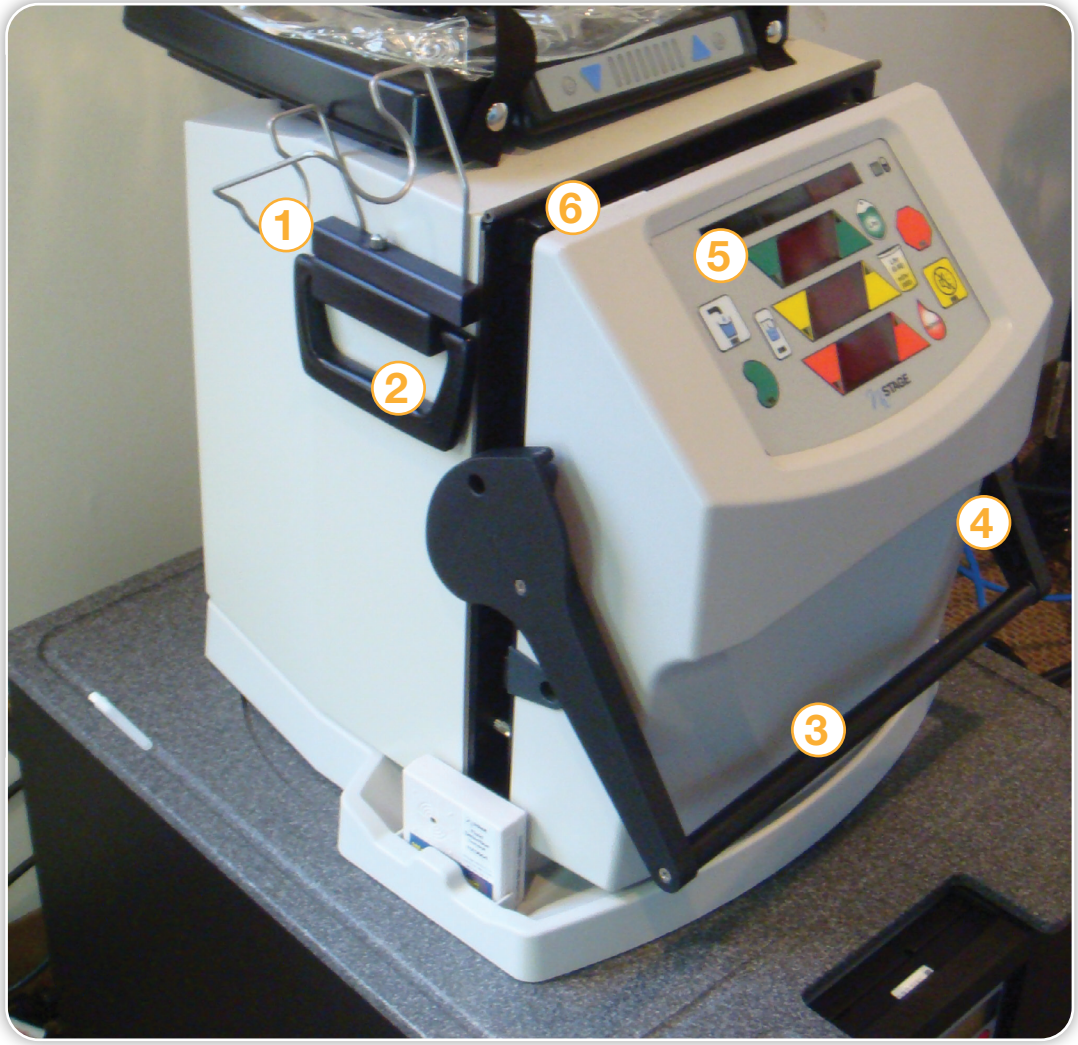
cycler components and major controls



Identify and describe the Cycler components listed below.

1. **Filter Holder:** Holds the Dialyzer during treatment.
2. **Lift/carry handle:** Used to lift or carry the Cycler.
3. **Cycler door handle:** Used only to open or close the Cycler door.
4. **Access Pressure Pod connection point:** Location of connection to the Cartridge Access Pressure Pod Monitoring Line.
5. **Control Panel:** Controls and monitors therapy.
6. **Serial number label:** Lists the equipment serial number.

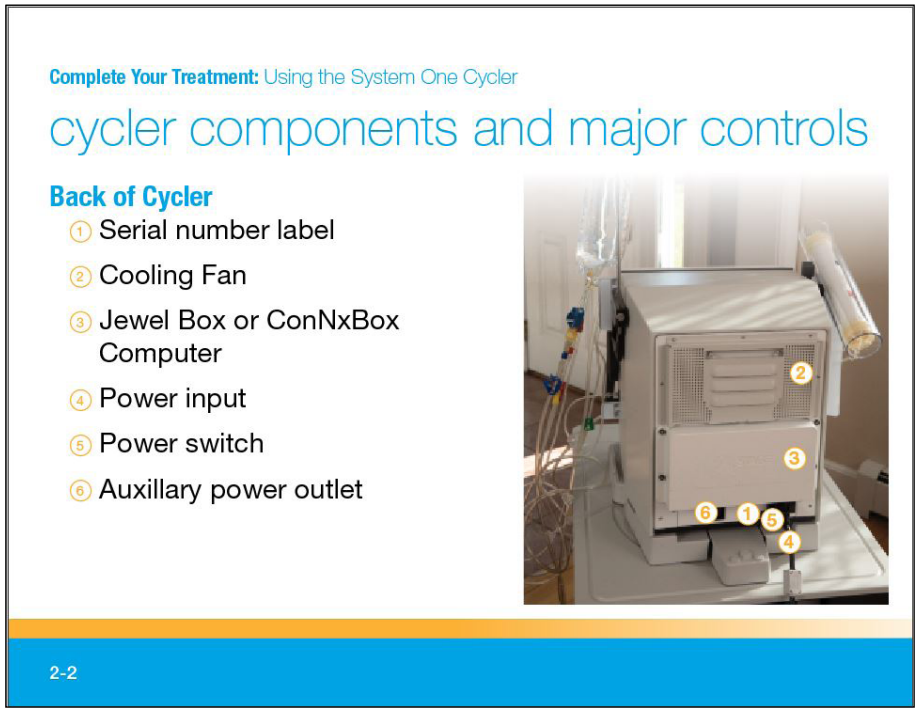
cycler components and major controls



Front of Cycler

1. Filter Holder
2. Lift/carry handle
3. Cycler door handle: lift to open, push to close
4. Access Pressure Pod connection point
5. Control Panel
6. Serial number label

cycler components and major controls



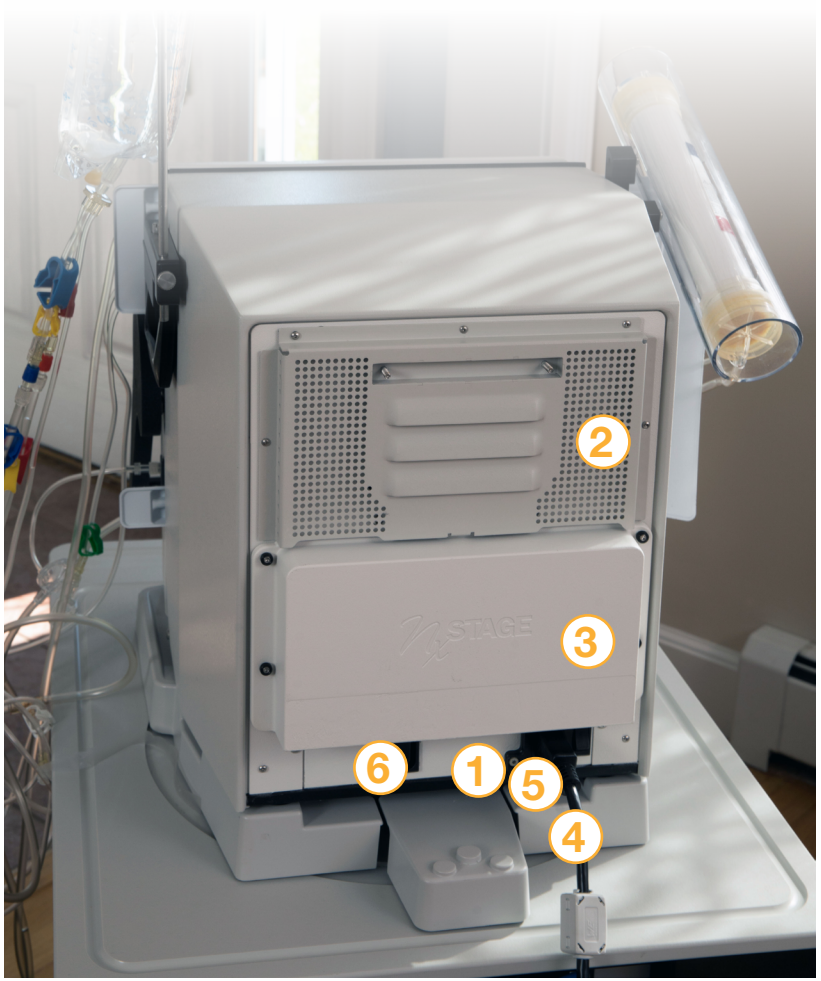
Identify and describe the Cycler components listed below.

1. **Serial number label:** Lists the equipment serial number.
2. **Cooling fan:** Cools the Cycler.
3. **Jewel Box or ConNxBox™ Computer:** Contains log files (data) that are communicated to NxStage.
4. **Power input:** Plug for the power cord.
5. **Power switch:** Turns the Cycler on and off.
6. **Auxillary power outlet:** Plug for the Warmer.

cycler components and major controls

Back of Cycler

1. Serial number label
2. Cooling Fan
3. Jewel Box or ConNxBox Computer
4. Power input
5. Power switch
6. Auxillary power outlet



cycler components and major controls

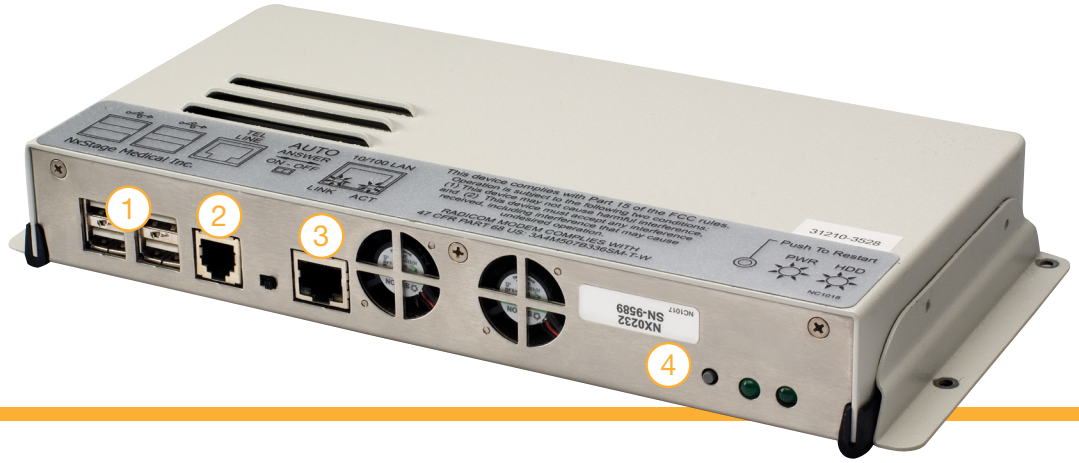


Identify and describe the Cycler components listed below.

- **USB ports:** Connection point used to retrieve log files using a USB flash drive or to connect the PureFlow SL to the Cycler
- **Internet and phone connections (Jewel Box):** Connection point to send log files
- **Internet connection (ConNxBox):** Connection point to send log files
- **Reset Button:** Restarts/resets the Computer

cycler components and major controls

Computer Components



Underside of Jewel Box

1. USB ports
2. Telephone connection
3. Internet connection
4. Reset button



Underside of ConNxBox

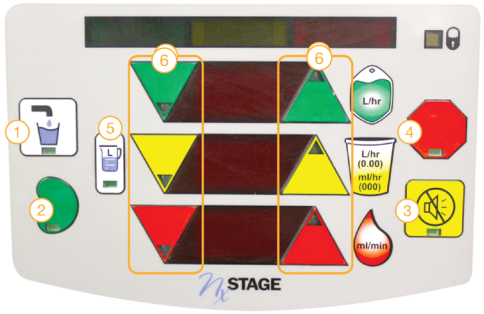
1. USB ports
2. Internet connection
3. Reset button
4. HB light

cycler components and major controls

Complete Your Treatment: Using the System One Cycler

cycler components and major controls

Cycler Control Panel Keys and Adjustment Arrows



1. ADD FLUID key
2. TREATMENT key
3. MUTE key
4. STOP key
5. Volume TOGGLE
6. Rate/Volume Adjustment Arrows

Explain that the Cycler Control Panel is used to control and monitor the therapy. The Control Panel keys function when lit and pressed. Identify and describe the keys on the Control Panel listed below.

1. **ADD FLUID** During PRIME, starts the PRIME and Alarm Test. During RINSEBACK, returns blood.

2. **TREATMENT** Begins or restarts therapy and all Cycler pumps.

3. **MUTE** Temporarily silences beep (caution or alarm condition) and clears some caution conditions.

4. **STOP** When pressed once:
   - During TREATMENT, it stops all pumps.
   - During an alarm, it initiates alarm recovery.

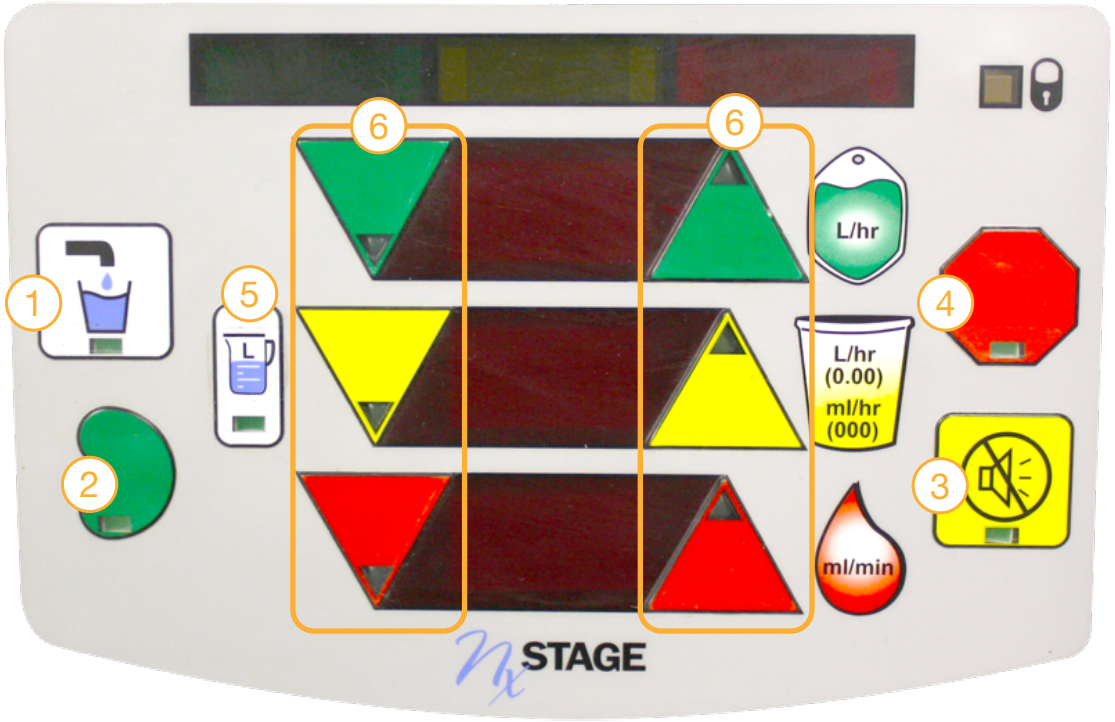
   When the STOP is pressed and held for 2 seconds, it ends TREATMENT or RINSEBACK.

5. **VOLUME TOGGLE:** When pressed, shifts the display from rate to volume.

6. **Rate/Volume Adjustment Arrows:** Used to adjust the dialysate volume and rate, ultrafiltration volume and rate, and blood flow rate.

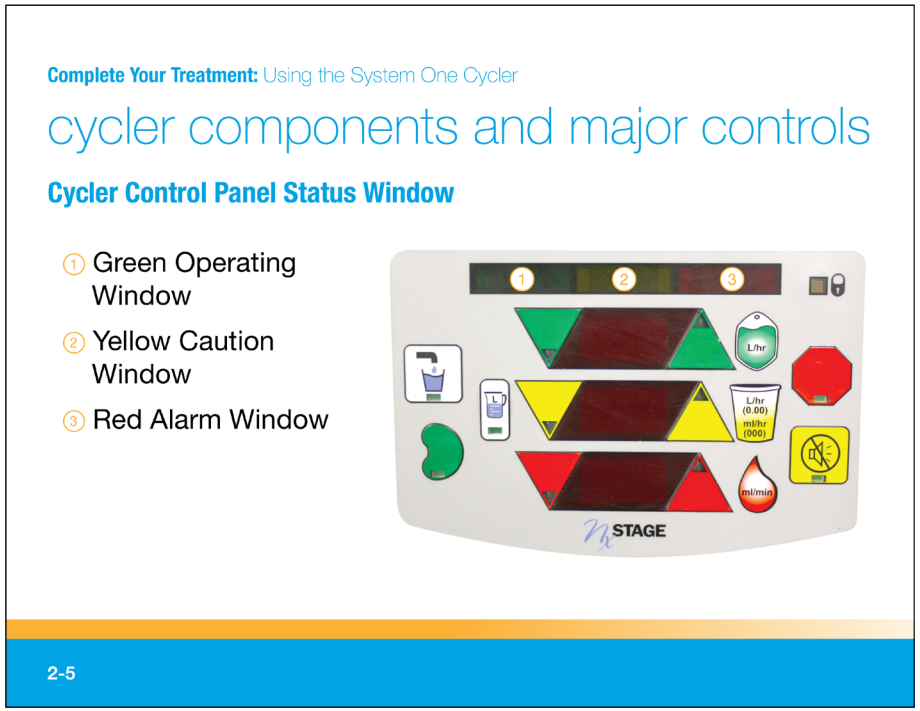
cycler components and major controls

Cycler Control Panel Keys and Adjustment Arrows



1. ADD FLUID
2. TREATMENT
3. MUTE
4. STOP
5. Volume TOGGLE
6. Rate/Volume Adjustment Arrows

cycler components and major controls



Identify and describe the Control Panel Status windows and what each window means as listed below.

① **Green Operating window:** During TREATMENT, shows the “safe” operating condition. Displays the time left in TREATMENT, venous, effluent, and arterial pressures, and the flow fraction (FF). During PRIME, it displays the time left in PRIME.

② **Yellow Caution window:** Displays a caution condition. Action may be required.

③ **Red Alarm window:** Displays an alarm condition. Action is required. Displays “000” to signify the end of a mode (PRIME, TREATMENT, RINSEBACK).

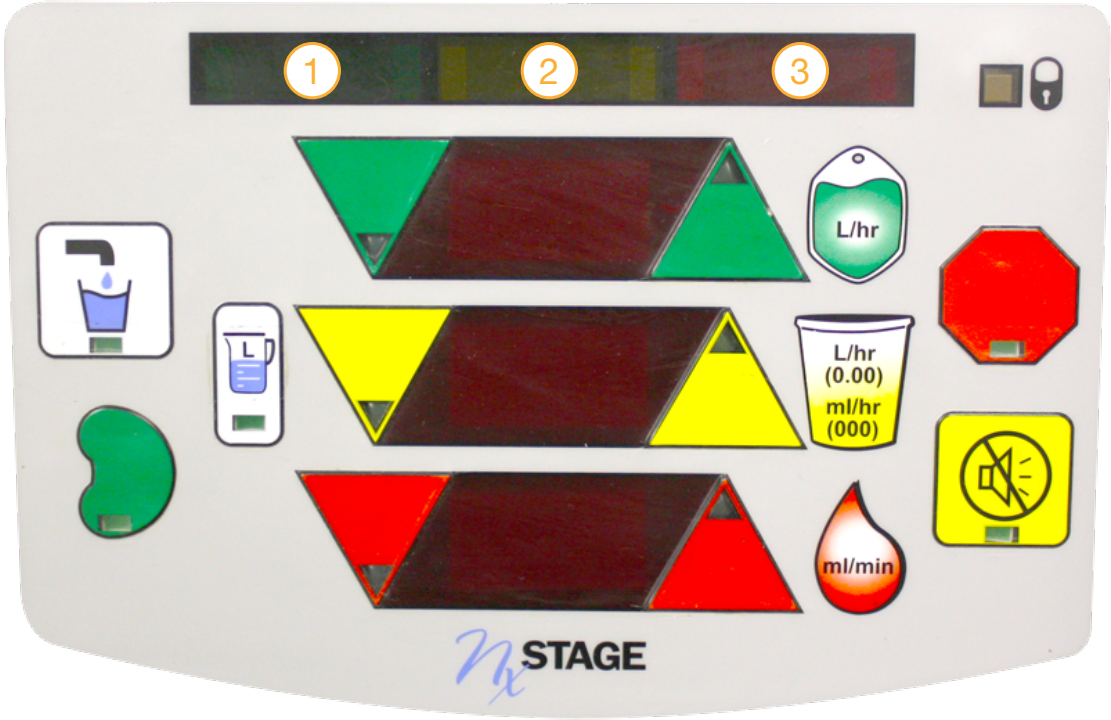
cycler components and major controls

Cycler Control Panel Status Window

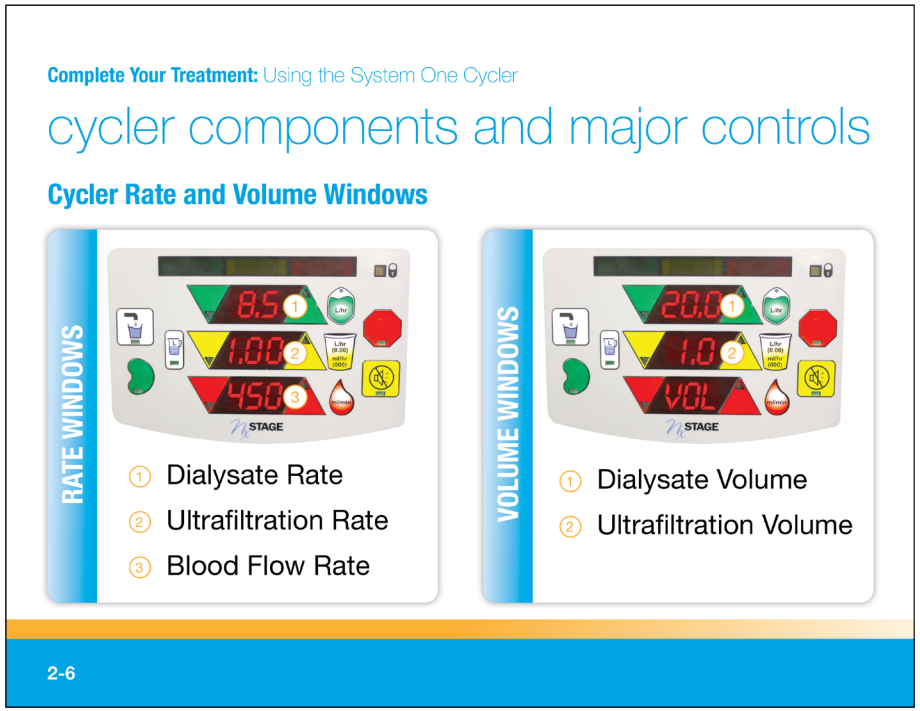
① Green Operating Window

② Yellow Caution Window

③ Red Alarm Window



cycler components and major controls



Identify and describe the Cycler Rate and Volume windows listed below.

RATE

Dialysate rate: How fast the prescribed dialysate is flowing in liters per hour. During RINSEBACK, the rinseback volume in milliliters.
Ultrafiltration rate: How fast excess fluid or weight is being removed in liters per hour.
Blood flow rate: How fast blood is flowing through the Cartridge in milliliters per minute.

Explain that during TREATMENT or automatic RINSEBACK, a red dot will appear in the lower right-hand corner of each the Rate/Volume windows when the associated pump is running.

