Nurse Link
BY CAREPATHRX

Total Parenteral Nutrition (TPN)

2023

Click here to watch recorded presentation

https://www.youtube.com/watch?v=YlgrCEtvlLw

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Access to Nurse Link

To login, follow the link below and click "*Login to Nurse Link*."

https://carepathrxllc.com/nurselink-welcome/

Password: email nursingsupport@homeinfusion.com

Be sure to bookmark this URL and save your password for future use.

NL Patient Site:
https://carepathrxllc.com/nurselink-patient/

Patient teaching Videos	Patient Written Instructions	Nursing P & P	Links to RN virtual training	Nurse Videos	Home Infusion Society links	CarepathRX in the News

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CarepathRx On Call

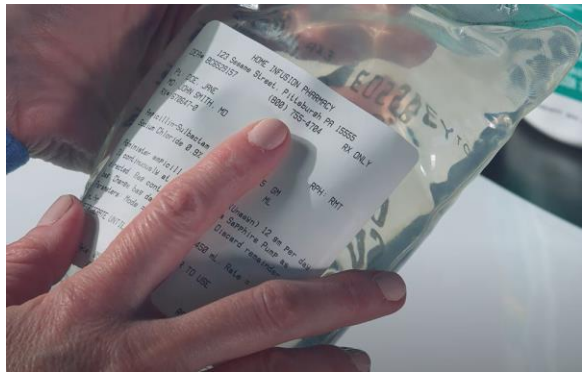
24 / 7 Access to the Clinical Pharmacy team

For after-hours, weekend and holiday support, troubleshooting, and delivery needs:

- CarepathRx Pharmacist
- Local pharmacy support varies by pharmacy.
- Dietitians

  1-877-ENTERAL
- Nurses
- Delivery

Contact the pharmacy by calling the phone number at the top of the medication label.



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TOTAL PARENTERAL NUTRITION

Total parenteral nutrition (TPN) is **a method of feeding that bypasses the gastrointestinal tract**. It is a process in which the patient is given nutrients through veins when they do not have other nutrition sources. The method is used when someone can't or shouldn't receive feedings or fluids by mouth. Protein, carbohydrates, fat, minerals and electrolytes, vitamins, and other trace elements are delivered intravenously so the nutrients go directly into the bloodstream, bypassing the gut.

It is long-term therapy.

TPN can be given to a person who has a digestive disorder, accident, or has critical surgery.

TPN is caustic as it has minerals, glucose, and electrolytes.

TPN can only be administered in larger veins near the chest or neck of the patient. TPN must be administered through a Central Line.

The products are made by pharmaceutical compounding companies.

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Peripheral Parenteral Nutrition

It is a process of providing supplements with another source of obtaining/receiving nutrients.

It is normally a fourteen day process. It is a short-term therapy.

It is not very caustic as compared to TPN

PPN can be administered in a short vein in a patient body.

PPN can be given to a person whose digestive system has been blocked or unable to take a sufficient amount of nutrients from other sources.

Total Parenteral Nutrition (TPN) is only appropriate when the gut does not work enough to support adequate nutrition or extended bowel rest is clinically indicated

Mechanical Obstruction

- Complete bowel obstruction
- Partial bowel obstruction
- Malignant GI mass
- Ileus

Short Bowel Syndrome

- Small bowel resection
- Congenital short gut
- GI Trauma

Bowel Rest Indicated

- Enterocutaneous fistula
- GI surgery with anastomosis healing
- Inflammatory bowel disease

Other

- Severe Malabsorption
- Pancreatitis
- Motility disturbance
- Enteritis

Site	Some	Possible deficiency
Skin	Dry and scaling. Pettechiae, Ecchymosis Follicular hyperkeratosis Pellagrous dermatosis “Flaky Paint” dermatosis	Vit A VIt C or K Vit A,C or Essential Fatty acid Niacin, Tryptophan Protein
Hair	Dull, dry thin and brittle	Protein and Essential Fatty Acid
Eyes	Eyelid lining and whites pale Bitot’s spots(buildup of keratin debris) Corners of eyes cracked, eyelids red inflamed Cornea dull, milky hazy or opaque	Anemia Vit A Riboflavin and Niacin Vit A
Mouth	Magenta tongue, atrophied taste buds Glossitis Bleeding Gums Cheilosos(inflammation mouth/lips) Angular stomatitis	Riboflavin Niacin, Folate, Vit B12 Vitamin C Riboflavin, Pyridoxine Riboflavin, Niacin, Iron, Pyroxine, Vit B12
General Appearance	Edema Muscle wasting Decreased subcutaneous fat	Protein Protein-Calorie Malnutrition
Neurologic	Disorientation Neuropathy	Thiamin, Niacin Thiamin, Copper, Vit B 12

Signs of Nutritional Deficiency

CONTRAINDICATIONS

- Known hypersensitivity to egg, soybean proteins, peanut proteins, corn or corn products or to any of the active substances or excipients

- Severe hyperlipidemia or severe disorders of lipid metabolism characterized by hypertriglyceridemia (serum triglyceride concentration >1,000 g/dL)

- Inborn error of amino acid metabolism

- Cardiopulmonary instability (including pulmonary edema, cardiac insufficiency, myocardial infarction, acidosis and hemodynamic instability requiring significant vasopressor support)

- Hemophagocytic syndrome (a life-threatening disease of severe hyperinflammation)

Biochemical/ Laboratory Testing

Failure to achieve nutritional goals is often because of inadequate monitoring.

General PN goals are to support lean body mass, structure and function of the organs and prevent nutrient deficiencies.

Serum Albumin	•Albumin is a protein made in the liver, found in blood plasma, and the most abundant blood protein. •Albumin maintains plasma oncotic pressure by promoting fluid transfer between blood vessels and body tissues. •Albumin transports steroids, thyroid hormones, and fatty acids throughout the body. •Albumin levels decrease during stress and illness, making it a poor indicator of nutrition at times of stress.
Prealbumin	•Prealbumin is a protein made by the liver & is the building block for other proteins •Prealbumin transports thyroxine throughout the body.
Serum Transferrin	•Transferrin as a protein made by the liver. •Transferrin transports iron in the plasma.
Nitrogen Balance	•Nitrogen balance refers to the amount of protein (nitrogen) intake and excretion in the urine. •Goal is for equilibrium, with intake and output of nitrogen equal. •Accuracy depends on detailed 24-hour intake and 24-hour urine collection.
Total Lymphocyte count (TLC):	•Lymphocytes are a type of white blood cell, supporting the immune system. •Lymphocytopenia (low count) indicates inadequate nutritional status.
A comprehensive metabolic panel:	•A group of blood tests providing an overall picture of chemical balance and metabolism. •Liver & kidney health – Blood sugar & protein levels – Acid balance – Hydration & electrolyte balance - metabolism
Stool analysis:	•A stool analysis is a series of tests done on a stool (feces) sample to help diagnose certain conditions affecting the digestive tract. These conditions can include infection (such as from parasites, viruses, or bacteria), poor nutrient absorption, or cancer.
Subjective Global Assessment (SGA) of Nutritional Status:	•Tool used to evaluate changes associated with weight, dietary intake, functional capacity, GI symptoms, and disease. •Categories findings: well nourished - moderately nourished - severely malnourished

Blood Sampling Tips

Always stop the infusion prior to lab draw.

Flush line before and after lab draw.

5-10ml flush before

10-20ml flush after

Waste 10ml of blood prior to collecting specimen.

Hub to hub for best results.

Always remove extension sets when drawing labs.

Attach new sterile caps/extension sets after lab draws.

Microclave manufacture recommends:

Draw labs through cap and flushing adequate.

- Caps should be changed no more than every 96 hours (use clinical judgement).

Helpful with sluggish or no blood return:

Positioning of line and limb.

Syringe draw by pulling back 1-2 ml increments and allow to fill.

Use the other line lumen.

Flush briskly with 10mls using the push pause method to create turbulent flow.

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TPN must be administered through a Central Line.

TPN is highly concentrated

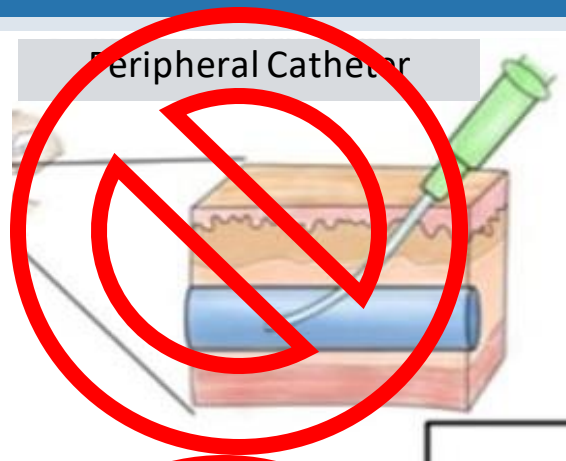
Also, why high risk of sepsis.

- 10% Dextrose (or more)
- 5% protein (or more)

Appropriate central lines for TPN:

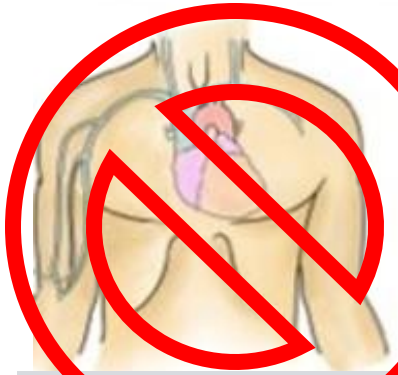
- PICC
- Non-tunneled central
- Tunneled central
- Implanted Ports

PPN (partial parenteral nutrition with dextrose concentration <10% and protein conc<5%) is very rare and not indicated for home infusion.



