

A.S.P.E.N. Clinical Guidelines

Update on Parenteral Nutrition Ordering,
Order Review, Compounding, Labeling and
Dispensing!

Julianne Harcombe RPh, BCNSP

Disclosure Statement

I have no relevant financial
relationships with commercial
interests to disclose

Pharmacist Objectives

1. Acknowledge the new 2014 A.S.P.E.N. Clinical Guideline on Parenteral Nutrition Ordering, Order Review, Compounding, Labeling, and Dispensing
2. Recognize clinical advantages or disadvantages of commercially available premade multichambered Parenteral Nutrition formulations.

Pharmacist Objectives cont'd

3. Review the A.S.P.E.N. guidelines on Parenteral Nutrition Safety and discuss what pharmacists and pharmacy technicians can do together to improve best practice.
4. Indicate the benefit of integrating Nutrition status into the Comprehensive Geriatric Assessment.

Technician Objectives

1. Recognize the new 2014 A.S.P.E.N. Clinical Guidelines on Parenteral Nutrition, Compounding, Labeling, and Dispensing
2. Recognize advantages or disadvantages of premade Parenteral Nutrition formulations.
3. Review the A.S.P.E.N. guidelines on Parenteral Nutrition Safety and discuss how to improve best practice.
4. Indicate the benefit of integrating Nutrition status into the Comprehensive Geriatric Assessment.



LEADING THE SCIENCE AND
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Society for Parenteral and Enteral Nutrition

20 A.S.P.E.N. Clinical Guidelines

1. 2014 A.S.P.E.N. Clinical Guidelines: Support of Pediatric Patients with Intestinal Failure at Risk of Parenteral Nutrition – Associated Liver Disease
2. 2014 A.S.P.E.N. Clinical Guidelines: Parenteral Nutrition Ordering, Order Review, Compounding, Labeling, and Dispensing
3. 2013 A.S.P.E.N. Clinical Guidelines: Nutrition Support of Hospitalized Patients with Obesity
4.
5. 2013 A.S.P.E.N. Clinical Guidelines: Nutrition Support of Adult Patients with Hyperglycemia

A.S.P.E.N. Clinical Guidelines cont'd

- 17. 2009 Adult Critical Care – In collaboration with the Society of Critical Care Medicine (SCCM)
- 19. 2004 Safe Practices for Parenteral Nutrition – [Endorsed by the American Society of Health System Pharmacists (ASHP)]
- 20. 2002 Guidelines A.S.P.E.N. Board of Directors and the Clinical Guidelines Task Force. Guidelines for the use of parenteral and enteral nutrition in adult and pediatric patients.

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Journal of Parenteral and Enteral Nutrition

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A.S.P.E.N. Clinical Guidelines: Parenteral Nutrition Ordering, Order Review, Compounding, Labeling, and Dispensing


Joseph I. Boullata, Karen Gilbert, Gordon Sacks, Reginald J. Labossiere, Cathy Crill, Praveen Goday, Vanessa J. Kumpf, Todd W. Mattox, Steve Plogsted, Beverly Holcombe and American Society for Parenteral and Enteral Nutrition

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Practice Guidelines and Recommendations

Question 1.

Does education of prescribers improve PN ordering?

Recommendation: We suggest providing education to healthcare professionals to improve PN ordering, thereby reducing errors.

Practice Guidelines and Recommendations

Question 2. What is the maximum safe osmolarity of PN admixtures intended for peripheral vein administration?

Recommendation: We suggest that PN with an osmolarity of up to 900 mOsm/L can be safely infused peripherally.



Practice Guidelines and Recommendations

Question 3. What are the appropriate calcium intake and calcium-phosphate ratios in PN for optimal neonatal bone mineralization?

Recommendation: We recommend an elemental calcium intake of 76 mg/kg per day for short-term PN in neonates.



Visit our patients on home PN

- www.oley.org
- www.mallorycyr.com

Practice Guidelines and Recommendations

Question 4. What are the clinical advantages or disadvantages of commercially available premade (“premixed”) multichambered PN formulations compared with compounded PN formulations?

Recommendation: We suggest that commercially available premade multichambered PN products be considered as an available option for patients alongside compounded (customized or standardized) PN formulations to best meet an organization’s patient needs.



Practice Guidelines and Recommendations

Question 5. What are the clinical (infection, catheter occlusion) advantages or disadvantages of 2-in-1 compared with 3-in-1 PN admixtures?

Recommendation: We suggest that there is no clinical difference in infectious complications between the two PN delivery systems; 3-in-1 formulations administered in the homecare setting may increase the risk for catheter occlusion and shorten catheter lifespan.

Practice Guidelines and Recommendations

Question 6. What macronutrient dosing limits are expected to provide for the most stable 3-in-1 admixtures?

Recommendation: We recommend that total nutrient admixtures maintain final concentrations of amino acid $\geq 4\%$, monohydrated dextrose $\geq 10\%$, and injectable lipid emulsion $\geq 2\%$ to be more likely to remain stable for up to 30 hours at room temperature (25°C) or for 9 days refrigerated (5°C) followed by 24 hours at room temperature.

Cracked, Example 2



Practice Guidelines and Recommendations

Question 7. What are the most appropriate recommendations for optimizing calcium (gluconate) and (Na- or K-) phosphate compatibility in PN admixtures?

Recommendation: We cannot make a recommendation due to the multiple variations in amino acid concentrations, PN volume, pH, presence or absence of fat emulsion, and the amounts of other minerals (eg, magnesium). We suggest that published graphs for specific products provide adequate guidance; however, no evidence indicates that these formulations remain stable for >24–48 hours.

Practice Guidelines and Recommendations

Question 8. What micronutrient contamination is present in parenteral stock solutions currently used to compound PN admixtures?

Recommendation: We suggest that, given the level of mineral contamination found in parenteral stock solutions used to compound PN admixtures, practitioners purchase products that accurately describe levels of contamination and also take that exposure into account when recommending or reviewing trace element dosing.

Practice Guidelines and Recommendations

Question 9. Is it safe to use the PN admixture as a vehicle for non-nutrient medication delivery?

Recommendation: We recommend that non-nutrient medication be included in PN admixtures *only* when supported by (1) pharmaceutical data describing physicochemical compatibility and stability of (a) the additive medication and (b) the final preparation under conditions of typical use, and (2) clinical data confirming the expected therapeutic actions of the medication.

