WEBCAST INFORMATION

What is a webcast? A webcast brings the presentation to you – at your work place or in your home. You view and hear the presentations in “real time” complete with slides and video of the speakers and have the opportunity to ask questions at the end of the activity. Continuing pharmacy education (CPE) credits earned through participation in webcasts qualify as live CPE credit. Please join the webcast at least 5 minutes before the scheduled start time for important activity announcements.

How do I register? You should have received a confirmation email with your enrollment code and instructions for accessing the educational program via ASHP new eLearning site. If you need assistance, contact ASHP at eLearning@ashp.org.

How do I process my CPE? After completing this webcast, you will process your CPE online and print your statement of credit at elearning.ashp.org/my-activities. To process your CPE, you will also need your NABP e-Profile ID, birth month, and birth day. Complete CPE processing instructions are available in this handout.

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Why can’t I hear audio? Check your volume controls and whether or not the device you are using has speakers. There are three areas you may find volume controls:

- Player volume: look for the volume icon inside the player.
- Adjust the volume slider and confirm that mute is not selected.
- External speakers (optional): check whether or not the speakers have a volume control dial or knob that you can use to increase or decrease the volume level.

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Alternately, an Audio Only option is available for those who are unable to launch the webcast stream. Users call in using a toll free number and follow along with the slides in this handout. After opening the appropriate month in Your Enrollments, click on the Live Webcast link for call-in information.

Can I access my subscription and view the live webcast and archived version on a mobile device?
Yes, the entire subscription is accessible on iPad and iPhone.
Beverly Holcombe, Pharm.D., BCNSP, FASHP
Clinical Practice Specialist
American Society for Parenteral and Enteral Nutrition
Silver Spring, Maryland

Beverly J. Holcombe, Pharm.D., BCNSP, FASHP, is Clinical Practice Specialist with the American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.).

She received her Bachelor of Science degree from the University of North Carolina (UNC) – Chapel Hill School of Pharmacy and her Doctor of Pharmacy degree from the University of Tennessee Health Sciences Center in Memphis. Dr. Holcombe then completed an ASHP Research and Education Foundation Pharmacy Nutrition Support Services Fellowship at the University of Tennessee in Memphis.

Prior to joining A.S.P.E.N. Dr. Holcombe was a Clinical Specialist in the Pharmacy Department at UNC Health Care and Clinical Professor, UNC Eshelman School of Pharmacy. Dr. Holcombe’s specialty practice at UNC Health Care was in nutrition support and she was a member of the adult nutrition support service for more than 25 years. During her tenure at UNC she participated in both didactic and experiential education for pharmacy students and post-graduate trainees. She continues to facilitate classroom education experiences for UNC pharmacy students.

Dr. Holcombe has held leadership roles in ASHP including serving on the Executive Committee of the Section of Clinical Specialists and Scientists. She has held leadership positions with the Board of Pharmacy Specialties and was chair of the first Specialty Council on Nutrition Support Pharmacy Practice. Throughout her career Dr. Holcombe has been a leader in A.S.P.E.N. Her leadership roles include serving as Secretary and a member of the Board of Directors. Dr. Holcombe has also served on numerous A.S.P.E.N. committees and task forces. Most recently she served as chair of the A.S.P.E.N. Nutrition Product Shortage Subcommittee and was a member of the Parenteral Nutrition Safety Task Force. The work of this task force culminated in the publication of the A.S.P.E.N. Parenteral Nutrition Consensus Safety Recommendations.


Dr. Holcombe is recognized locally, nationally and internationally for her expertise in nutrition support. She has provided presentations at ASHP Midyear Clinical meetings, ASHP state affiliate conferences, A.S.P.E.N. Clinical Nutrition Week, local chapters of A.S.P.E.N. and international congresses on parenteral and enteral nutrition.
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TARGET AUDIENCE

This continuing pharmacy education series was planned to meet the needs of pharmacists in a variety of settings, and it would be particularly beneficial for pharmacists, clinical specialists, pharmacy managers, leaders, and educators who are interested in learning about new and emerging trends for improving patient care.