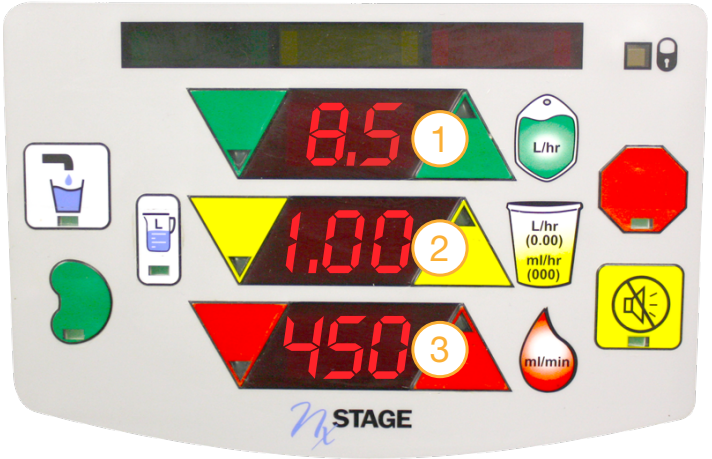
VOLUME

Dialysate volume: During TREATMENT, the volume of prescribed dialysate left to exchange in liters.
Ultrafiltration volume: Excess fluid left to remove in liters. **In the Volume screen, VOL replaces the blood flow rate.**

cycler components and major controls

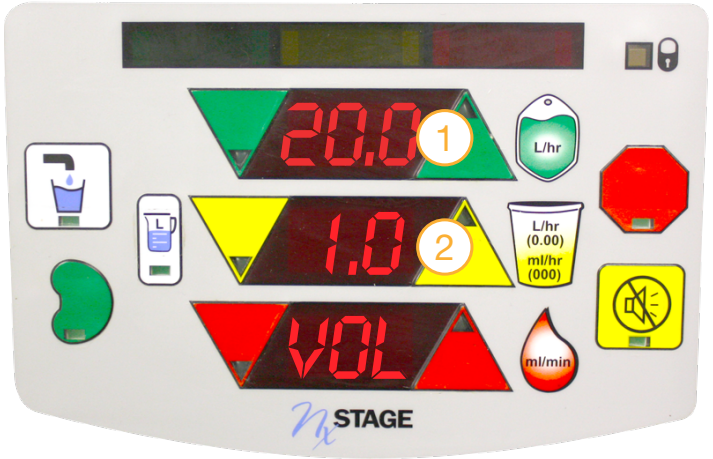
Cycler Rate and Volume Windows

RATE WINDOWS



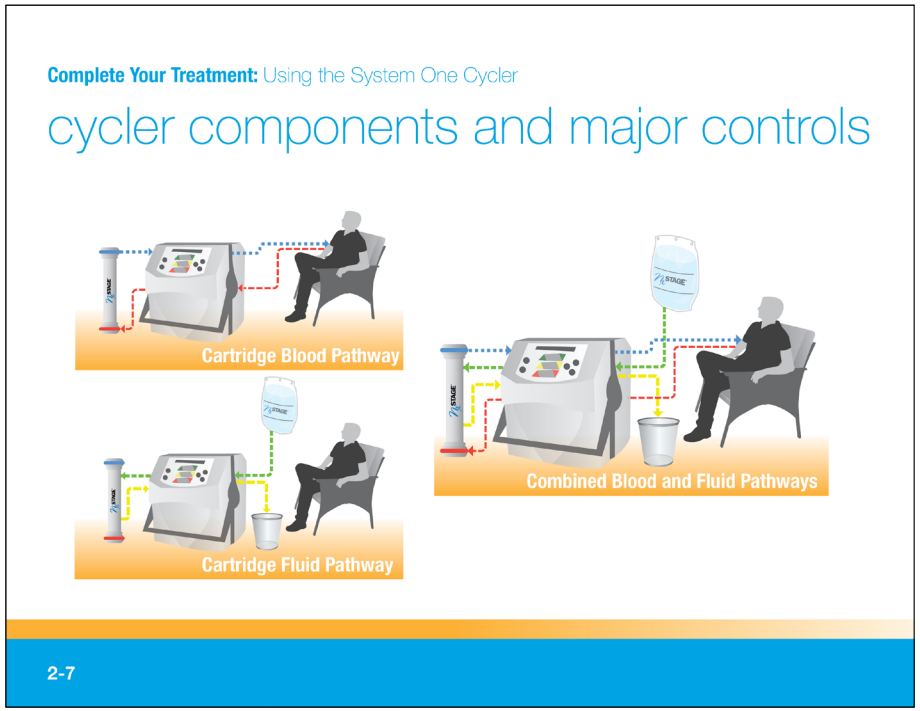
1. Dialysate Rate
2. Ultrafiltration Rate
3. Blood Flow Rate

VOLUME WINDOWS



1. Dialysate Volume
2. Ultrafiltration Volume

cycler components and major controls

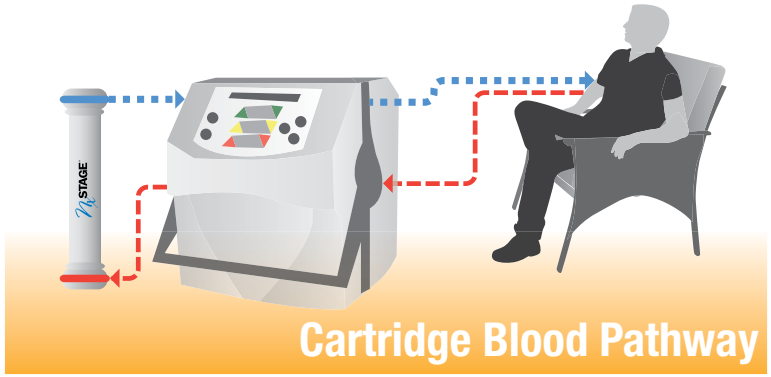


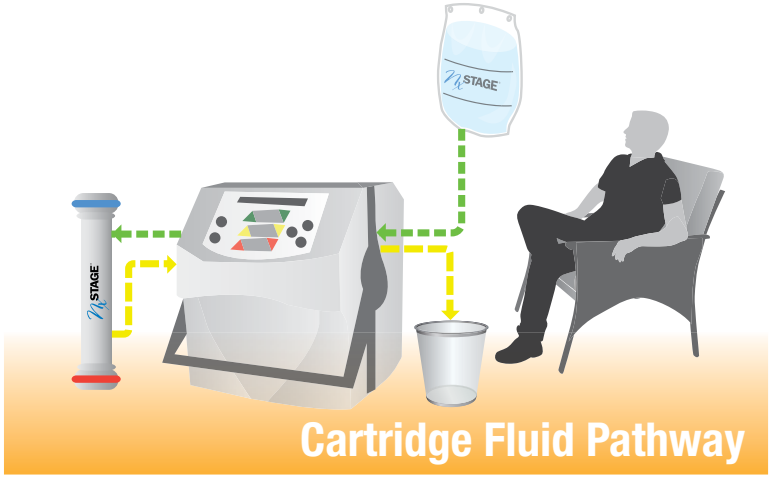
Explain the Cartridge blood pathway and fluid pathways.

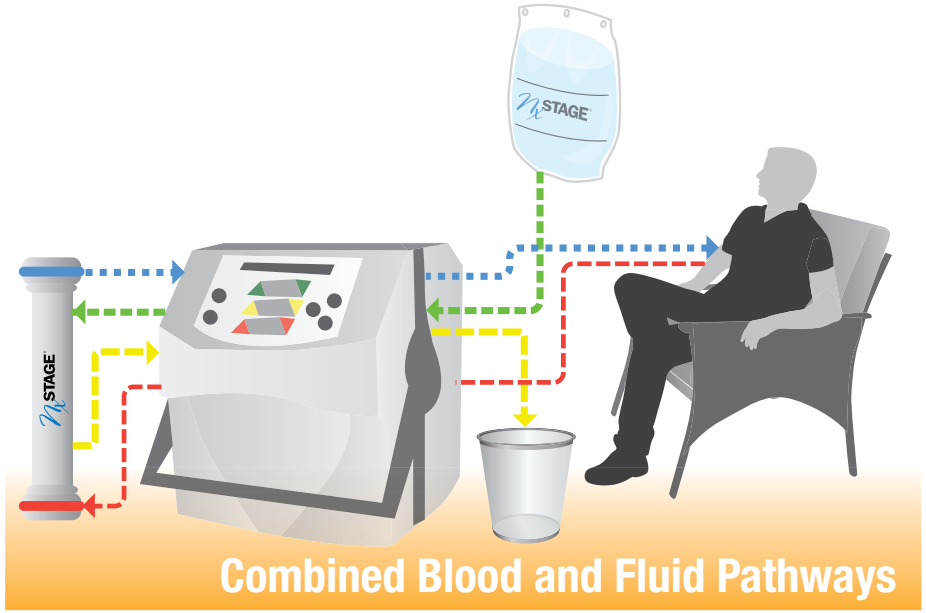
Cartridge blood pathway: Within the blood circuit, the Cycler blood pump pulls blood from the arterial access (creating negative pressure) and pushes it through the dialyzer fibers (creating positive pressure), and then back to the venous access.

Cartridge fluid pathway: Within the fluid circuit, the Cycler dialysate fluid pump pulls dialysate from the Dialysate Bags or the PureFlow SL SAK and pushes the dialysate through the Fluid Balance Chambers to the Dialyzer. The ultrafiltration and effluent pumps pull the effluent (spent dialysate or waste) from the Dialyzer and pushes it through the Fluid Balance Chambers, and then sends the fluid to the drain.

cycler components and major controls







cycler components and major controls



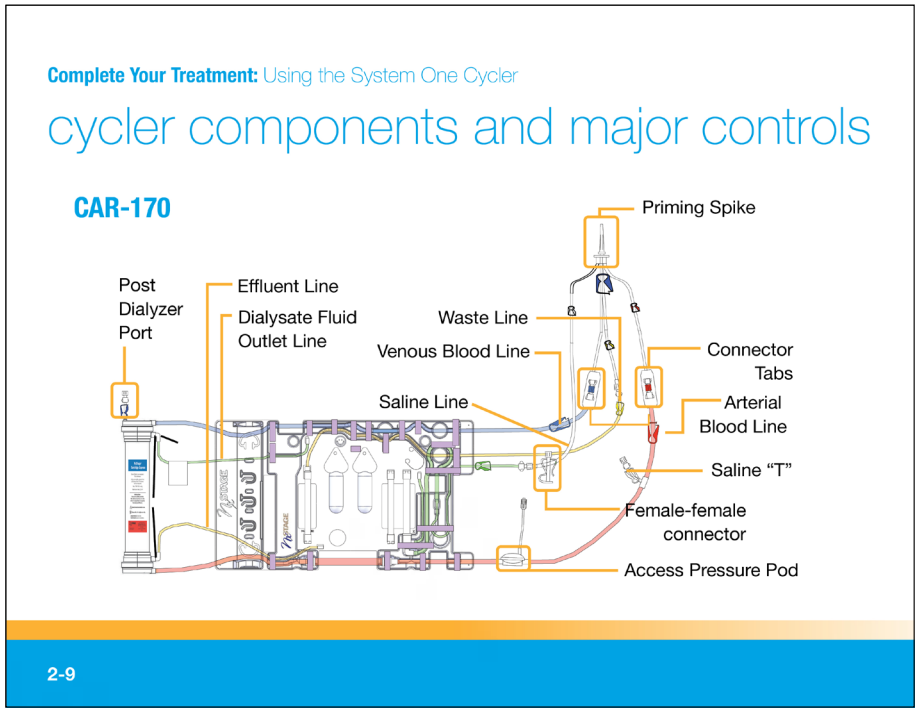
Explain that as blood flows through the Dialyzer fibers, the dialysate surrounds or “bathes” the fibers, which allows the diffusion of toxins.

cycler components and major controls





cycler components and major controls



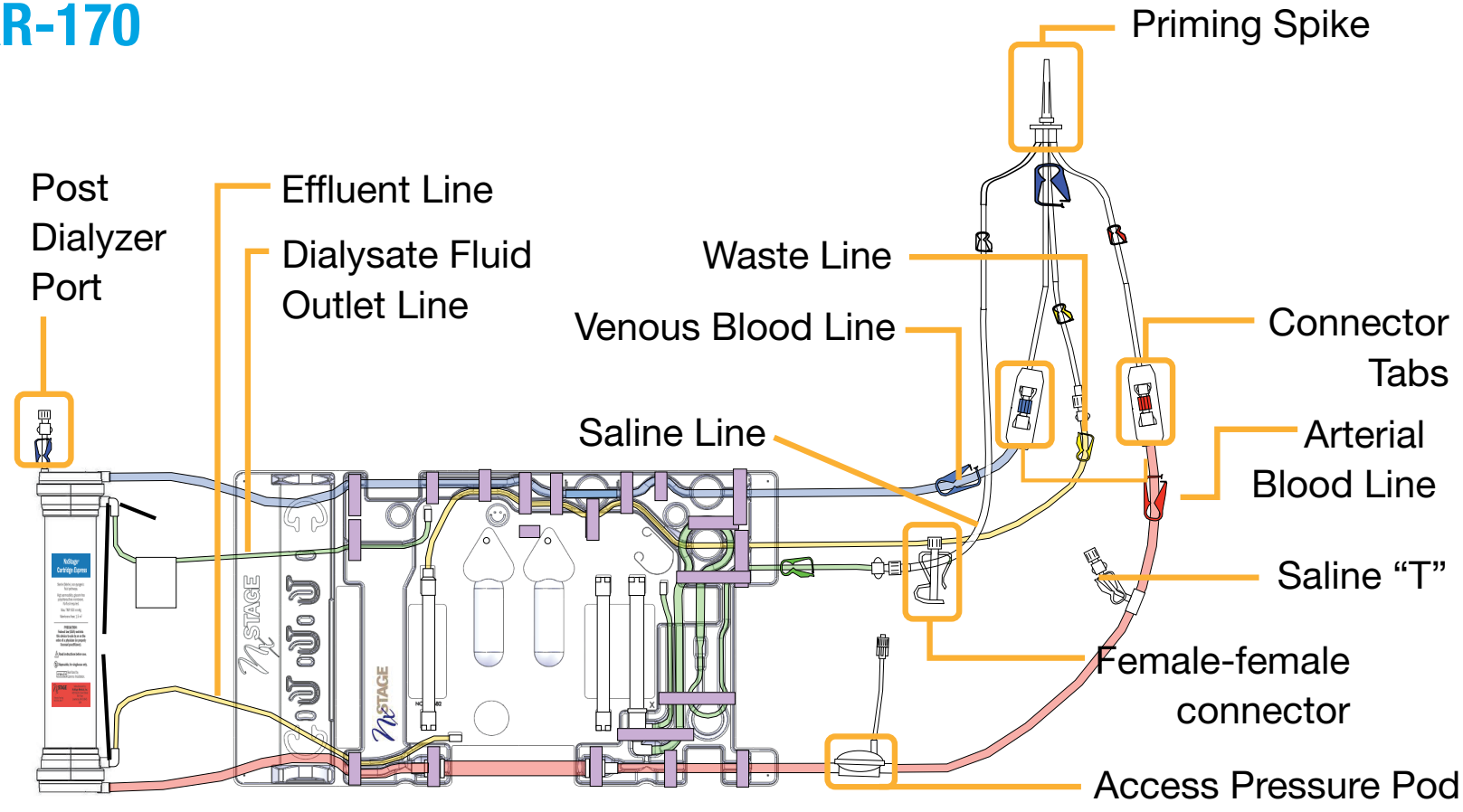
Identify the Cartridge components. Explain that the Cartridge is a single-use disposable tubing set that contains all the fluid and blood pathways. Explain that the pictures in the flipbook display the Cartridge in the PRIME configuration.

- Point out that the clamp colors on the Cartridge lines match the colors of the Rate and Volume Adjustment Arrows on the Cycler Control Panel (for example, the red clamp on the Arterial Blood Line corresponds to the red blood flow rate Adjustment Arrow).

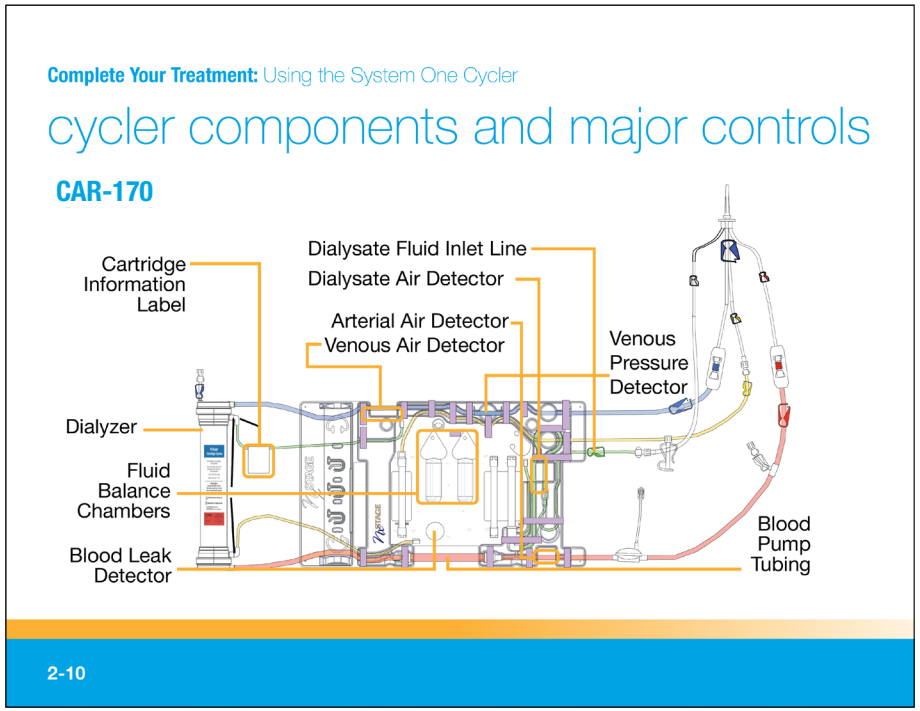
- The CAR-170 includes a pre-attached Dialyzer and is the most common Cartridge used in the home setting.

cycler components and major controls

CAR-170



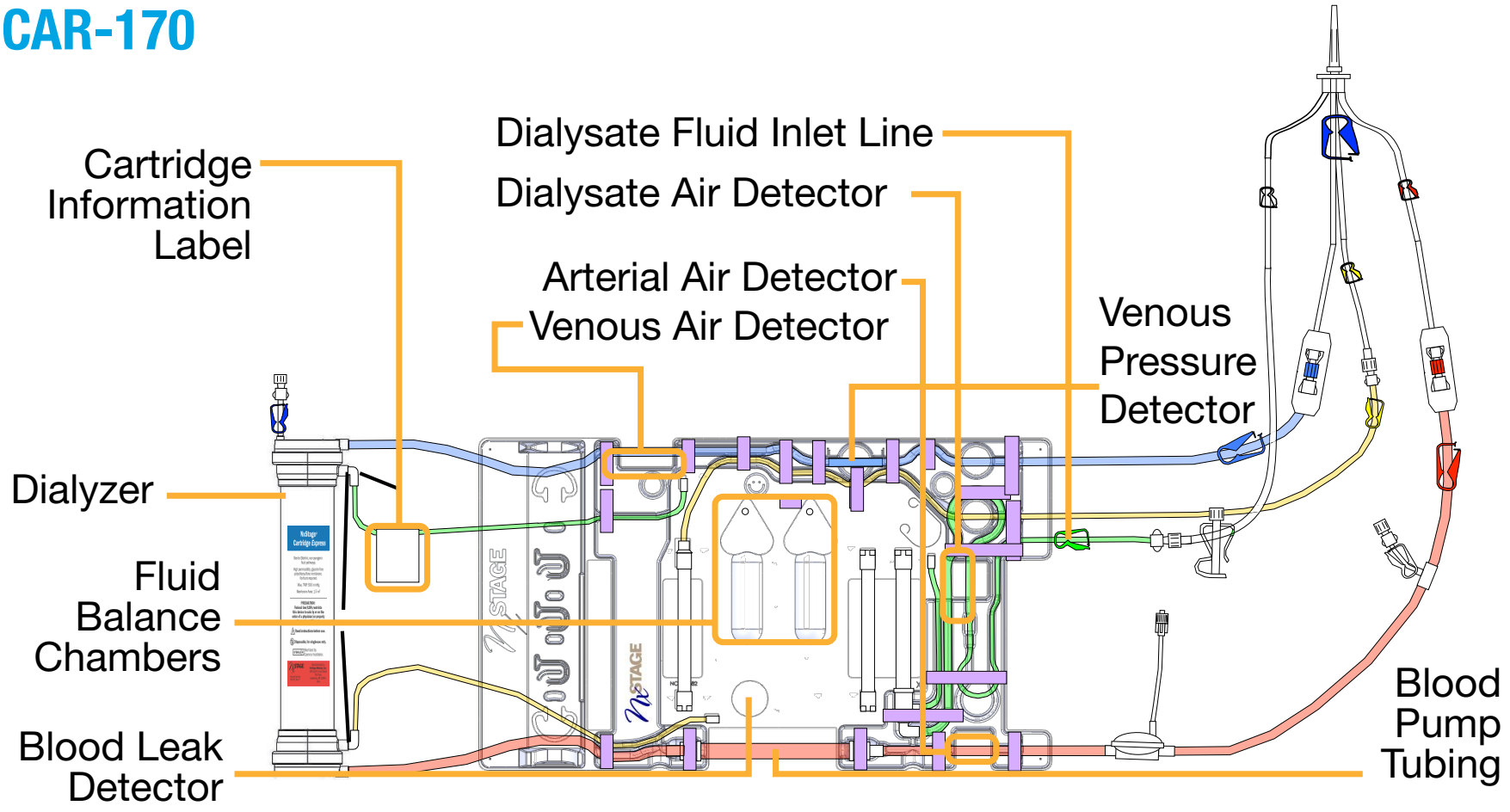
cycler components and major controls



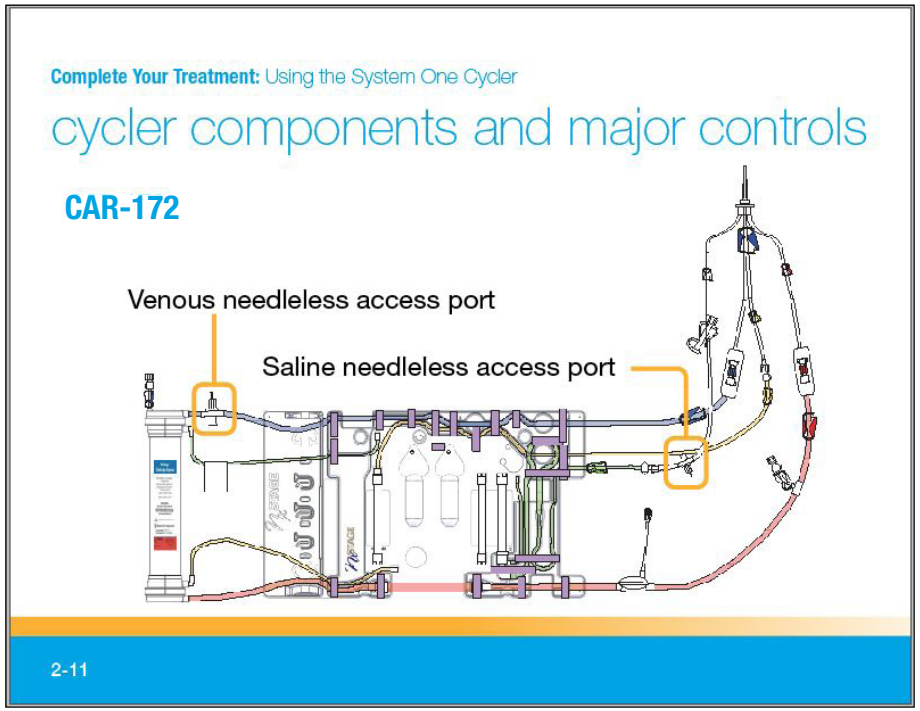
Identify the remaining Cartridge components.

cycler components and major controls

CAR-170



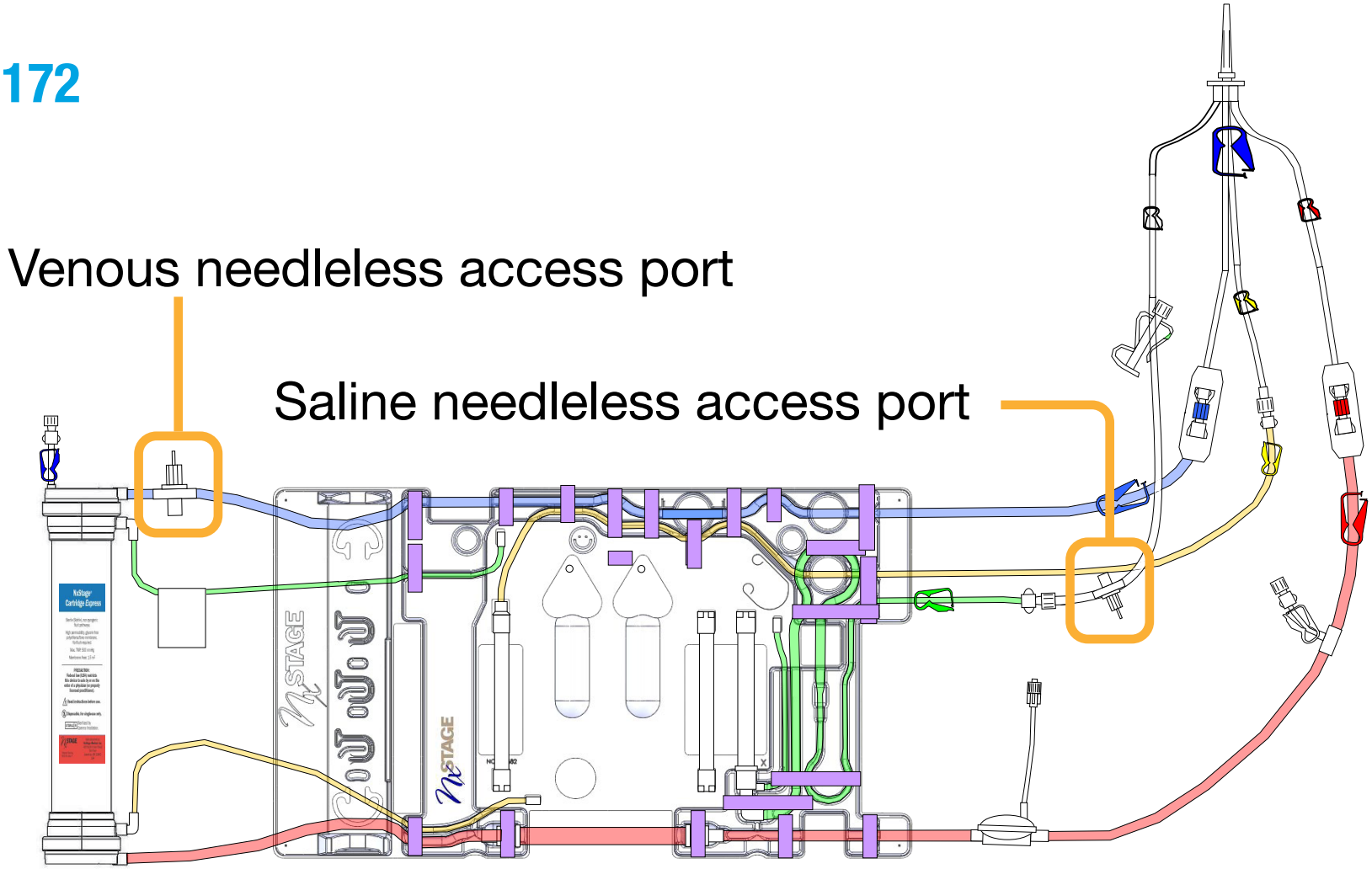
cycler components and major controls



If the patient will be using the CAR-172, point out that the CAR-172 is similar to the CAR-170, except that CAR-172 has additional Venous and Saline needleless access port.

cycler components and major controls

CAR-172



cycler components and major controls



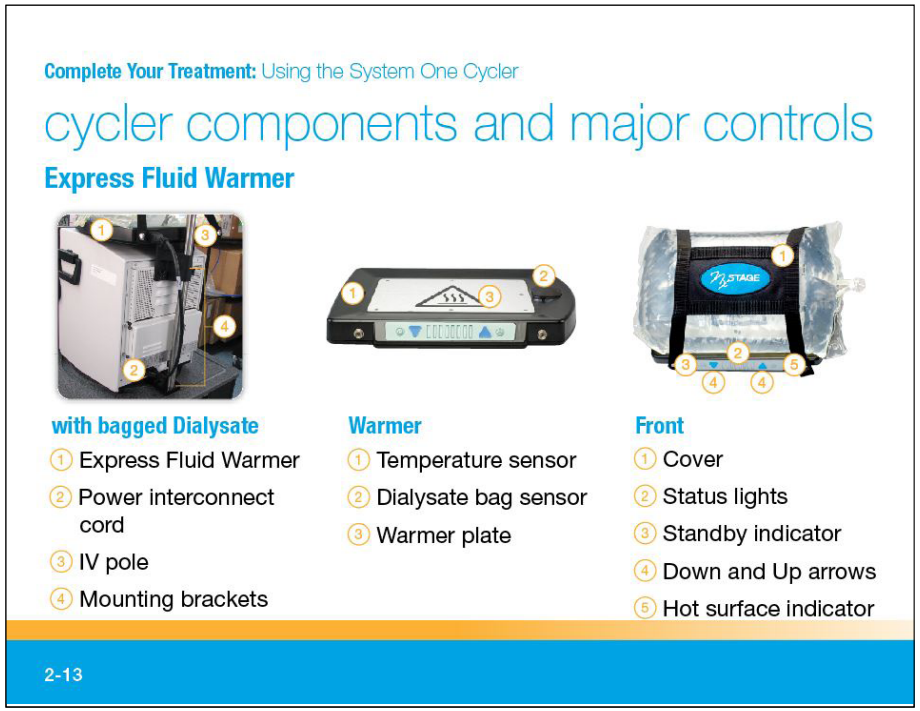
- Explain the components of the Cycler Base and the Fluid Detection Sensor and the function of each.
- Explain that the Cycler Base and Fluid Detection Sensor is an optional product designed to alert the patient of potential Cartridge leaks. When fluid comes into contact with the Fluid Detection Sensor's stainless steel bars, it sounds an alert.
- Describe how the Cycler Base fits under the Table Top Stand or the Express Fluid Warmer bottom mount (if used).
- Explain that the Cycler Base and Fluid Detection Sensor may not detect a dialyzer or other leaks. Patient or care partner should periodically check all connections and the system for possible leaks.
- Explain that the Fluid Detection Sensor battery must be correctly installed and replaced as needed. The Sensor must be tested before EVERY treatment to be sure it is working properly.

cycler components and major controls

Cycler Base and Fluid Detection Sensor



cycler components and major controls



Identify and describe the Express Fluid Warmer's components listed below.