Practice Guidelines and Recommendations

Question 10. Should heparin be included in the PN admixture to reduce the risk of central vein thrombosis?

Recommendation: We suggest that heparin not be included in PN admixtures for reducing the risk of central vein thrombosis in adults. *GRADE:* Weak

Practice Guidelines and Recommendations

Question 11. What methods of repackaging IVFE into smaller patient-specific volumes are safe?

Recommendation: We recommend against the repackaging of IVFE into syringes for administration to patients. We suggest that other methodologies for repackaged IVFE, such as drawn-down IVFE units, are preferable. *GRADE:* Strong

Automated Compounding device

Ybarra JV, Rose WE, Curtis CS, Sacks GS.
Sterility of pediatric lipid emulsions
repackaged by an automated
compounding device. *JPEN J*

Parenter Enteral Nutr. 2011;35(3):391-394.



Practice Guidelines and Recommendations

Question 12. What beyond-use date should be used for

- (a) IVFE dispensed for separate infusion in the original container and
- (b) repackaged IVFE.

Question 12. cont'd

Recommendation:

- a. We recommend that the beyond-use date (BUD) for unspiked IVFE in the original container should be based on the manufacturer's provided information. The BUD for IVFE in the original container spiked for infusion should be 12–24 hours.

- b. Although repackaged IVFE is not recommended, when used, the BUD for IVFE transferred from the original container to another container for infusion separately from a 2-in-1 PN solution should be 12 hours.



Journal of Parenteral and Enteral Nutrition

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A.S.P.E.N. Parenteral Nutrition Safety Consensus Recommendations

Phil Ayers, Stephen Adams, Joseph Boullata, Jane Gervasio, Beverly Holcombe, Michael D. Kraft, Neil Marshall, Antoinette Neal, Gordon Sacks, David S. Seres, Patricia Worthington and American Society for Parenteral and Enteral Nutrition

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On behalf of:



Improving Parenteral Nutrition (PN) Safety: Prescribing and Labeling in your Facility

Outline

- Why Focus on PN Safety?
- PN Safety Gap Analysis Survey Results
- Examples of PN Related Errors
- How to Assess our Needs
- Steps to Increase PN Safety
- Action Points

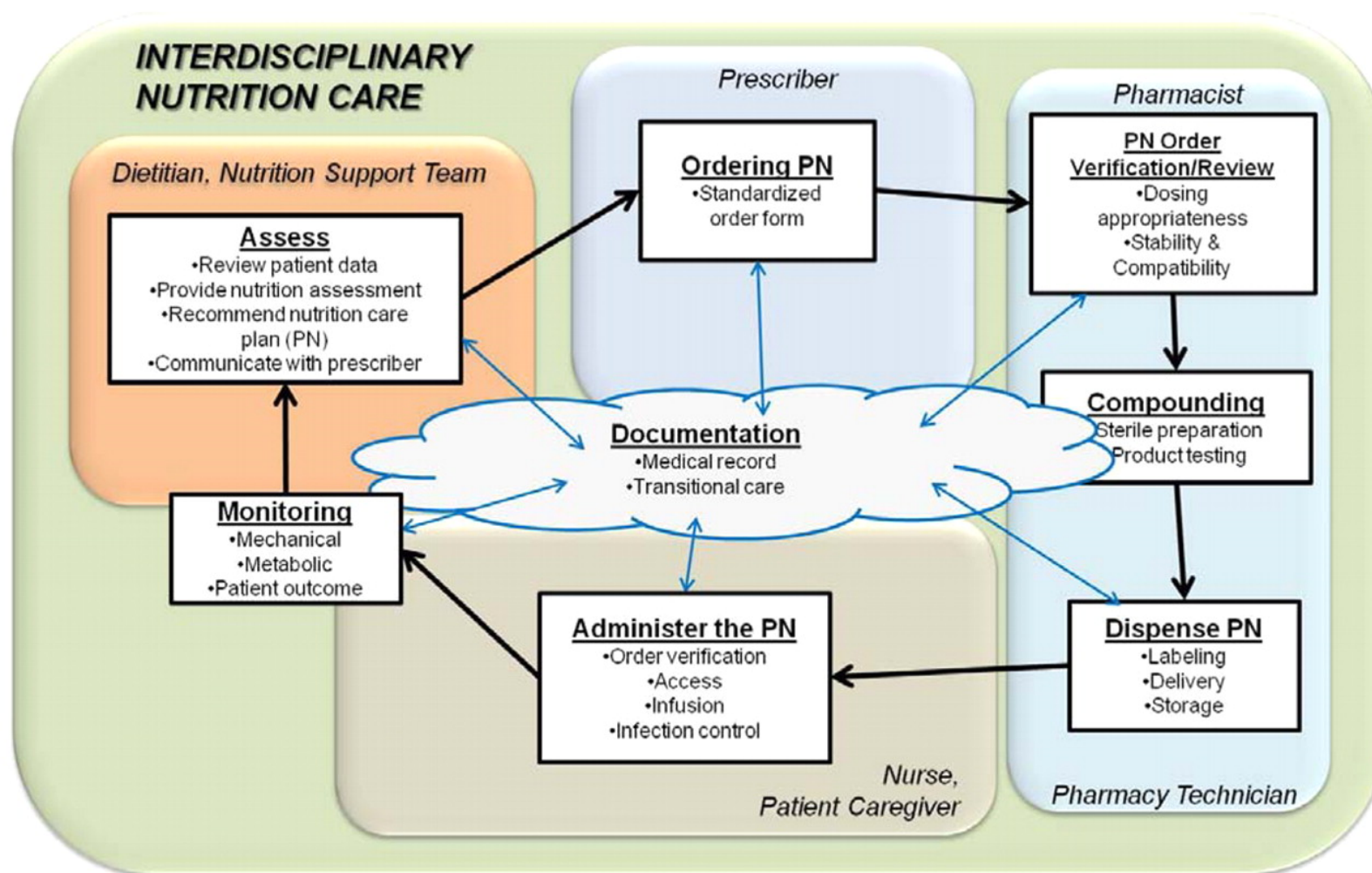
Why Focus on PN Safety?