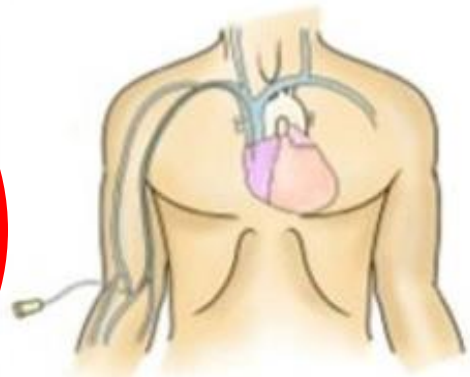
Peripheral Catheter

Subcutaneous Needles

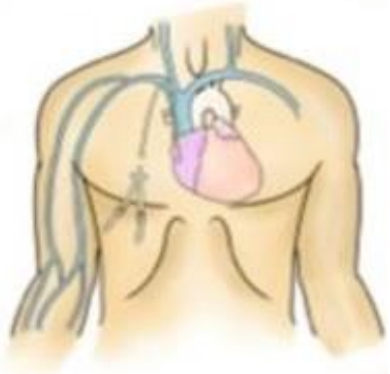


Midline Catheter

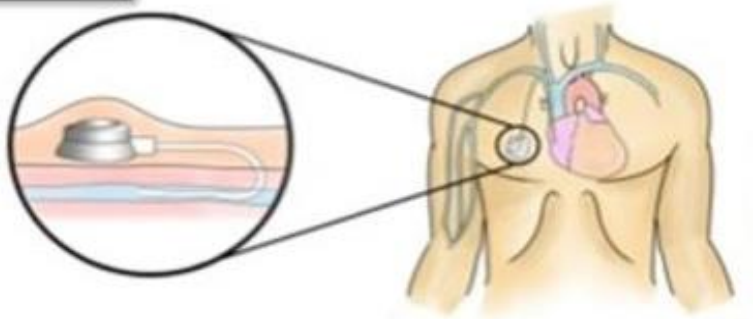
Non-tunneled Central Venous Catheter



PICC (Peripherally Inserted Central Catheter)



Tunneled Central Venous Catheter



Implanted Ports

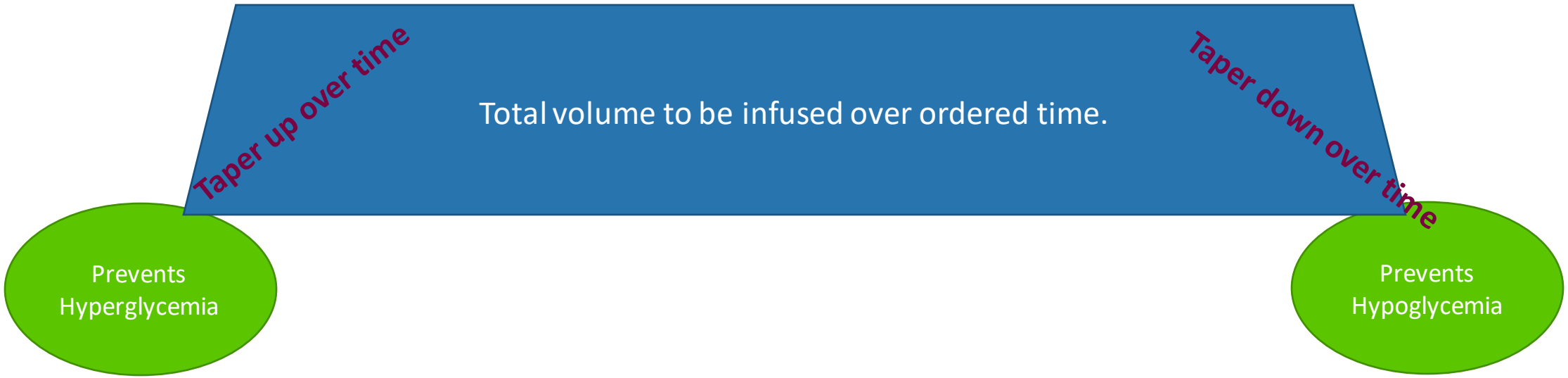
TPN Orders

Total Volume to be infused

Nutrients to be infused

Calories & lipids to be infused

Duration of infusion, and tapers



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Components of TPN

Proteins	•Protein is the premiere macronutrient in PN solution, provided as crystalline amino acids. •Proteins are essential to cell function and structure, acting as building blocks for muscles, tendons, enzymes, hormones, and antibodies.
Carbohydrates	•Carbohydrates serve as the prime energy source and provide 45% to 65% of daily energy needs. •Nearly all dietary carbs are broken down into glucose and oxidized for energy.
Lipids	•Fat emulsions prevent essential fatty acid deficiency, insulating and supporting organs, hormone precursors &, and carrier of essential nutrients. •Fat is, composed of triglycerides, sterols, and phospholipids making it the most calorically dense nutrient in PN •Lipids may be ordered daily or on certain days of the week in quantities sufficient to prevent essential fatty acid deficiency.
Water	•To maintain individual fluid requirements. •To monitor measure daily I & O; assess for sings of cardiac, respiratory, and renal compromise; observing for rapid weight changes; evaluating peripheral edema; and manag levels of serum electrolytes.
Electrolytes	•Electrolytes are included in PN formula to meet daily requirements, promoting physiological functions. Help maintain normal cellular metabolism. •Common PN electrolytes are sodium, potassium, calcium, magnesium, chloride and phosphorous.
Vitamins	•Fat Soluble: Vitamin A (retinol), Vitamin D, Vitamin E (tocopherol), and Vitamin K •Water Soluble: Vitamin B1 (thiamine), Vitamin B2 (riboflavin). Pantothenic acid, Vitamin B6 (pyridoxine), Vitamin B12 (cyanocobalamin), Biotin, Niacin, Folic acid, and Vitamin C (ascorbic acid)
Trace Elements	•Trace elements are included in PN formula to meet daily requirements, promoting physiological functions. •Copper, Chromium, Manganese, Selenium and Zinc
Medication Additives	• Medications deemed necessary by the Physician or Pharmacist according to the patient's condition. •Common medication additives are: Insulin, Famotadine, and Heparin.

2:1 Solution

Dual Chamber Bags

SMOF

3:1 Solution

3 Chamber Bag

Supplies

Review teaching guide to determine what supplies are required to administer therapy.

Review TPN additives and volume on Rx Orders in HCN and/or POT to determine additional supplies.

Lipids are larger molecules and require the 1.2 - micron filter to be able to pass through.

- 2:1 (no lipids) require the 0.2-micron filter.

Adequate battery or battery charge.

- Typically, TPN is ran over 12-16 hours and is 1200-1600 ml per dose.
  - Resulting in a Plateau greater than 100ml/hr.

Glass ampules require a filtered needle to draw up medication.

Tubing change

- Daily – with each dose.

IV Line Filters

An IV-line filter is a membrane in the tubing set designed to prevent particulates and air bubbles from being administered.

Filters Components:

- Inlet allows fluid to enter the filter compartment.
- Fluid then fills the vented side, allowing air to be removed.
- Filter membrane becomes wet and prevents air and particulates to flow through the tubing. Works like a strainer.
- Fluid flow to patient side for administration.

Proper priming techniques allow the fluid to fill the air-vent side first, then saturating the membrane and before filling the patient side.

- Arrow should point up when priming to allow air bubbles to flow through membrane before fluid saturates it.

Arrow to point up during priming.

Common filter membrane sizes:
0.2 micron
- For medications compounded in the home.
- Most frequently used to filter particulates.

1.2 micron
- Usually for TPN lipids.
- Allows larger molecules to pass to the patient.

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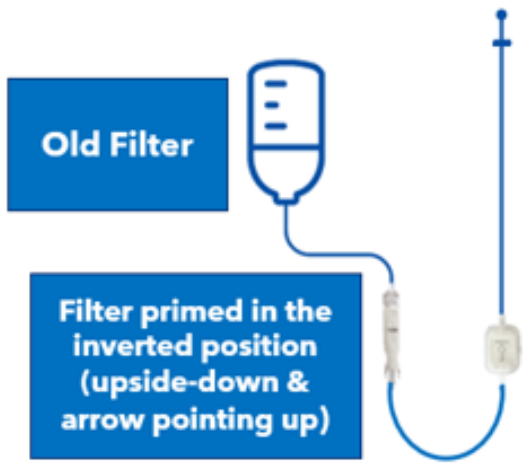
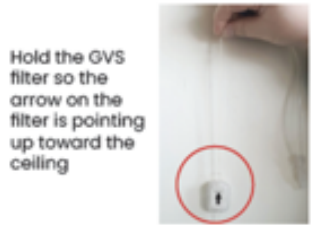
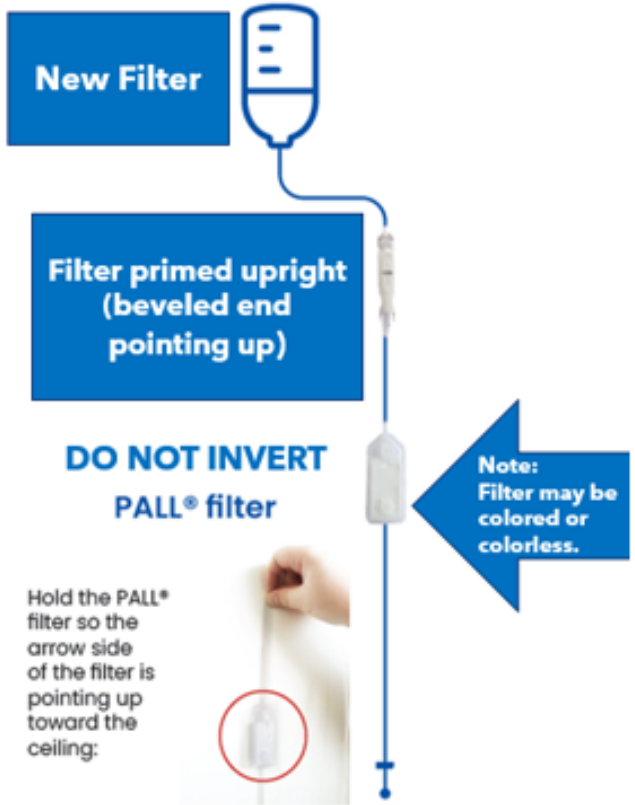
Eitan Medical, the supplier of the Sapphire pump, recently changed their inline tubing filter to the PALL filter. Both the old and new PALL filter remove air and particles; the difference between the filters being the priming process. **The new PALL filter must be primed upright, with the beveled-end (arrow) pointing up – do not invert PALL filter during priming**. The filte work the same. It is important to note that all PALL filters work the same, although color may vary.