Bottom and top mounting brackets: Secures the IV pole.

Collapsible IV pole: Holds the dialysate and saline bags.

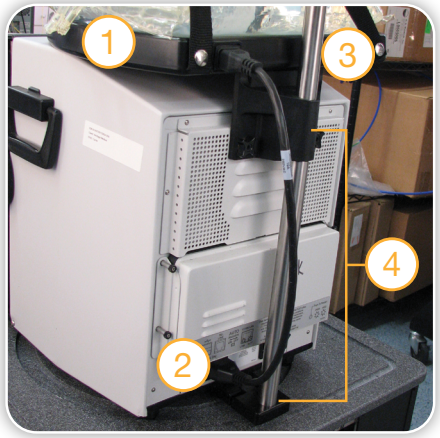
Warmer plate: Warms the Dialysate.

Power interconnect cord: Connects the warmer to the Cycler.

Dialysate cover: Secures the Warmer Dialysate bag.

cycler components and major controls

Express Fluid Warmer



with bagged Dialysate

1. Express Fluid Warmer
2. Power interconnect cord
3. IV pole
4. Mounting brackets



Warmer

1. Temperature sensor
2. Dialysate bag sensor
3. Warmer plate



Front

1. Cover
2. Status lights
3. Standby indicator
4. Down and Up arrows
5. Hot surface indicator

cycler components and major controls

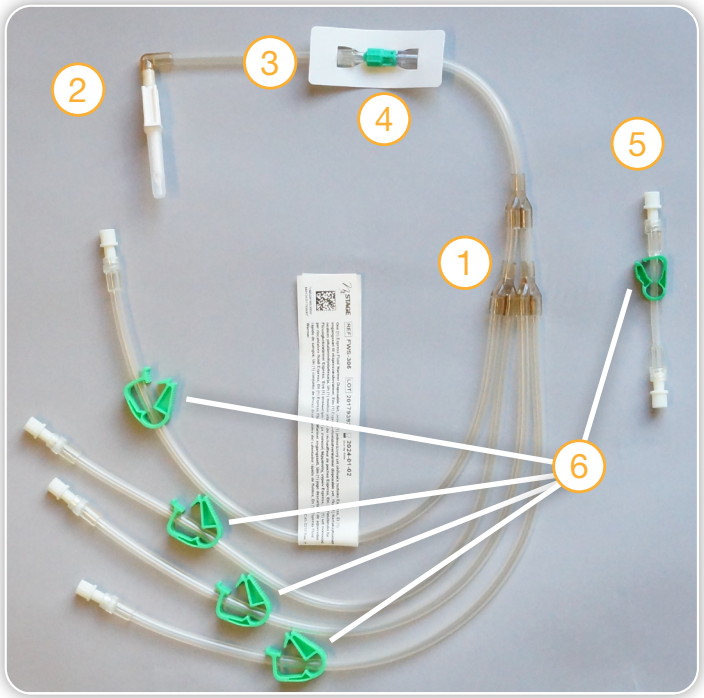


Identify and describe the Express Fluid Warmer's components listed below.

1. **MLA:** Connects to the dialysate bags using luer connections.
2. **Removable single lumen spike:** Connects MLA to the dialysate bag spike port on the warmer.
3. **White connector tab:** When removed, allows the user to tighten the connection.
4. **Green rotating luer connector:** Connects MLA to the dialysate bag luer port on the warmer.
5. **Short dialysate outlet line:** Connects dialysate to the cartridge dialysate fluid inlet.
6. **Green clamps:** Close the short dialysate outlet and MLA lines.

cycler components and major controls

Express Fluid Warmer Disposable Set



1. MLA (multi-line adapter)
2. Removeable single lumen spike
3. White connector tab
4. Green rotating luer connector
5. Short dialysate outlet line
6. Green clamps

Waste Line Extension



Complete Your Treatment

Create and Maintain PureFlow™



1. pureflow components
2. pureflow process

Complete Your Treatment

Create and Maintain PureFlow



1. pureflow components
2. pureflow process

pureflow sl components



Identify and describe the PureFlow SL components as you place labels on the PureFlow SL.

1. **Cabinet:** Contains the Control Unit and Tub.
2. **Tub:** Holds the Dialysate SAK.
3. **Tub serial number label:** Identifies the Tub.
4. **Control Unit and Control Panel:** Contains the controls and interface for purifying water and mixing and delivering dialysate to the System One Cycler.
5. **Control Unit Serial Number label:** Identifies the Control Unit.
6. **Waste Line connector:** Yellow connector on the front of the Control Unit for connecting the Waste Line Adapter.
7. **Conductivity sensor connector:** Orange connector on the front of the Control Unit for connecting to the Condo Adapter.
8. **Water outlet connector:** White connector on the front of the Control Unit for connecting the PAK Water Inlet Line.
9. **PAK electrical connector:** Connector on the left side of the Control Unit for connecting the electrical cable from the PAK.

pureflow sl components



1. Cabinet
2. Tub
3. Tub serial number label
4. Control Unit and Control Panel
5. Control Unit Serial number label
6. Waste Line connector
7. Conductivity sensor connector
8. Water outlet connector
9. PAK electrical connector

pureflow sl disposables



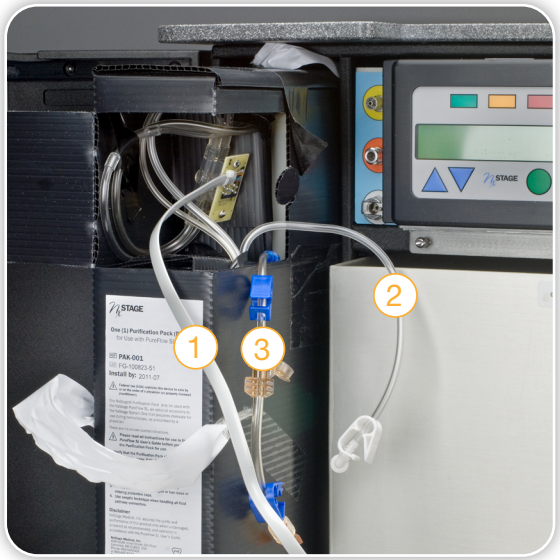
Identify and describe the PureFlow SL disposables as you place labels on the PureFlow SL.

Purification PAK: Filters and purifies tap water.

Dialysate SAK: Disposable bag that contains dialysate concentrate and includes connection lines.

Control Unit adapters: Two disposable adapters. The Waste Line Adapter (yellow clamp) connects to the Waste Line Connector and the Cartridge Waste Line. The Condo Adapter (orange clamp) connects to the Conductivity Sensor Connector and either the PAK during PAK Prime or SAK during Make Batch.

pureflow sl disposables



① Electric Cable

② Water Inlet (White Clamp)

③ Water Outlet (Blue Clamp)



① SAK Label

② Lot Number and Expiration Date



Control Unit adapters

pureflow sl control panel



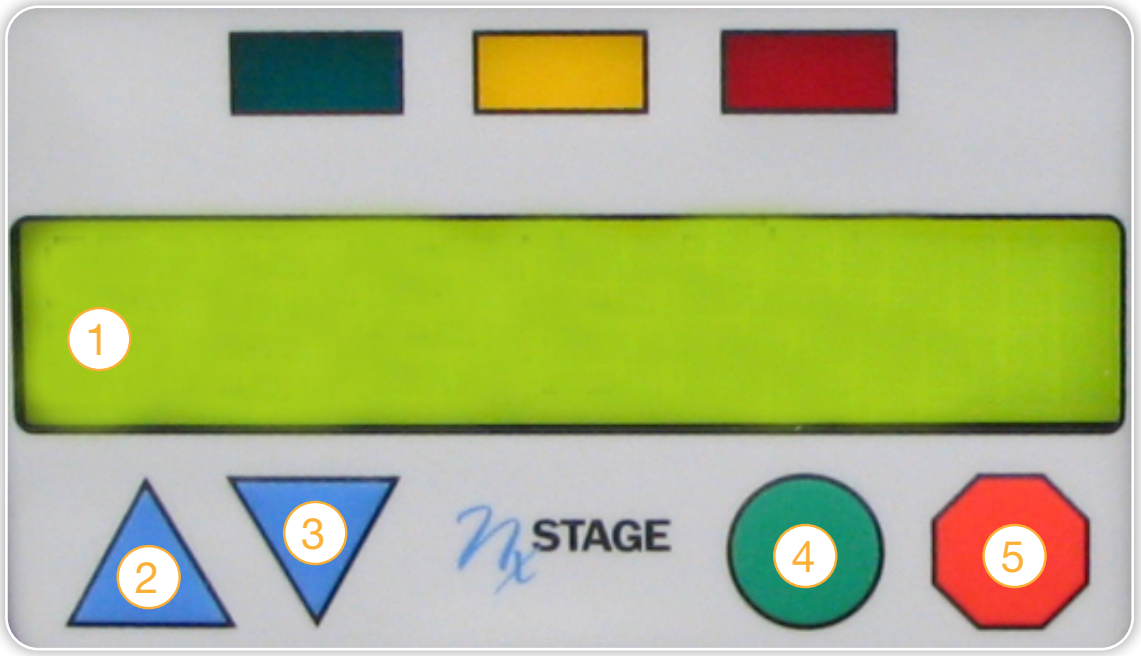
Identify and describe the PureFlow SL Control Panel components listed below as you place labels on the Control Panel.

Operating Conditions

Green: When on, indicates safe operating condition.
Yellow: When flashing, provides a visual caution alert.
Red: When flashing, provides a visual alarm alert.

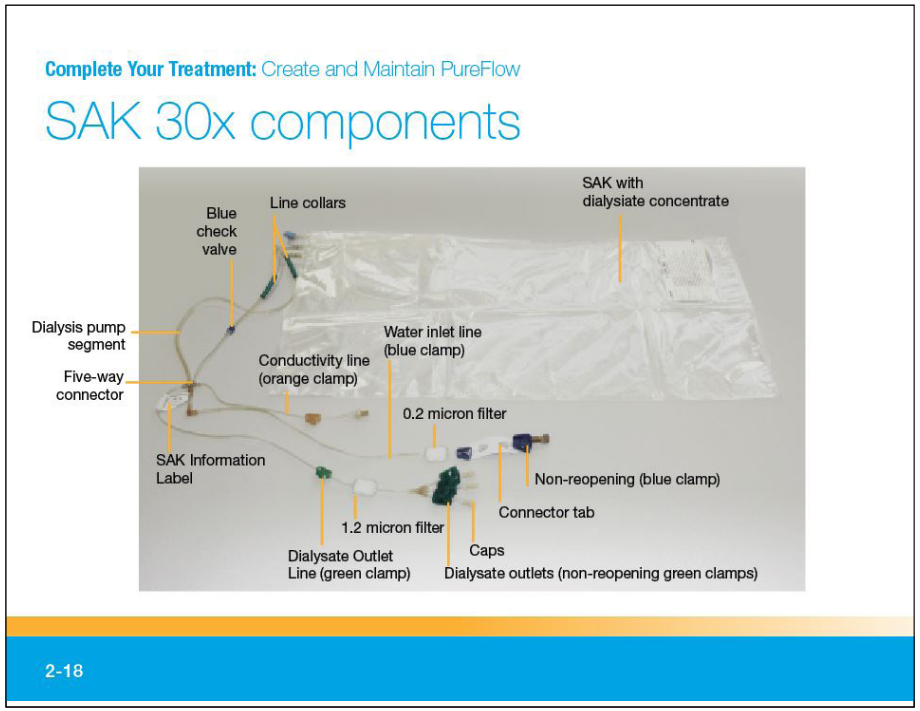
1. **Control Panel display:** Provides operating information, including alarms, cautions, modes, and times.
2. **UP:** Used to display information on the Control Panel display and make operational changes.
3. **DOWN:** Used to display information on the Control Panel display and make operational changes.
4. **GO:** Starts a mode (PRIME PAK, MAKE BATCH) and confirms a prompted action.
5. **STOP:** Stops the mode and acknowledges and silences alarms.

pureflow sl control panel



1. Control Panel display
2. UP
3. DOWN
4. GO
5. STOP

SAK 30x components



Identify and describe the SAK lines listed below as you place labels on the SAK Lines.

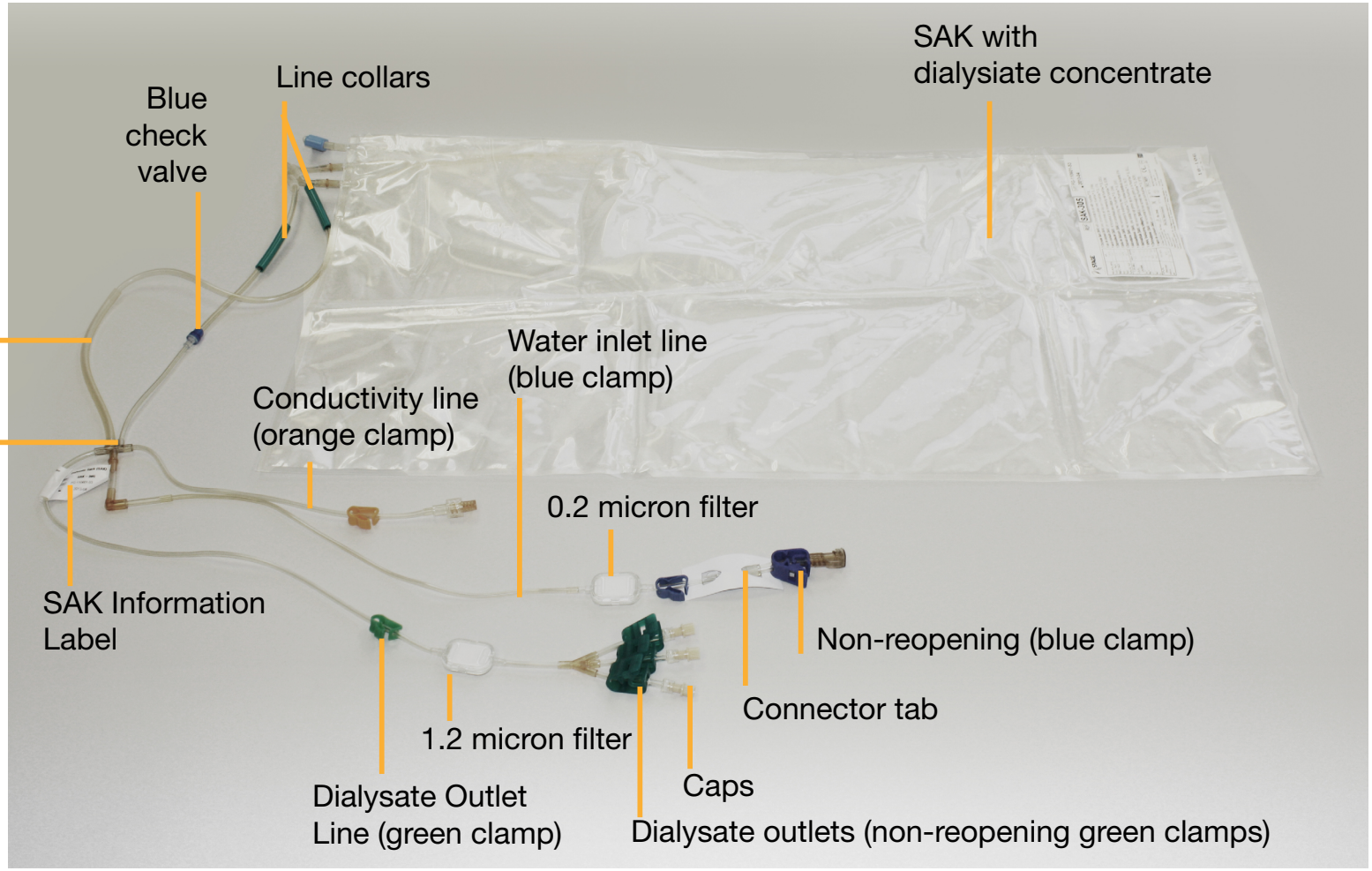
SAK Dialysate Outlet Line (green clamp): Connects the SAK to the Cartridge Dialysate Inlet Line.

SAK Water Inlet Line (blue clamp): Connects the SAK to the PAK.

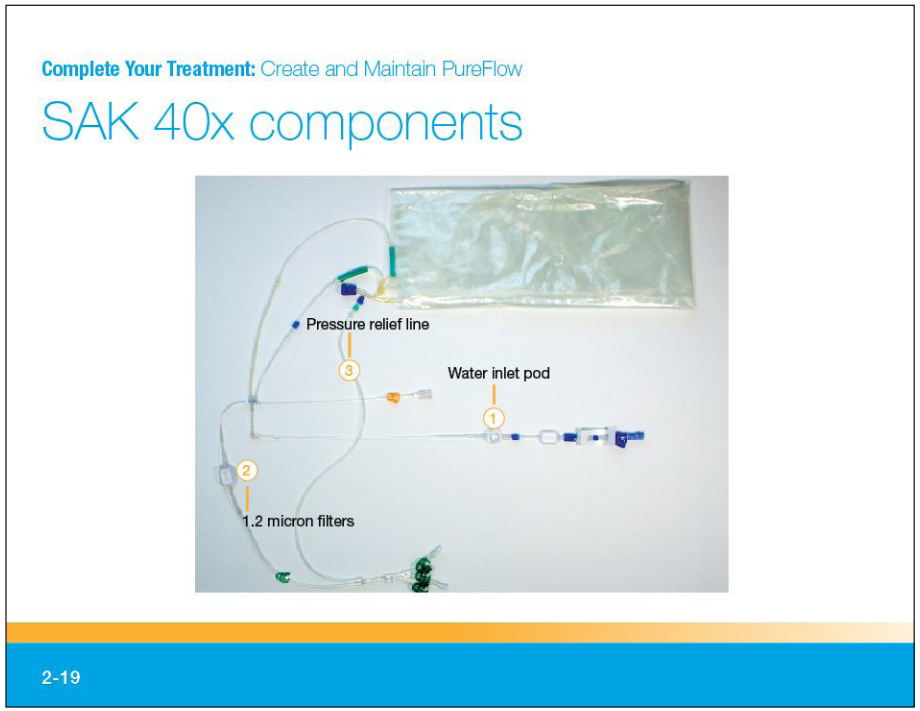
SAK Conductivity Line (orange clamp): Connects the SAK to the Control Unit Conductivity Sensor Connector.

Explain where to find the SAK type, expiration date, and lot number.

SAK 30x components



SAK 40x components



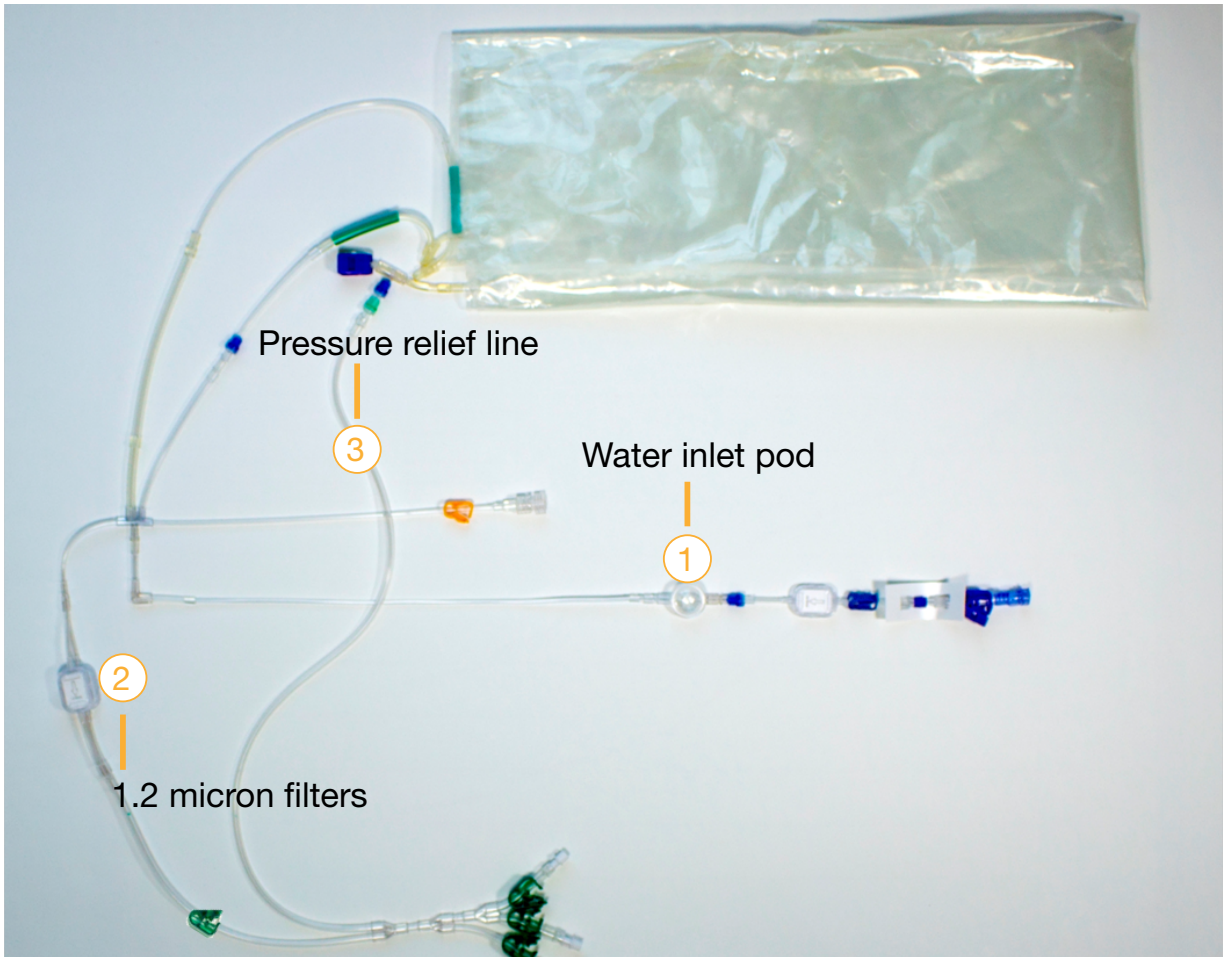
SAK 40x Components

① Water Inlet Pod

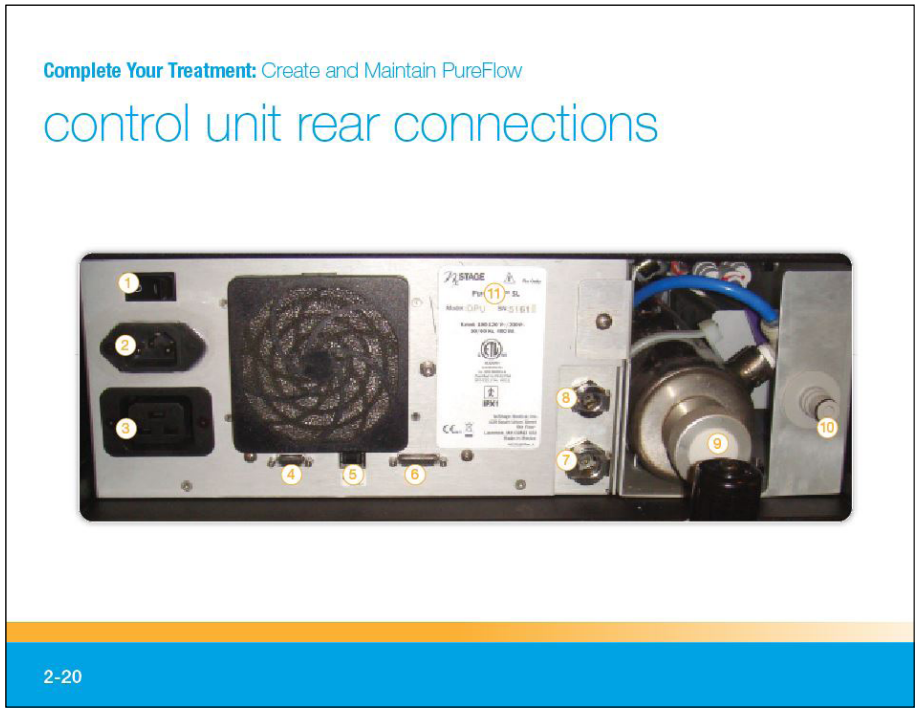
② 1.2 Micron Filters

③ Pressure Relief Line

SAK 40x components



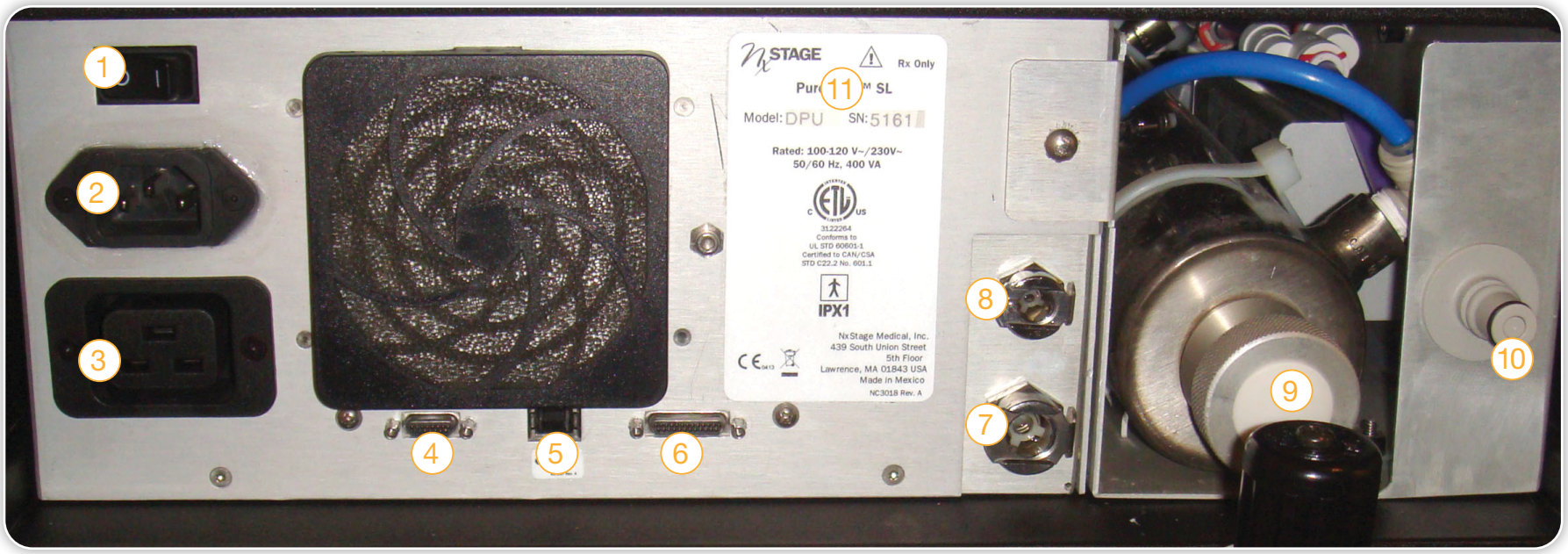
control unit rear connections



Point out the following connectors on the rear of the Control Unit as you place labels on each item:

1. Power Switch
2. AC Power Connector from Cycler
3. Heater Power Connector
4. Dialysate Tub Connector (J2)
5. USB Connector to Cycler
6. UV Light Connector (J1)
7. Water Inlet Connector (from Pre-Treatment Unit)
8. Water Outlet to UV Light
9. UV Light
10. Drain Line Connector
11. Model Serial Number Label

control unit rear connections



pre-treatment unit



Identify and describe the components of the Pre-Treatment Unit.

