



A Call to Action for Optimizing the Electronic Health Record in the Parenteral Nutrition Workflow: Executive Summary

Vincent W. Vanek, MD, FACS, FASPEN¹; Phil Ayers, PharmD, BCNSP, FASHP²; Michael Kraft, PharmD, BCNSP³ ; Jean M. Bouche, RD, CD⁴; Van T. Do, PharmD⁵; Charles W. Durham, PharmD, BCPS⁶; Peggi Guenter, PhD, RN, FAAN⁷; Lindsey Hoggie, MS, RDN, PMP⁸; Sue Kent, MS, RDN, LD⁹; Emily T. Lin, PharmD¹⁰; L. Steven Molinar, RD, LD¹¹; Steven W. Plogsted, PharmD, BCNSP, CNSC¹²; Jessica M. Poehls, PharmD, BCPPS¹³; Peggy Turner, MS, RD, LD, FAND¹⁴; Charles Van Way III, MD, FACS, FCCM, FCCP, FASPEN¹⁵ ; and American Society for Parenteral and Enteral Nutrition, Academy of Nutrition and Dietetics, American Society of Health-System Pharmacists

The full paper can be accessed online at <https://doi.org/10.1002/ncp.10095>

Abstract

Parenteral nutrition (PN) is a complex therapeutic modality provided to neonates, children, and adults for various indications. Surveys have shown that current electronic health record (EHR) systems are in need of functionality enhancement for safe and optimal delivery of PN. This is a consensus statement from the American Society for Parenteral and Enteral Nutrition, the Academy of Nutrition and Dietetics, and the American Society of Health-System Pharmacists outlining some of the key challenges to prescribing, order review/verification, compounding, and administration of PN using EHRs today and is a call to action for clinicians and vendors to optimize their EHRs regarding the PN build and workflow. (*Nutr Clin Pract.* 2018;33:594–596)

Keywords

clinical informatics; electronic health record; medication errors; parenteral nutrition; patient safety

Linked content: This executive summary is related to the full article by Vanek et al.: <https://doi.org/10.1002/ncp.10095>

From the ¹St Elizabeth Youngstown Hospital, Youngstown, Ohio, USA; ²Mississippi Baptist Medical Center, Jackson, Mississippi, USA; ³University of Michigan, Ann Arbor, Michigan, USA; ⁴Option Care Home Infusion, Wauwatosa, Wisconsin, USA; ⁵Oregon Health & Science University, Portland, Oregon, USA; ⁶Sentara Healthcare, Virginia Beach, Virginia, USA; ⁷American Society for Parenteral and Enteral Nutrition, Silver Spring, Maryland, USA; ⁸Academy of Nutrition and Dietetics, Chicago, Illinois, USA; ⁹Cleveland Clinic, Cleveland, Ohio, USA; ¹⁰Mayo Clinic, Rochester, Minnesota, USA; ¹¹Salem Health, Salem, Oregon, USA; ¹²Nationwide Children's Hospital, Columbus, Ohio, USA; ¹³University of Wisconsin Hospitals and Clinics, Madison, Wisconsin, USA; ¹⁴University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma, USA; ¹⁵University of Missouri, Kansas City, Missouri, USA.

This article is being copublished by the American Society of Health-System Pharmacists (ASHP), the Academy of Nutrition and Dietetics (AND), and the American Society for Parenteral and Enteral Nutrition (ASPEN). Minor differences in style may appear in each publication, but the article is substantially the same in each journal.

Financial disclosure: None declared.

Conflicts of interests: None declared.

Podcast available

Listen to a discussion of this manuscript with *NCP* Editor-in-Chief Jeanette M. Hasse, PhD, RD, LD, FADA, CNSC, and author Vincent W. Vanek, MD, FACS, FASPEN. This and other *NCP* podcasts are available at: <https://onlinelibrary.wiley.com/page/journal/19412452/homepage/podcasts>

Corresponding Author:

Peggi Guenter, PhD, RN, FAAN, FASPEN, Senior Director of Clinical Practice, Quality, and Advocacy, American Society for Parenteral and Enteral Nutrition (ASPEN), 8401 Colesville Road, Suite 510, Silver Spring, MD 20910.
Email: peggig@nutritioncare.org

Nutrition in Clinical Practice
Volume 33 Number 5
October 2018 594–596
© 2018 American Society of
Health-System Pharmacists, Inc.,
American Society for Parenteral
and Enteral Nutrition, and the
Academy of Nutrition and
Dietetics. All rights reserved.
DOI: 10.1002/ncp.10202
wileyonlinelibrary.com

WILEY

Parenteral nutrition (PN) is an important therapy provided to neonates, children, and adults. PN is a complex medication containing up to 40 different ingredients.¹ In 2013, PN was administered during approximately 302,000 hospital stays, while many other patients received this therapy in the home or long-term care settings.² The Institute for Safe Medication Practices (ISMP) classifies PN as a high-alert medication and recommends that strategies be formulated to minimize harm and errors in patients receiving this medication.³ PN should only be used in patients in whom the benefit outweighs the potential risks. In 2017, the American Society for Parenteral and Enteral Nutrition (ASPEN) published consensus recommendations on the appropriate use of PN.⁴ A 2013 ASPEN survey with a gap analysis revealed only 58% of healthcare organizations have precautions in place to prevent errors and patient harm associated with PN.⁵

The PN process most often involves a number of basic steps, including prescribing, order review/verification, compounding, labeling, and administration.⁶ PN ordering has evolved over the years to include not only physicians as prescribers, but also dietitians, nurse practitioners, pharmacists, and physician assistants. The ASPEN Parenteral Nutrition Safety Consensus Recommendations advised that PN shall be prescribed using standardized electronic orders via a computerized provider order entry (CPOE) system.⁶

In 2015, a work group was formed consisting of members from ASPEN, the Academy of Nutrition and Dietetics (Academy), and the American Society of Health-System Pharmacists (ASHP). This work group consisted of experts in PN, electronic health record (EHR) functionality, and health information technology (HIT) standards. The work group identified areas of opportunity for optimizing the EHR in the PN workflow. The goals of the work group were:

1. increase the awareness of EHR vendors to consensus recommendations and guidelines for safe PN ordering,^{6,7}
2. recommend to EHR vendors opportunities to improve PN process functionality and clinical decision support (CDS),
3. encourage HIT standards for PN across the continuum of care, and
4. publish a joint consensus statement on PN and EHR best practices.