GVS filter





Old GVS Filter

Eliminates: Particles and Air

Primed inverted (arrow pointing up)

New PALL Filter

Eliminates: Particles and Air

Primed upright (beveled-end up)

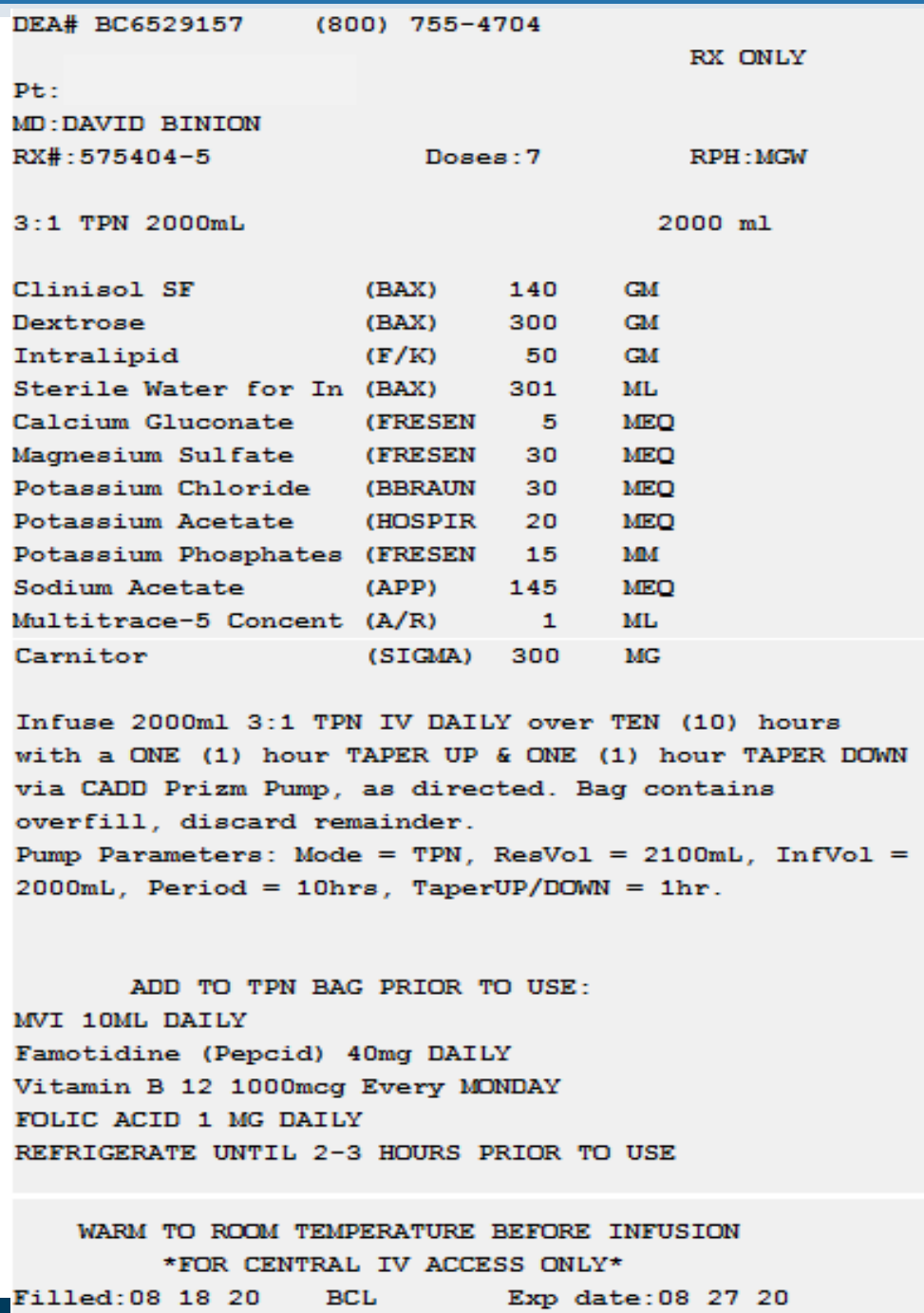
TPN Product Label

Product label to be reviewed with each dose or bag change.

Pump settings to be reviewed on the pump with each dose or bag change.

Product label components to review:

- Patient name
- Ordering provider
- Medication name and dose in bag or cassette
- Administration instructions / Pump parameters
- TPN additives
- Storage & warming instructions
- Expiration date



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DEA# BC6529157     (800) 755-4704
                                                    RX ONLY
Pt:
MD:DAVID BINION
RX#:575404-5                 Doses:7            RPH:MGW

3:1 TPN 2000mL                                  2000 ml

Clinisol SF              (BAX)     140     GM
Dextrose                 (BAX)     300     GM
Intralipid               (F/K)      50     GM
Sterile Water for In     (BAX)     301     ML
Calcium Gluconate        (FRESEN     5     MEQ
Magnesium Sulfate        (FRESEN    30     MEQ
Potassium Chloride       (BBRAUN    30     MEQ
Potassium Acetate        (HOSPIR    20     MEQ
Potassium Phosphates     (FRESEN    15     MM
Sodium Acetate           (APP)     145     MEQ
Multitrace-5 Concent     (A/R)       1     ML
Carnitor                 (SIGMA)   300     MG

Infuse 2000ml 3:1 TPN IV DAILY over TEN (10) hours
with a ONE (1) hour TAPER UP & ONE (1) hour TAPER DOWN
via CADD Prizm Pump, as directed. Bag contains
overfill, discard remainder.
Pump Parameters: Mode = TPN, ResVol = 2100mL, InfVol =
2000mL, Period = 10hrs, TaperUP/DOWN = 1hr.


       ADD TO TPN BAG PRIOR TO USE:
MVI 10ML DAILY
Famotidine (Pepcid) 40mg DAILY
Vitamin B 12 1000mcg Every MONDAY
FOLIC ACID 1 MG DAILY
REFRIGERATE UNTIL 2-3 HOURS PRIOR TO USE