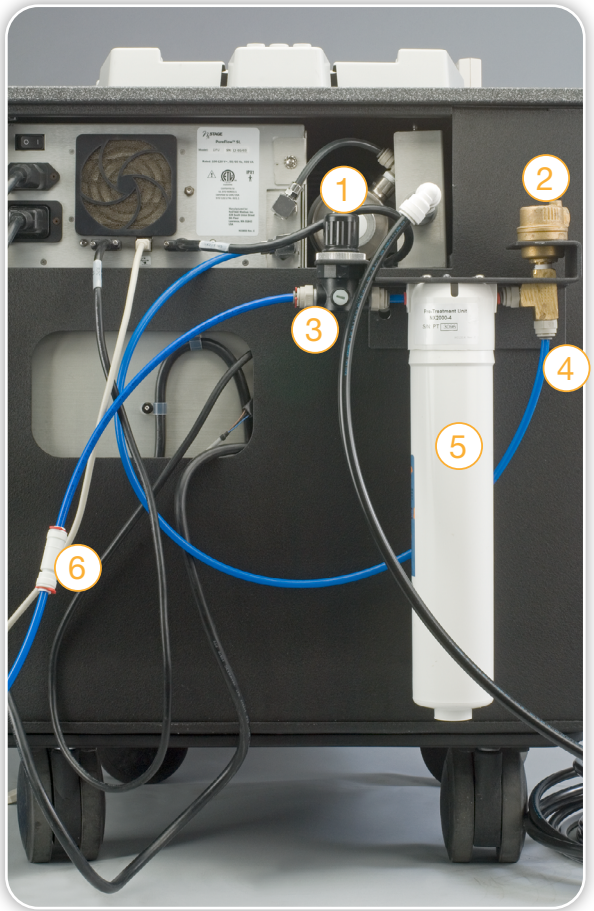
Pre-Treatment Unit

① Pressure regulator
② Air vent
③ Water line from water source
④ Water line to Control Unit
⑤ Sediment filter
⑥ Check valve

Water Source Connectors

⑦ Faucet adapter
⑧ Washer hook-up adapter
⑨ Under sink adapter

pre-treatment unit

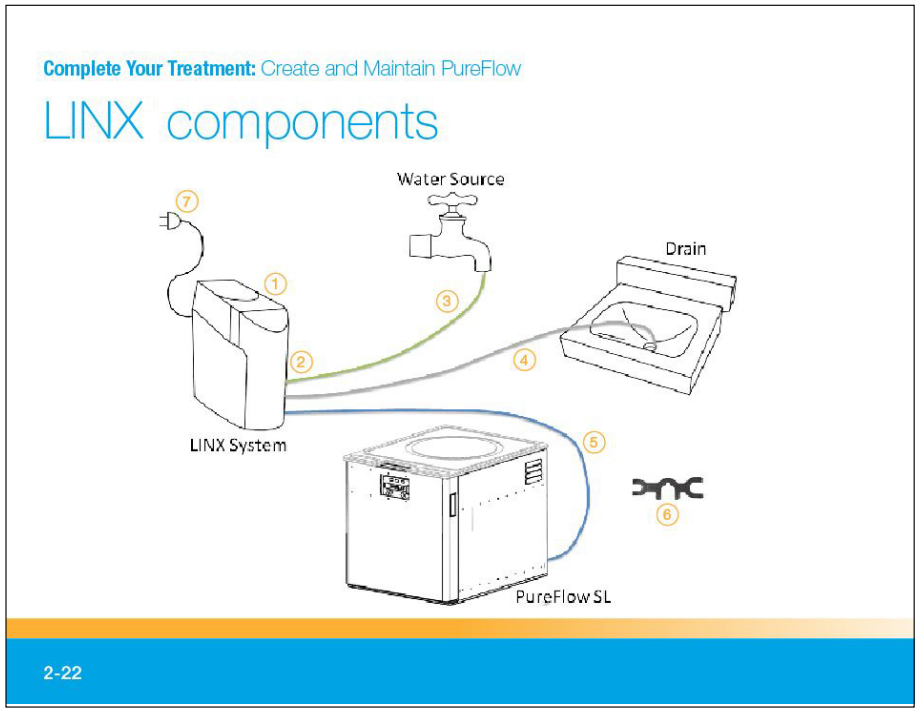








LINX components

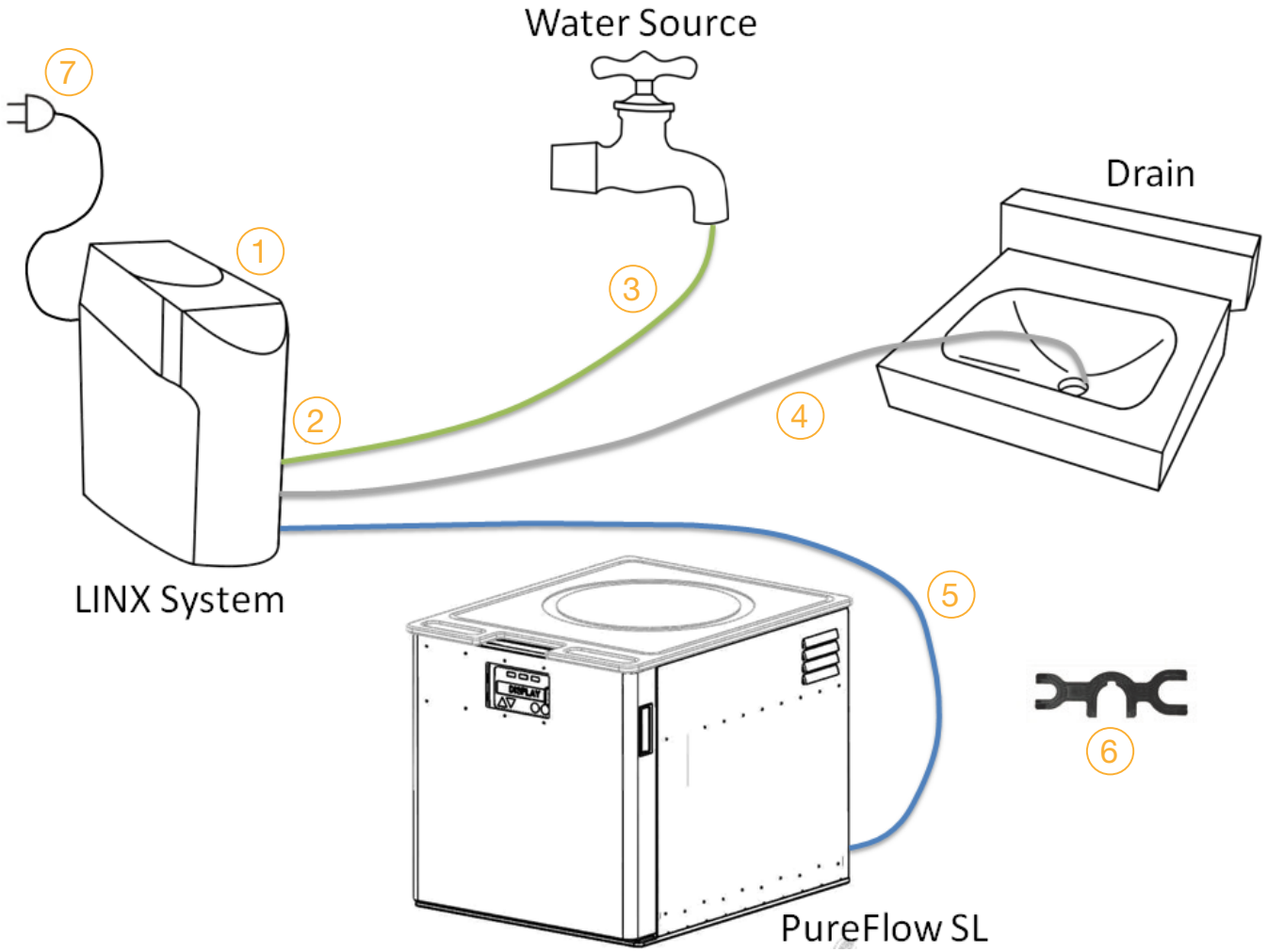


Identify and describe the components of the LINX system.

LINX

① LINX System
② Three Unit Connectors
③ Feed Water Line
④ Drain Line
⑤ LINX-treated Water Line
⑥ Line Release Tool
⑦ Power Cord

LINX components



LINX components



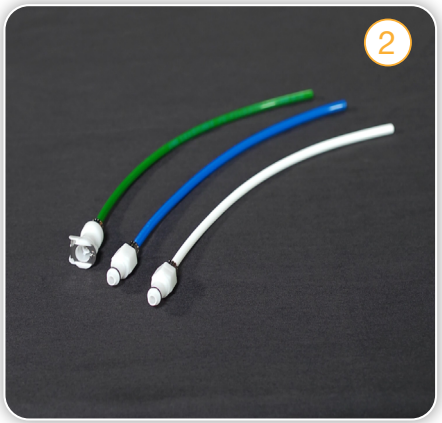
Identify and describe the components of the LINX Unit.

LINX

① LINX System Unit
② Three Unit Connectors
③ Feed Water Line
④ LINX-treated Water Line
⑤ Drain Line
⑥ Power Cord
⑦ User Guide
⑧ DI Cell Replacement Kit

LINX components





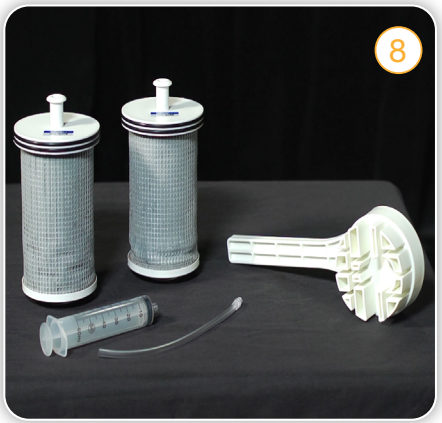




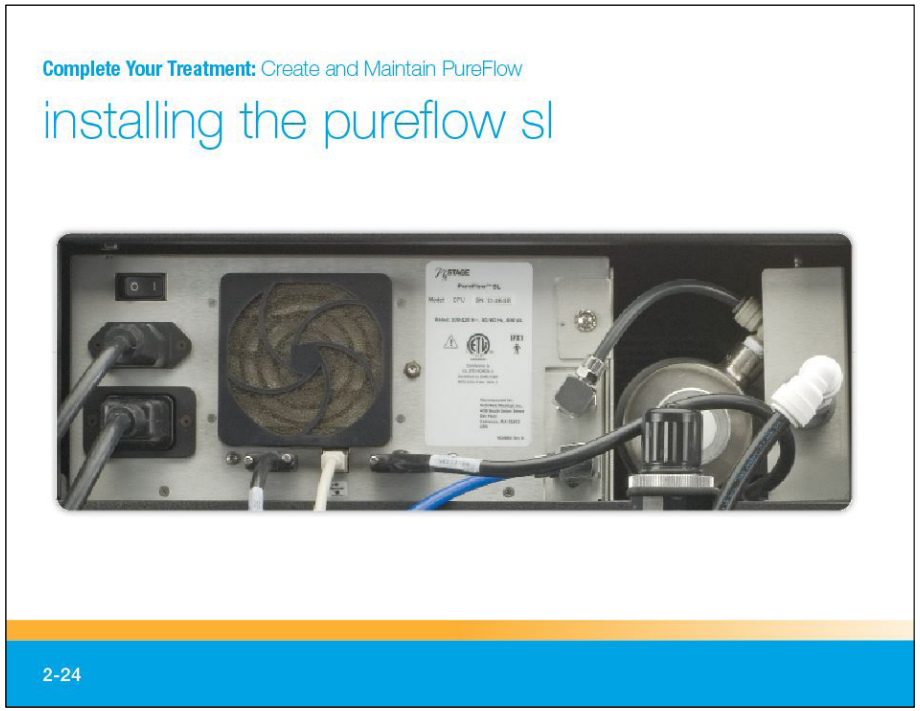








installing the pureflow sl



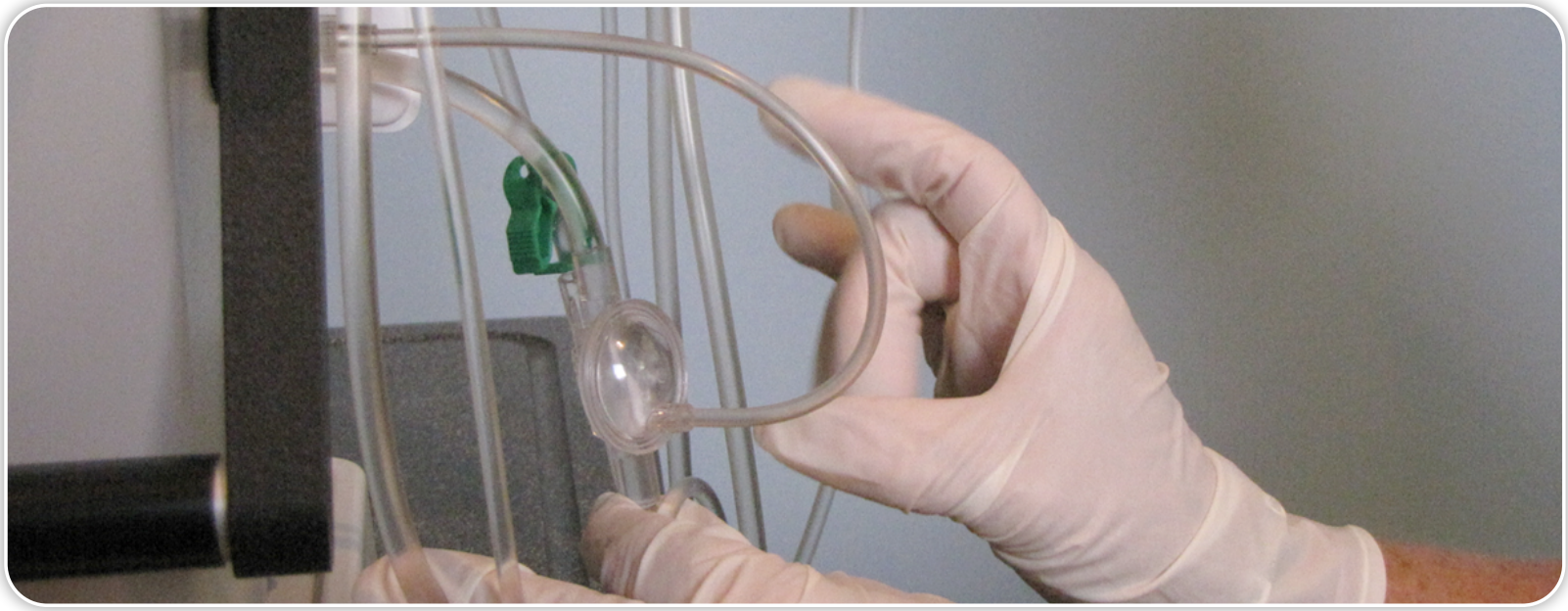
- Show the patient and care partner what the Control Unit rear connectors look like when properly installed.
- As the patient and care partner install the Control Unit, Pre-Treatment Unit, and Drain Line, refer to this graphic as necessary.

installing the pureflow sl



Keep Calm. Carry On.

Troubleshooting Alarms

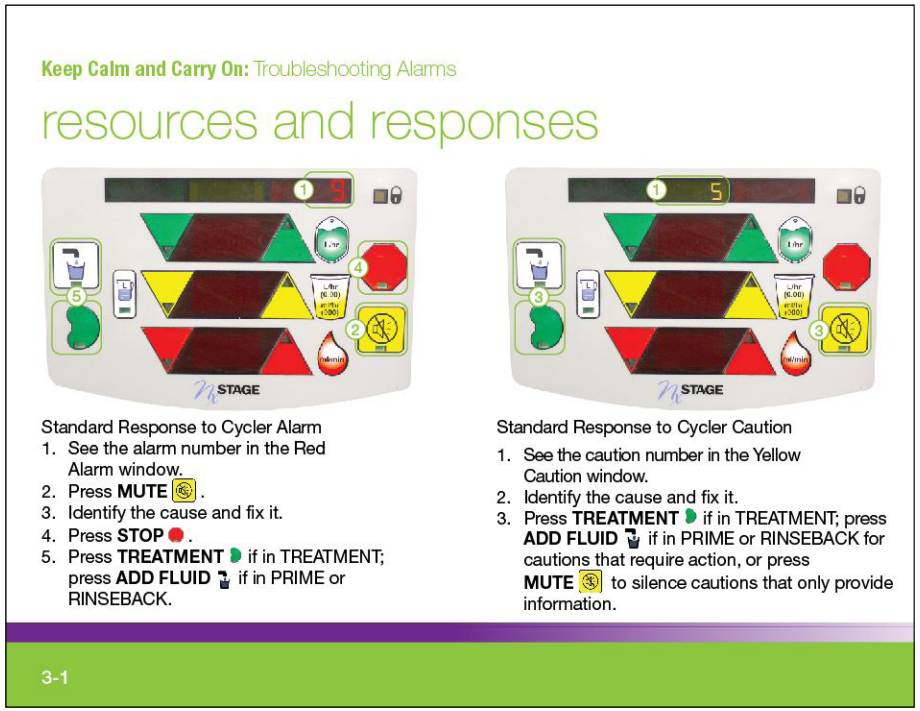


Keep Calm and Carry On: Troubleshooting Alarms

Review the steps for responding to Cycler alarms and cautions.

1. resources and responses
2. causes for common cycler alarms and cautions
3. causes for common pureflow alarms and cautions
4. warmer alarms
5. special conditions

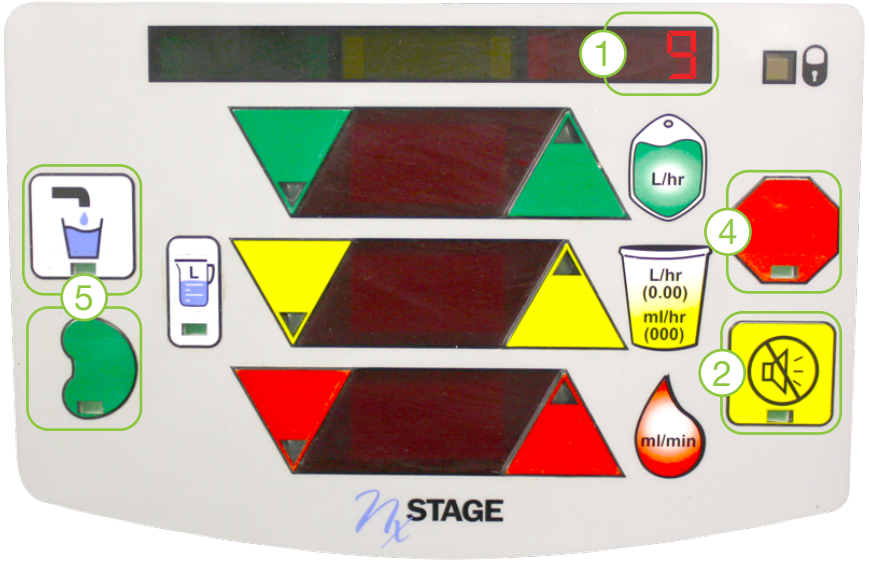
resources and responses



Note that some steps represent a choice depending on current mode.

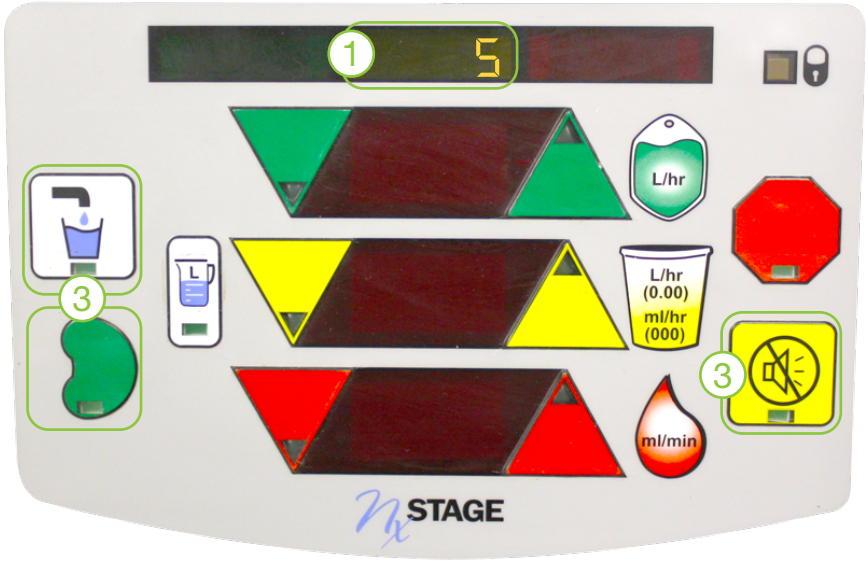
For example, **ADD FLUID** is pressed during PRIME or RINSEBACK and **TREATMENT** is pressed during TREATMENT.

resources and responses



Standard Response to Cycler Alarm

1. See the alarm number in the Red Alarm window.
2. Press **MUTE** .
3. Identify the cause and fix it.
4. Press **STOP** .
5. Press **TREATMENT** if in TREATMENT; press **ADD FLUID** if in PRIME or RINSEBACK.



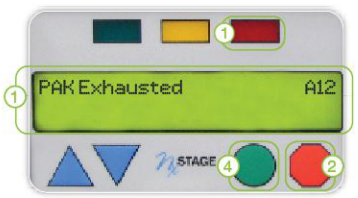
Standard Response to Cycler Caution

1. See the caution number in the Yellow Caution window.
2. Identify the cause and fix it.
3. Press **TREATMENT** if in TREATMENT; press **ADD FLUID** if in PRIME or RINSEBACK for cautions that require action, or press **MUTE** to silence cautions that only provide information.

resources and responses

Keep Calm and Carry On: Troubleshooting Alarms

resources and responses



Standard Response to PureFlow SL Alarm

1. See the Red Alarm light flashing and the alarm number and error message.
2. Press **STOP** .
3. Identify the cause and fix it.
4. Press **GO** .



