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Standardized Competencies for Parenteral Nutrition Prescribing The American Society for Parenteral and Enteral Nutrition Model

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Abstract

Parenteral nutrition (PN) provision is complex, as it is a high-alert medication and prone to a variety of potential errors. With changes in clinical practice models and recent federal rulings, the number of PN prescribers may be increasing. Safe prescribing of this therapy requires that competency for prescribers from all disciplines be demonstrated using a standardized process. A standardized model for PN prescribing competency is proposed based on a competency framework, the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.)—published interdisciplinary core competencies, safe practice recommendations, and clinical guidelines. This framework will guide institutions and agencies in developing and maintaining competency for safe PN prescription by their staff.

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Introduction

Parenteral nutrition (PN) provision requires careful interpretation of clinical and laboratory data, multidisciplinary communication, and vigilant surveillance for unintended complications. The process is prone to a variety of potential errors during each step, from PN prescription to its delivery. The practices and safeguards surrounding this process are critical to maintaining patient safety. In 2012, patients received PN during approximately 320,000 hospital stays, while many others received it in the home or long-term care settings.¹ Compared with most other medications, ordering PN varies considerably between organizations as reported in a survey of current PN practices performed in 2011 in which a number of trends were reported.² In this survey, members of the primary medical or surgical service prescribed PN most often (71.6%), with nutrition support team members (30.5%), pharmacists (28.3%), dietitians (20.9%), advanced practice nurses (14.7%), or physician assistants (PAs, 12.8%) also involved in ordering PN. In organizations with a smaller daily census (<200), PN was also most commonly ordered by the primary clinical service members (75.3%), followed by pharmacists (29.8%), nutrition support team members (21.8%), and dietitians (21.5%). This trend was similar in organizations with 5 or fewer PN orders daily (76%, 27.8%, 23.5%, and 21.1% respectively). The PN order was most often communicated in handwriting using a standard order form (62.1%), with an additional 5.1% handwriting a nonstandardized order. Electronic order entry was only available in 32.7% of organizations, and just over half of those used a standardized process. When standardized order entry occurred, it was available to adult patients (96.7%) much more often than for pediatric patients (36.5%) or neonates (46%).²

Recently published American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.). PN clinical guidelines addressed the education of prescribers as a way to improve PN ordering.³ The prescriber should be well versed in the appropriate indications for PN, formulation design (volume, macronutrient and micronutrient composition) for patients of differing weights, medical and surgical conditions, and metabolic management. Prescribers should also be knowledgeable about vascular access devices (peripheral and central) and their associated complications. There is scant literature evaluating the direct impact of safe prescribing education programs on the outcomes of patients receiving PN. However, interdisciplinary teams applying education as part of an overall quality intervention have been successful in reducing unnecessary PN use and decreasing errors.⁴

Judicious PN order review and appropriate modification of daily orders is also critical to optimize patient safety. Based on pharmacists' survey responses, the pharmacy receiving the PN order may have been onsite or at a remote location and commonly dedicated a pharmacist to verify, review, and clarify PN orders. Most facilities (60.2%) dedicate 0.6 full-time equivalents or more to this effort, although 23.1% of respondents did not have any dedicated pharmacist time for these processes. According to this survey, when a pharmacist was involved, both a clinical review (eg, allergy, indication for PN, dosing; 88.2%) and a pharmaceutical review (eg, stability, compatibility of the formulation; 92.8%) of the PN order took place. According to 68.5% of survey respondents, clarification is required for $\leq 10\%$ of PN orders, another 20.6% report clarifications are required for 11%–25% of PN orders, and the remaining 10.9% of respondents reported that clarifications are needed for 26%–100% of orders. There are many reasons for requiring clarification of the PN

order, though no specific component of the PN admixture stands out more than another. When a prescribed PN order is expected to be unstable on order review, the responsibility to rewrite the order is relegated to the pharmacist twice as often as to the original prescriber. In 69.7% of organizations, a pharmacist can adjust electrolyte additives most commonly as per guideline or protocol (64.2%) or with individual prescriber approval (35.8%).² Therefore, competent PN prescribers would reduce the need for order clarification and revision. Permanent and easily retrievable documentation is required to further determine appropriate prescribing processes.