PN is a
High Alert Medication
one that involves significant risk of harm when used in error

PN is the most complex drug preparation available
with 20 – 40 active ingredients

PN use process is interdisciplinary
with safety dependent upon individual competence
and reliable function of each step

Interdisciplinary PN Process



Boullata J. *JPEN J Parenter Enteral Nutr* 2012;36:10S-13S

ASPEN PN Practice Surveys

Table 7. Major Findings on Select Safe Practice Issues and Survey Results

Safe Practice Issue	2003 (n = 651), %	2011 (n = 895), %
<i>Organizational systems</i>		
• ≤5 PN admixtures daily	33	50–82
• Outsourcing of PN compounding	15	21
• Exclusive use of premixed PN products	—	81
• Administer outside PN preparations	43	25
<i>Order communication</i>		
• Standardized PN order form	88	90
• CPOE for PN	31	33
• Electronic interface available	—	7
• Transcription required	—	81
• Ordered in amount/day (or amount/kg/d)		
• Macronutrient	19	21–26
• Electrolytes	39	11–35
<i>Order review and clarification</i>		
• Dedicated pharmacist time = 0 FTEs	—	23
• ≤10% of orders requiring clarification	61	69
<i>PN compounding</i>		
• ACD in use for PN preparations	22	64
• Order transcription to ACD required	84	82
• ACD active dose limits in place	—	65
• PN admixture kept refrigerated/out of light	—	36
<i>Administration</i>		
• Nurse has access to full PN order for review	—	83
• Policy and procedure for IVFE administration	84	65
<i>Medication errors and documentation</i>		
• Performance improvement process	54	40
• Oversight of PN use process	—	96
• Aware of PN-related medication errors	—	34–42
• Document PN order review process in medical record	—	27–35

ACD, automated compounding device; CPOE, computerized prescriber order entry; FTE, full-time equivalent; IVFE, intravenous fat emulsion; PN, parenteral nutrition. Long dashes represent the lack of data available on certain issues from the 2003 survey.

Parenteral Nutrition Gap Analysis Concerns

- Handwritten PN orders are still very common
 - 62.1% with a standardized order form
 - 5.1% using a non-standardized order form
- 32.7% of organizations use electronic order entry but with only 50% using a standardized process
- 81% of institutions manually transcribe orders
- 23% don't dedicate pharmacist time to review PN orders
- Although 40% have PN performance improvement processes, 44% do not track PN-related medication errors

Frequency and Severity of Harm of Medication Errors Related to PN Process in a Large University Teaching Hospital

- Total of 4730 PN prescriptions
- 74(1.6% of total) associated with medication error
 - 1(1%) Prescription
 - 29 (39%) Transcription
 - 18 (24%) Preparation (Compounding)
 - 26 (35%) Administration
- 67/74 (91%) errors non-harmful to patient
- 6/74(8%) contributed or resulted in temporary patient harm

Sacks GS et al. Pharmacotherapy 2009

Summary of Reported PN Errors

Event	Age	Outcome	Contributing factors
Zinc overdose	Neonate	Death	<ul style="list-style-type: none"> • Performance deficit: training not completed • Compounder safeguards not used • Dose assessed for appropriateness
Sodium / Calcium	Neonate	Death	<ul style="list-style-type: none"> • Error in prescription transcription: calcium dose entered as sodium • Overlooked at all check points
Glucose overdose	Pediatric	Death	<ul style="list-style-type: none"> • Product label & order misinterpretation
Glucose under dose	Infant	Death	<ul style="list-style-type: none"> • Final concentration 1.75% vs 17.5%
No dextrose in PN	Neonate	Permanent brain damage	<ul style="list-style-type: none"> • Compounding error
Iron overload	Pediatric	Liver toxicity	<ul style="list-style-type: none"> • Misinterpretation of label, 50 fold error
Hyperkalemia	Child	Death	<ul style="list-style-type: none"> • Manual preparation of PN
Hypermagnesemia	Neonate	Toxicity	<ul style="list-style-type: none"> • Compounder malfunction
Ca/Phosphate precipitate	Adult	Death, respiratory distress	<ul style="list-style-type: none"> • Improper compounding sequence

Adapted from J Mirtallo, A.S.P.E.N. Clinical Nutrition Week 2013

PN Safety Can be Improved in your Institution

What do you do now?

Assess our Needs

1. How much PN is used daily, weekly, annually?
2. What types of patients receive PN?
3. Are PN error reports collected?
4. What is the level of PN training of prescribers and pharmacy staff?
5. What processes are used to prescribe, communicate orders, verify and create labels?

Assess our Needs

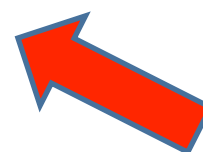
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2. What types of patients receive PN?
3. Are error reports collected?
4. What is the level of PN training of prescribers and pharmacy staff?
5. What processes are used to prescribe, communicate orders, verify and create labels?

Step 1: Evaluate PN Order Forms

- Why are we suggesting to address this issue?
 - Is easy to do with high potential to improve safety
 - Are able to follow-up to measure and show improvement

A.S.P.E.N. Standardized Prescribing Template for Adult Patients

<u>Patient Information</u> Patient name _____ Medical record number _____ Birthdate/age _____ _____ Patient location _____ Allergies _____ Height and dosing weight: Ht: _____ cm Dosing Wt: _____ kg Diagnosis(es)/Indication(s) for PN _____ Vascular access device/location CVC type _____ Location _____ Administration date/time _____	
Base Formula Amino acids Dextrose IV Fat emulsion Electrolytes Sodium phosphate Sodium chloride Sodium acetate Potassium phosphate Potassium chloride Potassium acetate Magnesium sulfate Calcium gluconate Vitamins, Trace Elements, Additives Multi-component vitamins Multi-component Trace elements Other Additives (eg, individual vitamins or trace elements, cysteine, regular insulin) as clinically appropriate and compatible	Amount/day g g g mmol mEq mEq mmol mEq mEq mEq mEq mL mL _____
<u>PN Instructions</u> Total volume _____ mL Infusion rate _____ mL/hr , start and stop times _____ Cycle information _____ Prescriber and contact information _____	

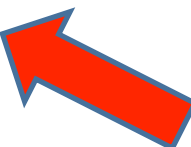


Order in consistent doses per day

Ayers, et al. ,
 A.S.P.E.N. Parenteral
 Nutrition Safety
 Consensus
 Recommendations
*JPEN J Parenter
 Enteral Nutr.* 2013

Figure 1. Parenteral Nutrition Order Template: Adult Patient.