    WARM TO ROOM TEMPERATURE BEFORE INFUSION
         *FOR CENTRAL IV ACCESS ONLY*
Filled:08 18 20     BCL        Exp date:08 27 20
```

Parenteral Nutrition Home Order Form

CHARTWELL

Name: Doe, Jane D.O.B. : 05/31/1961 Chartwell I.D. 099999
Address: 1001 Oakdale Road
Oakdale, PA, 15071
Allergies: Vancomycin, Heparin, Interferons, Barium Compounds, Remicade, IV Iron, IV Dye, Sulfites, IV Potassium
Diagnosis: Crohns

TPN Therapy to Infuse Seven (7) day('s)/week

☐ Initial Home Order ☐ Renew Current TPN Formula ☐ Change TPN Formula

Indication: Crohns Dosing Wt (kg): 82.0 Ht (cm): 162.6

Volume/Rate Infusion
- (•) Total Volume of 1100 ml/day
- ( ) Continuous over 24 hours
- (•) Cycle over 12 hours Taper Up: 1 hour Taper Down: 1 hour

Base Solution:
- (•) CENTRAL — Dextrose 50 gm per BAG (170 kcal) — Amino Acids 75 gm per BAG (300 kcal)
- ( ) PERIPHERAL (can be infused through peripheral vein) — Dextrose ____ gm per BAG — Amino Acids ____ gm per BAG

Lipid Emulsion 20% (2 kcal/ml) (2 in 1 MUST be filtered with a 0.22 micron filter)
- (•) NONE
- ( ) 3 in 1 (3 in 1 Must be filtered with a 1.2 micron filter) Conventional (Intralipids 20%)
  - (•) 100 ml (20 grams) ( ) 250 ml (50 grams) ( ) Other ____ ml per bag

Protein Dose = 0.9 gm/kg
2:1 provides:470 kcal (total)/5.7 kcal/kg

Frequency: (•) Daily ( ) M / W / F ( ) M / TH ( ) Every Other Day ( ) Lipid Therapy to Infuse Pick One day('s)/7day('s)

ALL ADDITIVES ARE PER BAG

Electrolytes

			Average Adult Requirements Per 24hrs	Electrolytes per Current Solution
Calcium Gluconate		mEq (4.65 mEq = 1gm)	Sodium	60-150 mEq	80.7 mEq
Magnesium Sulfate	32	mEq (8 mEq = 1 gm)	Potassium	60-150 mEq	70 mEq
Potassium Chloride		mEq	Phosphorus	20-45 mMoles	8 mMol
Potassium Acetate	70	mEq	Magnesium	10-15 mEq	32 mEq
Potassium Phosphate		mMol (3mM of PO4 contains 4.4mEq K)	Calcium	10-20 mEq	0 mEq
Sodium Chloride		mEq			
Sodium Acetate	70	mEq	Ratio = 1 (Chloride) : 6.9 (Acetate)		
Sodium Phosphate	8	mMol (3mM of PO4 contains 4mEq Na)			

Other Additives

Standard Multivitamins	1 amp (10ml)	☑ Zinc	5 mg	☑ L-Carnitine	200 mg
Standard Trace Elements (MTE-5 Conc 1ml)		☐ Selenium	mcg	☐ Phytonadione (Vitamin K1)	mg Select Frequency
Thiamine 100 mg		☐ Chromium	mcg	☐ Heparin	Units
Folic Acid 1 mg		☐ Copper	mg	☐ Other	
Famotidine	mg	☐ Manganese	mg	☐ Other	
Regular Insulin	Units			☐ Other	

Monitoring

- ☑ Panel 1: Glucose, Sodium, Potassium, Chloride, CO2, BUN, Creatinine, Calcium, Phosphorous, Magnesium
- ☑ Panel 2: Protime, Triglyceride, Total Bilirubin, Alkaline Phosphatase, GGTP, AST, ALT, Albumin, CBC, Diff, Platelets
- ☐ Micro-Nutrient Panel: Manganese, Copper, Chromium, Selenium, Carnitine Battery, Ceruloplasmin, Vitamin A, Zinc, Vitamin D (25 OH D3), Vitamin B12, Folic Acid, Vitamin C, & Vitamin E
- ☑ Other: crp, prealbumin

Date: December 12, 2019 Date: December 12, 2019 Date: December 12, 2019

Additional Orders

☐ Lock Therapy:

12/3/2019 Use/change ethanol cpas and contiue use of chloraprep pads per protocol as indtructed by Dr. Binion
12/3/2019 Ethanol 70% 1.5ml locks to lumen while not in use
12/3/2019 Give LR 1L IV daily as needed vis gravity over 4 hours (rate 250 ml/hr)
NOTE: Dextrose concentration < 5%, watch total CA+ Phos per liter

Signature: ____ Date: ____

CHARTWELL

2:1 TPN Formula

Plan of Treatment/Certificate of Medical Necessity

Team 5 **Unbundled**

Name: Doe, Jane D.O.B. : 05/31/1961 Chartwell I.D. 099999 Ht: 64 inch Wt: 82 kg Date: 00-
Address: 1001 Oakdale Road, Oakdale, PA, 15071 Ordering Physician: David Binion MD
Diagnosis: Crohns Physician's Phone / Fax: 412-647-8666 / 4126
Allergies: Vancomycin, Heparin, Interferons, Barium Compounds, Remicade, IV Iron, IV Dye, Sulfites, IV Potassium
Nursing Agency: UPMC IV Team
Agency's Telephone: 412-653-8200, Fax: 412-653-8695

Infusion Parameters:
Patient to receive 7 Days Of Total Parenteral Nutrition
Administer 2:1 Formulation 7day('s)/7day('s)
Infusion Volume: 1100 ml

Infusion Period: 12 Hours via Rate-Controlled Infusion Pump
Taper Up: 1 hour & Taper Down: 1 hour

Additives (per bag):
Dextrose 70% Solution 71.4 ml (50 Gm)
Amino Acid (Travasol 10%) Solution 750 ml (75 Gm)

Magnesium Sulfate 32 mEq
Potassium Acetate 70 mEq
Sodium Acetate 70 mEq
Sodium Phosphate 8 mMol (10.7 mEq)

MTE-5 Conc 1 ml
L-Carnitine 200 mg
Zinc 5 mg

Totals
Sodium: 80.7 mEq Potassium: 70 mEq
Chloride: 30 mEq Acetate: 206 mEq
Ratio = 1 (Chloride) : 6.9 (Acetate)

Patient Additives:
Multivitamin (Infuvite) 10 ml daily

Catheter Care: Triple Lumen PICC
5 to 10 ml 0.9% NaCl before/after therapy & PRN
5 ml Heparin 10 units/ml after final saline flush & PRN