Adding to the complexity of PN prescribing are three inconsistencies in PN practices. First, nutrient dosing in PN orders may follow a number of different formats from amount per day, amount per volume, or amount per liter to percent final concentration. Second, the error-prone step of PN order transcription is still required in a majority of organizations. Third, for transitions in patient care, PN orders are communicated by a number of individuals including the case manager, dietitian, nurse, pharmacist, or physician.

Recently, changes have occurred in PN prescribing patterns with the increase in midlevel prescribers such as nurse practitioners (NPs) and PAs. The 2014 Centers for Medicare and Medicaid Services (CMS) final rule permitting clinically qualified nutrition professionals, including registered dietitians (RDs), to be privileged to prescribe patient diets under the hospital conditions of participation (CoPs) states that patient diets, "including therapeutic diets, must be ordered by a practitioner responsible for the care of the patient, or by a qualified dietitian *or* qualified nutrition professional as authorized by the medical staff and in accordance with state law governing dietitians and nutrition professionals."⁵

With these prescribing trends, changes in the CMS rules, and the recent publication of prescribing recommendations from the A.S.P.E.N. PN clinical guidelines and safety consensus recommendations, the next logical step was to develop a model for standardized competencies around PN prescribing that all institutions may use.^{3,6} A model for PN standardized competencies would allow for consistency between institutions and offer a template for a variety of nutrition professionals to identify a minimum standard level of knowledge and skills for prescribing this complex drug therapy. Regardless of whether PN is compounded onsite, outsourced to a compounding vendor, or makes use of multichamber fixed-dose products, a standardized model for PN prescribing could be applied in a multidisciplinary fashion and be used to educate and assist institutional privileging physicians in training (residents and fellows), medical students, nutrition support RDs, NPs, PAs, clinical nurse specialists, and nutrition support pharmacists, as appropriate. A secondary gain from this competency model might be more standardized prescribing patterns, which also could help educate providers, improve patient care and safety, and decrease prescribing-related errors.

The competency recommendations within this document are intended for discussion and adoption over time by organizations involved in the prescribing for patients requiring PN. The competency recommendations are not intended to supersede the judgment of the employing institution in light of the individual circumstances of each case.

General Nutrition Competencies

A competency is a quality or characteristic of a person that is related to effective performance. Competencies can be described as a combination of knowledge, skills, motives, and personal traits. Competencies help individuals and their organizations look at how they do their jobs.⁷ Competencies define expectations for knowledge, skills, and traits for effective role implementation. Without documented competencies, an assessment of an individual at regular intervals cannot be performed and, therefore, compromises the ability to effectively and safely perform a role within their job.

In 1999, A.S.P.E.N. published interdisciplinary core competencies in order to help nutrition support clinicians meet performance expectations in job descriptions and demonstrate the knowledge and skills necessary to adapt care to the physical, psychosocial, cultural, and age-related needs of patients. These core competencies are examples of critical aspects of job performance that supervisors, managers, or directors may use and/or adapt for performance appraisal of nutrition support practitioners.⁸ There are many ways to gather data to evaluate practitioner performance, which include but are not limited to one or more of the following⁸:

1. Direct observation of a practitioner demonstrating skills or tasks.
2. Observation of participation in interdisciplinary clinical rounds.
3. Evaluation of an approach to practice in clinical simulations.
4. Evaluation of care plans for specific case examples.
5. Review of results of written examinations.
6. Verification of nutrition support certification.
7. Analysis of performance on nutrition support–related self-assessment programs.
8. Evaluation of educational presentations on nutrition support–related topics.
9. Confirmation of participation in local or national professional organization activities.
10. Documentation of continuing education in activities related to nutrition support practice.
11. Confirmation of participation in mentoring or peer review programs.
12. Confirmation of participation in quality improvement programs.

Building programs and tools for patient safety and professional accountability has long been a goal for A.S.P.E.N. In his presidential address, Philip Schneider stated, “the tools that can be used to improve patient safety include self-assessment of practitioners who routinely use nutrition support in their practice, curricular-based continuing education programs, board certification in nutrition support practice, and the use of clinical guidelines to assist in making clinical decisions. By developing and promoting these tools, A.S.P.E.N. is committed to building a safe nutrition system so every patient receives optimal nutrition care.”⁹ Competencies are a strong evaluation tool to build that safe PN system.

