

**POLICY AND PROCEDURE MANUAL  
PHARMACY SERVICES**

CODE: 5.10.0  
DATE: 12/21/84  
REVISED: 8/1/18, 4/19/22  
APPROVED: Thinh Tran, Pharm.D.

SECTION: **INTRAVENOUS ADMIXTURE PROGRAM**

SUBJECT: **TOTAL PARENTERAL NUTRITION**

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**II. PURPOSE**

To provide standard for prescribing, preparing, dispensing, administering, and patient monitoring of Total Parenteral Nutrition.

**IV. PROCEDURE**

**A. Total Parenteral Nutrition: Adult - Writing TPN Orders**

1. All privileged physician writes the order to start TPN/PPN on a TPN order form.
2. A designated TPN order form is used by the physician to specify the TPN or PPN components. See attachment (A & B)
3. This form must be completed each day by 1300 hour for same day delivery.
4. Orders are written as:
  - a. # mL Amino Acid/ 24 hours
  - b. # mL % Dextrose/ 24 hours
  - c. # mL lipid solution and % lipid
  - d. Total volume/ 24 hours
  - e. Electrolytes/ 24 hours
  - f. Trace elements/ 24 hours
  - g. Multivitamins/ 24 hours
  - h. Other Additives/ 24 hours
5. The TPN solution may be ordered as one of two standard solutions, or a custom formula may be ordered.
  - a. The volumes for macronutrients and additives, and infusion rates for two standard TPN solutions are available on the order form.
  - b. If a custom formula is ordered, then the volume of each macronutrient and additive, and the infusion rate must be specified.
6. The Pharmacist reviews the TPN order and enters the order onto the patient's electronic health record through PharmNet.
7. Dietitian consult is placed to monitor patient's daily requirements.

**B. Preparation of TPN Solutions**

1. Central Admixture Pharmacy Services, Inc (CAPS) is serviced to make all adult TPNs:
  - a. The pharmacist enters the order into CAPS order entry online.
  - b. The CAPS order must be placed by 1300 hour for same day delivery for 1900 hour daily.
  - c. Upon receipt, the pharmacist checks each bag for accuracy against the original order.
  - d. Parenteral nutrition solutions will be delivered to the nursing unit once final approval by pharmacist.

Approved By: *Ben Arndt*

2. The CAPS Pharmacy will supply a quarterly Quality Assurance Report that includes, but is not limited to:
  - e. Environmental Control (Particle Counts of their Laminar-Flow Hoods) and USP 797 standards (when applicable).
  - f. Particle Counts and Bioburden (Surface contamination and Air contamination inside the Laminar-Flow hoods preparation area)
  - g. Temperature Monitoring (Room, Refrigerators, Freezers, Incubators)
  - h. Certification / Equipment Calibration/Maintenance
  - i. Permits / Licensure
  - j. Validations of Personnel Aseptic Technique / Training
  - k. Compounding Process Sterility validation and Potency
  - l. End Product Testing

**D. Nursing Guideline for TPN**

1. Concentration
  - a. Solutions with a final concentration over 10% Dextrose must be infused through a central line.
  - b. Solutions with a final concentration of 10% Dextrose or lower may be infused through a peripheral line.
2. Dedicated TPN Infusion
  - a. Do not add any medications to the mixed TPN bottle.
  - b. Do not piggyback or push any medication into the TPN line except lipids.
  - c. Administer IVPB and push medications into another line.
  - d. Do not draw or administer blood from TPN line during therapy.
3. TPN Solution
  - a. Solution must be ordered daily.
  - b. Solution is dispensed in 24-hour bags.
  - c. Keep TPN solutions in the medication refrigerator until needed.
  - d. TPN bag/bottle must be changed every 24 hours.
  - e. Write date and time on bag/bottle label indicating when hung.
4. Tubing
  - a. Use regular primary IV tubing for TPN.
  - b. Change tubing used for TPN and lipids every 24 hours.
  - c. Use aseptic technique when changing tubing.
5. In-line Filter
  - a. 0.2 micron filter must be used on every TPN infusion.
  - b. Must be changed every 24 hours using aseptic technique.
6. Infusion Rate
  - a. Rate designated by the physician order
  - b. Maintain constant rate of infusion.
  - c. Additives may result in an increased fluid volume in the bag. Maintain ordered rate.
7. Vital Signs

