

April 2022 ~ Resource #380426

Parenteral Nutrition Safety

Parenteral nutrition (PN) is ripe for errors. Ordering and compounding are complex due to the laundry list of ingredients (e.g., dextrose, protein, fat, electrolytes).²⁻⁴ Plus, PN is high-alert because of the risk for harm from errors.^{1,2} Refer to this checklist for some key operational safety strategies in inpatient settings. Also use other best practices (e.g., aseptic technique, development and maintenance of policies) and ensure initial and at least annual competency assessment of staff involved with PN.²⁻⁴ We have a CE, *Parenteral Nutrition for the Pharmacists*, that covers clinical aspects.

Goal	Suggested Approach
Limit ordering errors with PN.	☐ Advocate for use of an effective order entry/clinical decision support system interfaced with an automated compounder.^{3,4} - o Reduces risk associated with order re-entry or transcription.^{2,4} ☐ Use standardized order formats/templates, either computerized or electronic.^{2,4} - o Avoid handwritten orders and telephone or verbal orders.² - o Include full generic names of ingredients, and brand names only when needed for clarity (e.g., if multiple versions are available).² - o List electrolytes as complete salts (e.g., potassium chloride and potassium phosphate NOT potassium, chloride, and phosphate).² - o Use dosing unit of amount (e.g., grams, mEq, mmol) per day for adults or amount/kg/day for pediatrics or neonates.² - o Minimize free text on orders.⁶ - o Ensure order of ingredients matches on orders and labels.^{2,4} ☐ If order transcription is needed, require an independent double check.² ☐ Require prescriber review of any order modifications.⁴
Compound PN accurately and safely.	☐ Advocate for automated, rather than manual, compounding processes.³ - o Improves accuracy and efficiency and reduces contamination risk. ☐ Remedy environmental issues such as poor lighting, frequent interruptions, etc.² ☐ Use bar-code technology, such as for hanging and replacing products on the compounder.^{3,4} ☐ Trace tubing from the product to the compounder port when setting up or replacing products on the compounder.⁶ ☐ Require pharmacist approval for any configuration or ingredient changes (e.g., due to product shortages) on the compounder.³ ☐ Ensure any applicable changes in the EHR resulting from drug shortages are reflected in the compounder.³ ☐ Keep vendor support contact information on-hand to reduce delays when there are compounder issues such as hardware or software malfunctions.³ ☐ Properly address compounder warnings such as for dose, osmolarity, incompatibility (e.g., calcium/phosphate), malfunction (e.g., obstructed tubing).² - o Require pharmacist approval and independent double check for overrides.²
Continued...	

Goal	Suggested Approach
Compound PN accurately and safely, continued	○ Report situations that could lead to alert fatigue.⁴ □ Stay alert for red flags for potential errors, such as a substantial change on a PN order from the previous day.^{2,4} □ If calculations or conversions are needed, require an independent double check.² □ Require independent double check of manual additives (i.e., additive container and syringe) before injection into PN bags.² □ Require comparison of labels to orders after compounding.²
Properly dispense PN.	□ Assign appropriate beyond-use dates. ○ PN bags with dextrose and protein or dextrose, protein, and fat should get a beyond-use date according to pharmacy policies, such as 24 hours from hang time.² ○ Fat (i.e., lipid emulsion) alone should get a beyond-use date of 12 hours from hang time.² □ Ensure a 1.2 micron in-line filter is available for administration of PN.^{2,5} ○ Check that this information is included on the PN label for nursing.² □ Mix any multichamber PN products prior to dispensing.² □ Observe PN bags for integrity and absence of issues (e.g., leaks or separation of fat from other components).²
Limit mishaps with premixed PN products.	□ Streamline stock by routinely eliminating low-use products. □ Separate stock to prevent product selection errors. ○ For example, <i>Clinimix E</i> products have added electrolytes compared with plain <i>Clinimix</i> products. ○ For example, <i>Kabiven</i> has a higher dextrose concentration than <i>Perikabiven</i>, so <i>Kabiven</i> can only be infused centrally while <i>Perikabiven</i> can be infused centrally or peripherally.
Limit mishaps with outsourced PN.	□ Advocate for interfacing EHR with outsourcer's software for PN order transmission.⁴ ○ Reduces risk associated with order re-entry or transcription.^{2,4} □ Ensure processes are consistent regardless of whether PN is compounded in-house or by a third party.² ○ For example, compare outsourced PN labels to orders prior to dispensing.²

Users of this resource are cautioned to use their own professional judgment and consult any other necessary or appropriate sources prior to making clinical judgments based on the content of this document. Our editors have researched the information with input from experts, government agencies, and national organizations. Information and internet links in this article were current as of the date of publication.

References

1. ISMP. High-alert medications in acute care settings. August 23, 2018. <https://www.ismp.org>. (Accessed March 18, 2022).
2. Ayers P, Adams S, Boullata J, et al. A.S.P.E.N. Parenteral nutrition safety consensus recommendations. JPEN J Parenter Enteral Nutr. Mar-Apr 2014;38(3):296-333.
3. Iredell B, Mourad H, Nickman NA, et al. ASHP guidelines on the safe use of automated compounding devices for the preparation of parenteral nutrition mixtures. <https://www.ashp.org/-/media/assets/policy-guidelines/docs/guidelines/safe-use-automated-compounding-devices-preparation-parenteral-nutrition-admixtures.ashx>. (Accessed March 23, 2022).
4. Vanek VW, Ayers P, Kraft M, et al. A call to action for optimizing the electronic health record in the parenteral nutrition workflow. Am J Health-Syst Pharm. 2018 Sep 15;75(18):1400-1420.
5. Worthington P, Gura KM, Kraft MD, et al. Update on the Use of Filters for Parenteral Nutrition: An ASPEN Position Paper. Nutr Clin Pract. 2021 Feb;36(1):29-39.
6. ASPEN. PN compounding checklist. https://www.nutritioncare.org/Guidelines_and_Clinical_Resources/Toolkits/Parenteral_Nutrition_Safety_Toolkit/PN_CompoundCklist/. (Accessed March 25, 2022).

Cite this document as follows: Clinical Resource, Parenteral Nutrition Safety. Hospital Pharmacist's Letter/Pharmacy Technician's Letter. April 2022. [380426]

—To access hundreds more clinical resources like this one, visit trchealthcare.com to log in or subscribe—