Prescribing Competencies Framework and Elements

A competency framework is a collection of competencies thought to be central to effective performance and includes guiding principles to optimize patient safety. Development of competencies should help individuals to continually improve their performance and work more effectively.¹⁰ If acquired and maintained, the prescribing competencies in this framework should help healthcare professionals to be safe and effective prescribers. This competency framework underpins the clinician's personal responsibility for prescribing.⁷ Selected tenets of the British National Health Service (NHS) framework⁷ on prescribing effectively that are particularly pertinent to PN prescribing can be found in Table 1.

Table 1. Selected Competencies Pertinent to Parenteral Nutrition Prescribing.⁷

Competency A: Safe

- Knows the limits of her/his own knowledge and skill and works within them.
- Knows when to refer to or seek guidance from another member of the team or a specialist.
- Only prescribes a medicine if he or she has adequate up-to-date awareness of its actions, indications, dose, contraindications, interactions, cautions, and side effects.
- Accurately calculates doses and routinely checks calculations where relevant, such as for children.
- Keeps up to date with advances in practice and emerging safety concerns related to prescribing.
- Knows about common types of medication errors and how to prevent them.
- Ensures confidence and competence to prescribe are maintained.
- Makes accurate, legible, and contemporaneous records and clinical notes of prescribing decisions.
- Effectively uses the systems necessary to prescribe medicines (eg, medicine charts, electronic prescribing, decision support).
- Writes legible, unambiguous, and complete prescriptions that meet legal requirements.

Competency B: Professional

- Accepts personal responsibility for prescribing and understands the legal and ethical implications of doing so.
- Makes prescribing decisions based on the needs of patients and not the prescriber's personal considerations.
- Knows and applies legal and ethical frameworks affecting prescribing practice (eg, misuse of drugs, regulations, prescribing of unlicensed/off-label medicines).
- Takes responsibility for her/his own learning and continuing professional development.
- Maintains patient confidentiality in line with best practices, regulatory standards, and contractual requirements.

Competency C: Always improving

- Learns and changes from reflecting on practice.
 - Shares and debates her/his own and others' prescribing practice and acts upon feedback and discussion.
 - Acts upon colleagues' inappropriate prescribing practice using appropriate mechanisms.
 - Understands and uses tools to improve prescribing (eg, review of prescribing data, audit, and feedback).
 - Reports prescribing errors and near misses, reviews practice to prevent recurrence.
-

Examples of PN Prescribing Practices and Need for Competency Programs

General PN

A full assessment of the patient and PN prescribing system is important in order for the competent clinician or interdisciplinary nutrition support team to prescribe appropriate PN.¹¹ A British report specifically found that patients with prescription-related complications were often inadequately assessed before beginning PN.¹² A patient's current and past medical conditions, physical examination findings, nutrition status and requirements, fluid and electrolyte requirements, venous access, and current medication therapy must be evaluated.¹¹ Several studies indicated a need for prescribing education, as well as revision of PN ordering processes including standardized order forms.¹³ Although the appropriateness of the PN order is ultimately up to the competent practitioner who examines the patient and determines whether PN is indicated, the content and presentation of the order form (or template) can positively influence the prescription.¹⁴

Physicians

Several studies report the need for additional nutrition education and training in nutrition assessment and intervention for physicians.¹⁵ Vanek and colleagues specifically assessed the physicians' ability to prescribe PN in the community teaching hospital setting. The authors found that medical and surgical residents need more education in the area of nutrition support, particularly in determining nutrient requirements.¹⁶

Pharmacists

The concept of pharmacists taking on new patient care roles such as disease management and prescribing is contingent upon the determination of the pharmacist's competency. Competency can be addressed in part by obtaining continuing education credits, maintaining licensure, and becoming certified in a clinical specialty,¹⁷ such as through the Board of Pharmacy Specialties (BPS), which has a nutrition support specialty certification program, or certification by the National Board of Nutrition Support Certification (NBNSC). Traditionally, pharmacists have been heavily involved in the PN order-writing process and these interactions have led to more appropriate PN therapy, earlier transition to enteral nutrition (EN) therapy, and recognition of pharmacists as resources for physicians.¹⁸⁻²⁰ There have also been reports of pharmacists as prescribers of PN.^{18,21,22} In 1996, 12.1% of pharmacist survey respondents in Canada were prescribing PN,²³ and a more recent study in the United States showed that 28.3% of respondents reported pharmacists prescribing PN.²