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- a. Monitor vital signs at a minimum of every four (4) hours x 24 hours or as ordered.
8. Daily Weight
  - a. Weigh patient prior to starting therapy.
  - b. Weigh weekly while on TPN.
9. Intake & Output
  - a. Accurately monitor intake and output as ordered
  - b. Include any oral fluids.
10. Blood Glucose
  - a. Blood glucose is monitored every 4 hours x 24 hours during TPN or as ordered.
  - b. Notify physician if glucose above 250 mg/dL or below 70 mg/dL
11. If TPN is interrupted, dextrose 10 % may be temporarily infused at ordered rate to avoid hypoglycemia. TPN infusion should be resumed as soon as possible.

**F. Clinical Dietitian**

1. The Nutrition department will receive a list of patients receiving TPN and PPN each day.
2. Every patient on TPN or PPN is monitored by the dietitian.
  - a. A nutrition consult is ordered by the provider. The initial documentation in the patient's medical record will be completed within a timely manner of the TPN/PPN initiation.
  - b. Follow-up monitoring will be documented every three days or less, or more frequently as needed. All patients receiving parenteral nutrition are considered to be at high nutrition risk.
3. The dietitian's documentation will include an estimation of the patient's energy and protein needs, and a recommendation for the macronutrient goals for the solution. The dietitian may also include in her documentation recommendations for specific micronutrients as appropriate. She/he may also recommend specific lab tests, such as prealbumin and triglyceride levels.

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Attachment A. Parenteral Nutrition Initiation Order form

COUNTY OF LOS ANGELES DEPARTMENT OF HEALTH SERVICES  
**RANCHO LOS AMIGOS NATIONAL REHABILITATION CENTER**

Diagnosis: \_\_\_\_\_ Allergy: \_\_\_\_\_ Ht: \_\_\_\_\_ Wt: \_\_\_\_\_  
 Intravenous Access: \_\_\_\_\_ Peripheral / PICC / Central: Type: \_\_\_\_\_

**Yes**  
 Clinical Nutrition Consult - Parenteral Nutrition (PN)  
 Fasting Lipid panel, CMP, CBC with diff, Calcium, Magnesium, Phosphorus levels (baseline)  
 Triglyceride level 48 hours after Parenteral Nutrition is initiated date/time: \_\_\_\_\_

Choose one **PN Base Orders:**  
 **Central:**  D25% / Amino Acid 4.25% 1000 mL or  
 D \_\_\_\_\_ % / Amino Acid \_\_\_\_\_ % 1000 mL Justification: \_\_\_\_\_

**Electrolyte additives (per 1000 mL of base order)**  
 Choose one  **Standard**  **Special**

NaCl	10 mEq	_____ mEq
Na Acetate	30 mEq	_____ mEq
NaHPO4	---	_____ mM
KCl	20 mEq	_____ mEq
K Acetate	---	_____ mEq
KHPO4 (20mEq of K)	14 mM	(_____ mEq of K) mM
Magnesium Sulfate	8 mEq	_____ mEq
Ca Gluconate	5 mEq	_____ mEq

**Other Additives**  
 Choose one  **Standard**  **Special**

Multivitamins (per 24 hours)	10 mL	_____ mL
Trace Elements (per 24 hours)	1 mL	_____ mL

Plus  Folic Acid (per 24 hours) 1 mg or \_\_\_\_\_ mg  
 Thiamine (per 24 hours) 100 mg or \_\_\_\_\_ mg  
 Insulin \_\_\_\_\_ units/liter  
 Heparin \_\_\_\_\_ units/liter  
 Famotidine \_\_\_\_\_ units/liter

