

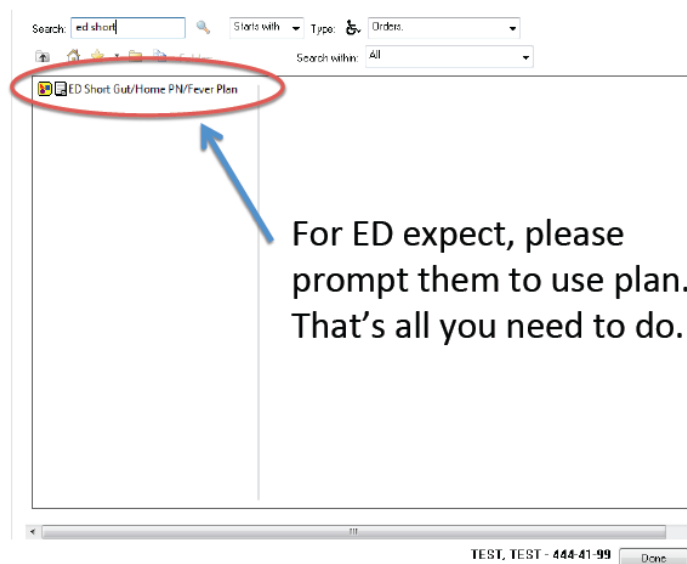
**Boston Children's Hospital**  
**Home Parenteral Nutrition**  
**Handbook for**  
**For On-Call Emergencies**

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On behalf of the Home Parenteral Nutrition staff and patients, thank you for agreeing to take urgent off-hour calls. We hope you will find this brief handbook helpful when handling off-hour complaints. As it is impossible to cover every urgent issue, your clinical judgment is indispensable. In case of emergency, consider sending patient to the closest emergency department. You might suggest transfer to Boston Children's Hospital once patient is stabilized. If you are not sure what to do, do not be afraid to ask. Thanks again. – Home PN team

### What if patient has a fever?

- Refer patient to the emergency department. Do not reassure family over the phone. For red flag symptoms, tell them to dial 911 (altered mental status, chills, seizures). Tell family to anticipate admission for at least 48 hours.
- Call in Expect to ED saying that patient who is “central line dependent coming into ED”.
  - If going to BCH, tell operator to use “**ED Short Gut/Home PN/Fever plan**” (see image below), request someone to personally call you back to close loop on plan once patient has been seen. Consider notifying surgery on-call if concerning story.
  - If going another ED, recommend: CBC with diff, Chem 18, CRP, blood cultures from CVC and peripheral. If history of UTI, UA and urine culture.
  - Empiric antibiotics: Vanco/Zosyn. Use linezolid for Vanco allergy. Use meropenem for Zosyn allergy.



What if a blood culture drawn in the outpatient setting turns positive while patient is at home?

- Refer patient to emergency department. Tell family to anticipate admission for at least 48 hours and maybe longer if repeat blood cultures are positive.
- Call in Expect
- Ask for repeat blood cultures prior to initiation of antibiotics
- If CAIR patient, notify surgeon on-call.
- FYI: Patient should always be observed for first dose of IV antibiotics.

What if another team has prescribed a patient antibiotics for non-CVC related infection (eg. acute otitis media, pneumonia, urinary tract infection)?

- Ideally patient has been seen by a medical provider.
- If fever present, request blood culture from CVC prior to starting antibiotics.
- Hold IV iron.
- Low threshold for admission for observation.

What if catheter (PICC Broviac) pulled out a bit?

- Check X-ray for tip placement.

What if the cuff is exposed?

- Refer to ED.
- Consult surgery
- Needs central line replacement.

What if PN bag damaged/leaking?

- Dispose of PN bag, use new bag. May need to re-set PN pump.
- Family should notify home infusion company.

What if there is unilateral swelling?

- Dependent edema?
- Check fluoroscopic catheter study (injection of contrast into CVC) for fibrin sheath.
- Consider upper extremity Doppler study for thrombus.

What if the patient has headaches or pain with PN flushing?

- Check X-ray for tip placement.
- Check line study for fibrin sheath or thrombus.
- FYI: Differential diagnosis includes catheter malposition, thrombus, catheter fracture.

What if I cannot draw back ethanol lock?

- Can you flush the line? (If you cannot flush line, see instructions below)
- Flush slowly with 10 ml normal saline (NOT heparin).
- If recurs, then have patient seen in clinic for tPA.
- Check X-ray for tip placement.
- Check fluoroscopic catheter study for fibrin sheath.

- Consider upper extremity Doppler study for thrombus.

What if I cannot flush my catheter?