A.S.P.E.N. Standardized Prescribing Template for Adult Patients

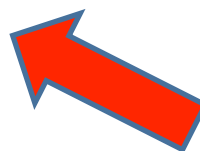
<u>Patient Information</u> Patient name _____ Medical record number _____ Birthdate/age _____ _____ Patient location _____ Allergies _____ Height and dosing weight: Ht: _____ cm Dosing Wt: _____ kg Diagnosis(es)/Indication(s) for PN _____ Vascular access device/location CVC type _____ Location _____ Administration date/time _____		
Base Formula Amino acids Dextrose IV Fat emulsion Electrolytes Sodium phosphate Sodium chloride Sodium acetate Potassium phosphate Potassium chloride Potassium acetate Magnesium sulfate Calcium gluconate Vitamins, Trace Elements, Additives Multi-component vitamins Multi-component Trace elements Other Additives (eg, individual vitamins or trace elements, cysteine, regular insulin) as clinically appropriate and compatible	Amount/day g g g mmol mEq mEq mmol mEq mEq mEq mEq mEq mL mL _____	Order should have same sequence of ingredients and must match label 
<u>PN Instructions</u> Total volume _____ mL Infusion rate _____ mL/hr , start and stop times _____ Cycle information _____ Prescriber and contact information _____		

Ayers, et al. ,
 A.S.P.E.N. Parenteral
 Nutrition Safety
 Consensus
 Recommendations
*JPEN J Parenter
 Enteral Nutr.* 2013

Figure 1. Parenteral Nutrition Order Template: Adult Patient.

A.S.P.E.N. Standardized Prescribing Template for Pediatric and Neonatal Patients

<u>Patient Information</u>	
Patient name _____ Medical record number _____ Birthdate/age _____	
Patient location _____ Allergies _____	
Height and dosing weight: Ht: _____ cm Dosing Wt: _____ kg	
Diagnosis(es)/Indication(s) for PN _____	
Vascular access device/location CVC type _____ Location _____	
Administration date/time _____	
Base Formula	Amount/kg/day
Amino acids	g
Dextrose	g
IV Fat emulsion	g
Electrolytes	
Sodium phosphate	mmol
Sodium chloride	mEq
Sodium acetate	mEq
Potassium phosphate	mmol
Potassium chloride	mEq
Potassium acetate	mEq
Magnesium sulfate	mEq
Calcium gluconate	mEq
Vitamins, Trace Elements, Additives	
Multi-component vitamins	mL
Multi-component trace elements	mL
Other Additives (eg, cysteine, regular insulin) as clinically appropriate and compatible	
<u>PN Instructions</u>	
Total volume _____ mL Infusion rate _____ mL/hr , start and stop times _____	
Cycle information _____	
Prescriber and contact information _____	



Order in
consistent
doses per
weight per day

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Parenteral and Enteral Nutrition

Figure 2. Parenteral Nutrition Order Template: Pediatric/Neonatal Patient.

A.S.P.E.N. Standardized Prescribing Template for Pediatric and Neonatal Patients

Patient Information	
Patient name _____	Medical record number _____ Birthdate/age _____
Patient location _____	Allergies _____
Height and dosing weight: Ht: _____ cm Dosing Wt: _____ kg	
Diagnosis(es)/Indication(s) for PN _____	
Vascular access device/location CVC type _____	Location _____
Administration date/time _____	
Base Formula	Amount/kg/day
Amino acids	g
Dextrose	g
IV Fat emulsion	g
Electrolytes	
Sodium phosphate	mmol
Sodium chloride	mEq
Sodium acetate	mEq
Potassium phosphate	mmol
Potassium chloride	mEq
Potassium acetate	mEq
Magnesium sulfate	mEq
Calcium gluconate	mEq
Vitamins, Trace Elements, Additives	
Multi-component vitamins	mL
Multi-component trace elements	mL
Other Additives (eg, cysteine, regular insulin) as clinically appropriate and compatible	
PN Instructions	
Total volume _____ mL Infusion rate _____ mL/hr , start and stop times _____	
Cycle information _____	
Prescriber and contact information _____	

Order should have same sequence of ingredients and must match label

Ayers, et al. ,
A.S.P.E.N.
Parenteral
Nutrition Safety
Consensus
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Enteral Nutr.* 2013

APPLYING THE SCIENCE AND PRACTICE OF CLINICAL NUTRITION

Figure 2. Parenteral Nutrition Order Template: Pediatric/Neonatal Patient.

A.S.P.E.N. Adult PN Label


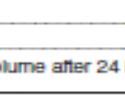

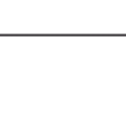
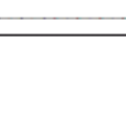
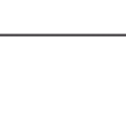
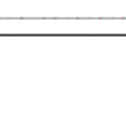
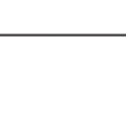
Patient Name _____ Medical Record Number _____		
Birthdate/age _____		
Patient location _____		
Height and dosing weight: Ht: _____ cm Dosing Wt: _____ kg		
Diagnosis(es)/Indication(s) for PN _____		
Vascular access device/location CVC type _____ Location _____		
Administration date _____ Administration time _____		
Macronutrients	Amount/day	
Amino acids*	g	
Dextrose	g	
IV Fat emulsion*	g	
Electrolytes		
Sodium phosphate	mmol of phosphate (Sodium _____ mEq)	
Sodium chloride	mEq	
Sodium acetate	mEq	
Potassium phosphate	mmol of phosphate (Potassium _____ mEq)	
Potassium chloride	mEq	
Potassium acetate	mEq	
Magnesium sulfate/chloride	mEq	
Calcium gluconate	mEq	
Vitamins, Trace Elements		
Multi-component Vitamins*	mL	
Multi-component Trace Elements*	mL	
Other Additives (eg, individual vitamins or trace elements, regular insulin)		
PN Instructions For Central (peripheral) Vein Administration Only Total volume _____ mL Overfill volume _____ mL Infusion rate _____ mL/h Start and Stop times _____ Cycle Information _____ Do not use after date/time _____ ***** Discard any unused volume after 24 hours*****		
Prescriber and Contact Information _____ Institution/Pharmacy Name _____ Institution/Pharmacy Address _____ Pharmacy Telephone number _____		

Figure 3. Parenteral Nutrition Label Template: Adult Patient.
*Specify product name.