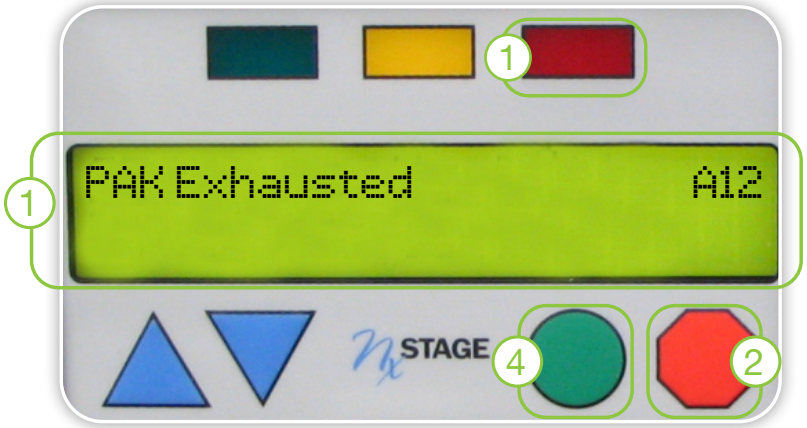
Standard Response to PureFlow SL Alarm

1. See the Yellow caution light flashing and the alarm number and error message.
2. Identify the cause and fix it.
3. Press **GO** .

3-2

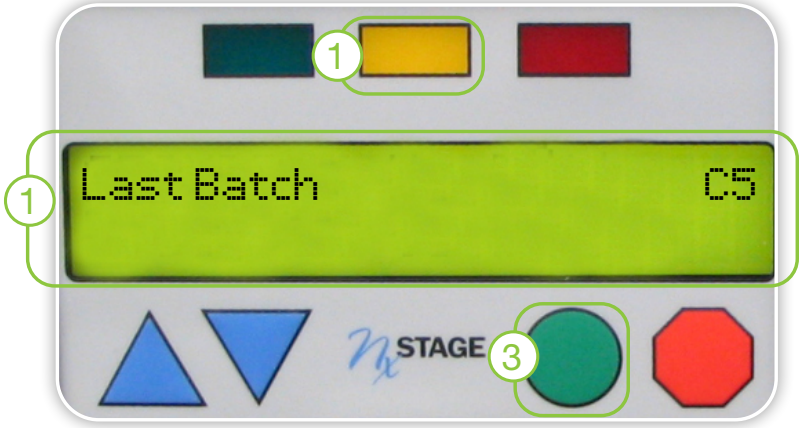
Review the steps for responding to PureFlow SL alarms and cautions.

resources and responses



Standard Response to PureFlow SL Alarm

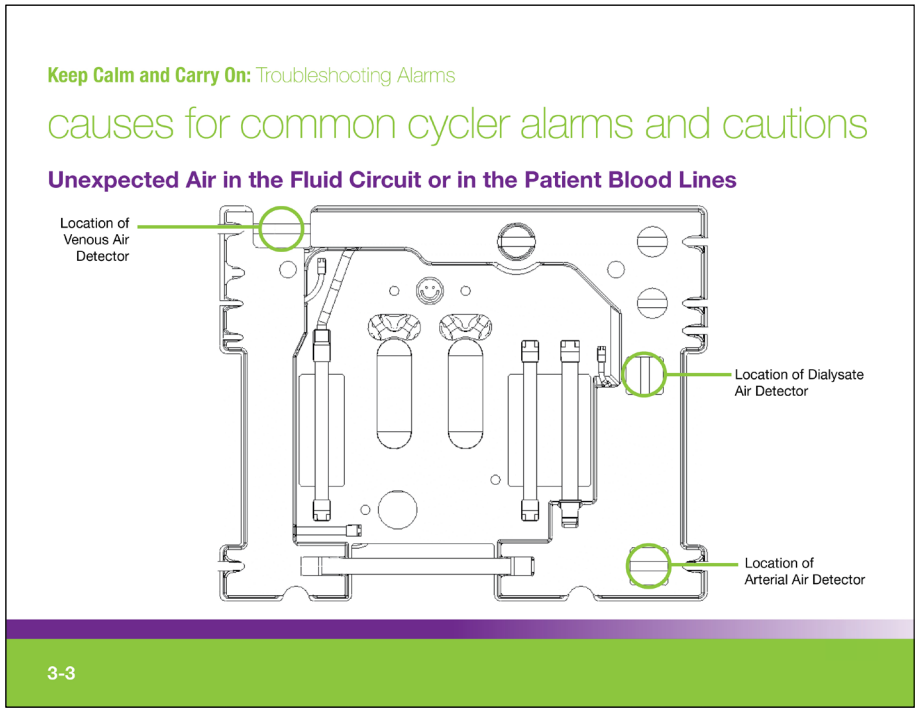
1. See the Red Alarm light flashing and the alarm number and error message.
2. Press **STOP** .
3. Identify the cause and fix it.
4. Press **GO** .



Standard Response to PureFlow SL Alarm

1. See the Yellow caution light flashing and the alarm number and error message.
2. Identify the cause and fix it.
3. Press **GO** .

causes for common cycler alarms and cautions



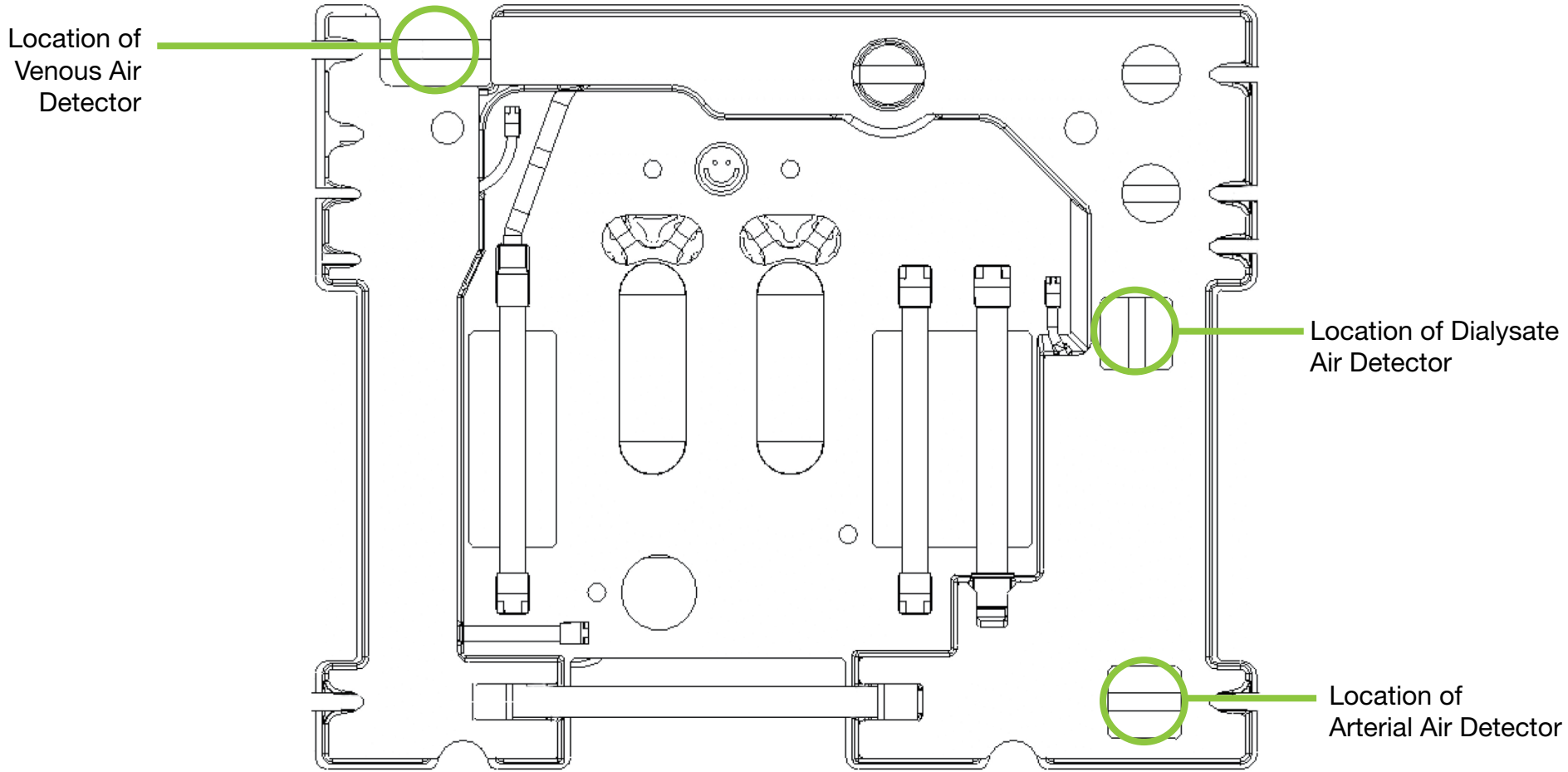
Explain that air should not be present in the fluid circuit or in the patient blood lines.

- Explain where and how the Cycler detects air:
  - Point out the Cartridge air detector locations and the Cycler air detector locations.

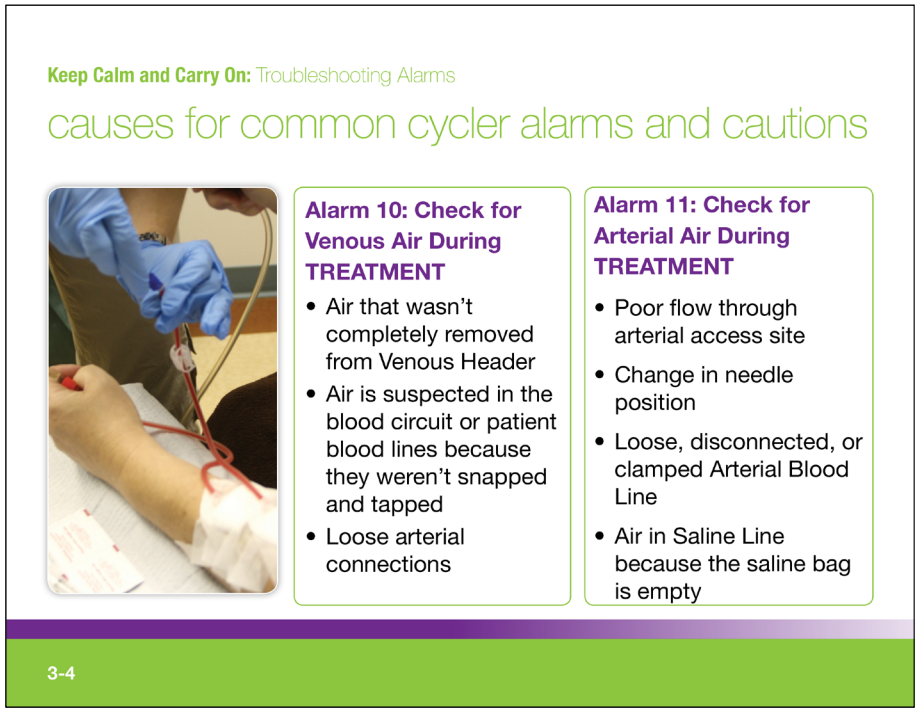
- Explain that the Cartridge air detector segments must be manually pressed into the appropriate Cycler location during setup. Air is detected at these locations as fluid flows by.

causes for common cycler alarms and cautions

Unexpected Air in the Fluid Circuit or in the Patient Blood Lines



causes for common cycler alarms and cautions



Explain the reasons air might enter the blood circuit or the patient blood lines and cause **Alarm 10: Check for Venous Air During TREATMENT** or **Alarm 11: Check for Arterial Air During TREATMENT**.

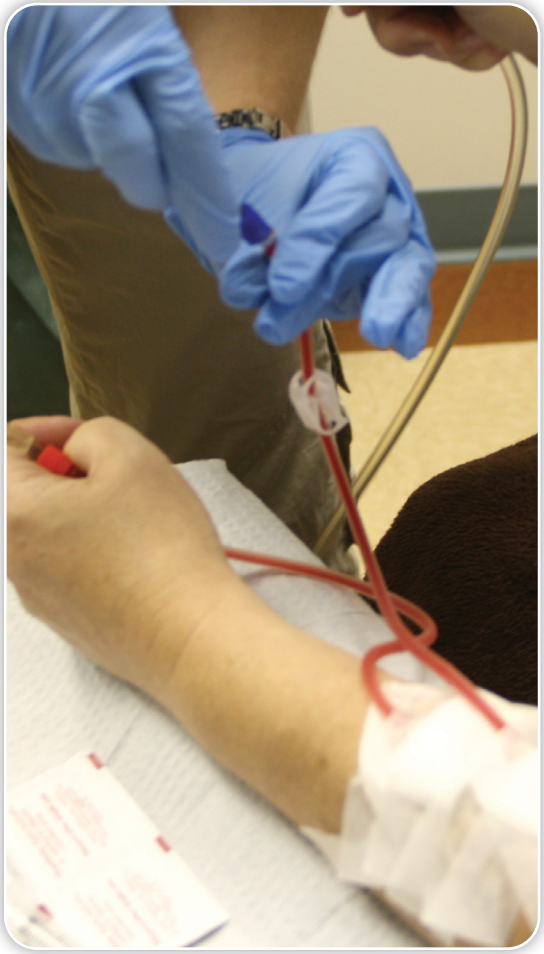
Alarm 10:

- Air that wasn't completely removed from Venous Header
- Air is suspected in the blood circuit or patient blood lines because they weren't snapped and tapped
- Loose arterial connections

Alarm 11:

- Poor flow through arterial access site
- Change in needle position
- Loose, disconnected, or clamped Arterial Blood Line
- Air in Saline Line because saline bag is empty

causes for common cycler alarms and causes



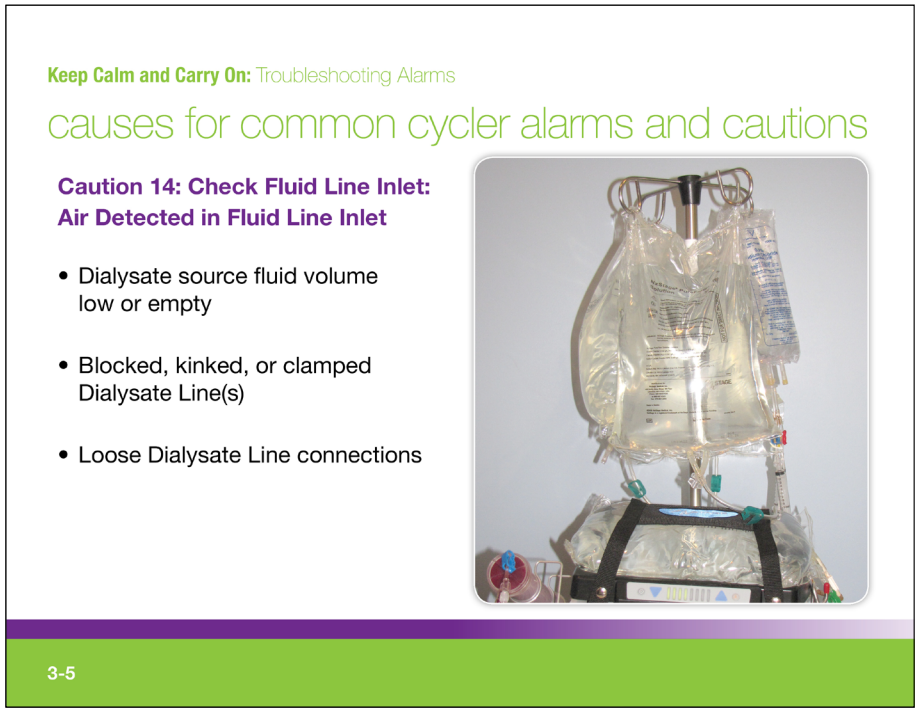
Alarm 10: Check for Venous Air During TREATMENT

- Air that wasn't completely removed from Venous Header
- Air is suspected in the blood circuit or patient blood lines because they weren't snapped and tapped
- Loose arterial connections

Alarm 11: Check for Arterial Air During TREATMENT

- Poor flow through arterial access site
- Change in needle position
- Loose, disconnected, or clamped Arterial Blood Line
- Air in Saline Line because the saline bag is empty

causes for common cycler alarms and cautions



Explain how air can enter the fluid circuit, resulting in **Caution 14: Check Fluid Line Inlet: Air Detected in Fluid Line Inlet:**

- Dialysate source fluid volume low or empty
- Blocked, kinked, or clamped Dialysate Line(s)
- Loose Dialysate Line connections

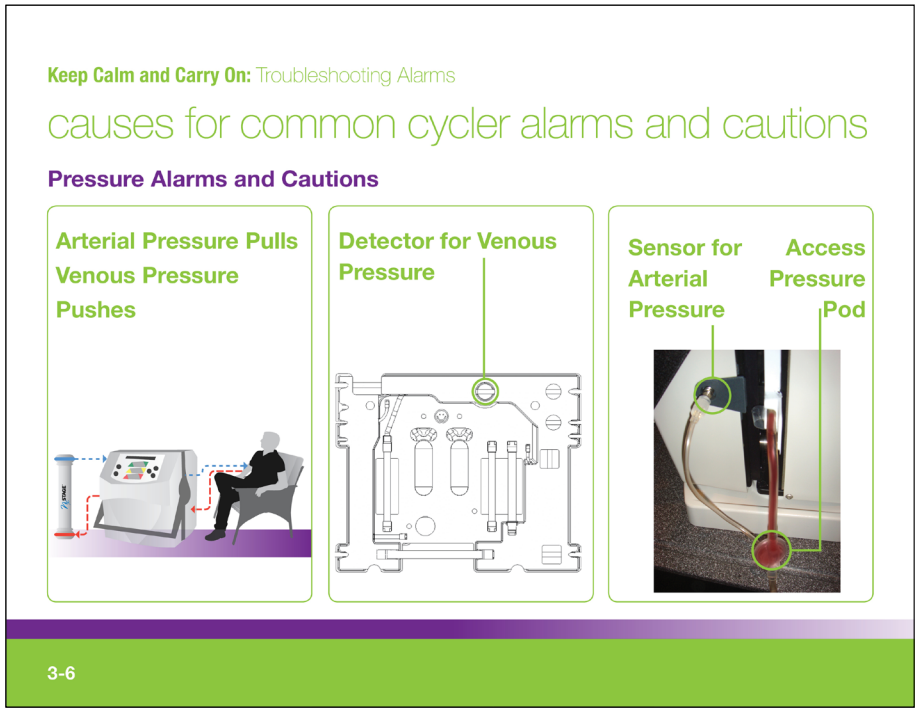
causes for common cycler alarms and cautions

Caution 14: Check Fluid Line Inlet: Air Detected in Fluid Line Inlet

- Dialysate source fluid volume low or empty
- Blocked, kinked, or clamped Dialysate Line(s)
- Loose Dialysate Line connections



causes for common cycler alarms and cautions



- Describe the arterial “pull” and venous “push” pressures.
- Explain that the arterial pressure reflects how well the arterial access is working.
  - A negative arterial pressure is created when the blood pump pulls the blood from the access.
  - Note that the Cycler displays the arterial pressure without the negative sign; therefore, a more negative reading is displayed as a larger positive number.
- Explain that a positive venous pressure is created because there is a normal resistance related to the patient’s venous access.
- Show where the Cycler measures arterial and venous blood circuit pressures:
  - The Cartridge Arterial Pressure Pod senses arterial pressure and is connected to the Cycler during setup to measure the pressure.
  - Show the location for measuring venous pressures when the Cartridge is appropriately positioned in the Cycler.

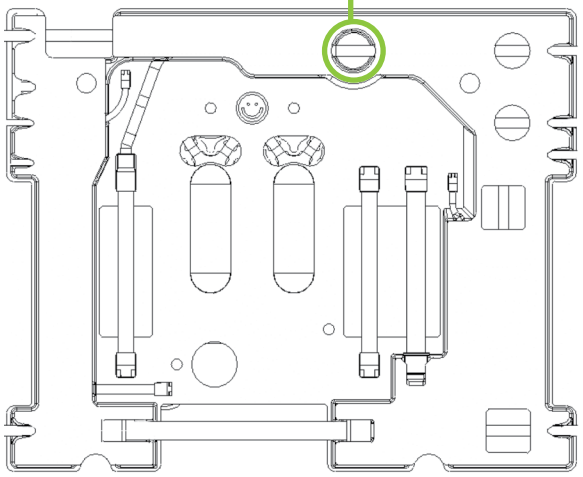
causes for common cycler alarms and cautions

Pressure Alarms and Cautions

Arterial Pressure Pulls
Venous Pressure Pushes

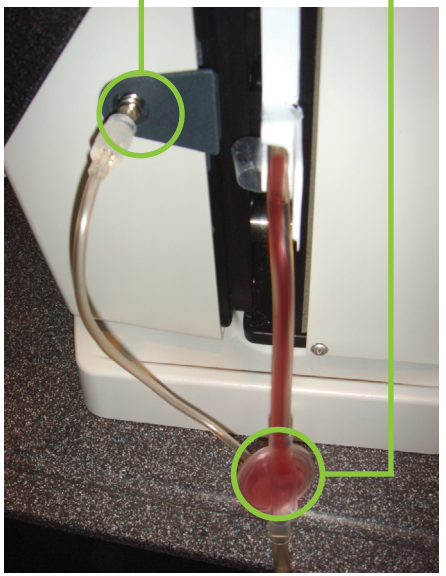


Detector for Venous Pressure

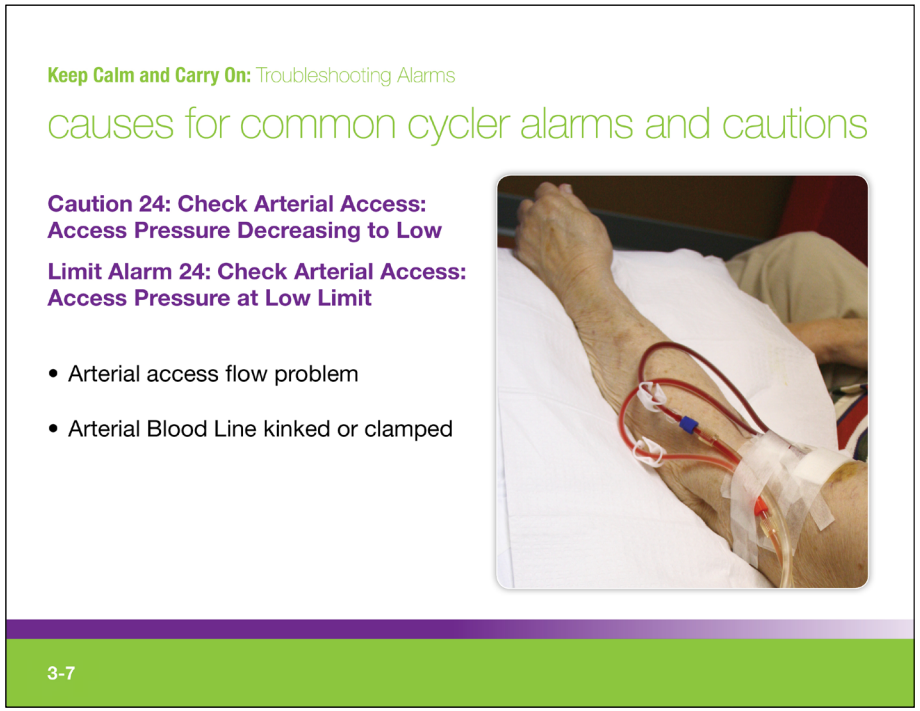


Sensor for Arterial Pressure

Access Pressure Pod



causes for common cycler alarms and causes



A low (more negative) access pressure may occur when it becomes harder for the blood pump to pull blood from the arterial access. This could occur for the following reasons:

- Arterial access flow problem
- Arterial Blood Line kinked or clamped

Remember, the Cycler displays arterial pressure without the negative sign, so a more negative reading is displayed as a larger positive number. A larger positive number can indicate a problem.

causes for common cycler alarms and cautions

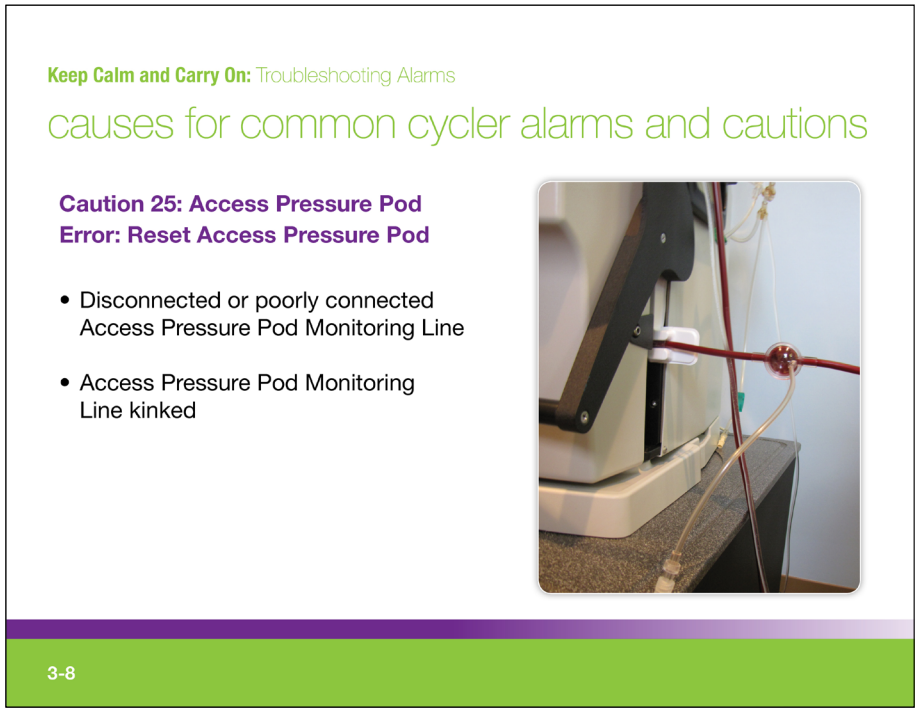
Caution 24: Check Arterial Access: Access Pressure Decreasing to Low

Limit Alarm 24: Check Arterial Access: Access Pressure at Low Limit

- Arterial access flow problem
- Arterial Blood Line kinked or clamped



causes for common cycler alarms and cautions



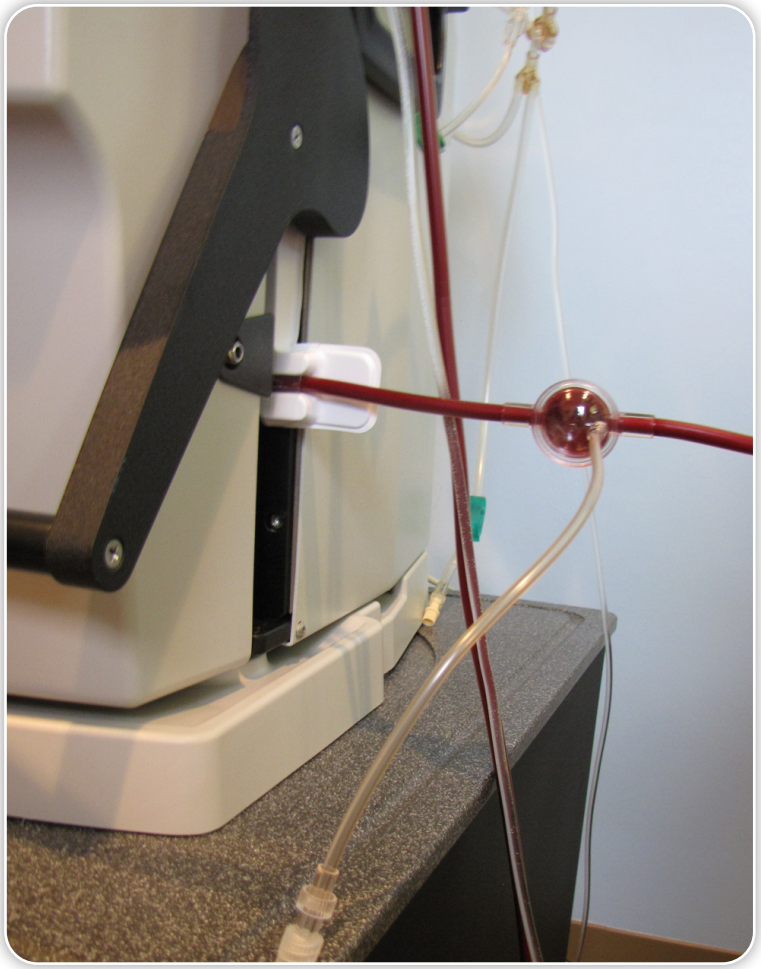
Explain that this caution will display if the Access Pressure Pod Monitor Line is disconnected, poorly connected, or the Access Pressure Pod Line is kinked. The arterial pressure reading may not be accurate until the Access Pressure Pod is reset.