Dietitians

In the mid-1990s, one institution developed clinical privileges for RDs as prescribers of clinical nutrition therapy. These privileges included ordering PN along with the monitoring studies needed with this therapy. The competencies for PN included evaluation of appropriateness of the therapy, recommendation of the PN admixture, advancement of the PN, evaluation of specialty formulas, cycling regimens, and transitioning to oral or enteral feedings.²⁴ In 2002, this practice was extended to the long-term acute-care hospital setting where competencies included maintenance of certification such as an RD, documentation of certification by NBNSC, demonstration of competence to write PN and EN orders as verified by nutrition experts in the organization, and continued professional education with an emphasis in nutrition support.²⁵ In 2013, Roberts described the RD order-writing program using a nutrition management protocol and the positive patient outcomes associated with such a program.²⁶ In this program, a minimum of 10 PN orders were written and evaluated prior to sign-off on privileges. Positive patient outcomes using an electronic order entry program with clinical decision support and monitoring were also demonstrated.²⁷

Physician Assistants/Nurse Practitioners

Like physicians, PAs and NPs have varied and limited amounts of nutrition education in their basic curriculums. Attempts have been made to improve nutrition instruction,²⁸⁻³⁰ yet there are no articles in the literature on PN prescribed by PAs and NPs and the competencies needed for this care management knowledge and skill. Many of these clinicians are in the primary care setting,

but greater numbers are practicing in the acute care environment and in need of PN prescribing competencies.

A.S.P.E.N. Model for PN Prescribing Competencies

This model is intended for use by organizations to train and assist in privileging the following healthcare professionals: physicians in training (residents and fellows), medical students, nutrition support RDs, NPs, PAs, clinical nurse specialists, and nutrition support pharmacists. An experienced prescriber of PN can serve as preceptor for this training and privileging process. The model should be implemented as a 7-day process.

Table 2. American Society for Parenteral and Enteral Nutrition Recommendations for Safe Parenteral Nutrition Prescribing.^{3,6}

Does a standardized process for PN prescribing increase clarity and reduce PN-related errors? What are the essential elements of a PN order that minimize errors?

1. Healthcare organizations shall use a standardized process for PN management, and this process shall include clinicians with expertise in the area of nutrition support, preferably from multiple disciplines.
2. The primary healthcare team, in collaboration with nutrition support professionals, shall evaluate, clearly define, and accurately document the patient's medical problem(s) and indication(s) for PN.
3. The primary healthcare team, in collaboration with nutrition support professionals, shall specify and document the therapeutic goal(s) of PN therapy.
4. PN shall be prescribed using a standardized PN order format and review process applicable to patients of every age and disease state within a healthcare organization.
5. Institutions shall create a home parenteral nutrition (HPN) order template/format that provides a safe plan for multiple days of therapy. The prescription for HPN therapy should be written in a format that specifically reflects trends in laboratory values and previous days of PN therapy. An institutional daily PN order format should not be used as an HPN prescription.
6. The most appropriate nutrition modality, in collaboration with nutrition support professionals, should be prescribed for the patient. Healthcare organizations should determine the most appropriate types of PN formulation(s) for their patient population(s) (eg, standardized compounded, standardized commercial [premixed] PN products, or customized compounded PN admixtures) or methods of delivery (eg, dextrose/amino acid vs total nutrient admixtures), and should develop criteria for each formulation that will be used in their patients.

How can education be provided to non-nutrition support specialist clinicians to improve PN prescribing and safety?

1. Prescribers from all disciplines, including physicians, pharmacists, nurse practitioners, physician assistants, and dietitians, should be educated on basic PN prescribing and monitoring.
2. Introductory didactic and experiential education/training about PN should be included in the core curriculum. Knowledge and skills should be evaluated for all clinicians in each discipline involved with PN as determined by the individual institution. Education and assessment materials and processes shall be developed and led by clinicians with expertise in the area of nutrition support, preferably from multiple disciplines.
3. In-depth education on PN should be included as a standard component of acute care and home care pharmacy and physician residency training. This is also applicable to all pharmacists, nurses, dietitians, physicians, physician extenders, and other clinicians involved in caring for patients who receive PN.