Ayers, et al. ,
A.S.P.E.N. Parenteral
Nutrition Safety
Consensus
Recommendations
*JPEN J Parenter
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A.S.P.E.N. Adult PN Label

1

Has Vascular Access Device Tip Location for Nurse to Check

2

Lists Prescribed Doses Per Day for Nurse to Compare with Order

3

Lists Prescribed Doses in Standard Sequence for Nurse to Compare with Order

4

Lists Clear Instructions for Administration

A.S.P.E.N. Pediatric PN Label




Patient Name _____ Medical Record Number _____ Birthdate/age _____ Patient location _____		
Height/Length and dosing weight: Ht/Length: _____ cm Dosing Wt: _____ kg Diagnosis(es)/Indication(s) for PN _____ Vascular access device/location CVC type _____ Location _____		
Administration date _____ Administration Time _____		
Macronutrients Amino acids* _____ g Dextrose _____ g IV Fat emulsion* _____ g	Amount/kg/day ^b g g g	
Electrolytes Sodium phosphate _____ mmol of phosphate (Sodium _____ mEq) Sodium chloride _____ mEq Sodium acetate _____ mEq Potassium phosphate _____ mmol of phosphate (Potassium _____ mEq) Potassium chloride _____ mEq Potassium acetate _____ mEq Magnesium sulfate/chloride _____ mEq Calcium gluconate _____ mEq		
Vitamins, Trace Elements Multi-component Vitamins* _____ mL Multi-component Trace Elements* _____ mL		
Other Additives Cysteine _____ mg/g amino acids Others (eg, regular insulin) _____		
PN Instructions For Central (peripheral) Vein Administration Only Total volume _____ mL Overfill volume _____ mL Infusion rate _____ mL/h Start and Stop times _____ Cycle information _____ Do not use after date/time _____ ***** Discard any unused volume after 24 hours*****		
Prescriber and Contact information _____		
Institution/Pharmacy Name _____ Institution/Pharmacy Address _____ Pharmacy Phone Number _____		

Figure 4. Parenteral Nutrition Label Template: Pediatric/Neonatal Patient.

^aSpecify product name.

¹Since the admixture usually contains multiple sources of sodium, potassium, chloride, acetate, and phosphorus, the amount of each electrolyte/kg provided by the PN admixture is determined by adding the amount of electrolyte provided by each salt.

A.S.P.E.N. Pediatric PN Label



Has Vascular Access Device Tip Location for Nurse to Check



Lists Prescribed Doses Per Weight Per Day for Nurse to Compare with Order



Lists Prescribed Doses in Standard Sequence for Nurse to Compare with Order



Lists Clear Instructions for Administration

Steps to Increase PN Safety in Our Institution

- Gain buy-in by this P & T Committee
- Adapt A.S.P.E.N. order forms and labels for use in our institution
- Implement monitoring to measure change

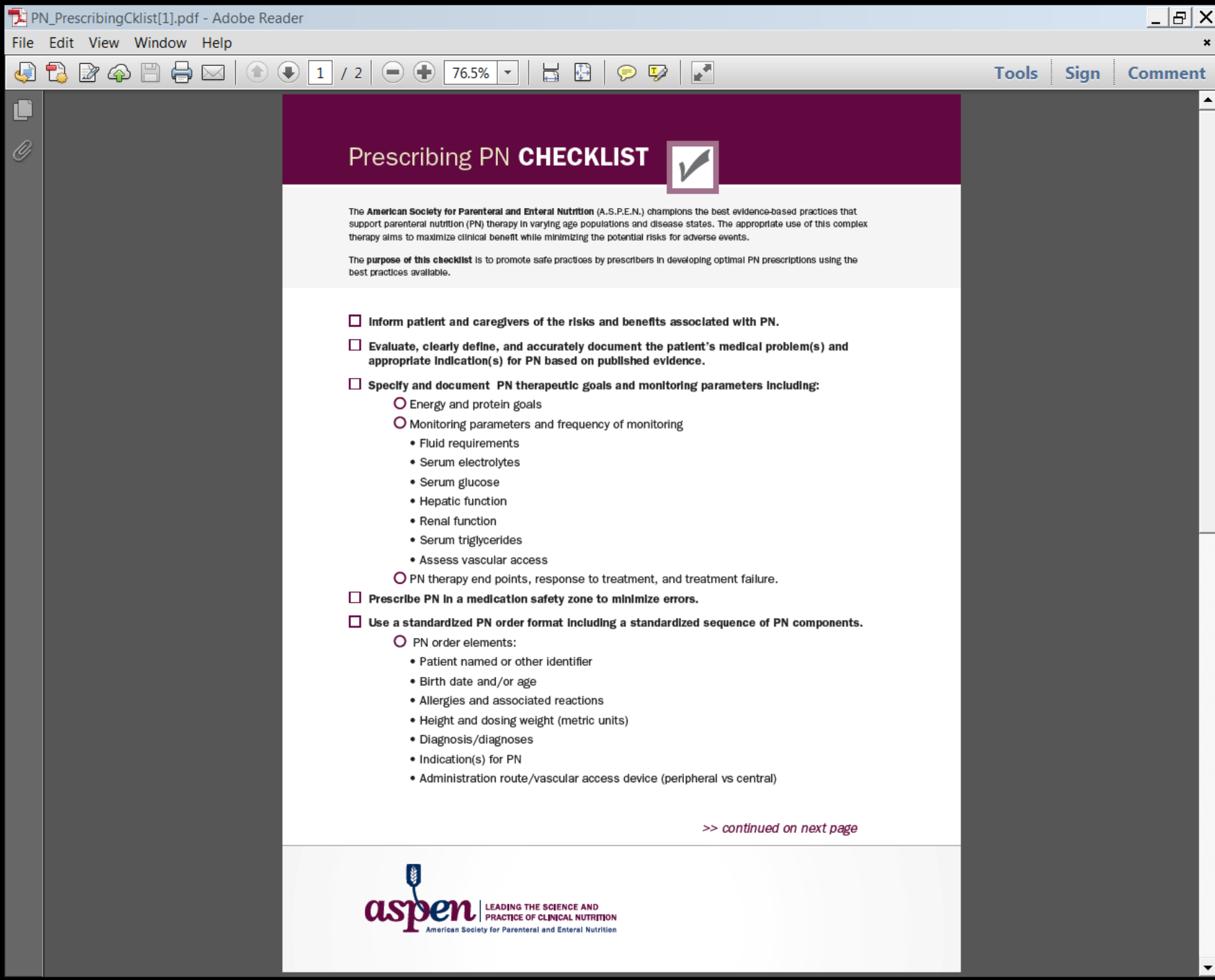
Steps to Increase PN Safety in Our Institution