- In addition to Caution 25, the Access Pressure Pod may also need to be reset if:
  - The Access Pressure Pod tops out (is full of blood and is not pulsating).
  - The Access Pressure Pod bottoms out (is clear or has no blood in it).
  - There is no access pressure reading or it is very low or at zero.

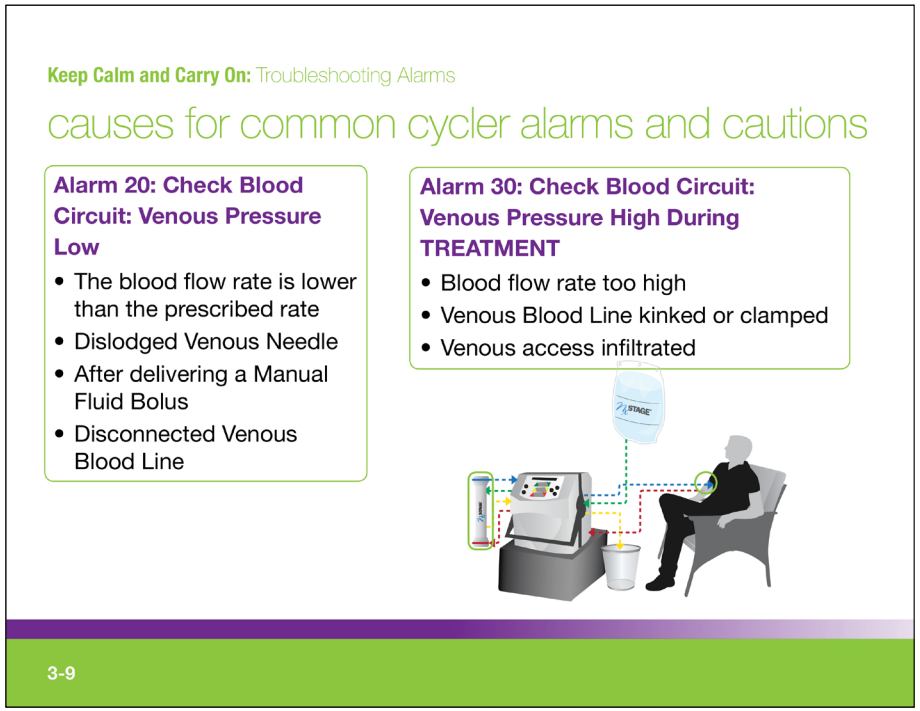
causes for common cycler alarms and cautions

Caution 25: Access Pressure Pod Error: Reset Access Pressure Pod

- Disconnected or poorly connected Access Pressure Pod Monitoring Line
- Access Pressure Pod Monitoring Line kinked



causes for common cycler alarms and causes



Explain that low venous pressure may occur if the flow of blood is obstructed before it gets to the Venous Pressure Detector or if there is a decrease in venous access resistance after the Venous Pressure Detector.

These could occur for the following reasons:

- The blood flow rate is lower than the prescribed rate
- Dislodged Venous Needle
- After delivering a Manual Fluid Bolus
- Disconnected Venous Blood Line

Explain that high venous pressure may occur due to an increase in resistance after the Venous Pressure Detector. This could occur for the following reasons:

- Blood flow rate too high
- Venous Blood Line kinked or clamped
- Venous access infiltrated

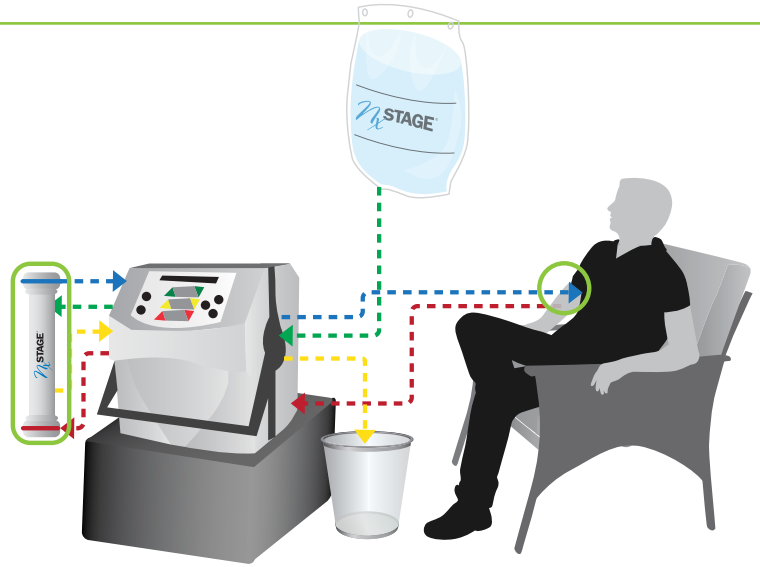
causes for common cycler alarms and cautions

Alarm 20: Check Blood Circuit: Venous Pressure Low

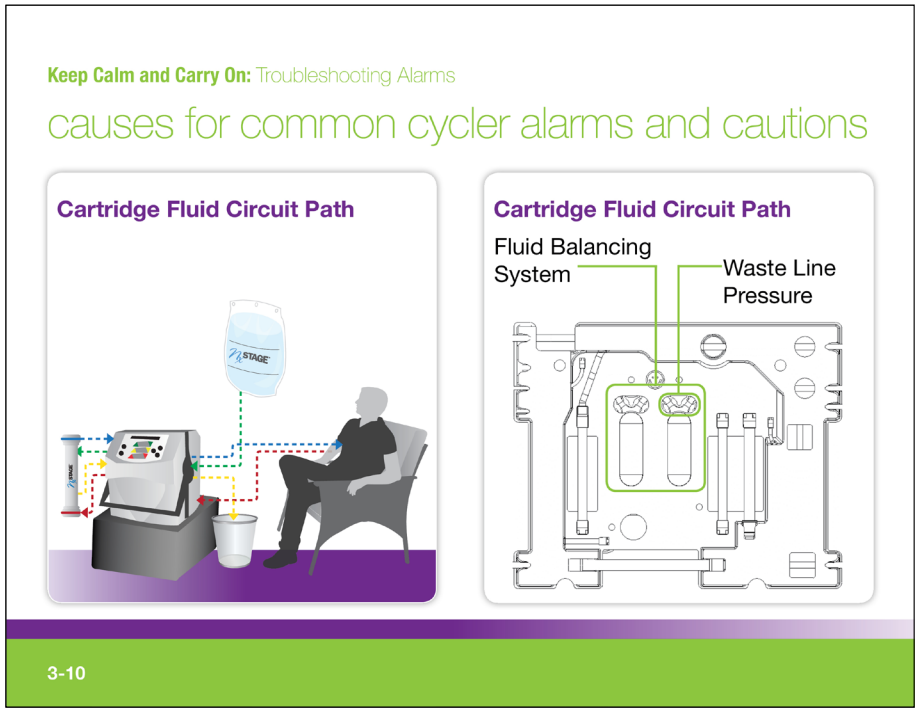
- The blood flow rate is lower than the prescribed rate
- Dislodged Venous Needle
- After delivering a Manual Fluid Bolus
- Disconnected Venous Blood Line

Alarm 30: Check Blood Circuit: Venous Pressure High During TREATMENT

- Blood flow rate too high
- Venous Blood Line kinked or clamped
- Venous access infiltrated



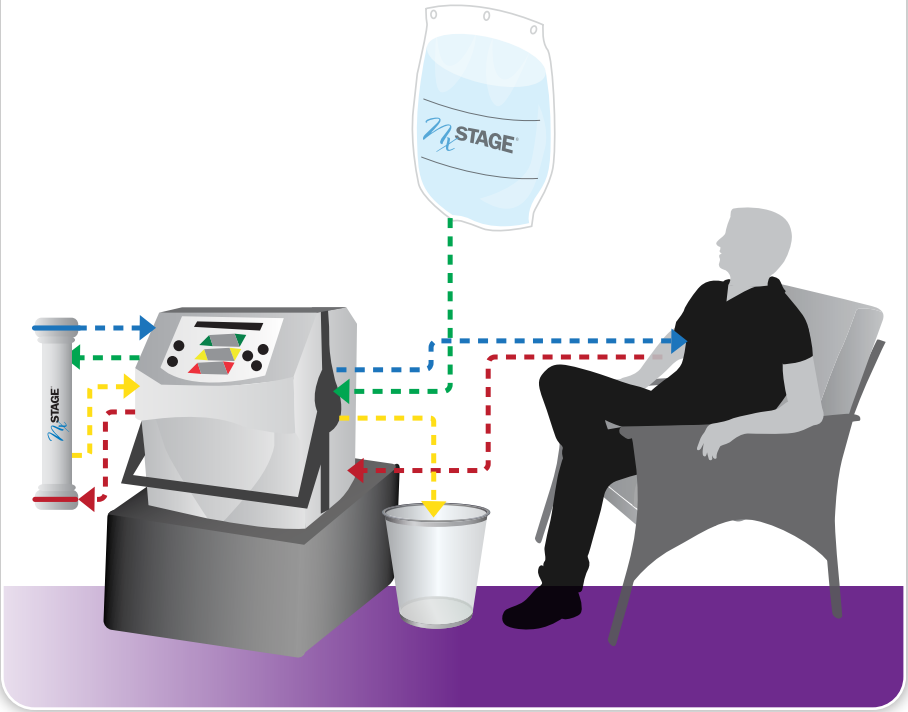
causes for common cycler alarms and cautions



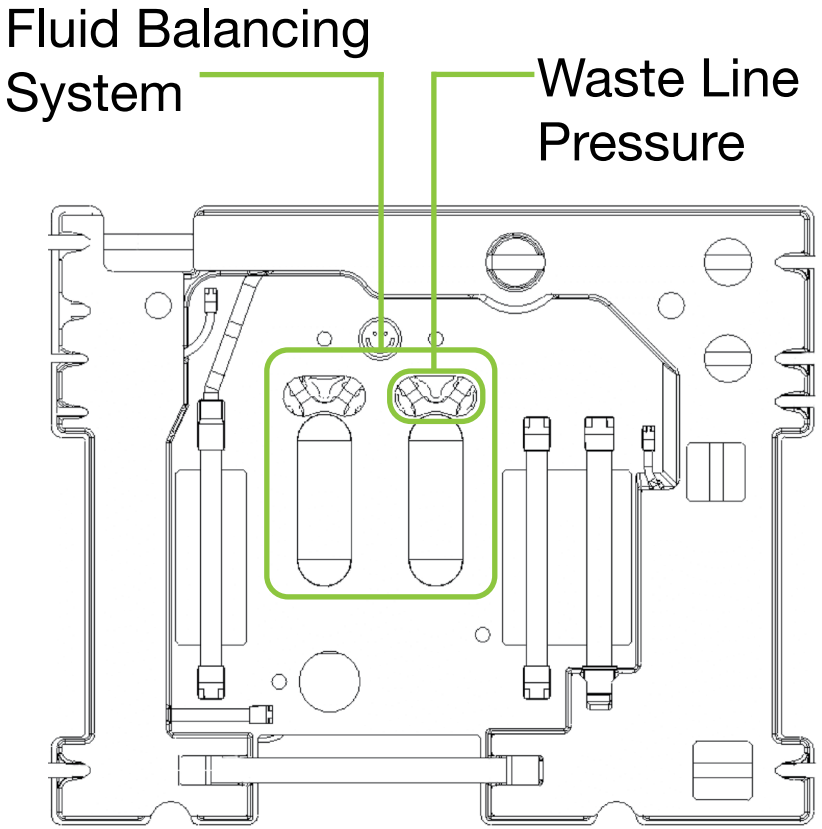
- Explain how the Cycler routes the fluid and ensures the same amount of fluid that goes in comes out.
  - With the Cartridge loaded in the Cycler, the Cycler pump pulls dialysate either from Bagged Dialysate or the PureFlow SL into the Cartridge, through the Balance Chambers, and into the Dialyzer.
  - It then pulls waste fluid (spent dialysate or effluent) out of the Dialyzer, through the Balance Chambers, and out to the Waste Line for disposal into the drain.
- Show the location where fluid circuit pressures are monitored.
- Explain that the Cycler ensures the same amount of dialysate that goes into the Dialyzer comes out as waste fluid and notifies the patient and care partner when there are high Balance Chamber pressures.
- Explain that the Cycler monitors the Waste Line pressure and alerts the patient of any high Waste Line pressures.

causes for common cycler alarms and cautions

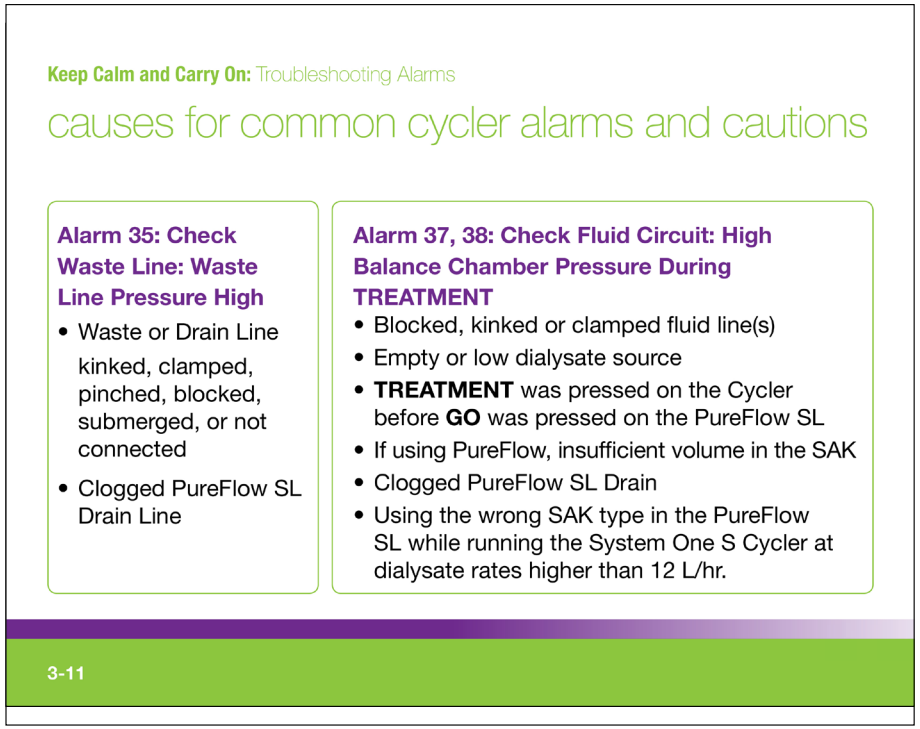
Cartridge Fluid Circuit Path



Cartridge Fluid Circuit Path



causes for common cycler alarms and cautions



Explain that **Alarm 35: Check Waste Line: Waste Line Pressure High** develops when waste fluid is not able to exit the Balance Chambers. This could occur for the following reasons:

- Waste or Drain Line kinked, clamped, pinched, blocked, submerged, or not connected
- Clogged PureFlow SL Drain Line

- Explain that Alarm **37, 38: Check Fluid Circuit: High Balance Chamber Pressure During TREATMENT** may occur when the Cycler has difficulty pumping fluid in or out. This could occur for the following reasons:
  - Blocked, kinked, clamped fluid line(s)
  - Empty or low dialysate source
  - TREATMENT was pressed on the Cycler before GO was pressed on the PureFlow SL
  - If using PureFlow, insufficient volume in the SAK
  - Clogged PureFlow SL Drain
  - Using the wrong SAK type in the PureFlow SL while running the System One S Cycler at dialysate rates higher than 12 L/hr.

causes for common cycler alarms and cautions

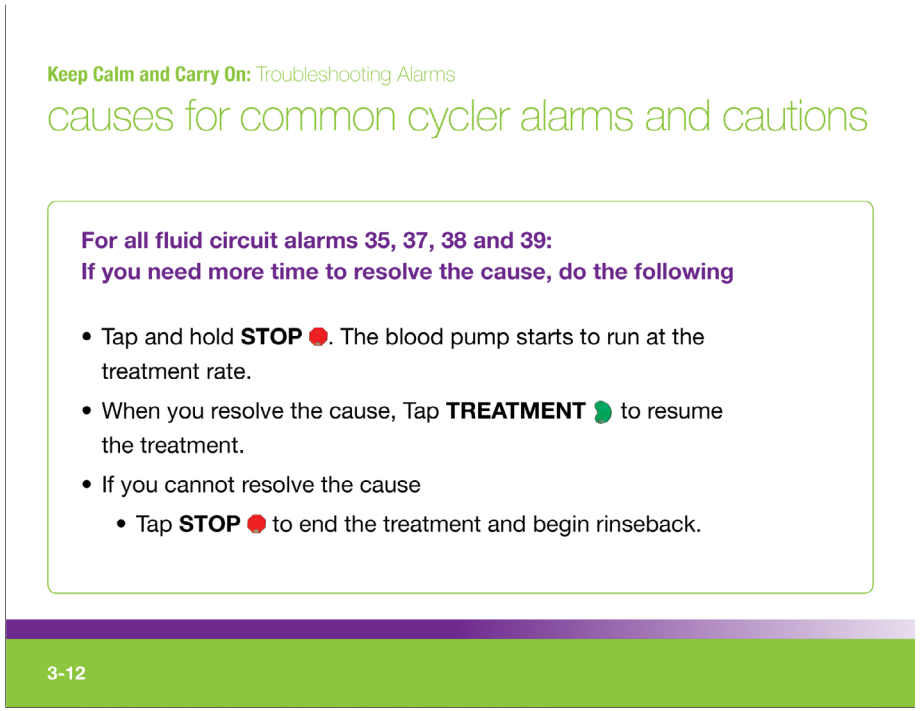
Alarm 35: Check Waste Line: Waste Line Pressure High

- Waste or Drain Line kinked, clamped, pinched, blocked, submerged, or not connected
- Clogged PureFlow SL Drain Line

Alarm 37, 38: Check Fluid Circuit: High Balance Chamber Pressure During TREATMENT

- Blocked, kinked or clamped fluid line(s)
- Empty or low dialysate source
- **TREATMENT** was pressed on the Cycler before **GO** was pressed on the PureFlow SL
- If using PureFlow, insufficient volume in the SAK
- Clogged PureFlow SL Drain
- Using the wrong SAK type in the PureFlow SL while running the System One S Cycler at dialysate rates higher than 12 L/hr.

causes for common pureflow alarms and cautions



Following a 35, 37, 38 or 39 Red Alarms, you may want to do the following: Fluid Interupt / blood pump only mode. (the Dialysate and UF pumps will stop running, but the blood pump remains running at the prescribed rate). If you need more time to resolve the cause, do the following:

- Tap and hold **STOP**. The blood pump starts to run at the prescribed rate.
- When you resolve the cause, tap **TREATMENT** to resume the treatment.
- If you cannot resolve the cause

› Tap **STOP** to end the treatment and begin rinseback

Explain to the patient additional information related to the Fluid Balance Chamber Pressure Alarms:

- A yellow caution 9 may be displayed indicating the system is recovering from a high pressure condition. Do not tap **STOP** at this time. Prime resumes when the yellow caution 9 disappears.
- The red alarm 37, 38 may recur a few times after the yellow caution 9 disappears if the pressure remains high.

causes for common pureflow alarms and cautions

For all fluid circuit alarms 35, 37, 38 and 39:
If you need more time to resolve the cause, do the following:

- Tap and hold **STOP** . The blood pump starts to run at the treatment rate.
- When you resolve the cause, Tap **TREATMENT** to resume the treatment.
- If you cannot resolve the cause
- Tap **STOP** to end the treatment and begin rinseback.

causes for common pureflow alarms and cautions

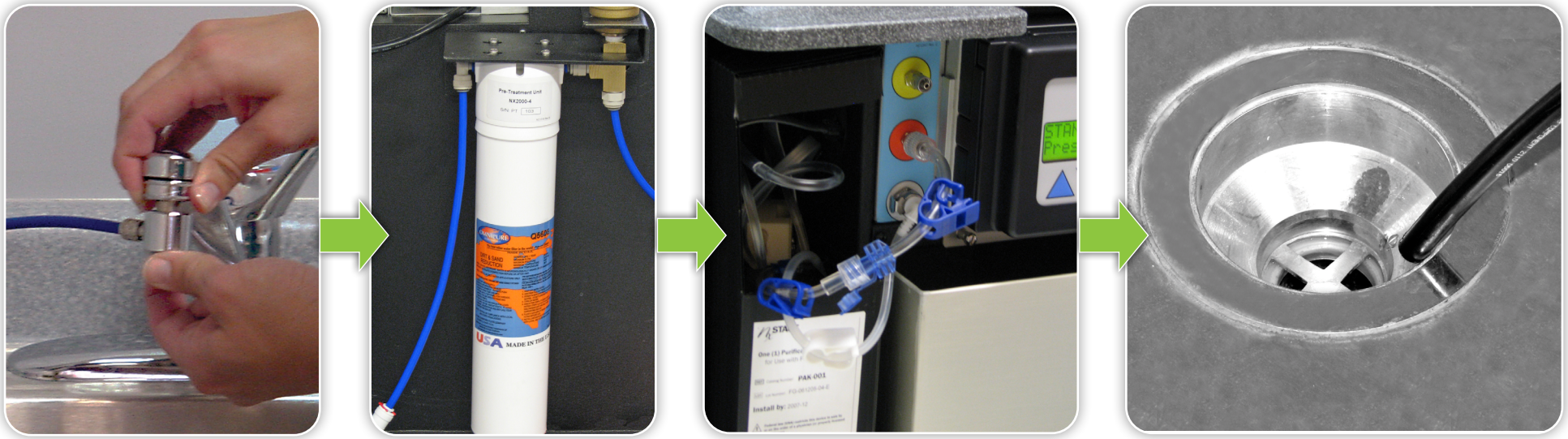


Explain the fluid flow during PAK PRIME:

Water flows from the patient's home water source to the Pre-Treatment Kit, to the Water Inlet Line (white clamp), to the PAK, out the Water Outlet Line (blue clamp), and to the drain.

causes for common pureflow alarms and cautions

Fluid Flow During PAK PRIME



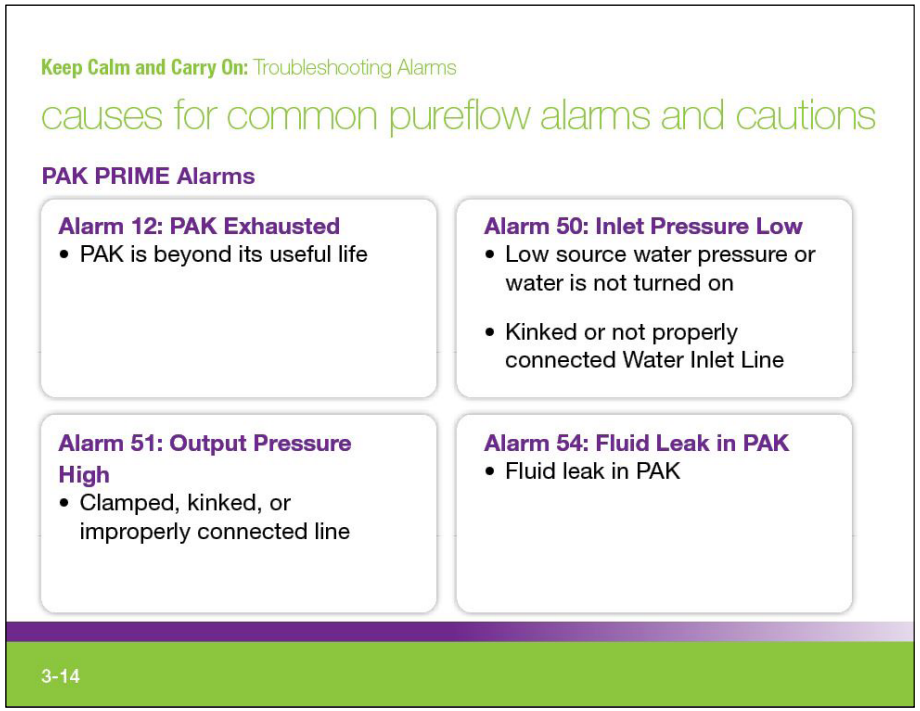
Water source

Pre-Treatment Kit

PAK

Drain

causes for common pureflow alarms and cautions



Explain that PureFlow SL will notify the patient and care partner if there is a fluid flow problem during PAK PRIME.