Laboratory: Flush with 10-20ml Saline before and after labs

December 12, 2019 Panel 1: Glucose, Sodium, Potassium, Chloride, CO2, BUN, Creatinine, CALCIUM, PHOSPHORUS, MAGNESIUM **VERIFY THAT ALL TEST ARE INCLUDED**

December 12, 2019 Panel 2: Protime, Triglyceride, Total Bilirubin, Alkaline Phosphatase, GGTP, AST, ALT, Albumin, CBC, Diff, Platelets

December 12, 2019 crp, prealbumin

MD:DAVID BINION
RX#:446682-B Items:7 RPH:BCL

2:1 TPN 1100 mL 1100 ml

Travasol	(BRX)	75	GM
Dextrose	(BRX)	50	GM
Sterile Water for In	(BRX)	208	ML
Magnesium Sulfate	(APP)	32	MEQ
Potassium Acetate	(HOSPIR	70	MEQ
Sodium Acetate	(APP)	70	MEQ
Sodium Phosphate	(HOSPIR	8	MM
Multitrace-5 Concent	(R/R)	1	ML
Carnitor	(SIGMA)	200	MG
Zinc Trace Metal	(HOSPIR	5	MG

Infuse 2:1 TPN 1100 mL IV DAILY over TWELVE (12) with a ONE (1) hour taper up and down via Cadd pump as directed. Bag Contains overfill.
Pump Parameters: TPN mode, ResVol=1150ml, InfVol

ADD TO TPN BAG PRIOR TO USE:
MVI 10ML DAILY

REFRIGERATE UNTIL 2-3 HOURS PRIOR TO USE

CAUTION: Parameter Change review pump setting before use

First Pharmacist's Signature

Second Pharmacist's Signature

I certify that the use of this indicated medication, equipment, & is necessary and I will be supervising this patient's treatment. Initial/re-certification. It will reduce the length of stay for inpat of delay or avert an otherwise medically necessary hospital ad

Physician Signature

Prescription For Home Infusion/Certification of Medical Necessity

CHARTWELL

Unbundled

Team 5

Diagnosis: Crohns General Prescription
Name: Doe, Jane D.O.B. : 05/31/1961 Chartwell I.D. 099999 Date: 01/00/00
Address: 1001 Oakdale Road Height: 64 inch
Oakdale, PA, 15071 Weight: 82 kg
Allergies: Vancomycin, Heparin, Interferons, Barium Compounds, Remicade, IV Iron, IV Dye, Sulfites, IV Potassium

Patient: ____ New X Existing Prescription: ____ New X Order Change

TPN:

1.) 12/3/2019 Use/change ethanol cpas and continue use of chloraprep pads per protocol as instructed by Dr. Binion
2.) 12/3/2019 Ethanol 70% 1.5ml locks to lumen while not in use
3.) 12/3/2019 Give LR 1L IV daily as needed vis gravity over 4 hours (rate 250 ml/hr)
4.) NOTE: Dextrose concentration < 5%, with total CA+ Phos per liter
5.)

Access: ____ Peripheral X PICC/Long ____ Hickman ____ CVP ____ Port
____ Midline ____ Broviac ____ Groshong ____ Subclavian ____ Other
____ Single ____ Double X Triple

Catheter Care:
Normal Saline 5 to 10 ml flush ____ time(s) day X Before ____ In Between X After
Heparin Flush 5 ml flush 10 units/ml (as directed) time(s)/day ____ times(s)/month

Laboratory:
12/12/19 Panel 1: Glucose, Sodium, Potassium, Chloride, CO2, BUN, Creatinine, CALCIUM, PHOSPHORUS, MAGNESIUM **VERIFY THAT ALL TEST ARE INCLUDED**
12/12/19 crp, prealbumin
12/12/19 Panel 2: Protime, Triglyceride, Total Bilirubin, Alkaline Phosphatase, GGTP, AST, ALT, Albumin, CBC, Diff, Platelets

Report To: David Binion MD Fax Number: 4126475151 / (412) 920-2870

Expected Duration of Therapy: Indefinitely
Orders Given By: 0
Nursing Agency: UPMC IV Team
Substitution Permitted: X Yes No

This P.O.T. reflects continuation of care

Physician Check: Weekly/Lab Results
Telephone: 412-647-8666
Phone / Fax: 412-653-8200 / 412-653-8695
David Binion MD
Prescribing Physician
412-647-8666
Telephone Number
Pharmacist Signature

I certify that the use of the indicated medication, equipment, and supplies is necessary and I will be supervising this patient's treatment. This is an initial/re-certification. It will reduce the length of stay for inpatient care or delay or avert an otherwise medically necessary hospital admission.

(Signature) MD (Date) DEA

TPN PLAN OF TREATMENT IS 3 PAGES

Patient Additives

Always maintain aseptic technique.

Some medications are added to the PN solution at time of administration due to decreased stability.

- The bag of TPN will expire 24 hours after the additives are placed in the TPN bag.

Examples of common additives include, but are not limited to:

- ❖ Insulin
- ❖ Famotidine
- ❖ Heparin
- ❖ Vitamins (exp. Multivitamin, folic acid & vitamin B12)

When introducing additives, use strict aseptic technique to avoid antimicrobial contamination

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TPN PLACEMAT

WHEN IT IS TIME TO INFUSE:

1. Remove TPN bag from refrigerator 2-3 hours before infusing.

*Double check label(s) on bag(s) for correct name and date.

2. Clean work area with disinfectant wipe.
3. Gather equipment on mat.
4. Wash hands for 30 seconds with soap and water.