Measure Change:

- Monitor PN errors now for 1-3 months
- In 3-6 months implement new order forms and labels
- In months 6-9 measure PN errors and compare to baseline

Steps to Increase PN Safety in Our Institution

- Future Steps:
- Educate prescribing staff on PN order writing
 - Implement annual PN Order Writing competency program
 - Implement double check policy in pharmacy for order transcription



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Prescribing PN CHECKLIST

The **American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.)** champions the best evidence-based practices that support parenteral nutrition (PN) therapy in varying age populations and disease states. The appropriate use of this complex therapy aims to maximize clinical benefit while minimizing the potential risks for adverse events.

The **purpose of this checklist** is to promote safe practices by prescribers in developing optimal PN prescriptions using the best practices available.

- ☐ **Inform patient and caregivers of the risks and benefits associated with PN.**
- ☐ **Evaluate, clearly define, and accurately document the patient's medical problem(s) and appropriate indication(s) for PN based on published evidence.**
- ☐ **Specify and document PN therapeutic goals and monitoring parameters including:**
 - ☐ Energy and protein goals
 - ☐ Monitoring parameters and frequency of monitoring
 - Fluid requirements
 - Serum electrolytes
 - Serum glucose
 - Hepatic function
 - Renal function
 - Serum triglycerides
 - Assess vascular access
 - ☐ PN therapy end points, response to treatment, and treatment failure.
- ☐ **Prescribe PN in a medication safety zone to minimize errors.**
- ☐ **Use a standardized PN order format including a standardized sequence of PN components.**
 - ☐ PN order elements:
 - Patient named or other identifier
 - Birth date and/or age
 - Allergies and associated reactions
 - Height and dosing weight (metric units)
 - Diagnosis/diagnoses
 - Indication(s) for PN
 - Administration route/vascular access device (peripheral vs central)

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American Society for Parenteral and Enteral Nutrition

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Prescribing PN CHECKLIST

<< continued from previous page

- Prescriber contact information
- Date and time order submitted
- Administration date and time
- Volume and infusion rate
- Infusion schedule (continuous or cyclic)
- Type of formulation (dextrose/amino acids with separate infusion of IVFE or total nutrient admixture)

☐ PN components:

- Adults – ordered as amounts/day
- Pediatrics - ordered as amounts/kg/day
- Neonates - ordered as amounts/kg/day
- A dose for each macronutrient
- A dose for each electrolyte ordered as a complete salt form
- A dose for multivitamins
- A dose for individual vitamins, if ordered
- A dose for multi-trace elements
- A dose for individual trace elements, if ordered
- A dose for insulin, if ordered
- A dose for non-nutrient medications, if ordered


☐ Use CPOE to prescribe PN

☐ Avoid handwritten orders

☐ Avoid verbal and telephone orders

☐ When a CPOE system is not available, PN should be prescribed using a standardized order template as an editable electronic document in order to avoid handwritten orders.

☐ Prescribe home/alternative site PN therapy using a home/alternative site PN-specific order/template that allows for multiple days of therapy and reflects trends in laboratory values.

 **LEADING THE SCIENCE AND PRACTICE OF CLINICAL NUTRITION**
American Society for Parenteral and Enteral Nutrition

For full recommendations, rationale, and references, go to Ayers P, Adams S, Boullata J, Gervasio J, Holcombe B, Kraft M, et al. A.S.P.E.N. Parenteral Nutrition Safety Consensus Recommendations. *JPEN J Parenter Enteral Nutr.* 2014;38: 296-333.
www.nutritioncare.org/pnsafety
www.nutritioncare.org

PN_OrderReviewCklist[1].pdf - Adobe Reader

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Tools Sign Comment

PN Order Review and Verification CHECKLIST

The **American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.)** champions the best evidence-based practices that support parenteral nutrition therapy in varying age populations and disease states. The appropriate use of this complex therapy aims to maximize clinical benefit while minimizing the potential risks for adverse events.

The **purpose of this checklist** is to promote safe practices by pharmacists and other clinicians in the PN order review and verification process.

<ul style="list-style-type: none"><input type="checkbox"/> Verify PN order elements for:<ul style="list-style-type: none"><input type="checkbox"/> Patient name- or other identifier<input type="checkbox"/> Birth date and/or age<input type="checkbox"/> Allergies and associated reactions<input type="checkbox"/> Height and dosing weight (metric units)<input type="checkbox"/> Diagnosis/diagnoses<input type="checkbox"/> Indication(s) for PN<input type="checkbox"/> Administration route/vascular access device (peripheral vs central)<input type="checkbox"/> Prescriber contact information<input type="checkbox"/> Date and time order submitted<input type="checkbox"/> Administration date and time	<ul style="list-style-type: none"><input type="checkbox"/> Verify PN ingredients for:<ul style="list-style-type: none"><input type="checkbox"/> Adults - amounts/day<input type="checkbox"/> Pediatrics - amounts/kg/day<input type="checkbox"/> Neonates - amounts/kg/day<input type="checkbox"/> Electrolytes as complete salt form<input type="checkbox"/> A dose for each macronutrient<input type="checkbox"/> A dose for each electrolyte<input type="checkbox"/> A dose for multivitamins<input type="checkbox"/> A dose for individual vitamins, if ordered<input type="checkbox"/> A dose for multi-trace elements<input type="checkbox"/> A dose for individual trace elements, if ordered<input type="checkbox"/> A dose for insulin, if ordered<input type="checkbox"/> A dose for non-nutrient medications, if ordered	<ul style="list-style-type: none"><input type="checkbox"/> Perform clinical review of PN order for:<ul style="list-style-type: none"><input type="checkbox"/> Indication consistent with published guidelines<input type="checkbox"/> Appropriate dose of each additive<input type="checkbox"/> Appropriate osmolality for route of administration (peripheral vs. central)<input type="checkbox"/> Compare order to previous day's order to assess component doses for substantial changes<input type="checkbox"/> Perform PN order safety review for:<ul style="list-style-type: none"><input type="checkbox"/> Compatibility of ingredients
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PN Compounding CHECKLIST