Alarm 12: PAK Exhausted:

- PAK is beyond its useful life

Alarm 50: Inlet Pressure Low:

- Low source water pressure or water is not turned on
- Kinked or not properly connected Water Inlet Line (blue line from source water to PureFlow SL)

Alarm 51: Output Pressure High:

- Clamped, kinked, or improperly connected line

Alarm 54: Fluid Leak in PAK:

- Fluid leak in PAK (may also occur when making a batch)

causes for common pureflow alarms and cautions

PAK PRIME Alarms

Alarm 12: PAK Exhausted
- PAK is beyond its useful life

Alarm 50: Inlet Pressure Low
- Low source water pressure or water is not turned on
- Kinked or not properly connected Water Inlet Line

Alarm 51: Output Pressure High
- Clamped, kinked, or improperly connected line

Alarm 54: Fluid Leak in PAK
- Fluid leak in PAK

causes for common pureflow alarms and cautions



Explain the fluid flow path when making a batch of dialysate:

- Water flows from the patient's home water source, to the Pre-Treatment Kit, to the PAK, and to the SAK.

- Once the batch is made, it goes through the Conductivity Sensor Line for the conductivity check.

causes for common pureflow alarms and cautions

Fluid Flow When Making a Batch



Water source



Pre-Treatment Kit

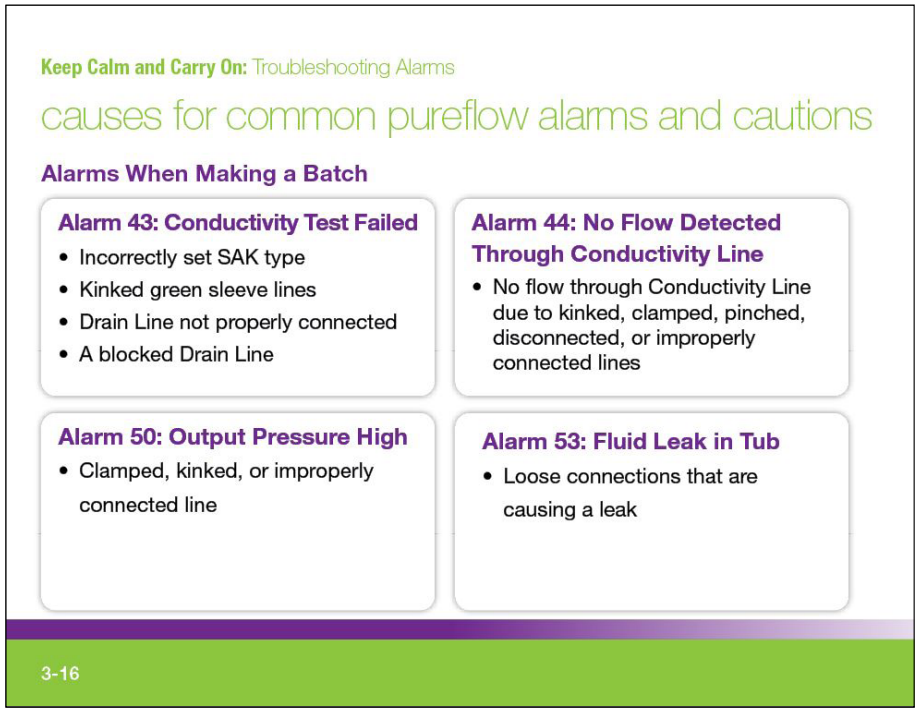


PAK



SAK

causes for common pureflow alarms and cautions



Explain that PureFlow SL notifies the patient and care partner if there is a fluid flow problem or failed conductivity check when making a batch of dialysate:

Alarm 43: Conductivity Test Failed:

- Incorrectly set SAK type
- Kinked green sleeve lines
- Drain Line not properly connected
- A blocked Drain Line

Alarm 44: No Flow Detected:

- No flow through Conductivity Line due to kinked, clamped, or pinched lines, disconnected lines, or improperly connected lines

Alarm 51: Output Pressure High:

- Clamped, kinked, or improperly connected line

Alarm 53: Fluid Leak in Tub:

- Loose connections that are causing a leak

causes for common pureflow alarms and cautions

Alarms When Making a Batch

Alarm 43: Conductivity Test Failed

- Incorrectly set SAK type
- Kinked green sleeve lines
- Drain Line not properly connected
- A blocked Drain Line

Alarm 44: No Flow Detected Through Conductivity Line

- No flow through Conductivity Line due to kinked, clamped, pinched, disconnected, or improperly connected lines

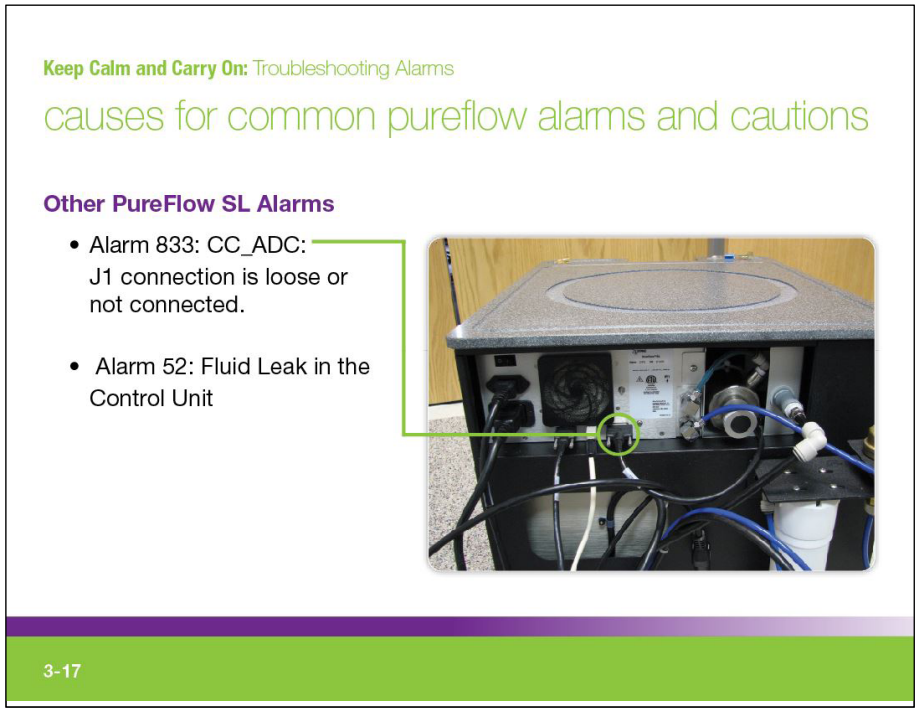
Alarm 50: Output Pressure High

- Clamped, kinked, or improperly connected line

Alarm 53: Fluid Leak in Tub

- Loose connections that are causing a leak

causes for common pureflow alarms and cautions



Explain reasons for other PureFlow SL common alarms:

- **Alarm 833: CC_ADC:** Occurs when the J1 connection is loose or not connected.
- **Alarm 52: Fluid Leak in the Control Unit:** A fluid leak has been detected in the Control Unit.

causes for common pureflow alarms and cautions

Other PureFlow SL Alarms

- Alarm 833: CC_ADC:
  J1 connection is loose or not connected.

- Alarm 52: Fluid Leak in the Control Unit



warmer alarms



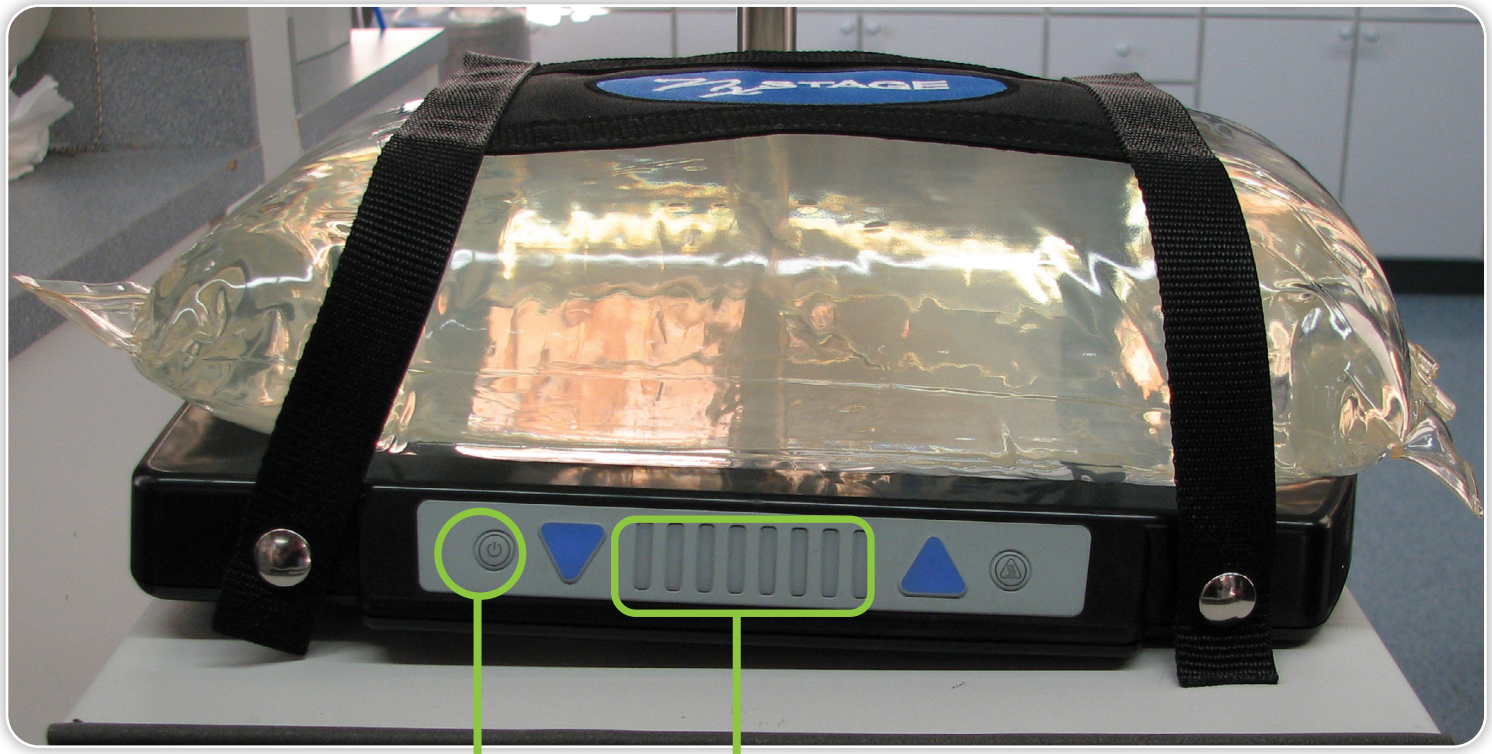
Explain how the Express Fluid Warmer provides visual and audible alerts to notify the patient and care partner of important information:

- Standby Indicator: When lit, indicates that the warmer is in STANDBY mode and the heater is disabled.

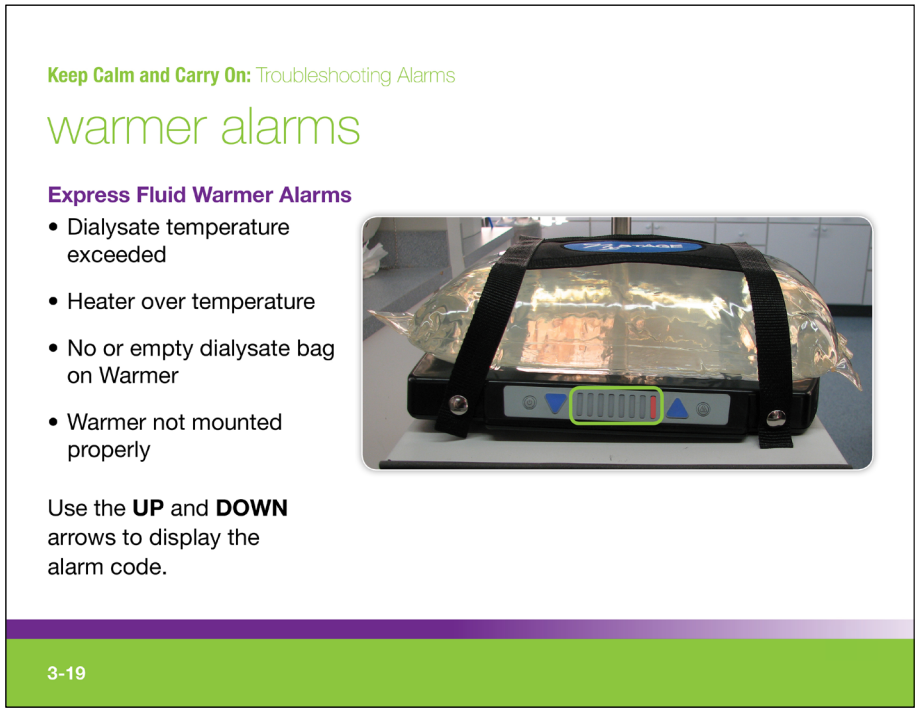
- Alarm: All comfort setting lights turn red and then go off, an alarm sounds, and the standby indicator light turns on.

warmer alarms

Express Fluid Warmer



warmer alarms



Describe the common causes of an Express Fluid Warmer alarm:

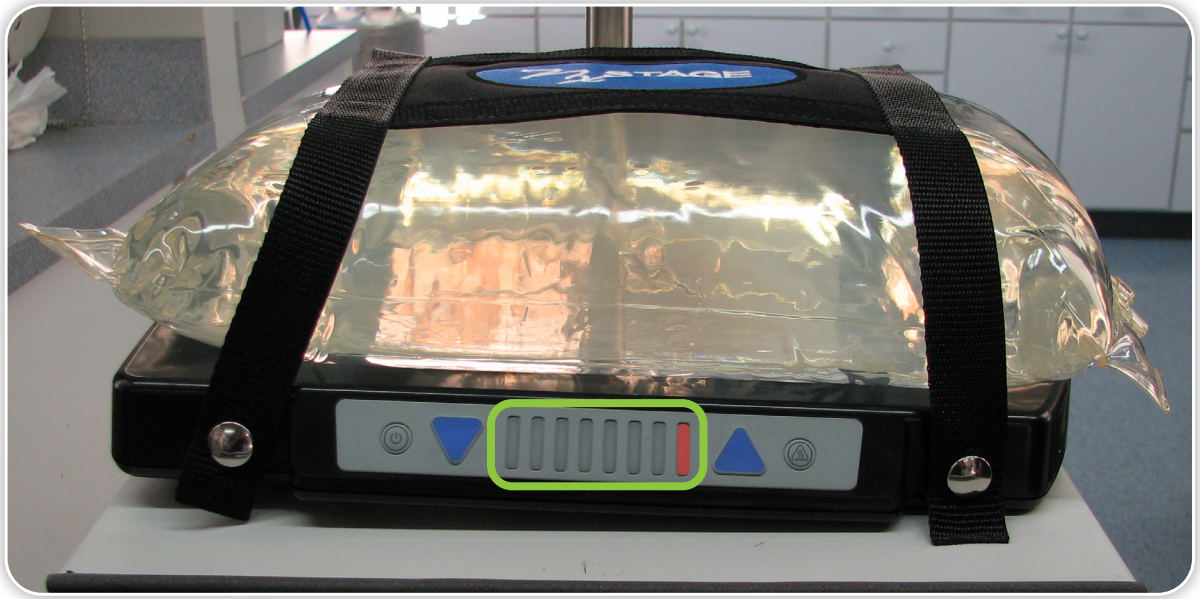
- Dialysate temperature exceeded
- Heater over temperature
- No or empty dialysate bag on Warmer
- Warmer not mounted properly

Explain how to use the **UP** and **DOWN** arrows to display the alarm code.

warmer alarms

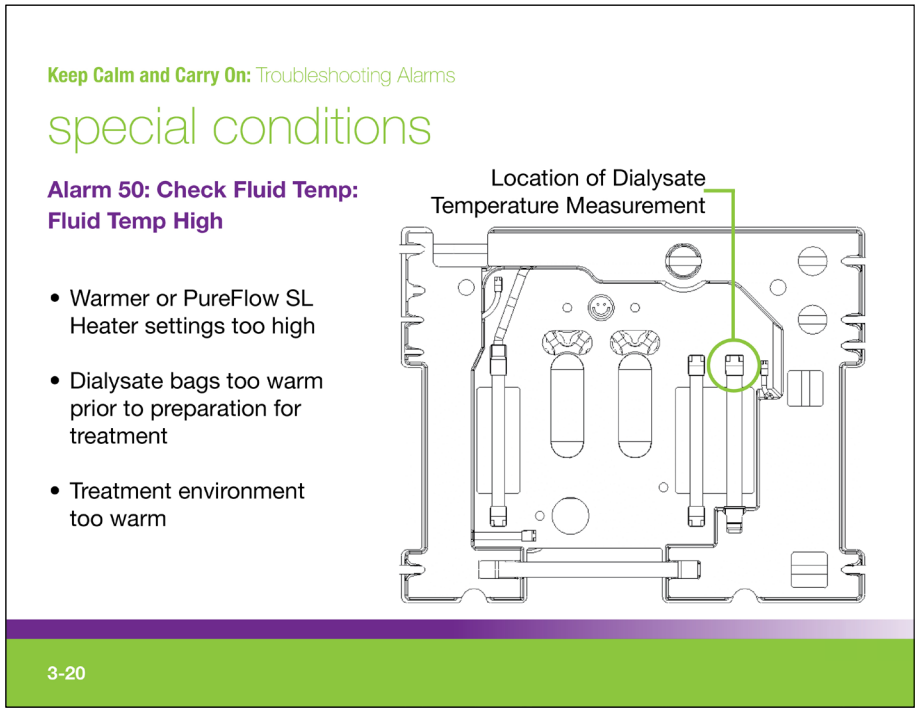
Express Fluid Warmer Alarms

- Dialysate temperature exceeded
- Heater over temperature
- No or empty dialysate bag on Warmer
- Warmer not mounted properly



Use the **UP** and **DOWN** arrows to display the alarm code.

special conditions



Explain that when the Cartridge is appropriately loaded in the Cycler during preparation for treatment, the Cycler monitors the fluid temperature and notifies the patient or care partner if the fluid temperature is high.

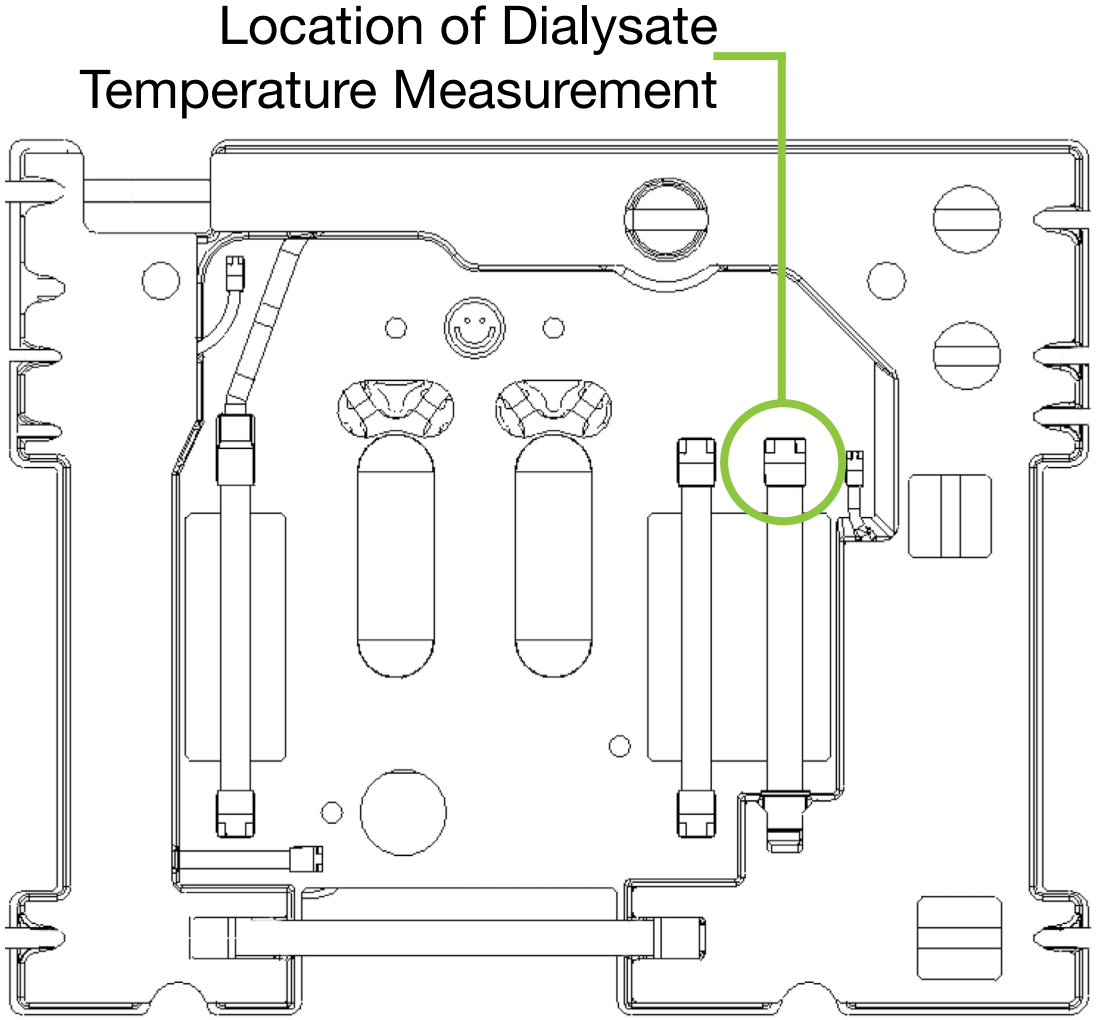
Describe the causes of this alarm:

- Warmer or PureFlow SL Heater settings too high
- Dialysate bags too warm prior to preparation for treatment, such as when bags have been stored in warm environment
- Treatment environment too warm

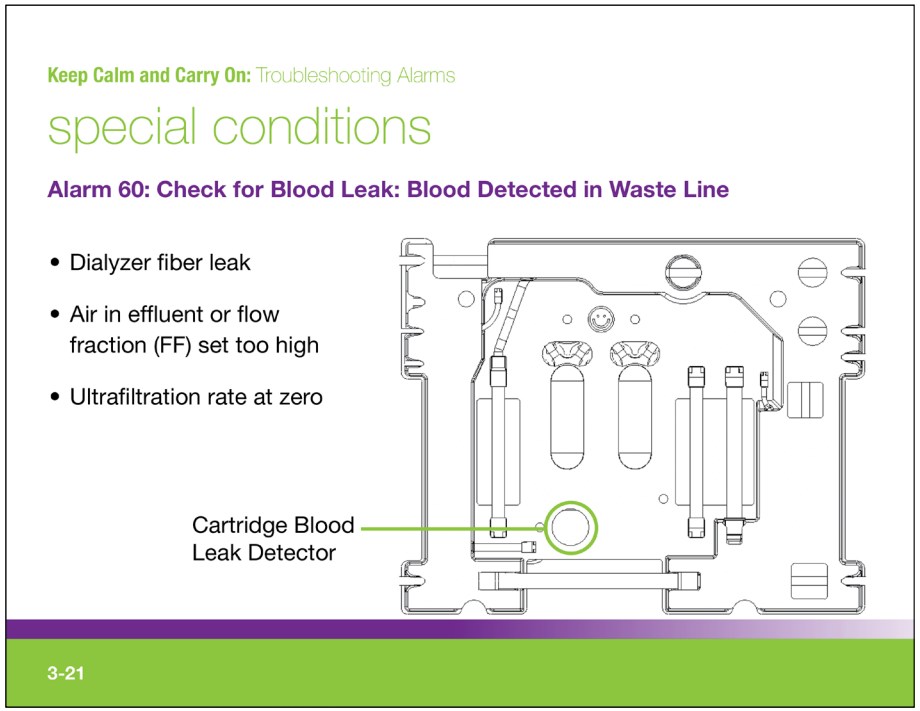
special conditions

Alarm 50: Check Fluid Temp: Fluid Temp High

- Warmer or PureFlow SL Heater settings too high
- Dialysate bags too warm prior to preparation for treatment
- Treatment environment too warm



special conditions



Show the location of the Cartridge Blood Leak Detector.

Explain how the Cycler notifies the patient and care partner with **Alarm 60: Check for Blood Leak: Blood Detected in Waste Line** if the system suspects blood may be present in the waste fluid.

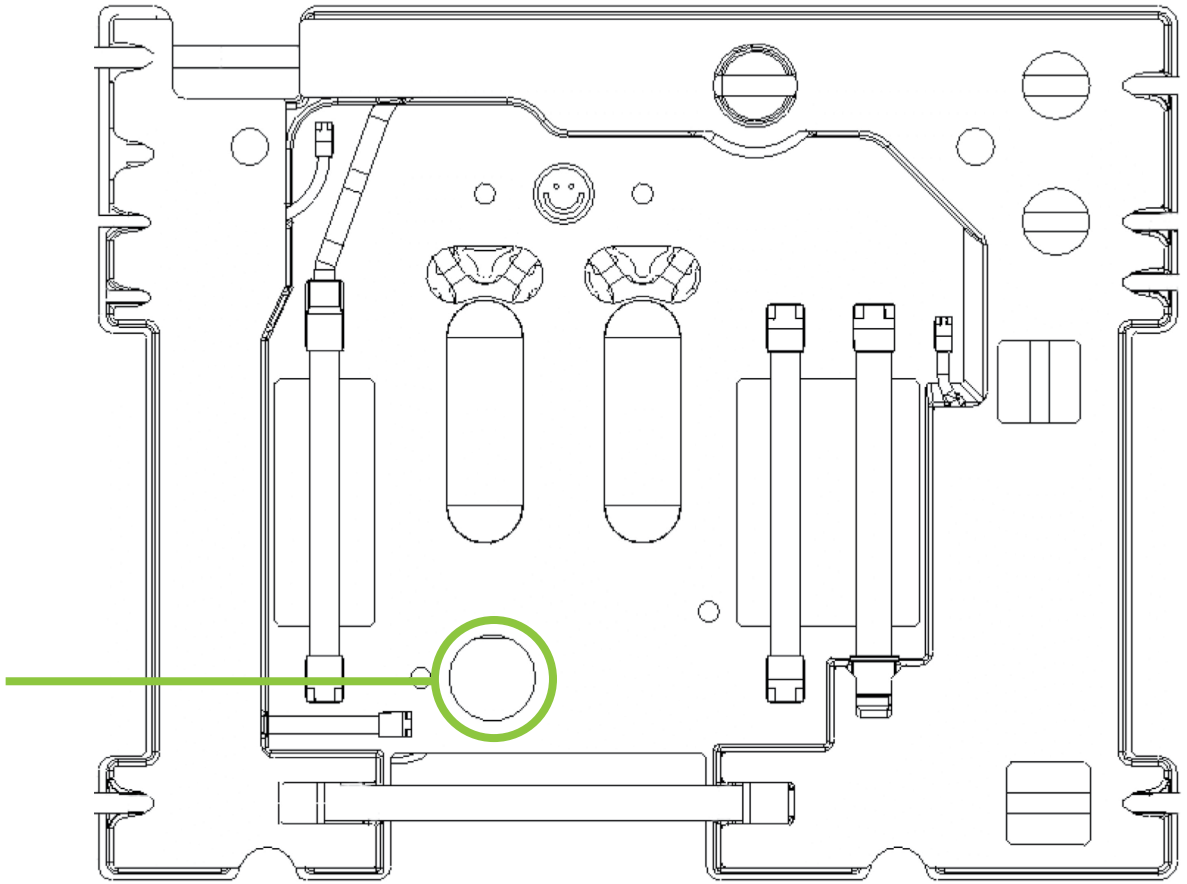
Describe the causes of this alarm:

- Dialyzer fiber leak
- Air in effluent or flow fraction (FF) set too high
- Ultrafiltration rate at zero

special conditions

Alarm 60: Check for Blood Leak: Blood Detected in Waste Line

- Dialyzer fiber leak
- Air in effluent or flow fraction (FF) set too high
- Ultrafiltration rate at zero



Keep Calm. Carry On.