**Peripheral:** D10% / Amino Acid 4.25% 1000 mL (No Additional Additives)

Choose one **Infusion Rate mL/hour x 24 hours:**  
 60 (1440 mL/day)  80 (1920 mL/day)  100 (2400 mL/day)  \_\_\_\_\_ mL/hour  
**Fat Emulsion Order (20%) Note: Egg Allergy is a contraindication, may consider test dose**  
 Test dose lipid prior to administration at a rate of 0.1g/min over 30 min

Choose one  
 Central: Infuse 20 mL/hour over 12 hours ( ) Daily or ( ) twice weekly: Mon., Thurs.  
 Peripheral: Infuse 10 mL/hour over 24 hours daily

**Yes**  
 Vitamin K 10 mg I.M. today  
 Vitamin K 10 mg I.M. weekly while on PN start date: \_\_\_\_\_  
 Vitamin B-12 1000 mcg I.M. today  
 Vitamin B-12 1000 mcg I.M. monthly while on PN start date: \_\_\_\_\_  
 Infuse Dextrose 10% at same rate as PN solution if PN not available on time

**Yes**  
 **Nursing Orders**  
 Blood sugar and vital signs every 4 hours x 24 hours, notify Physician if glucose above 250 mg/dL or below 70 mg/dL or temperature above \_\_\_\_\_ or below \_\_\_\_\_  
 Weight today and weekly while on PN  
 Intake and output

Transmittal order for Dr. \_\_\_\_\_ via \_\_\_\_\_

Date	Time	Authorized agent of MD	Dictation #
Date	Time	MD Signature	Dictation #
Date	Time	Unit Clerk Signature	
Date	Time	RN Signature	
Date	Time	24-Hour Check RN Signature	

**(To be in Pharmacy by 1300 for same day 1900 delivery)**

PATIENT INFORMATION

MRUN

NAME

DOB/GENDER

**PHYSICIAN'S ORDERS - ADULT / ADOLESCENT PARENTERAL NUTRITION INITIATION ORDER**

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Attachment B. Parenteral Nutrition Maintenance Order form