PN, parenteral nutrition.

Communication between PN prescribers and the primary provider team (if they are not the same) is essential to maintain congruent goals in management of the individual patient. Because the PN prescriber and primary provider each may be providing volume and metabolic management (eg, insulin, electrolyte replacement), the PN prescriber must know the goals of the primary provider. Documentation of PN changes are important. Based on the recommendations from A.S.P.E.N.'s consensus recommendations and clinical guidelines (Table 2), the following competencies should be met for institutions to privilege the prescriber:

- 1. The prescriber may be certified as a nutrition support clinician or other related nutrition board certification. (eg, NBNSC, BPS, National Board of Physician Nutrition Specialists [NBPNS])

- 2. If not certified in nutrition support, the prescriber should complete a didactic/interactive course such as the A.S.P.E.N. PN Order Writing Workshop or a facility-developed or organization-developed program for initial competency. Such a program should include the following:
 - PN indications
 - PN venous access
 - Volume, macronutrient requirements, and micronutrient requirements
 - Fluid, electrolyte, and acid-base balance basic concepts and principles
 - Drug–nutrient interactions
 - PN ordering
 - Monitoring and complication prevention and management

The didactic course should also include a pretest and post-test to evaluate learning.

- 3. The prescriber will complete at least 10 PN orders for the initial competency evaluation (via patient case scenarios and/or actual patients) under the supervision of an experienced preceptor. These cases should reflect the spectrum of medical and nutrition conditions, body weights, and age range.
- 4. The prescriber should follow these patients and modify daily PN orders over a period of several days. This allows demonstration of the ability to modify PN orders as needed for changing clinical conditions.
- 5. During evaluation of competency, the preceptor should use the PN Order-Writing Competency Tool (Figure 1).
- 6. For annual or every other year competency reevaluation, completion of ongoing continuing education requirements on nutrition support combined with PN order assessment of at least 5 cases or patients should be reviewed using the PN Order-Writing Competency Tool (Figure 1).

The model of standards for competency described in this paper will require time and resources at the organizational level. Interventions to achieve this level of competence may require customized solutions at individual institutions based on their existing PN prescribing structure. Each institution needs to incorporate this model in a way that is practical within its resources and capacity. The competency program may not be the same for each type of prescriber even within a single institution. Individual medical institutions may have developed an oversight system for PN order prescribing, in which case this privileging approach for physician trainees may not be necessary. For instance, some medical institutions provide specific nutrition rotations and training to residents and fellows or may have systems where individuals who are not physicians prescribe PN through a collaborative agreement.

The ultimate goal is to achieve a culture of safe PN prescribing that is based on evaluation of individual patients and achieved by multidisciplinary collaboration between physicians, dietitians, nurses, and pharmacists. The role of electronic health records in providing a layer of safety with built-in checks cannot be overstated.

American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.) Parenteral Nutrition (PN) Order-Writing Competency Tool

Adult/Pediatric/Neonatal (Circle applicable patient population)