Key areas identified by the work group for this publication were:

1. standardized PN order and label (see Figures 1–7 in full paper for ASPEN standardized templates);

2. CDS and warnings for macronutrient and micronutrient dosing, toxicity, and incompatibilities (see Tables 1–3 in full paper for detailed limits for CDS);
3. EHR interfaces, interoperability, and workflows involving automated compounding devices (ACDs) – functionality to improve safety and minimize risk of errors (see full paper on reasons why this is important in avoiding transcription and calculation errors);
4. ordering cyclic PN, taper up, and taper down (see Table 4 in full paper for detailed recommendations on taper up and taper down schedules); and
5. transition of PN from hospital to home or other alternative care settings and vice versa (see full paper regarding the issues involving these workflows).

The work group was divided into 5 subgroups, with each assigned 1 of the above key areas of the consensus statement. Each subgroup reviewed the literature and developed evidence-based recommendations for their respective area. Several members of the work group combined the sections of the subgroups and developed the rough draft of the paper. The paper was then revised based on review of the entire paper by the entire work group. The leaders on the work group from each organization identified appropriate members within their organization to review and submit comments on the final rough draft of the paper. The entire work group discussed and came to consensus on revisions of the paper based on reviewers' comments to form the final draft of the paper. The leaders on the work group from each organization identified and sent the final draft of the paper to the appropriate body within their organization for final review, revision, and approval on behalf of their organization.

Summary

Ordering and managing PN therapy using EHRs is a complex and multi-step process that involves multiple clinicians from multiple different specialties. This consensus statement serves to identify the best practices to date for electronic ordering of PN using HIT. As HIT standards become more prevalent in the infrastructure of health systems, these best practices need to be integrated into evolving and mature HIT standards and the incorporation of these standards into work practices, policy, and design/build of EHR technology should result in safer processes for ordering, administering and managing PN therapy.

EHRs should include the following PN therapy functionalities:

1. Use standardized and validated PN order and labeling templates as recommended by ASPEN.
2. Design PN orders to facilitate ordering based on ASPEN recommendations and incorporate CDS to guide the prescriber on requirements and maximal

limits for macronutrients and micronutrient for adult, pediatric, and neonatal patients.

3. Analyze workflow from patient-specific PN ordering to administration to the patient and documentation of delivered PN admixtures in such a way as to minimize manual human transcription or double documentation and provide appropriate CDS support in all of these steps.
4. Include the functionality to order cyclic PN with and without taper up and/or taper down.
5. Include the functionality to transition from hospital PN orders to home PN orders and vice versa.

Many of the current EHRs do not incorporate one or more of the above in their build and/or workflow. EHR vendors need to recognize these deficiencies and actively pursue the clinical nutrition expertise to enhance and optimize these areas. Nutrition support clinicians need to engage EHR vendors, the healthcare system EHR build team, and the medical and administrative leadership within their healthcare system to be involved in the process of purchasing, building, training, implementing, and optimizing their EHR to promote inclusion of the above functionalities within the PN therapy workflow. These steps will result in significant improvement in safety for patients receiving

PN therapy. Optimization of the EHR and CDS does not replace the requirement that the clinicians and caregivers involved in the PN workflow must be adequately educated, trained, and experienced in PN therapy.

References

1. Ayers P, Guenter P, Holcombe B, Plogsted S. How to prescribe parenteral nutrition therapy. In: Ayers P, Guenter P, Holcombe B, Plogsted S, eds. *ASPEN Parenteral Nutrition Handbook*, 2nd ed. Silver Spring, MD: American Society for Parenteral and Enteral Nutrition; 2014:111-134.
2. National Inpatient Sample (NIS) of the Healthcare Cost and Utilization Project (HCUP) from the Agency for Healthcare Research and Quality (AHRQ). <http://hcupnet.ahrq.gov/>. Accessed December 10, 2015.
3. Institute for Safe Medication Practices. 2016-2017 Medication Safety Best Practices for Hospitals. <http://www.ismp.org/tools/bestpractices/TMSBP-for-Hospitals.pdf>. Accessed January 2017.
4. Worthington P, Balint J, Bechtold M, et al. When is parenteral nutrition appropriate? *JPEN J Parenter Enteral Nutr.* 2017;41:324-377.
5. Boullata JL, Guenter P, Mirtallo JM. A parenteral nutrition use survey with gap analysis. *JPEN J Parenter Enteral Nutr.* 2013;37:212-222.
6. Ayers P, Adams S, Boullata JL, et al. ASPEN parenteral nutrition safety consensus recommendations. *JPEN J Parenter Enteral Nutr.* 2014;38:296-333.
7. Boullata JI, Gilbert K, Sacks G, et al. American Society for Parenteral and Enteral Nutrition. ASPEN clinical guidelines: parenteral nutrition ordering, order review, compounding, labeling, and dispensing. *JPEN J Parenter Enteral Nutr.* 2014;38(3):334-377.