- Make sure catheter is unclamped.
- Change cap in typical sterile fashion, then flush catheter with saline.
- Check to ensure the catheter is not kinked
- If above are not successful, refer patient to emergency department or urgent clinic visit for tPA
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What if cap breaks?

- Change cap in typical sterile fashion, then flush catheter with saline.

What if CVC dressing gets wet/soiled?

- As soon as possible, change the CVC dressing in typical sterile fashion.

What if CVC dressing is no longer occlusive?

- As soon as possible, change the CVC dressing in typical sterile fashion.

What if the Y-connector breaks?

- Clamp catheter, disconnect Y-connector, use a new Y-connector.

What if there is concern for cellulitis at CVC exit site?

- Evaluation in HPN clinic or emergency department within 12 hours.
- Consider surgical evaluation to remove suture.
- Check blood culture.
- If there are any concerning symptoms, admit for IV antibiotics. Otherwise may treat as outpatient (ceftriaxone).

What if CVC catheter breaks?

- Clamp the catheter proximal to break using atraumatic clamps (example: blue smooth tooth clamps, Kelly clamps), which should be universally provided by home infusion companies.
- Refer patient to emergency department
- Call in Expect. Tell family to anticipate waiting for new IV access.
- FYI: PICC cannot be repaired. It will need to be replaced.

What if catheter bubbles?

- May monitor- advise to flush slowly to avoid fracture
- Home PN team may discuss with surgery re: elective repair/replacement
- FYI: internal wall of catheter broken, leading to aneurysm.

What if the needle gets dislodged from Port?

- As soon as possible, clean area, re-access Port-a-Cath with new needle, flush with heparin. (If unable to access Port-a-Cath, see instructions below)

What if patient cannot access Port-a-Cath?

- Ask patient about any swelling, trauma to area.
- Refer to emergency department.
- Consider X-ray for port migration.

What if Port-a-Cath will flush, but won't draw back?

- First flush with 10 ml normal saline.
- Try to draw back.
- If that doesn't work, de-access and re-access Port-a-Cath.
- Try to draw back.
- If unsuccessful, instill tPA for 2 hours and re-try.

What if CVC tubing breaks?

- Clamp catheter, replace with new tubing.
- Family should notify home infusion company.

What if there is blood inside the catheter?

- Flush with saline, then flush with heparin or connect to tubing.
- Check closely for catheter fracture
- Is there a back check valve in place (<1 year-old)
- If this is first time going home, perhaps infusion rate is not high enough.

What if there is stool contamination to the catheter/tubing?

- **Stool Contamination to CVC**
- -Gather the following supplies: Saline Flushes, Heparin flush (if needed) Gauze, Multiple Alcohol Pads, sterile gloves, masks, and a new CVC cap
- - Place gauze or towel under CVC and positive pressure cap. Do not disconnect any connected IVF/PN
- - Use a 10ml Saline Flush to gently clean the exterior portion of CVC to remove visible stool
- - Scrub CVC connection with alcohol protected by 2x2 gauze for at least 30 seconds. Repeat x1. If the alcohol has stool on it, discard and start with a new set up.
- -Set up,3-4 alcohol pads on 3-4 sterile 2x2 gauze
- Normal Saline flush
- CVC cap (prime with Normal Saline leave flush attached)
- Heparin Flush
- Mask
- Put on sterile gloves
- Again scrub the CVC/ positive pressure cap junction for 30 seconds
- Remove CVC cap
- Scrub threads of CVC for at least 30 seconds
- Connect new cap
- Flush CVC

- If there was a fluid running, discard current fluid and use a new bag
- If there was not fluid running heparin flush the catheter
- Watch patient closely for 24-48 hours for fever, lethargy, concerning clinical changes. Present to the ED immediately.

What if patient admitted to BCH for r/o sepsis?

- If patient is hemodynamically unstable, do not use CVC for parenteral nutrition.
- If blood culture positive for bacteria, okay to run PN through CVC as long as hemodynamically stable.
- If blood culture is positive for yeast, consider holding PN unless heroic measures for catheter salvage used.
- If admitted after 1 pm, encourage family to bring HPN bag from home. HPN bag must be sent to pharmacy to verify mixture matches most recent prescription and to affix bar code. Floor nurses are not responsible for additions (eg. H2 blocker, MVI). The family is responsible for additions to the HPN bag from home.

What if patient admitted to another hospital?

- Provide a copy of electronic HPN prescription.
- Patient should use home supply of Omegaven.
- Encourage team to communicate with HPN team during business hours.
- Request copy of discharge summary, operative reports, laboratory studies.

What if IV lipids is run on wrong pump, and there is a rapid IV lipids infusion?