Manage Medical Complications



1. fluid issues
2. cardiac issues
3. blood issues

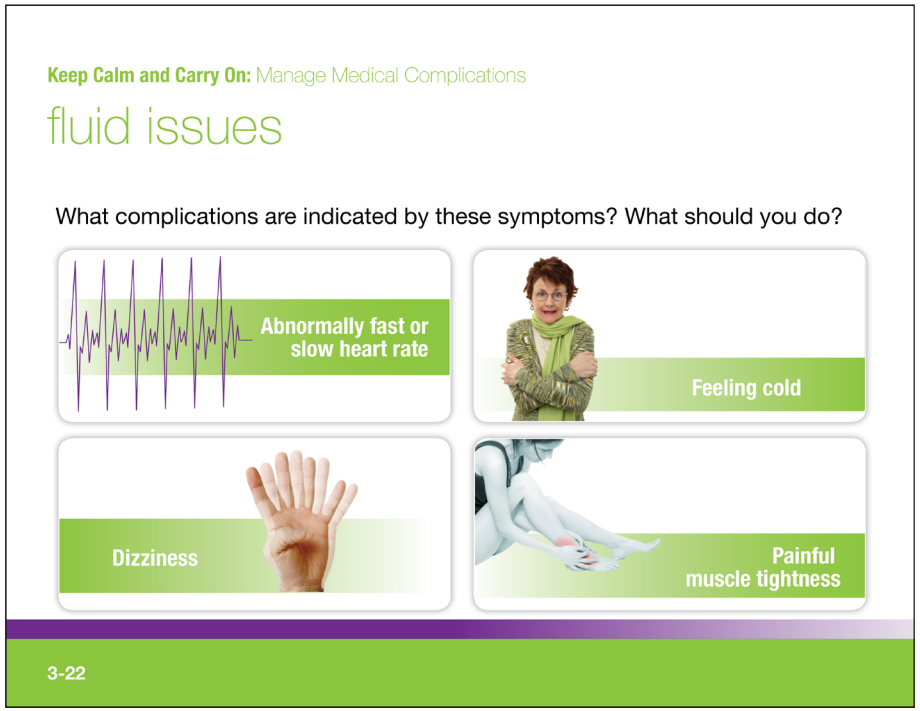
Keep Calm. Carry On.

Manage Medical Complications



1. fluid issues
2. cardiac issues
3. blood issues

fluid issues review

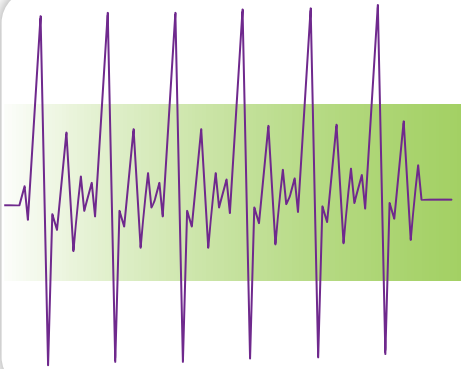


Low Blood Pressure

Use the patient's quick reference guide to review the treatment steps he or she should take in the event of this complication.

fluid issues

What complications are indicated by these symptoms? What should you do?

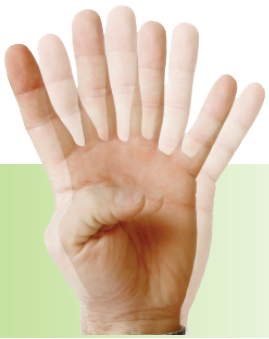


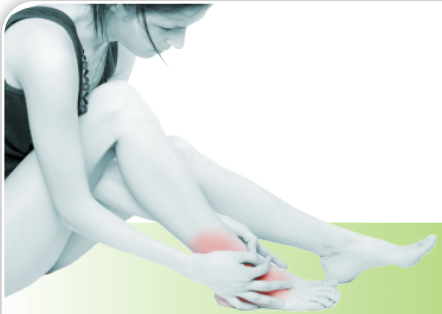
Abnormally fast or slow heart rate



Feeling cold

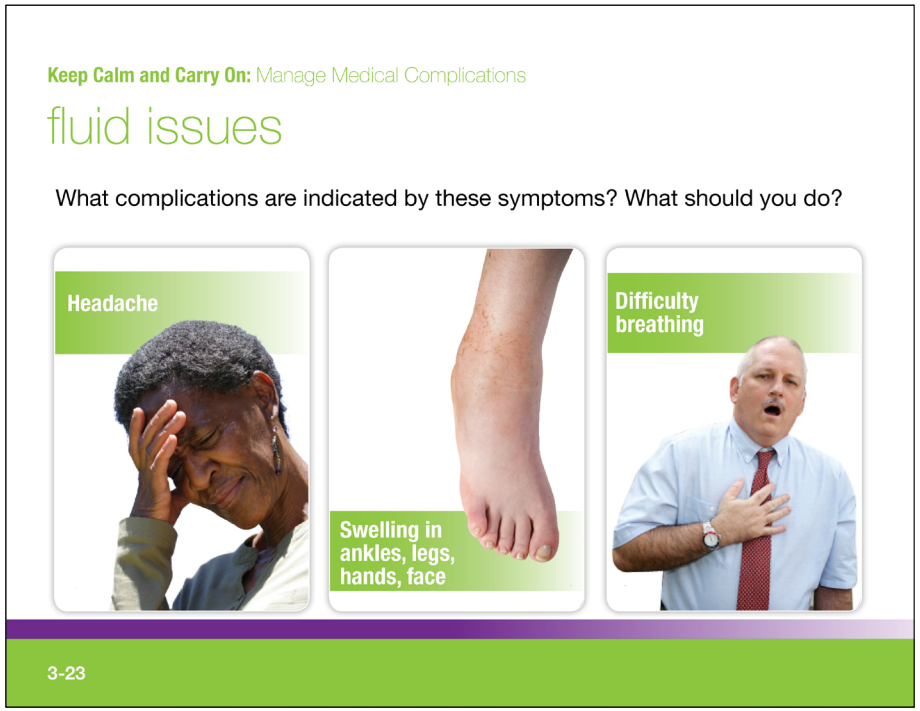
Dizziness





Painful muscle tightness

fluid issues



High Blood Pressure

Use the patient's quick reference guide to review the treatment steps he or she should take in the event of this complication.

fluid issues

What complications are indicated by these symptoms? What should you do?

Headache



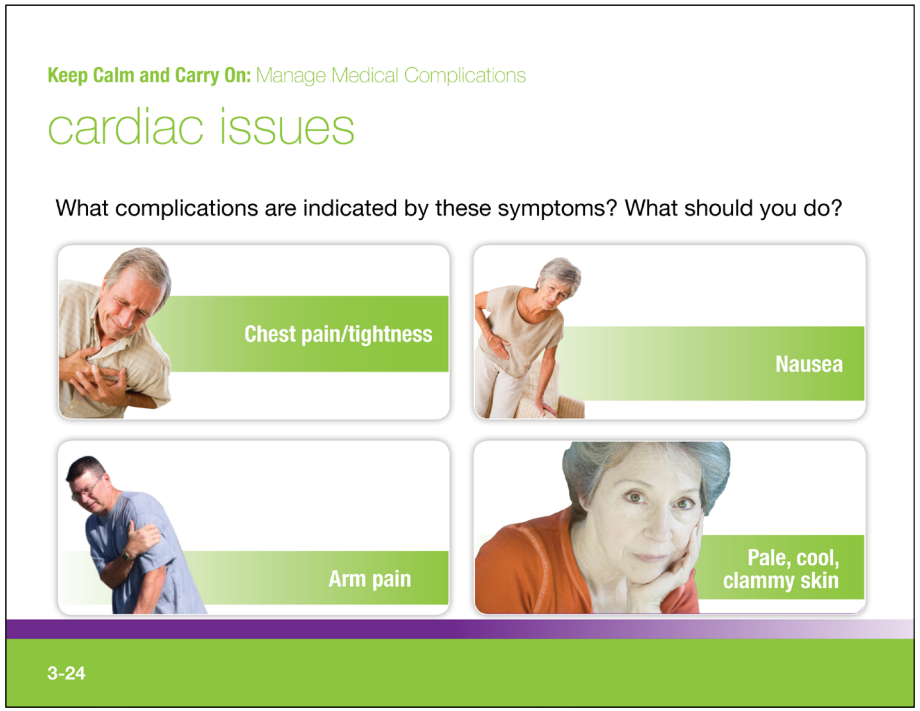


Swelling in ankles, legs, hands, face

Difficulty breathing



cardiac issues



Chest pain/angina

Use the patient's quick reference guide to review the treatment steps he or she should take in the event of this complication.

cardiac issues

What complications are indicated by these symptoms? What should you do?



Chest pain/tightness



Nausea



Arm pain



Pale, cool, clammy skin

cardiac issues



Cardiac Arrhythmia (Irregular Heart Rate)

Use the patient's quick reference guide to review the treatment steps he or she should take in the event of this complication.

cardiac issues

What complications are indicated by these symptoms? What should you do?

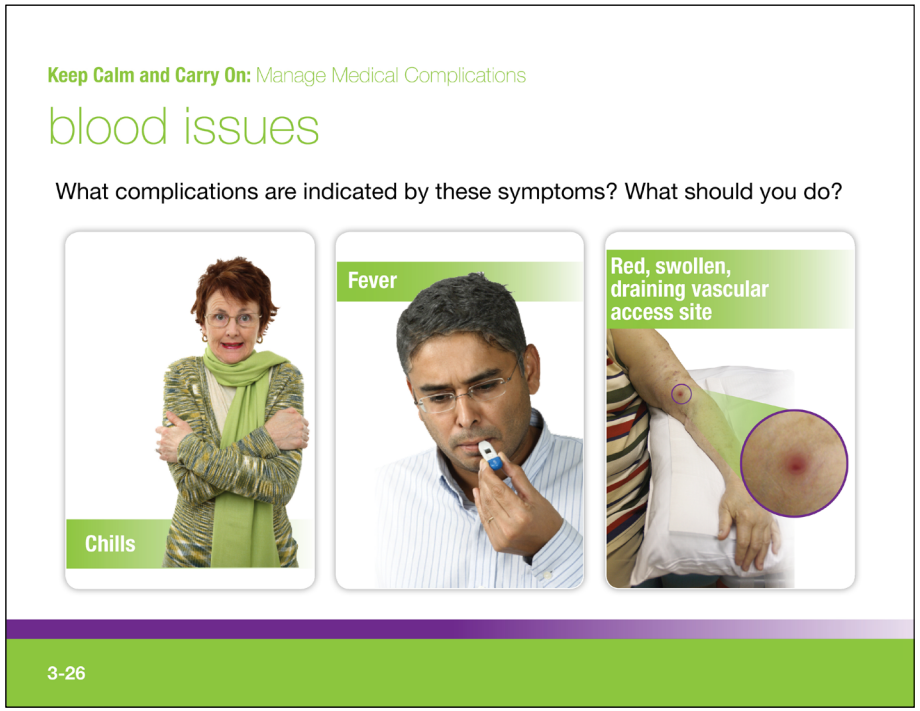
Skipped or extra beats with fast/slow heart rate





Feeling of pounding, bounding, or strong heart rate

blood issues



Infection

Use the patient's quick reference guide to review the treatment steps he or she should take in the event of this complication.

blood issues

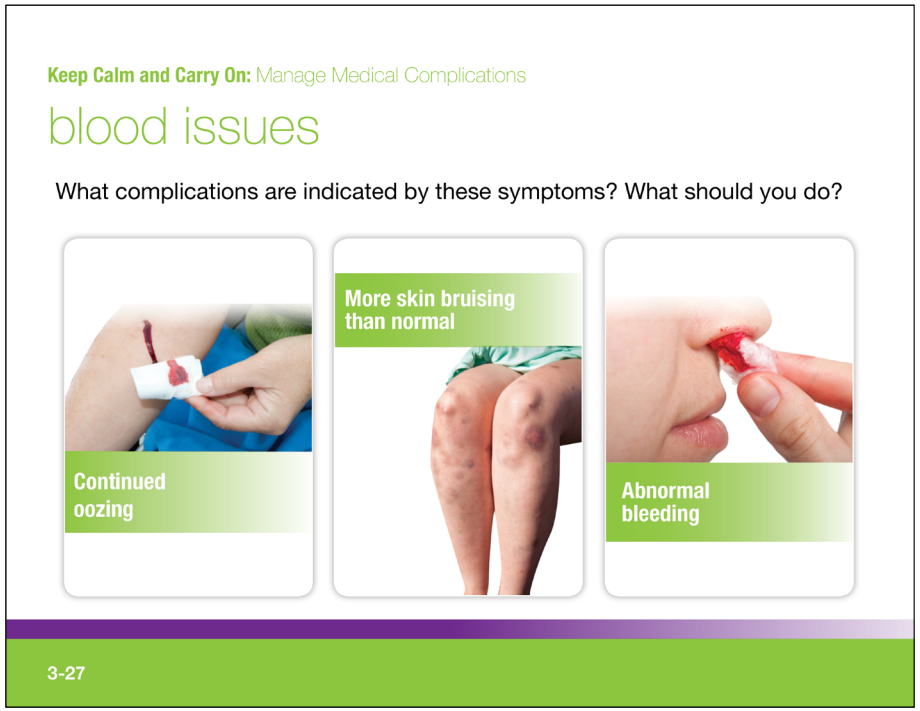
What complications are indicated by these symptoms? What should you do?







blood issues



Prolonged Bleeding

Use the patient's quick reference guide to review the treatment steps he or she should take in the event of this complication.

blood issues

What complications are indicated by these symptoms? What should you do?



Continued oozing

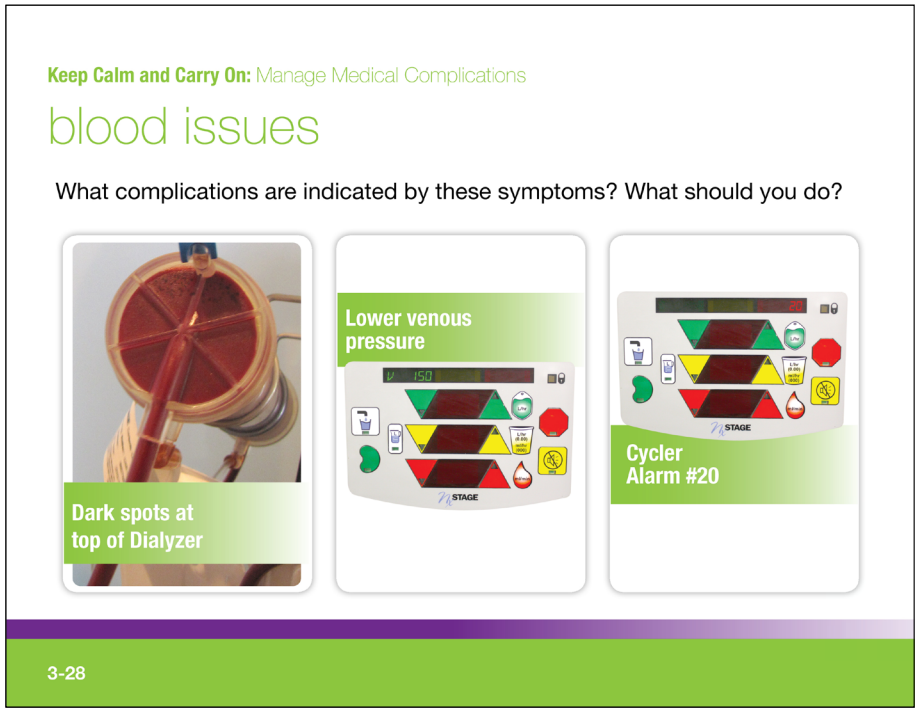
More skin bruising than normal





Abnormal bleeding

blood issues



Blood Circuit Clotting

Use the patient's quick reference guide to review the treatment steps he or she should take in the event of this complication.

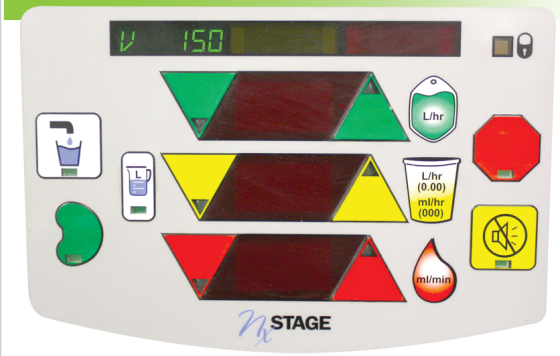
blood issues

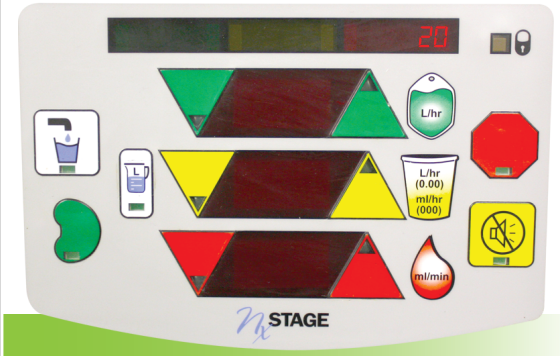
What complications are indicated by these symptoms? What should you do?



Dark spots at top of Dialyzer

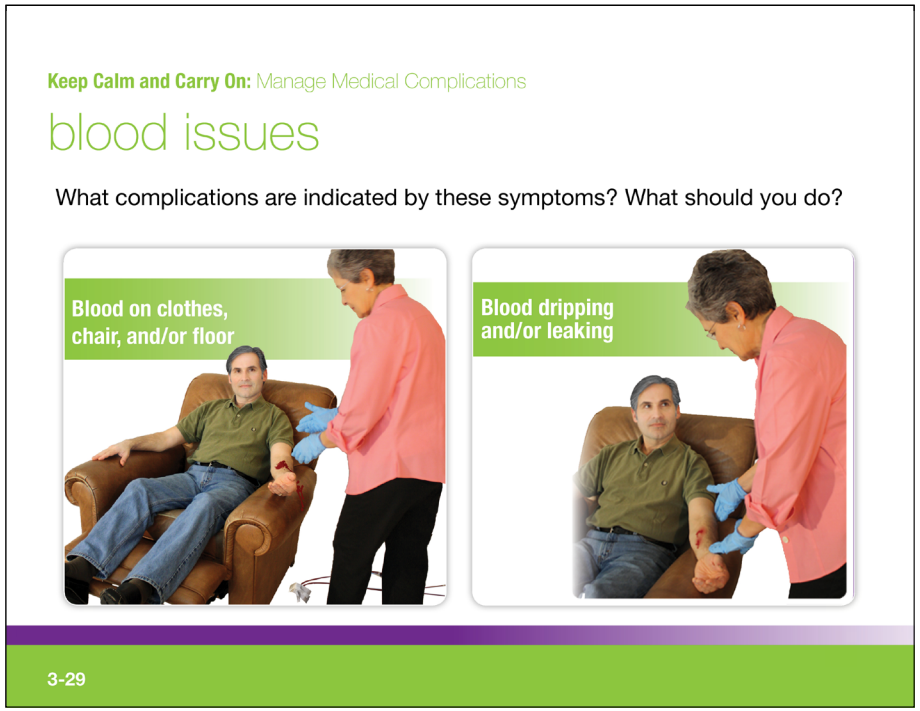
Lower venous pressure





Cycler Alarm #20

blood issues



Accidental Blood Circuit Disconnection

Use the patient's quick reference guide to review the treatment steps he or she should take in the event of this complication.

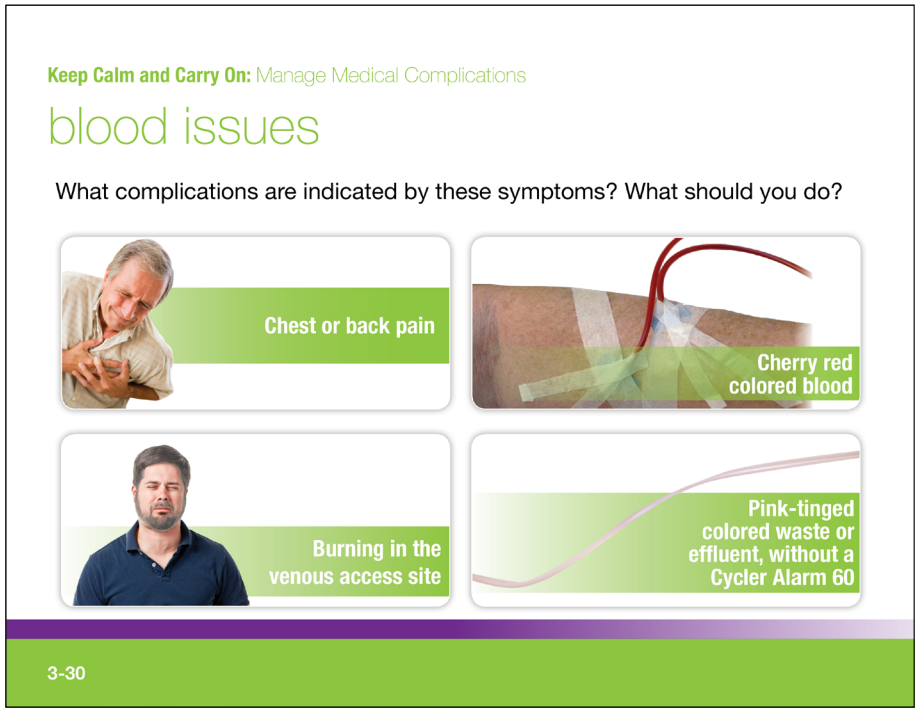
blood issues

What complications are indicated by these symptoms? What should you do?





blood issues



Hemolysis

Use the patient's quick reference guide to review the treatment steps he or she should take in the event of this complication.

blood issues

What complications are indicated by these symptoms? What should you do?



Chest or back pain



Cherry red colored blood

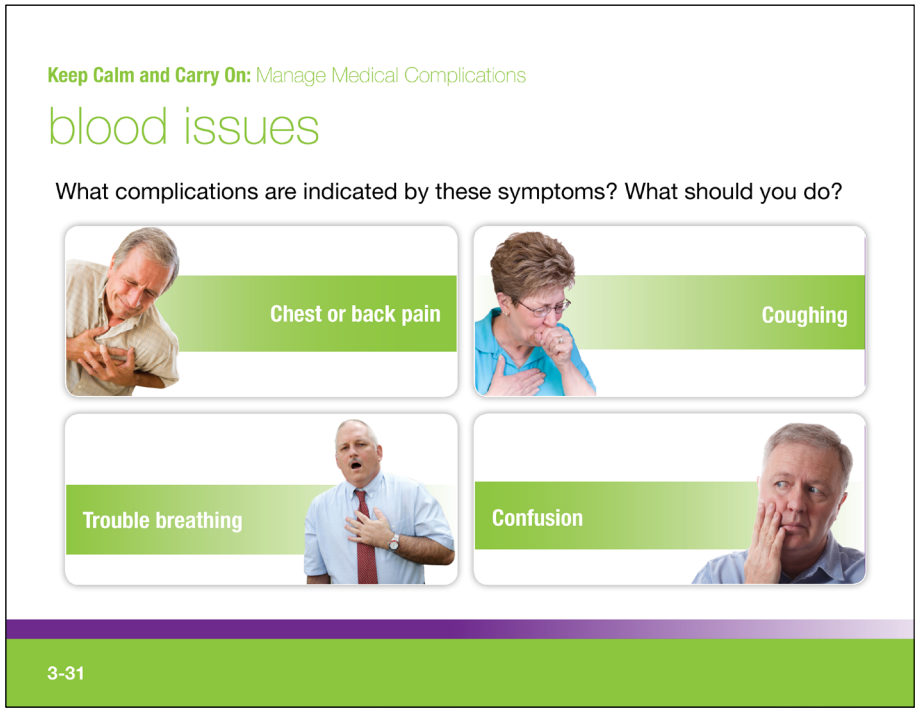


Burning in the venous access site



Pink-tinged colored waste or effluent, without a Cycler Alarm 60

blood issues



Air Embolism

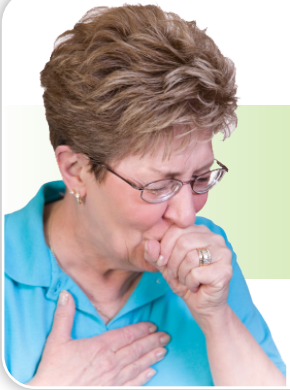
Use the patient's quick reference guide to review the treatment steps he or she should take in the event of this complication.

blood issues

What complications are indicated by these symptoms? What should you do?



Chest or back pain



Coughing

Trouble breathing



Confusion



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