COUNTY OF LOS ANGELES **RANCHO LOS AMIGOS NATIONAL REHABILITATION CENTER** DEPARTMENT OF HEALTH SERVICES

<p><b>Yes</b></p> <p><input checked="" type="checkbox"/> Parenteral Nutrition (PN) for date: _____</p> <p><input type="checkbox"/> Parenteral Nutrition for 3 days (Friday order only)</p> <p><input type="checkbox"/> Per Registered Dietician's recommendation(s) - and for item(s) marked below</p> <p>Choose one <b>PN Base Orders:</b></p> <p><input type="checkbox"/> <b>Central:</b> <input type="checkbox"/> D25% / Amino Acid 4.25% 1 L or <input type="checkbox"/> D_____ % / Amino Acid _____ % 1 L</p> <p>Justification: _____</p> <p><i>Electrolyte Additives (per 1000 mL of base order)</i></p> <p>Choose one</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:40%;"></td> <td style="width:30%; text-align: center;"><input type="checkbox"/> <b>Standard</b></td> <td style="width:30%; text-align: center;"><input type="checkbox"/> <b>Special</b></td> </tr> <tr> <td>Nacl</td> <td style="text-align: center;">10 mEq</td> <td style="text-align: center;">_____ mEq</td> </tr> <tr> <td>Na Acetate</td> <td style="text-align: center;">30 mEq</td> <td style="text-align: center;">_____ mEq</td> </tr> <tr> <td>NaHPO4</td> <td style="text-align: center;">---</td> <td style="text-align: center;">_____ mM</td> </tr> <tr> <td>KCl</td> <td style="text-align: center;">20 mEq</td> <td style="text-align: center;">_____ mEq</td> </tr> <tr> <td>K Acetate</td> <td style="text-align: center;">---</td> <td style="text-align: center;">_____ mEq</td> </tr> <tr> <td>KHPO4 (20mEq of K)</td> <td style="text-align: center;">14 mM</td> <td style="text-align: center;">( _____ mEq of K) mM</td> </tr> <tr> <td>Magnesium Sulfate</td> <td style="text-align: center;">8 mEq</td> <td style="text-align: center;">_____ mEq</td> </tr> <tr> <td>Ca Gluconate</td> <td style="text-align: center;">5 mEq</td> <td style="text-align: center;">_____ mEq</td> </tr> </table> <p><i>Other Additives</i></p> <p>Choose one</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:40%;"></td> <td style="width:30%; text-align: center;"><input type="checkbox"/> <b>Standard</b></td> <td style="width:30%; text-align: center;"><input type="checkbox"/> <b>Special</b></td> </tr> <tr> <td>Multivitamins (per 24 hours)</td> <td style="text-align: center;">10 mL</td> <td style="text-align: center;">_____ mL</td> </tr> <tr> <td>Trace Elements (per 24 hours)</td> <td style="text-align: center;">1 mL</td> <td style="text-align: center;">_____ mL</td> </tr> </table> <p>Plus <input type="checkbox"/> Folic Acid (per 24 hours) 1 mg or _____ mg</p> <p><input type="checkbox"/> Thiamine (per 24 hours) 100 mg or _____ mg</p> <p><input type="checkbox"/> Insulin _____ units/liter</p> <p><input type="checkbox"/> Heparin _____ units/liter</p> <p><input type="checkbox"/> Famotidine _____ mg/liter</p> <p><input type="checkbox"/> <b>Peripheral:</b> D10% / Amino Acid 4.25% 1000 mL</p> <p>Choose one <b>Infusion Rate mL/hour x 24 hours:</b></p> <p><input type="checkbox"/> 60 (1440 mL/day) <input type="checkbox"/> 80 (1920 mL/day) <input type="checkbox"/> 100 (2400 mL/day) <input type="checkbox"/> _____ mL/hour</p> <p>Choose one <b>Fat Emulsion Order (20%) Note: Egg Allergy is a contraindication, may consider test dose</b></p> <p><input type="checkbox"/> Central: Infuse 20 mL/hour over 12 hours ( ) Daily or ( ) twice weekly: Mon., Thurs.</p> <p><input type="checkbox"/> Peripheral: Infuse 10 mL/hour over 24 hours daily</p> <p><b>Others:</b></p> <p><input type="checkbox"/> Infuse Dextrose 10% at same rate as PN solution if PN not available on time</p> <p><b>Nursing Orders</b></p> <p>Blood sugar every _____ hour</p> <p><input checked="" type="checkbox"/> Weight weekly at the same time while on PN</p> <p><input type="checkbox"/> Notify Physician to re-evaluate Parenteral Nutrition needs when enteral intake changes</p> <p><input checked="" type="checkbox"/> 2 hours before Parenteral Nutrition is discontinued, decrease infusion rate by 50% before stopping.</p> <p><b>Laboratory Orders</b></p> <p><input type="checkbox"/> CMP, CBC w/diff, Calcium, Magnesium, Phosphorus levels every ( ) Mon. ( ) Wed. ( ) Fri.</p> <p><input type="checkbox"/> BMP, CBC w/diff every ( ) Tues. ( ) Thurs.</p> <p><input type="checkbox"/> Lipid panel weekly on ( ) Mon. or ( ) Wed. or ( ) Fri.</p>		<input type="checkbox"/> <b>Standard</b>	<input type="checkbox"/> <b>Special</b>	Nacl	10 mEq	_____ mEq	Na Acetate	30 mEq	_____ mEq	NaHPO4	---	_____ mM	KCl	20 mEq	_____ mEq	K Acetate	---	_____ mEq	KHPO4 (20mEq of K)	14 mM	( _____ mEq of K) mM	Magnesium Sulfate	8 mEq	_____ mEq	Ca Gluconate	5 mEq	_____ mEq		<input type="checkbox"/> <b>Standard</b>	<input type="checkbox"/> <b>Special</b>	Multivitamins (per 24 hours)	10 mL	_____ mL	Trace Elements (per 24 hours)	1 mL	_____ mL	<p style="text-align: center;"><b>Registered Dietician Note:</b></p> <p style="text-align: center;">R.D. may place recommendation sticker here</p>
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