Case # _____

Prescriber _____

Verified by _____

Date	Competency	Competency met	Review needed	Evaluator's Initials
	Appropriately determined indication for PN using facility-specific or A.S.P.E.N. guidelines and documented on order			
	Appropriately identified administration route and confirmed catheter tip placement			
	Accurately determined dosing weight and included on PN order			
	Identified pertinent allergies and documented on PN order			
	PN ordered via standardized form/electronic health record PN template			
	Accurately documented PN infusion rate and total intravenous fluid volume requirement as determined by the primary service			
	Based on completed nutrition assessment and physical examination, accurately determined and ordered macronutrient components of PN as grams/day (or g/kg/day in pediatric patients) including ordering appropriate macronutrient doses			
	Based on clinical status, appropriately ordered electrolyte additives as salts in amounts per day (or per kg/day in pediatric patients) including checking that calcium/phosphate doses are appropriate			
	Identified and accurately ordered vitamins, trace elements, and any other needed additives for PN formulation including additional vitamins, trace elements, or other nutrients (eg, cysteine, carnitine)			
	Included any non-nutrient medications (eg, insulin) in the PN order only if supported by stability, compatibility, and clinical data along with assessment of potential drug–nutrient interactions. Demonstrated familiarity with the glucose management plan of the primary provider is required			
	Reviewed completed PN formulation to verify that all intended contents are included and are within an acceptable standard range as listed on PN order			
	Included any related orders for routine care and monitoring as appropriate			
	Signed/dated (with contact information available) during the daytime hours 7 days per week			
	Established goals of therapy specific for the patient including any necessary age-specific and appropriate education			
	Involved patient and family/caregiver/surrogate decision maker in decisions			
	Demonstrated the ability to communicate this PN order recommendation and rationale verbally and in the medical record (electronic or otherwise)			
	Demonstrated ability to follow cases daily or over time to modify the PN order based on the patient's changing clinical condition and tolerance to PN. This includes demonstration of documentation of PN prescription changes and communication with primary healthcare team			
	Monitored for complications			
	Demonstrated knowledge of treatment for complications			
	Appropriately implemented PN product shortage management strategy in relation to this order			

Conclusion

PN is a complex therapeutic modality prescribed by multiple disciplines and as such should be prescribed by those clinicians with demonstrated competency in PN order writing to optimize the delivery of safe and effective therapy. Institutions should implement policies and procedures addressing determination of competent PN prescribing. This should be assessed initially and on an

annual basis at a minimum. The A.S.P.E.N. model presented in this article can be used to develop and implement such policies and procedures.

References

1. Agency for Healthcare Research and Quality. Healthcare Utilization Project (HCUP) National Inpatient Survey. *All listed ICD-9CM procedure code for parenteral nutrition infusion* 2012. www.hcupnet.ahrq.gov. Accessed January 10, 2015.
2. Boullata JJ, Guenter P, Mirtallo JM. A parenteral nutrition use survey with gap analysis. *JPEN J Parenter Enteral Nutr.* 2013;37(2):212–222.
3. Boullata JJ, Gilbert K, Sacks G, Labossiere RJ, Crill C, Goday P, et al. A.S.P.E.N. clinical guidelines: parenteral nutrition ordering, order review, compounding, labeling, and dispensing. *JPEN J Parenter Enteral Nutr.* 2014;38(3):334–377.
4. Boitano M, Bojak S, McCloskey S, McCaul DS, McDonough M. Improving the safety and effectiveness of parenteral nutrition: results of a quality improvement collaboration. *Nutr Clin Pract.* 2010;25(6):663–671.
5. Department of Health and Human Services, Centers for Medicare & Medicaid Services. 42 CFR Parts 413, 416, 440, 442, 482, 483, 485, 486, 488, 491, and 493 [CMS–3267–F] RIN 0938–AR49 Medicare and Medicaid Programs; Regulatory Provisions To Promote Program Efficiency, Transparency, and Burden Reduction; Part II. *Fed Regist.* 2014;79(91):27106–27157.
6. Ayers P, Adams S, Boullata J, Gervasio J, Holcombe B, Kraft MD, et al. A.S.P.E.N. parenteral nutrition safety consensus recommendations. *JPEN J Parenter Enteral Nutr.* 2014;38(3):296–333.
7. National Prescribing Centre; National Institute for Health and Clinical Excellence (NICE). *A Single Competency Framework for All Prescribers*. <https://v3.pebblepad.co.uk/v3portfolio/cumbria/File/OpenFile/94jgbwqMpZdkm83yzzxsRgdZwh>. Published May 2012. Reviewed May 2014. Accessed March 23, 2015.
8. Board of Directors, American Society for Parenteral and Enteral Nutrition. Interdisciplinary nutrition support core competencies. *Nutr Clin Pract.* 1999;14(6):331–333.
9. Schneider PJ. Crossing the quality chasm: building a safe nutrition system. *JPEN J Parenter Enteral Nutr.* 2002;26(4):219–225.
10. Whiddett S, Hollyforde S. *The Competencies Handbook*. London, England: Chartered Institute of Personnel and Development, 1999.
11. White R. Parenteral nutrition for adults—an overview of the basic principles. *Clinical Pharmacist.* 2011;3:183–184.
12. Stewart JAD, Mason DG, Smith N, Protopapa K, Mason M. National Confidential Enquiry into Patient Outcome and Death. A mixed bag: An enquiry into the care of hospital patients receiving parenteral nutrition. http://www.ncepod.org.uk/2010report1/downloads/PN_report.pdf. Published June 2010. Accessed March 23, 2015.
13. Quercia RA, Keating KP. A CQI program for prescribing and dispensing total parenteral nutrition. *Nutr Clin Pract.* 1998;13(5):219–224.
14. Storm HM, Young SL, Sandler RH. Development of pediatric and neonatal parenteral nutrition order forms. *Nutr Clin Pract.* 1995;10(2):54–59.
15. Adams KM, Kohlmeier M, Powell M, Zeisel SH. Nutrition in medicine nutrition education for medical students and residents. *Nutr Clin Pract.* 2010;25(5):471–480.
16. Vanek VW, Sharnek LK, Snyder DM, Kupensky DT, Rutushin AL. Assessment of physicians' ability to prescribe parenteral nutrition support in a community teaching hospital. *J Am Diet Assoc.* 1997;97:856–859.
17. Gourley DR, Fitzgerald WL, Davis RL. Competency, board certification, credentialing, and specialization: Who benefits? *Am J Manag Care.* 1997;3(5):795–801.
18. Mulholland P. Pharmacist prescribing in neonatal intensive care units in the UK. *Arch Dis Child.* 2013;98(6):e1.