- Refer patient to emergency department
- Call in Expect
- Request the following labs: liver panel, triglycerides, electrolytes at baseline. For patients receiving Omegaven, triglyceride level should be checked four hours after rapid infusion.
- If patient receiving Omegaven, send email to Alexis Potemkin, OM study nurse coordinator

What if there is air in the line?

1. Pause infusion. (hit "pause")
2. Disconnect tubing
3. Re-prime tubing (hit "prime")
4. Resume infusion (hit resume)
5. Reconnect tubing.
6. If above does not work, see below.
7. Switch to a back-up pump (problem with air sensor).
8. Inform HPN team, who will inform home infusion company (potentially a manufacturing problem with tubing).

What is pump alerts occlusion?

1. "Upward occlusion?" (between PN bag and pump)

- a. Check to see if tubing is pinched by door of pump
  - b. Check to see if bag is tipped, so spike not underneath fluid
2. "Downward occlusion?" (between pump and patient)
- a. Check to see clamp closed
  - b. Check to see if there is anything in the way of tubing
  - c. Disconnect tubing from CVC, check to make sure catheter flushes OK.  
(If not flushing, see above "What if I cannot flush my catheter?")

**CURLIN MEDICAL**  
**4000 Series™ and 2000 Series™\***  
**Ambulatory Infusion Pumps**  
**Clinician's Guide**  
**TPN THERAPY**

REFER TO USER'S MANUAL FOR DETAILED INSTRUCTIONS

**KEYPAD FUNCTION**

**ON/OFF:** Turns pump on and off. When the pump is running, the PAUSE key must be used to stop infusion first. Then press the OFF key to turn pump off.

**RUN/PAUSE:** Starts or pauses the pump. When the pump is paused, pressing this key will resume pumping.

**UP ARROW/ DOWN ARROW:** Used to scroll through the display screens.

**NO/CHANGE:** Rejects highlighted data.

**YES/ENTER:** Accepts highlighted data.

**HELP/OPTIONS:** Used to request and exit help screen when pump is paused, or go to options screen when pump is running.

**.SILENCE:** Used to silence alarm for 1 minute intervals, and as a decimal point.

**PRIME/BOLUS:** Used to prime fluid through the tubing to clear it of air.

**LED INDICATORS**

Green- pump is running  
Yellow- standby  
Red- pump in alarm status

**SETTING UP THE PUMP**

- 1 Install 2 new "C" size alkaline batteries or connect Battery Pack, or AC adapter to bottom of pump.
- 2 Prepare IV bag and attach a new administration set.
- 3 Eliminate all air from the bag and the administration set (see PRIMING THE SET).
- 4 Install set and close pump door.
- 5 Attach set to venous access device using agency protocol.

Note: If a Check Valve Adapter is provided with your administration set, remove it from the package and connect it to the distal end of the set.

**INSTALLING THE ADMINISTRATION SET**

- 1 Fully open the door of the pump.
- 2 Close the slide-clamp on the administration set.
- 3 Activate the Integral "Flow-Stop" by twisting and removing the breakaway tab.
- 4 Insert the blue tubing guide into the receptacle on right side of pump in the direction of the blue arrow, positioning the tubing in front of the door hinges.
- 5 Center the tubing in the middle of the pumping fingers, covering the yellow dot.
- 6 Holding the yellow Integral "Flow-Stop" by the handle, insert it on an angle into the receptacle on the left side of the pump in the direction of the yellow arrow. CAUTION: Do not press down on the top of the Integral "Flow-Stop" when inserting it into the receptacle. This action could inadvertently open the Integral "Flow-Stop" and allow fluid to flow through the tubing.
- 7 Open the slide-clamp on the administration set
- 8 Push the tubing slightly into the black Air Detector slot.
- 9 Fully close the door of the pump and latch it securely.

**Important Notification**

A lack of compliance with proper positioning of the tubing could result in infusion inaccuracies.

**CAUTION:** CENTER TUBING

Please center the tubing in the pumping area when installing the administration set.

**PRIMING THE SET**

CAUTION: Disconnect set from patient's access site before priming.

**By Gravity:**

- 1 Twist and remove breakaway tab from "Flow- Stop".
- 2 Squeeze "Flow-Stop" between thumb and forefinger to allow fluid to flow through tubing.

**Electrically:**

Note: Set must be installed into the pump.

- 1 Release any clamps on the administration set.
- 2 Press and release PRIME key from "Run Options" menu
- 3 Press and hold the PRIME key until set is free of air; release key to stop (each prime cycle allows up to 6 ml of fluid).
- 4 When prime is complete, press YES/ENTER to exit the prime screen.