The **American Society for Parenteral and Enteral Nutrition** (A.S.P.E.N.) champions the best evidence-based practices that support parenteral nutrition (PN) therapy in varying age populations and disease states. The appropriate use of this complex therapy aims to maximize clinical benefit while minimizing the potential risks for adverse events.

The **purpose of this checklist** is to promote safe practices by pharmacy staff to prepare optimal PN formulations.

Automated Compounding Device (ACD) Setup

- ☐ Use vendor-validated setup for ACD
- ☐ Initial - ACD setup performed using 2 staff members:
 - ☐ Use independent double-check process
 - ☐ Use printed check
 - ☐ Verbally affirm all additives and base solutions including
 - name
 - concentration
 - container size
- ☐ Use barcode technology to verify products during setup and replacement of ingredients
- ☐ Trace tubing from the source container to port where attached to ACD during initial setup and with each change in the source container
- ☐ Pharmacist verifies all empty containers when multiple containers of a single additive are used
- ☐ Use ACD to deliver all ingredients

Manual compounding

- ☐ Use manual compounding when
 - ☐ The volume of PN component to be mixed is less than the ACD can accurately deliver
 - ☐ There is an interaction between a PN component and a component of the ACD (e.g., insulin and tubing)

- ☐ There is a chemical reaction between PN components that cannot be mitigated by sequencing the addition of ingredients
- ☐ There is a shortage of a specific PN components and manual compounding is part of a conservation measure
- ☐ Verify and inspect manual additive vials and syringes with the additive prior to adding to PN (Do not use proxy methods of verification such as syringe pull-back method)
- ☐ Use check list or sign-off sheet for manual additives

Standardized, Commercial - Parenteral Nutrition Products

- ☐ Open seal/remove bar between the chambers, mix components, and add other components prior to dispensing from pharmacy.

Review and verify PN order

- ☐ After initial order entry
- ☐ Prior to injecting manual additives
- ☐ After compounding

Prior to dispensing PN

- ☐ Review and compare PN order, label on PN product and compounding label prior to dispensing
- ☐ Visually inspect PN

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PN Administration CHECKLIST

The **American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.)** champions the best evidence-based practices that support parenteral nutrition therapy in varying age populations and disease states. The appropriate use of this complex therapy aims to maximize clinical benefit while minimizing the potential risks for adverse events.

The **purpose of this checklist** is to promote safe practices by nurses administering parenteral nutrition.

<ul style="list-style-type: none"><input type="checkbox"/> Perform hand hygiene<input type="checkbox"/> Use sterile technique when manipulating vascular access device<input type="checkbox"/> Inspect PN container, check for:<ul style="list-style-type: none"><input type="checkbox"/> Integrity of container: no defects or leaks present<input type="checkbox"/> No visible particles or precipitates<input type="checkbox"/> No oiling, streaking, clumping, or separation<input type="checkbox"/> Confirm correct formulation, check for:<ul style="list-style-type: none"><input type="checkbox"/> Patient's name on label<input type="checkbox"/> Match all components listed on the label against the PN order<input type="checkbox"/> Route of administration (central vs peripheral)<input type="checkbox"/> Documentation of proper VAD tip placement	<ul style="list-style-type: none"><input type="checkbox"/> Initiate PN infusion<ul style="list-style-type: none"><input type="checkbox"/> Use appropriate size filter on distal end of tubing<input type="checkbox"/> Spike container<input type="checkbox"/> Prime tubing<input type="checkbox"/> Set infusion pump settings using double check<input type="checkbox"/> Trace catheter system to point of origin<input type="checkbox"/> Disinfect needleless adapter on VAD hub<input type="checkbox"/> Connect PN to patient<input type="checkbox"/> Initiate PN infusion at prescribed rate<input type="checkbox"/> Initiate monitoring protocol which includes:<ul style="list-style-type: none"><input type="checkbox"/> Patient response<input type="checkbox"/> Glucose monitoring
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GERIATRICS

Integrating Nutrition in the Comprehensive Geriatric Assessment

Countersailing the Trajectory of Frailty and Sarcopenia in Older Adults

Microelement Needs of the Elderly

Enteral Nutrition for Older Adults in Healthcare Communities

Home Delivered Meals and Nutrition Status Among Older Adults

Role of Nutrition in the Treatment and Prevention of Pressure Ulcers

A.S.P.E.N. Standards for Nutrition Support: Home and Alternate Site Care



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Comprehensive Geriatric Assessment (CGA)