19. Seres D, Sacks GS, Pederson CA, Canada TW, Johnson D, Kumpf V, et al. Parenteral nutrition safe practices: results of the 2003 American Society for Parenteral and Enteral Nutrition Survey. *JPEN J Parenter Enteral Nutr.* 2006;30(3):259–265.
20. Ragab MH, Al-Hindi MY, Alrayees MM. Neonatal parenteral nutrition: review of the pharmacist role as a prescriber [published online ahead of print July 2, 2014]. *Saudi Pharm J.* 10.1016/j.jsps.2014.06.009.
21. Faber EM. Program for training staff pharmacists in total parenteral nutrition. *Am J Health Syst Pharm.* 1991;48(5):980–986.
22. Ahmed M, Irwin S, Tuthill DP. Education and evidence are needed to improve neonatal parenteral nutrition practice. *JPEN J Parenter Enteral Nutr.* 2004;28(3):176–179.
23. Pearson G, Yuksel N, Card D, Chin T, Gray M, Hawboldt J, et al. An information paper on pharmacist prescribing within a healthcare facility. *Can J Hosp Pharm.* 2002;55(1). <http://www.cjhp-online.ca/index.php/cjhp/article/view/545/639>. Accessed March 23, 2015.
24. Davis AM, Baker SS, Leary RA. Advancing clinical privileges for nutrition support practitioners: the dietitian as a model. *Nutr Clin Pract.* 1995;10(3):98–103.
25. Moreland K, Gotfried M, Vaughan L. Development and implementation of the clinical privileges for dietitian nutrition order writing program at a long-term acute-care hospital. *J Am Diet Assoc.* 2002;102:72–81.
26. Roberts SR. Improving patient outcomes through registered dietitian order writing. *Nutr Clin Pract.* 2013;28(5):556–565.
27. Holaska JC. Parenteral nutrition web-based order writing: educating prescribers utilizing a network-wide computerized e-learning tool. *J Am Diet Assoc.* 2012;112:A39.
28. DiMaria-Ghalili RA, Mirtallo JM, Tobin BW, Hark L, Van Horn L, Palmer CA. Challenges and opportunities for nutrition education and training in the health care professions: intraprofessional and interprofessional call to action. *Am J Clin Nutr.* 2014;99(suppl 5):1184S–93S.
29. Sullivan SY. Nutrition education in physician assistant programs: a national survey. *Persp on Physician Assist Educ.* 2000;11(1):18–24.
30. Maillet JOS, Fixelle R, Thornton J. What physician assistants should know about nutrition. *Top Clin Nutr.* 1997;12(3):49–57.