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### PROGRAMMING FOR TPN THERAPY

- Turn the pump on.
- Observe the self-test, the LED lights, and the power source screen.
- Select PROGRAM from the first selection menu.
- If multiple therapies are available, select TPN from the therapy selection menu.
- Complete the pre-prescription menu:

DELAY: 0:00  
NEXT? YES  
ON
- Complete the prescription menu:

BAG Vol: 0.0 ml  
 Vol Tot: 0.0 ml  
 INF RATE: 0.0 ml/hr  
 VUP Ramp: 0.000  
 DN Ramp: 0.000  
 Tot Time: 0:00  
 RATE: 0.1 ml/hr  
 RATE? YES
- Make selection from run option menu:

PRESS  
 RUN TO START  
 NO TO REVIEW  
 OPTIONS or EXIT
- Press NO to review prescription, OPTIONS to view options menu, PRIME to prime set, or press RUN key to start infusion.
- While a TPN infusion is running, the display will alternate between various information screens.
- To interrupt or pause an infusion, press RUN/PAUSE key.
- Make selection from the pause menu:

ENTER to Select  
 RESUME  
 REPEAT Rx  
 NEW PROGRAM
- When the infusion is complete, the following screen displays:

INFUSION COMPLETE  
 \*\*\*\*\*  
 TOT VOL: 2000.0 ml  
 RATE: 0.1 ml/hr
- To stop a therapy, press PAUSE then turn pump off.

### OPTIONS

- LOCK:** Press NO to change Lock Setting (may need access code). Press YES to accept new setting.
- HOURLY TOTAL \*\*:** Press NO then YES to view. Scroll - to review. Press NO to exit.
- CLEAR HOURLY \*\*:** Press NO then YES to view. Press YES to clear, NO to retain and exit.
- DOWN RAMP:** Press NO to change OFF to ON, press YES to access early down ramp menu.
- DOWN OCCLUSION:** Press NO to change, YES to accept.
- AIR SENSITIVITY:** Press NO to change, YES to accept.
- AUDIO:** Press 1-9 to hear level, press YES to accept.
- POWER CHECK:** Press NO then YES to check level.
- ACCEPT OPT?:** Press YES to accept any changes made.

#### HOW TO CHANGE THE LOCK SETTING

- Lock may be initially selected in BIOMED SETUP.
- When infusing, press OPTIONS key.
- Scroll to LOCK and press NO to change.
- Enter access code at prompt.
- Select the appropriate Lock Setting.
- Press YES/ENTER to select.
- Exit Options menu by pressing YES at 'ACCEPT OPT?' field.

#### INSTALLING BATTERIES

- Turn pump OFF or connect to AC adapter.
- Open the battery door on the back of pump by depressing the release pin with a small coin and sliding it in a downward motion.
- Install 2 new "C" size alkaline batteries with both positive poles at the top of the battery compartment
- Slide the battery compartment door back into place.

#### USING THE HELP FUNCTIONS

- When programming, press the HELP key. While running, press PAUSE then press HELP key.
- When a HELP screen is displayed and there is more text to read that is not displayed on the screen, or icons will appear, scroll up and down the text using the ARROW keys.
- When finished, press the HELP key again to exit the HELP screen.

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### PUMP ALARMS & RESOLUTIONS

LCD DISPLAY	RESOLUTION
INFUSION COMPLETE	Press PAUSE, add another IV bag, select REPEAT Rx and confirm fields, or turn the pump off.
ALARM AIR-IN-LINE	Remove air from administration set and IV bag. (Disconnect set from patient's access site prior to using prime function.)
ALARM DOWN OCCLUSION	Check administration set from the pump to patient's access site for cause of occlusion. Correct obstruction per protocol. Consider changing the pressure setting from Low to High. When occlusion is resolved, the alarm will stop and pumping will resume.
ALARM UP OCCLUSION	Check administration set from IV bag to pump for cause of occlusion. When ready to begin infusion, press PAUSE, select RESUME, and press RUN.
ALARM HIGH UP PRESSURE	Check for excessive pressure on IV bag. When ready to begin infusion, press PAUSE, select RESUME, and press RUN.
ALARM SET NOT INSTALLED	Install appropriate Curlin Medical administration set. Use ONLY Curlin Medical administration sets. See User's Manual or IV set directions for proper installation instructions.
ALARM UNATTENDED PUMP	To resolve, press RUN and resume the therapy or continue with operating procedure.
ALARM REPLACE SET	Replace set, prime set if necessary, select RESUME and press RUN when ready to begin.
ALARM DOOR OPEN	Check placement of administration set and close pump door properly. See User's Manual for instructions.
ALARM EMPTY BATTERY	Press the pause key and turn pump off. Install 2 new "C" size alkaline batteries.
ERROR CODE	If an error code occurs, turn pump off then back on. If it reoccurs, notify dispensing agency

Any questions? Call Bram Raphael cell 914-584-6239