- Integrating Nutrition in the Comprehensive Geriatric Assessment







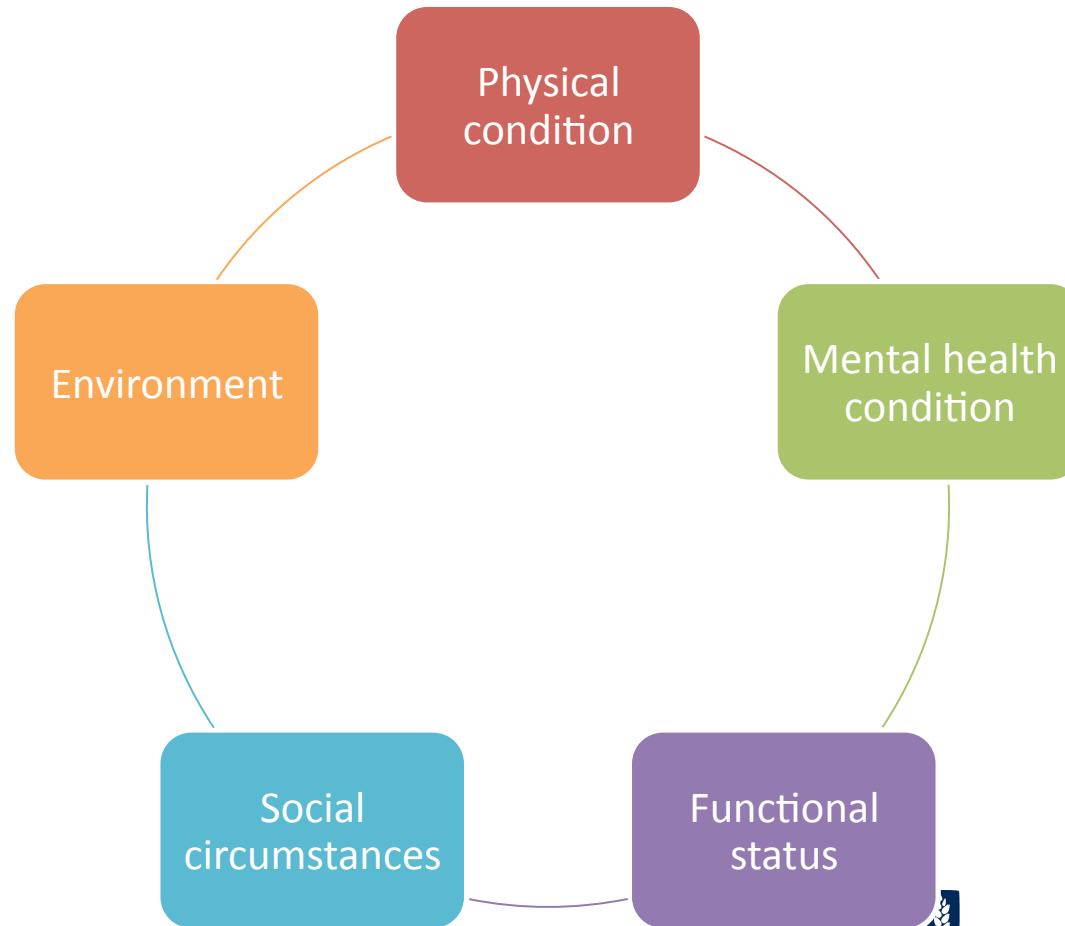
The young old (65-74 years)

The old (75-84 years)

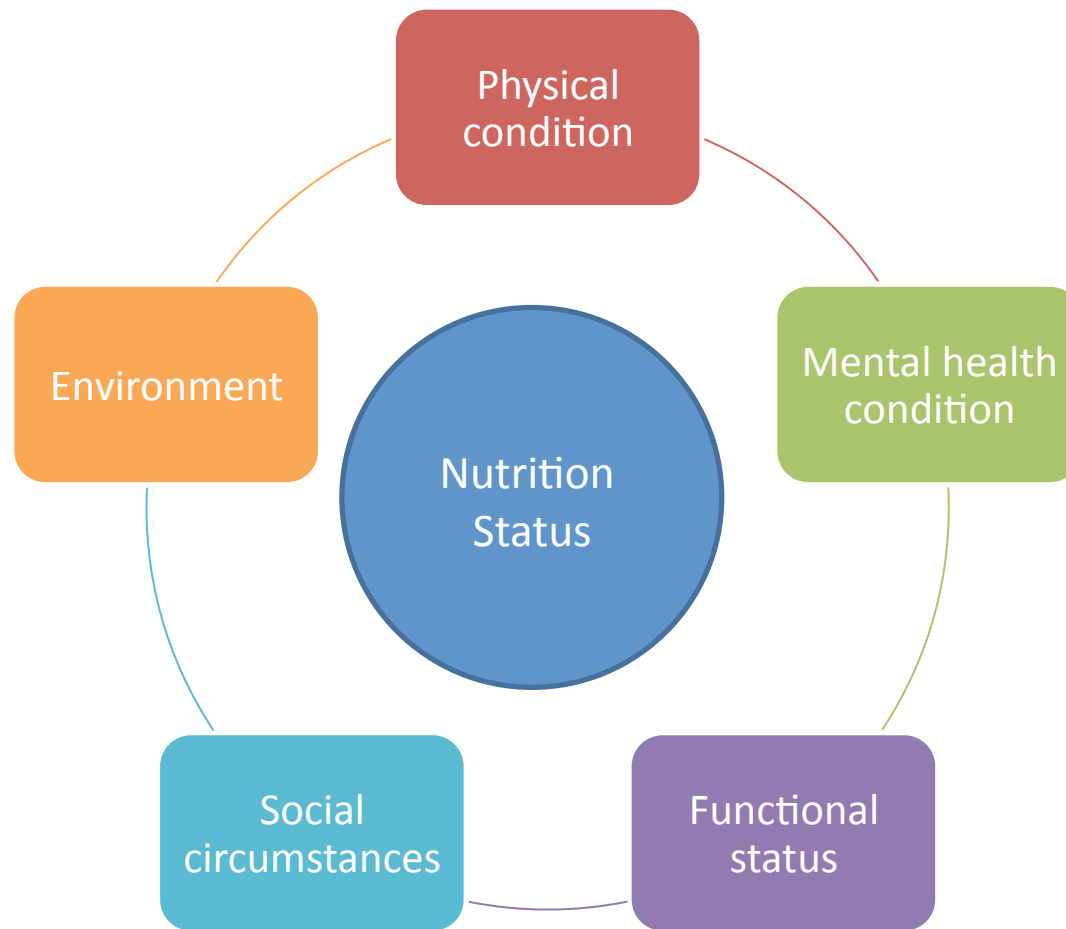
Oldest old (85-99 years)

Elite old (> 100 years old)

Comprehensive Geriatric Assessment



Comprehensive Geriatric Assessment



Micronutrient Needs of the Elderly

- Vitamin A
- Vitamin B1/Thiamine
- Vitamin B12/Cobalamin
- Vitamin C
- Vitamin D
- Iron
- Zinc





Assessment Questions

1. Does education of prescribers improve PN ordering?
2. What is the maximum safe osmolarity of PN admixtures intended for peripheral vein administration?
3. Is malnutrition associated with hospital readmission in the elderly?



Questions?