5. Prepare flushes, syringes, additives, and have several alcohol wipes nearby per your teaching sheet.
6. Have a sharps container readily available for used syringes.
7. Please follow your PATIENT TEACHING SHEET for step-by-step instructions on how to administer your TPN.

STOP

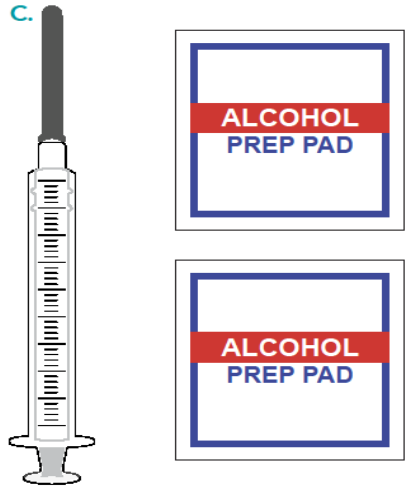
***BEFORE** injecting any additives or medications in the TPN bag ports, be sure to scrub the hub, (top) of the injection bag port, with a new alcohol wipe for 30 seconds and let air dry for 60 seconds.*

This step must be completed TWICE.

C. ADDITIVES

You may not have all the supplies displayed on this placemat due to your individualized treatment. Please refer to your supply list and prescription.

C.

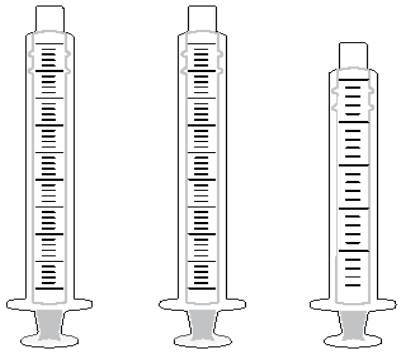


Remember to always use the SASH Flush Procedure

S	**Sodium Chloride**
A	**Administer TPN**
S	**Sodium Chloride**
H	**Heparin or other lock therapy if ordered**

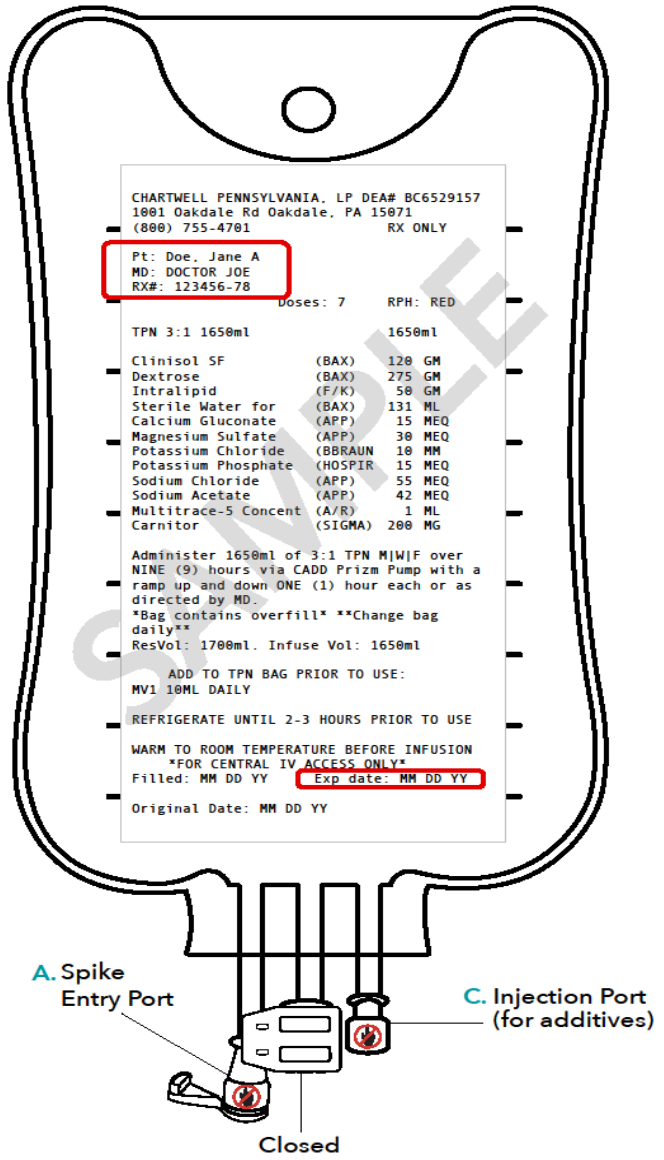
Follow Plan of Treatment for dosing instructions

Sodium Chloride/ Heparin Syringes



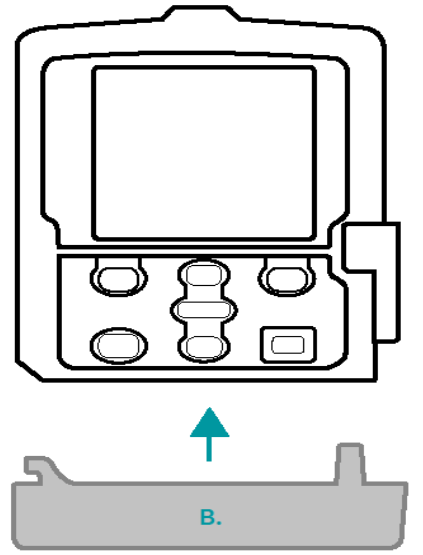
TPN Bag

Double check label(s) on bag(s) for correct name and date.

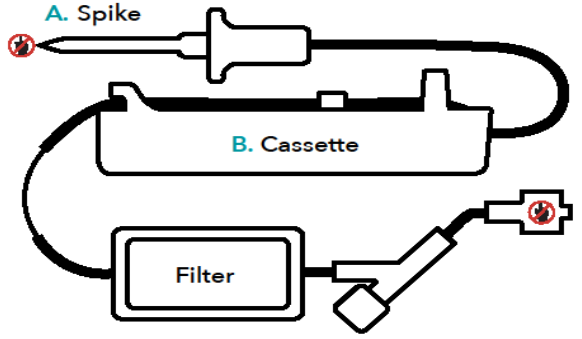


NEVER TOUCH THE TIP OF ANY SYRINGE or PORT. If touched, discard syringe or disinfect port.

CADD Pump



CADD Pump Tubing



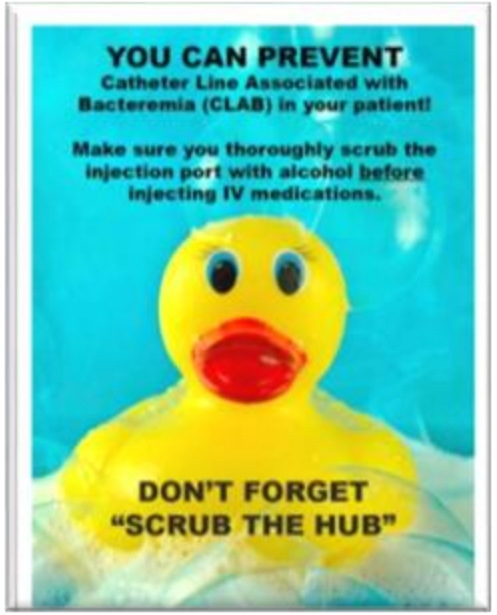
*Note: You will also have a CADD battery power pack (not shown) with your delivery.

Available 24/7 at 1-800-755-4704 with any questions or concerns.

Preventing CABSI
Scrub the Hub for 30 seconds!

"Hub scrub" for 30 seconds using alcohol and friction in a twisting motion.

Allow to dry for 60 seconds



TPN patients:

30 second scrub

x2 prior to TPN procedure

with a 60 second air dry between scrubs

The Catheter Hub is a known source of line related bloodstream infections (CABSI).

The CDC recommendations are to "SCRUB" rather than "WIPE" the hub with alcohol or chlorhexadine before accessing.

SCRUB THE HUB before each use. S.A.S.H requires cleaning the HUB 4 times with 4 new anapestic wipes, one for each IV-line access.

Teach the patient scrupulous Hand Hygiene and maintaining aseptic technique.

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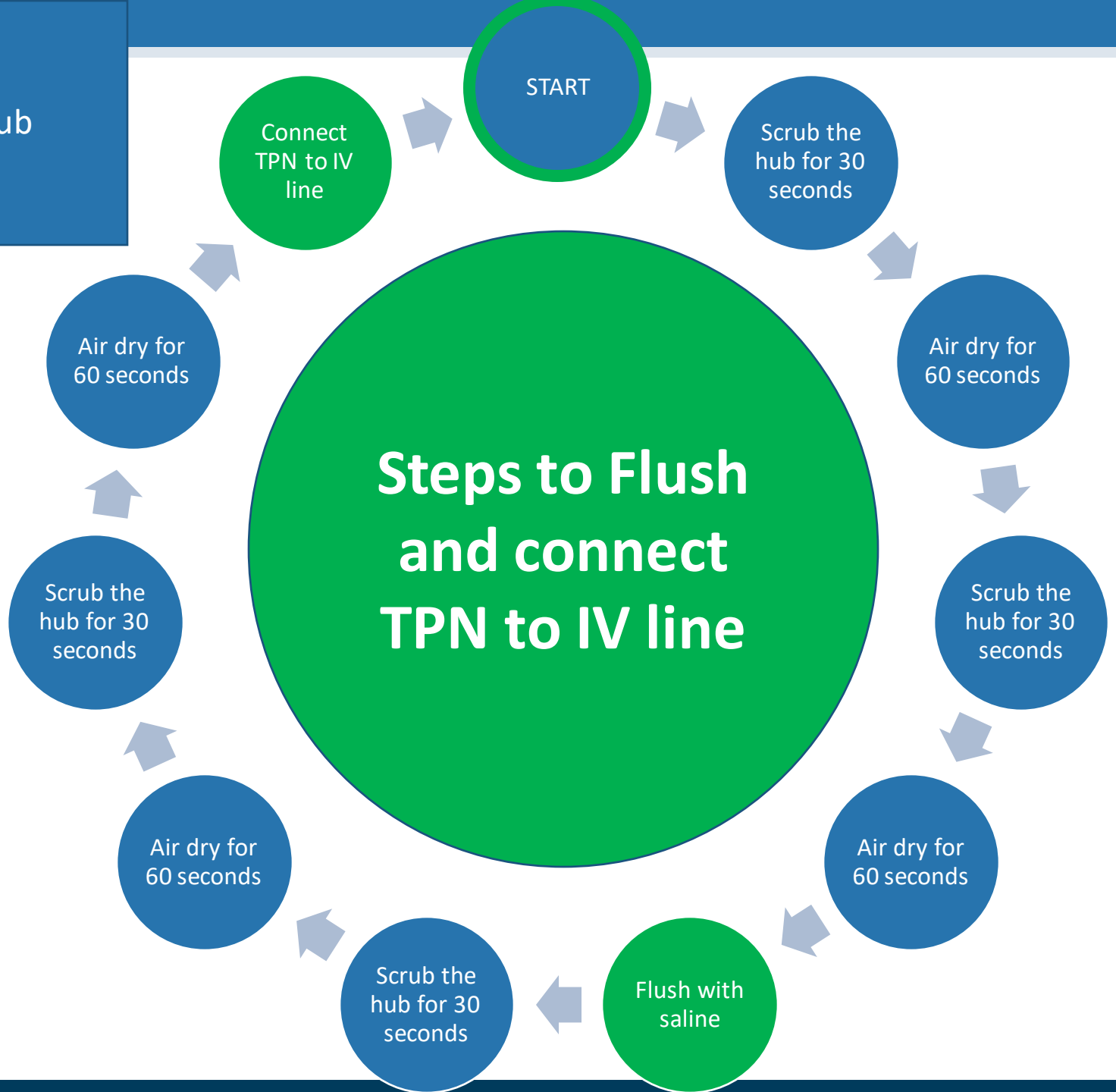
Double Scrub the Hub



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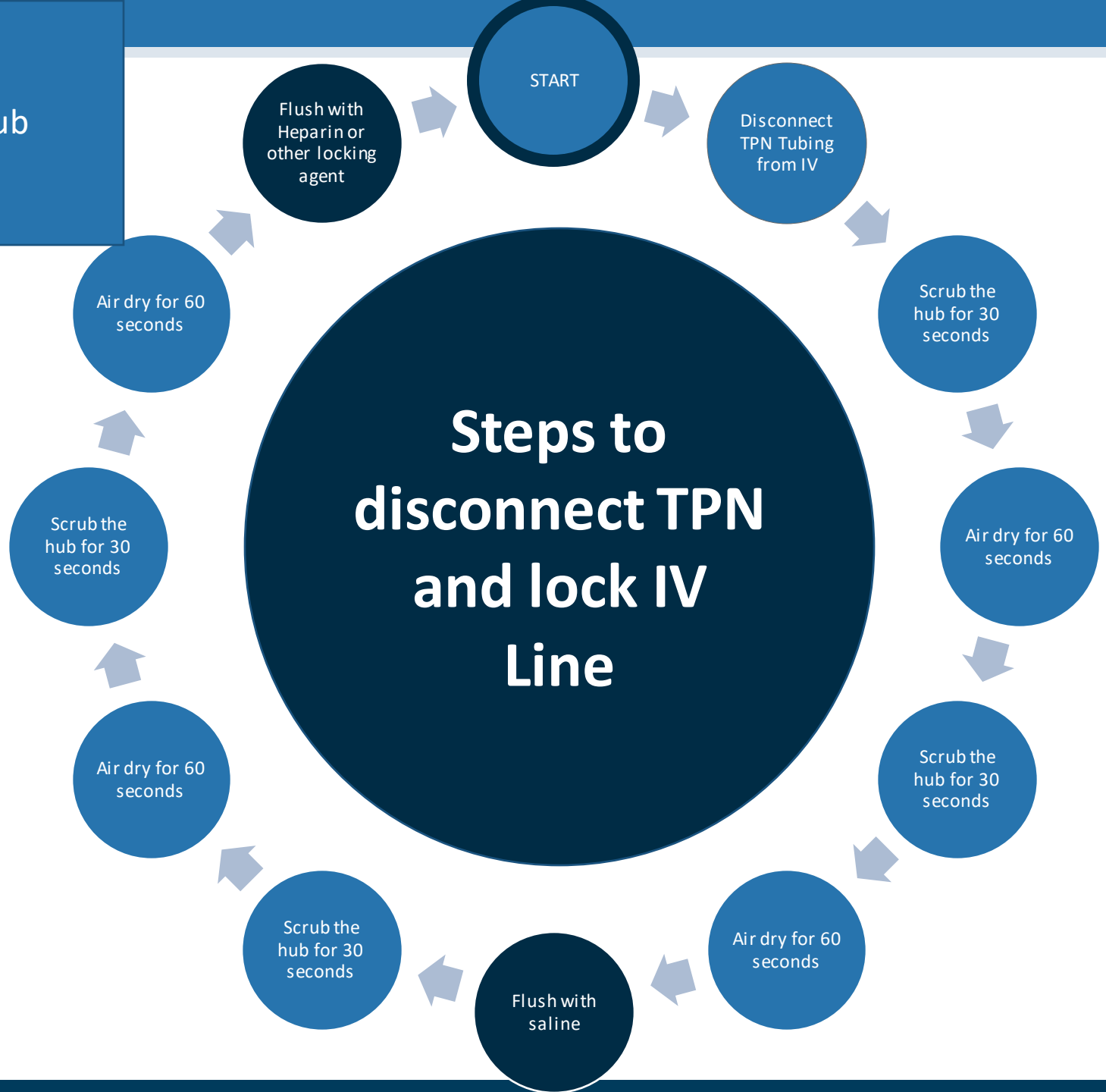
Double Scrub the Hub



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TPN Complications

Metabolic Complications

Glucose Metabolism

Why we taper up and down.

Hyperglycemia from rapid infusion of glucose & hypoglycemia with abruptly stopping.

Hepatic Dysfunction

•Why we monitor LFTs & cycle TPN.

•Cycling the TPN & lowering glucose concentration gives the liver time to rest .

•Fatty Liver from excessive carbohydrates consumption,. Cholecystitis from static bile in the gall bladder from disuse of the GI tract .

Refeeding Syndrome

•Occurs when TPN is started on a malnourished patient and increased insulin production results in the update of electrolytes, (primarily phosphate. Monitor LFTs.

•Symptoms include rhabomyolsis, respiratory failure, arrhythmias, cardiac failure, seizures and coma.

Metabolic Bone Disease

Decreased bond density resulting in bone pain, osteopenia and fractures. Detected by elevated serum calcium, excessive calcium and phosphorus in urine and low serum vitamin D.

Monitor serum calcium and urine calcium & phosphorus.

Catheter Related Complications

Catheter Occlusion

Causes are poor flushing technique, non-compliance, fibrin sheath formation, venous thrombosis and precipitate formation from medications or lipid residue.

Treatment may include: Re-education to the care giver to proper flushing technique and line care. Use o thrombolytics (CathFlo), 70% ethanol locks or line replacement

Sepsis

Lipids and high dextrose concentration support the growth of broad range of organisms.

Hyperosmolar formula may cause inflammation and thrombosis within the vein forming a biofilm at end of the central line, supporting organism growth.

Sepsis is the most serious and challenging complication.

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SASH Method

1 . Follow physician orders on POT for flushing volumes.

Patients are **NOT** taught to check for a blood return.

Flush using **Push Pause Method.**

Flush all lumens with adequate amount of saline or heparin to **ensure patency.**

After lab draws flush with 10-20mls of saline to clear the line.

2. Flush before AND after every dose of medication.

- **S – Flush the device with sterile Saline**
- **A – Administer the medication / draw blood work**
- **S – Flush the device with Sterile Saline**
- **H – Flush the device with Heparin**

3. Unused lumens to be flushed daily with heparin only (no saline).

Line Locking

To prevent CABSI and maintain line patency.

Not to be administered systemically.

- Always withdrawal lock solution before flushing line with Saline.
- If multiple caregivers, label the catheter: “DO NOT USE-LineLock” to prevent systemic administration (flushing of lock solution).

Allow lock solution to dwell for a period specified by the physician order.

Antibiotic lock therapy:

- Goal of sterilizing the catheter lumen
- Instilling high concentrations of antibiotics into the catheter lumen for extended periods of time

Ethanol lock therapy:

- Goal of sterilizing of the catheter lumen
- IV line must be made of silicone, other materials may deteriorate.

Common locking solutions:

Vancomycin
Gentamycin
Ciprofloxin
High dose Heparin

Alcohol Caps

Cap to cover the Microclave cap (hub/connector).

Cap with alcohol-soaked sponge to cleans hub.

Cap is left in place between IV-line access.

Reduces risk of CLABSI from hub contamination

- **Must continue to scrub the hub!**
- **Single use only.**

Must scrub the hub for 30 seconds before EVERY IV hub access

Failure to scrub the hub will result in increased infection risk!

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Sapphire

CADD Solis

CADD Prizm

- ✓VOLUME TO BE INFUSED
- ✓RATE OF INFUSION
- ✓TAPER UP TIME
- ✓TAPER DOWN TIME
- ✓INFUSION PERIOD

Pump Batteries & Charging

- Rechargeable battery – charge pump 6 hour each day.
- Can charge while in use.

Sapphire

- 4 – AA batteries or Rechargeable battery – charge pump 4 hours each day with AC adaptor.

CADD Solis

- 9V battery or External Powerpack with **9V battery** – charge powerpack 7 hours each day with AC adaptor.

CADD Prizm

Pump Parameter Changes

The pharmacy will either:

- Send a new pump to the patient programmed with the new parameters.
- Call the patient to talk through the pump changes, with a read back process for confirming the pump settings.

The role of the home nurse is to confirm the pump the patient is using is programmed with the correct settings.

CarepathRx Contacts:

nursingsupport@homeinfusion.com

Christie Fisher MSN, MBA, RN, CRNI, IgCN
National Director, Nursing
Cell: 412-295-7849

Thank you for participating!

Please reach out with questions or for information on additional training opportunities.

CADD Solis

Tubing change

- Daily

Allow medication to warm to room temperature for 4-6 hours, as noted on the Plan of Treatment.

Always power up before attaching tubing cassette

- Listen for series of beeps and self-check before attaching the tubing cassette.
- This will prompt "Reset RES VOL?"
- Attaching tubing cassette before power up will result in pump not prompting user with "Reset RES VOL?"

Powered by Battery

- 4 – AA Batteries
  - Remove batteries between infusions
  - Replace batteries when:
    - Low Battery
    - Depleted battery
- Rechargeable Battery
  - Plug in pump for a minimum of 4 hours each day, to maintain battery charge.

Always prime on its side, with the lever side down to prevent "Air In Line" alarms

Sapphire Pump

Tubing change

- Daily

Allow medication to warm to room temperature for 4-6 hours, as noted on the of Treatment.

Powered Internal Rechargeable Battery

- Plug in pump for 6 hours each day to fully charge rechargeable battery
- External Power Pack with 6 – AA batteries for emergency use.
- Passcode: 8880

Click: Repeat Infusion

- Do not select: Start New Infusion

Click: Screen Lock

- Do not select: Patient Lock Out

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Pump will be delivered programed with the patient's orders.

Always confirm pump setting against orders prior to starting the pump

CADD Prizm

Tubing change

- Daily – with each dose.

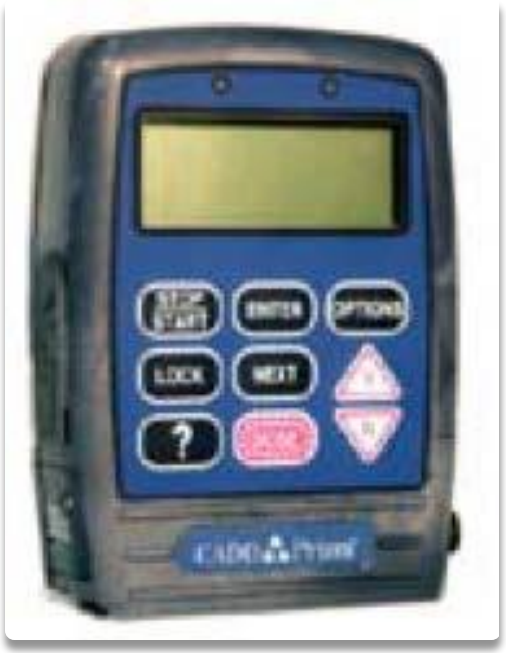
Allow medication to warm to room temperature for 4-6 hours, as noted on the Plan of Treatment.

Powered by 1 9-volt battery AND PowerPack

- External power pack is used with the 9-volt battery in the pump
- Power pack should be charged 7 hours each day.
- Power pack requires monthly maintenance.

Always power up before attaching tubing cassette

- Listen for series of beeps and self check before attaching the tubing cassette
- This will prompt "Reset RES VOL?"



Video link to TPN training

TPN in the Home (RNs):
https://www.youtube.com/watch?v=YlgrCEtvlLw

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Eitan Medical Sapphire Pump

Sapphire Pump

Tubing change

- Intermittent – every 24 hours
- Continuous – Mondays, Wednesdays and Fridays only

Allow medication to warm to room temperature for 2-4 hours, as noted on the Plan o Treatment.

Powered Internal Rechargeable Battery

- Plug in pump for 6 hours each day to fully charge rechargeable battery
- External Power Pack with 6 – AA batteries for emergency use.

Passcode: 8880

Click: Repeat Infusion

- Do not select: Start New Infusion

Click: Screen Lock

- Do not select: Patient Lock Out

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Sapphire Pump Overview

Pump programming Code: 7770

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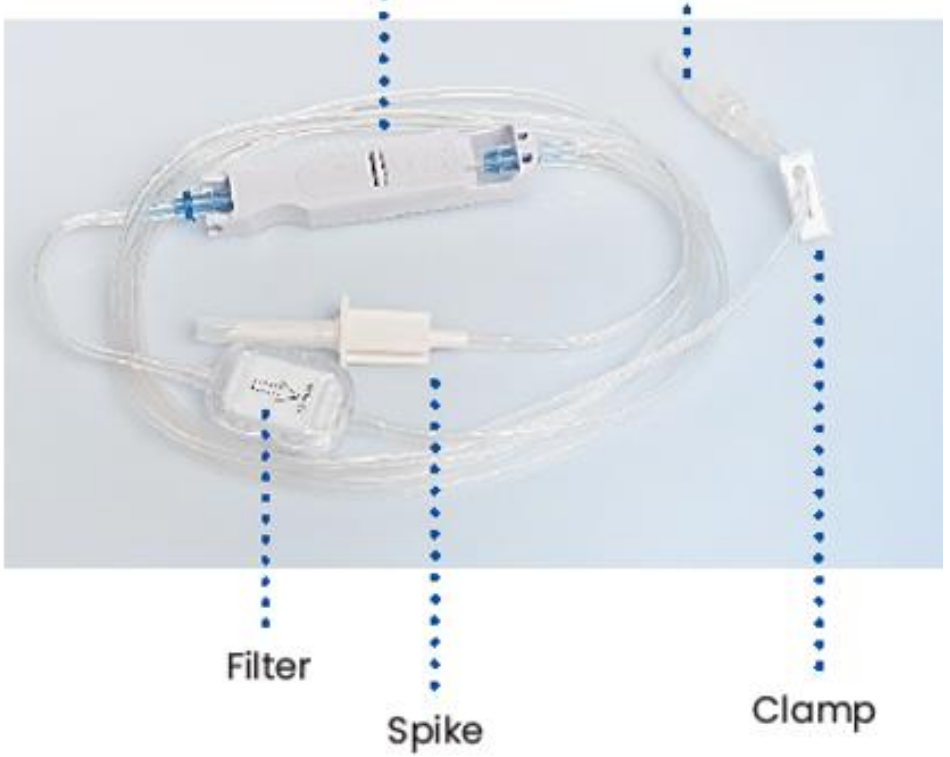
DELIVERY MODES

- PCA Delivery Mode
- Continuous Delivery Mode
- Intermittent Delivery Mode
- Multistep Delivery Mode
- TPN Delivery Mode
- Epidural Delivery Mode

Sapphire Pump Tubing Set

There are different types of tubing sets. The tubing set you are using may have some or all of these parts.



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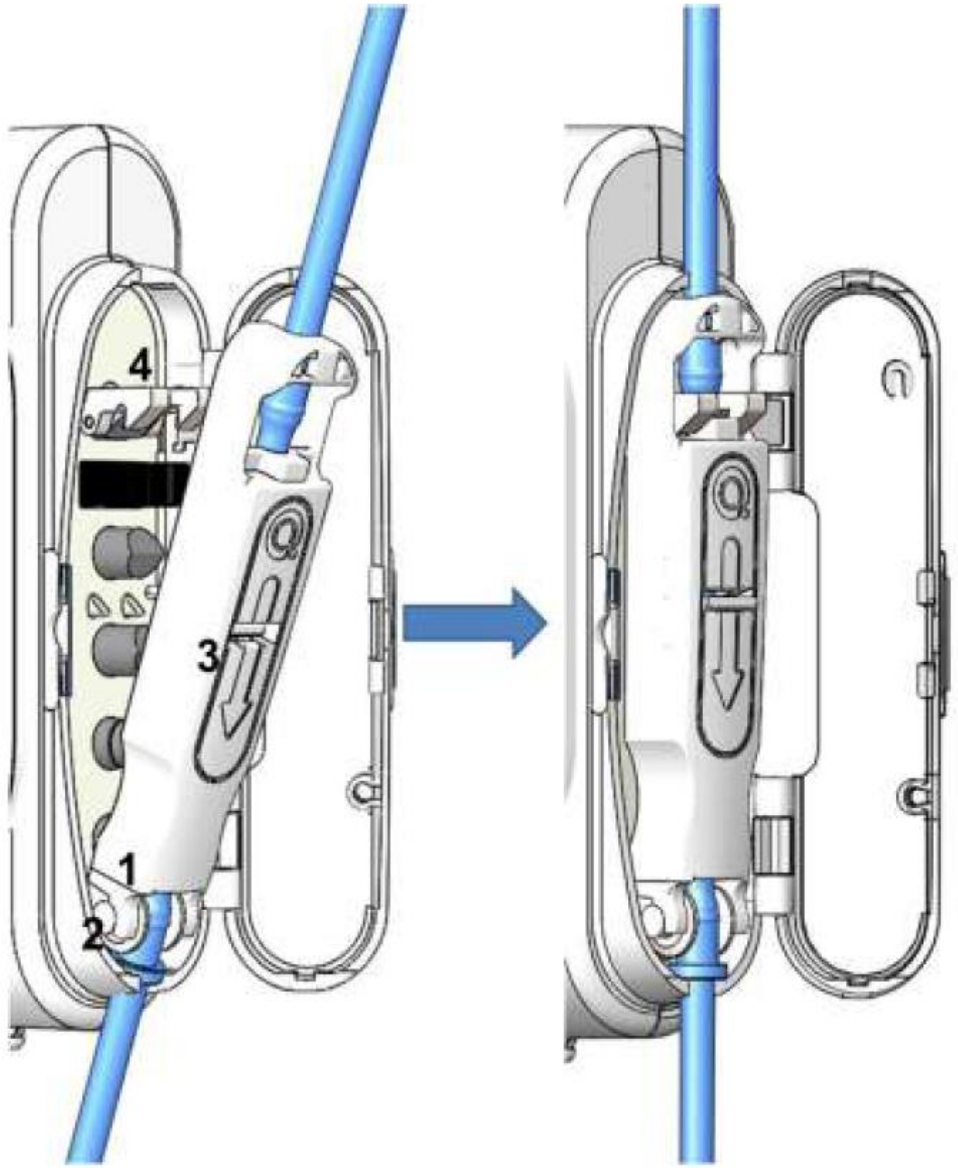

- Open the safety door. Then, insert the administration cassette at an angle, by placing the saddle (Figure #1) on the round metal anchor (#2) in the cassette's housing. Make sure that the arrow on the cassette (#3) is pointing toward the bottom of the pump, and the bottom flange is inside the cassette housing.

- Clip the upper end of the administration cassette into the metal lock (Figure #4).

- Close the safety door over the administration cassette. Ensure that the safety door clicks upon closure.

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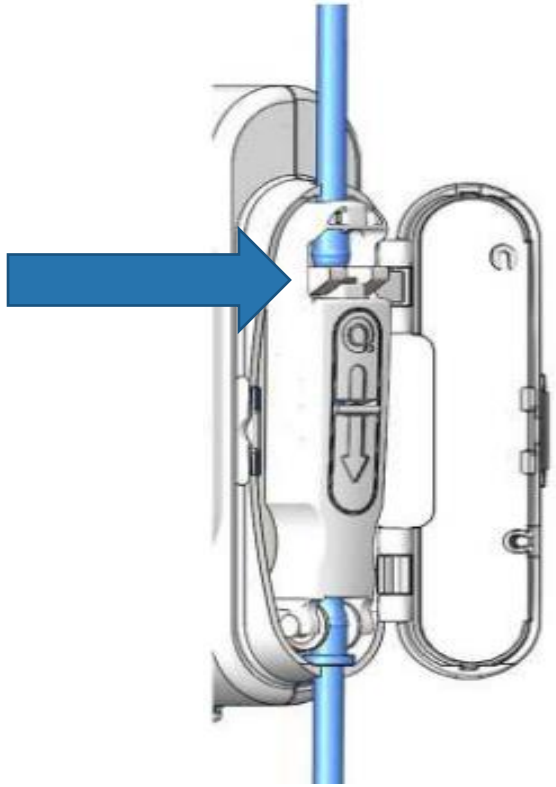
TO REMOVE CASSETTE

Disconnect administration set from the patient, close the clamps and remove administration cassette by raising the metal lock that secures it to the pump



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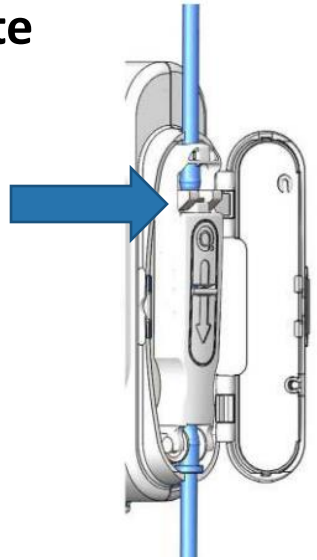
Sapphire Pump

STOP THE PUMP

Press **STOP**

TO REMOVE CASSETTE

Disconnect administration set from the patient, close the clamps and remove administration cassette by raising the metal lock that secures it to the pump



TURN OFF PUMP

To turn pump off, press and hold ON/OFF button for 5 seconds

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Sapphire Pump

Powered by an Internal Rechargeable Battery

- Plug in pump for 6 hours each day to fully charge rechargeable battery

External Battery Pack with 6 – AA batteries for emergency use.

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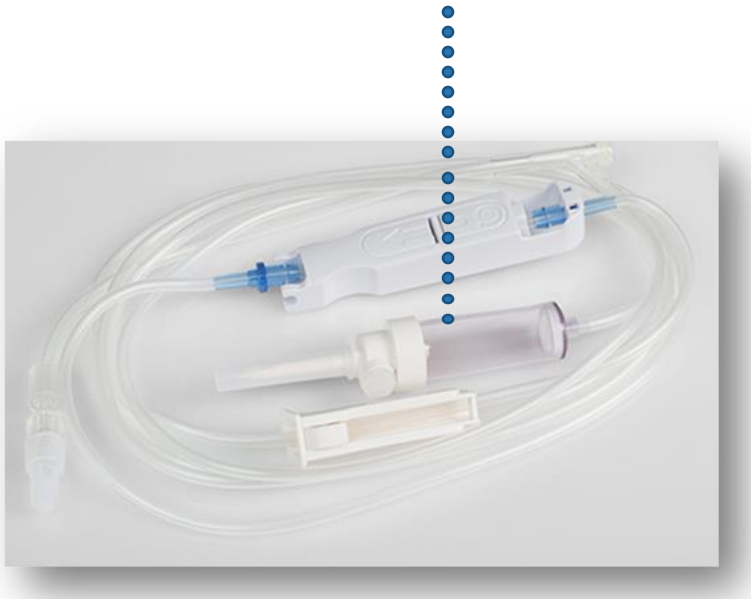
Sapphire Pump Tubing

Vented/Non-vented drip chamber



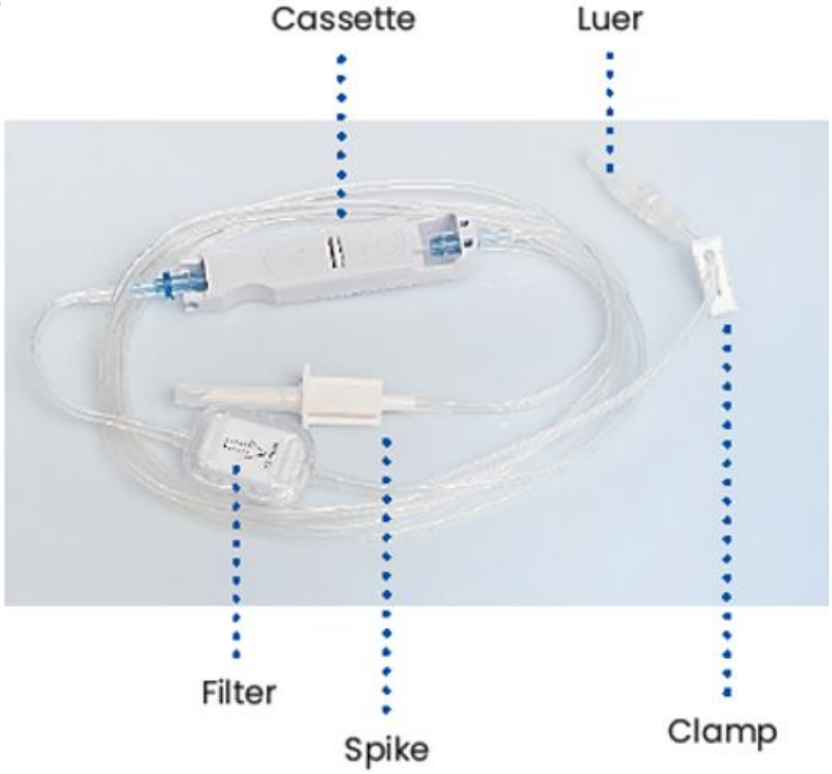
AVAILABLE SETS

Infusion set with non-vented spike, 1.2µ filter and needleless y-site

Microbore with non-vented spike, 0.2µ filter and needleless y-site

Microbore with non-vented spike

Primary infusion set with vented/non-vented drip chamber, back check valve and 2 needleless y-site



Tubing may contain some or all of these components

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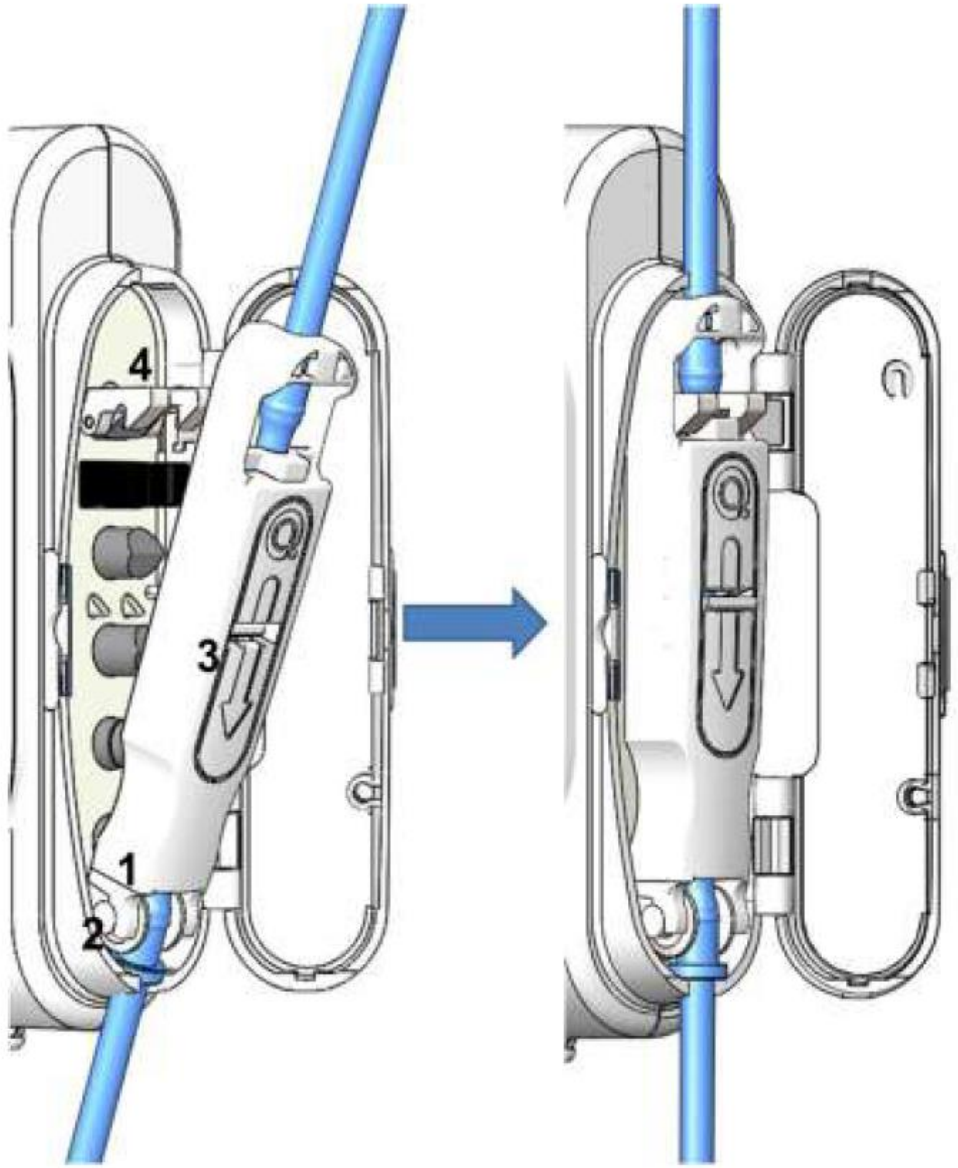

- Open the safety door. Then, insert the administration cassette at an angle, by placing the saddle (Figure #1) on the round metal anchor (#2) in the cassette's housing. Make sure that the arrow on the cassette (#3) is pointing toward the bottom of the pump, and the bottom flange is inside the cassette housing.

- Clip the upper end of the administration cassette into the metal lock (Figure #4).

- Close the safety door over the administration cassette. Ensure that the safety door clicks upon closure.

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Repeat Last Infusion

1. Select Repeat Last Infusion
2. Review and confirm the program
3. Prime the set
4. Press Start to start the infusion

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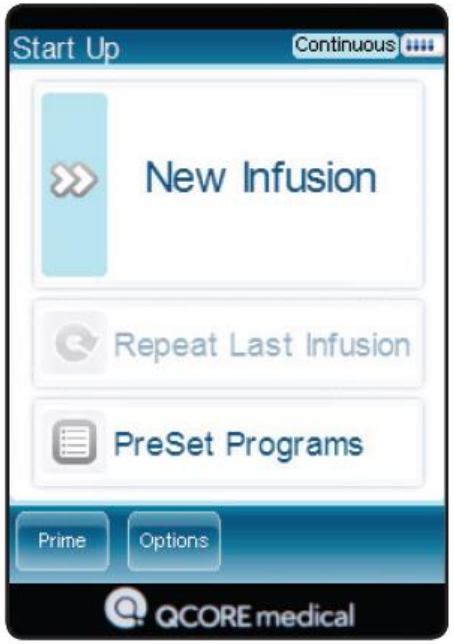
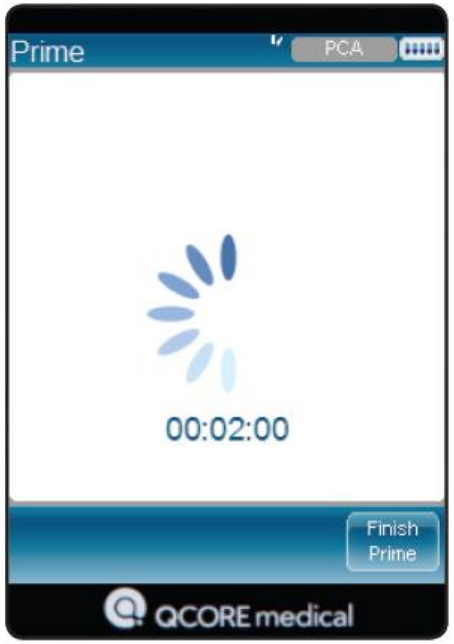
PRIMING THE SAPPHIRE SET



1. Before / after programming

2. Disconnect the set from the patient



3. Priming starts, countdown time is displayed

4. Prime ends., confirm with OK. Repeat until all air is discarded

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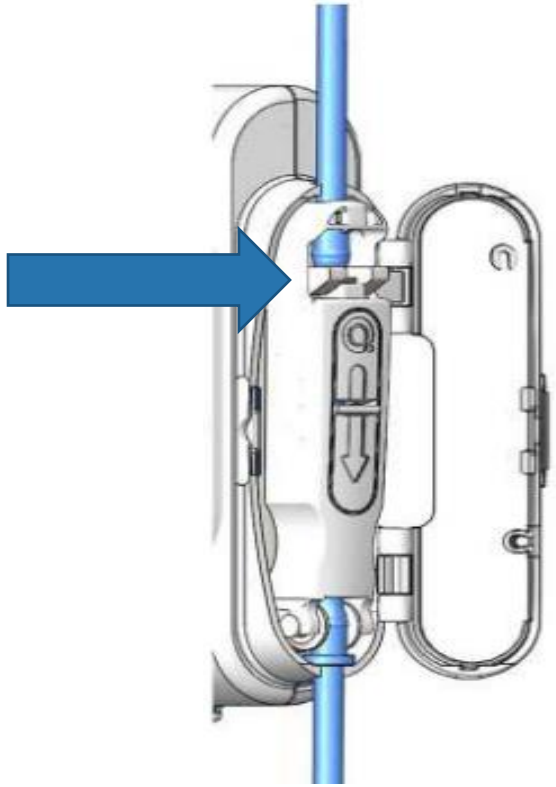
TO REMOVE CASSETTE

Disconnect administration set from the patient, close the clamps and remove administration cassette by raising the metal lock that secures it to the pump



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