LEARNING OBJECTIVES

After attending this knowledge-based educational activity, participants should be able to

- Describe system-based strategies to improve the safety of parenteral nutrition therapy.
- Describe management strategies for conserving and rationing parenteral nutrition components during shortages.
- Design a parenteral nutrition formulation for an adult to include appropriate dosing of macro- and micronutrients.
- Compare the composition and dosing regimens for intravenous fat emulsion products approved for use in the United States.
- Compare the advantages and disadvantages of compounded and commercially-available parenteral nutrition admixtures.
Instructions for Processing CPE online at
http://elearning.ashp.org/

Per ACPE, CPE credit must be claimed no later than 60 days from the date of
the live activity or completion of a home study activity. All CPE credit processed on the
eLearning site will be reported directly to CPE Monitor. To claim pharmacy credit, you must have
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The ASHP eLearning site allows participants to obtain statements of CPE conveniently and
immediately using any computer with an internet connection. To obtain CPE statements, please
visit: http://elearning.ashp.org/

1. Click on My Learning Activities or Log In / Register. You will be prompted to log in using
your e-mail address and password.

   If you have not logged in to any of the ASHP’s sites before and are not a member
   of ASHP, you will need to set up an account by clicking on Register and following the
   instructions.

2. Once logged in to the site, click on My Learning Activities.

3. You will see a field where you can enter an enrollment code. You should have received the
enrollment code when you purchased your subscription. Enter your code in the text box and
click Redeem.

4. If your code was redeemed successfully, you should see enrollments appear for each month
that you have access to.

5. Click on the title of the presentation that you are claiming for CPE.

6. After completing any remaining requirements for that program, click Claim in the credit
profile box on the right-hand side. Please check to make sure you are selecting the LIVE
credit profile.

   To claim credit, you will need to enter your NABP e-Profile ID, birth month, and
   birth day. Once you have entered this information the first time, it will auto fill in
the future.

7. Review the information for the credit you are claiming, and fill in your NABP e-Profile ID,
birth month, and birth day. If the information all appears to be correct, check the box at the
bottom and click Claim. You should receive a message if there are any problems claiming
your credit.

8. After successfully completing the processing of all your sessions, you may print your
certificate by clicking on Print in each session block. If you require a reprint of a certificate,
return here to print a duplicate. Please note that printed certificates may not be necessary
because your CPE credit will be reported directly to CPE Monitor.

NEED HELP? Contact ASHP at eLearning@ashp.org
Parenteral Nutrition: Current Practices and Innovations

Stay Up to Date on the Most Current and Relevant Topics in Health-System Pharmacy Practice. Below is the UNC Pharmacy Grand Rounds Webcast Schedule.

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Speaker(s)</th>
<th>Activity Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sept 8, 2015</td>
<td>Kids Can Be Foodies Too! Overview on Pediatric Parenteral and Enteral Nutrition</td>
<td>Daniel Lui, Pharm.D.</td>
<td>(Activity information coming soon)</td>
</tr>
<tr>
<td>Oct 13, 2015</td>
<td>Always Something New! Updates in Pharmacologic Management of Diabetes</td>
<td>Caron Misita, PharmD, BCPS, CDE, CPP</td>
<td>(Activity information coming soon)</td>
</tr>
<tr>
<td>Nov 10, 2015</td>
<td>Role of Adjunct Analgesics and Other Non-Opioid Strategies in the Management of Chronic Pain</td>
<td>Timothy J. Ives, Pharm.D., M.P.H., BCPS, FASHP, FCCP, CPP</td>
<td>(Activity information coming soon)</td>
</tr>
<tr>
<td>Dec 15, 2015</td>
<td>Pharmacist Involvement in Transitions of Care</td>
<td>Jamie Cavanaugh, PharmD, CPP</td>
<td>(Activity information coming soon)</td>
</tr>
<tr>
<td>Jan 12, 2016</td>
<td>Atrial Fibrillation with a Focus on New Oral Anticoagulants</td>
<td>Zack Deyo, Pharm.D., BCPS, CPP</td>
<td>(Activity information coming soon)</td>
</tr>
<tr>
<td>Feb 9, 2016</td>
<td>Update on the Management of Parkinson’s Disease</td>
<td>Shauna S. Garris, Pharm D., BCPP, BCPS</td>
<td>(Activity information coming soon)</td>
</tr>
<tr>
<td>Mar 8, 2016</td>
<td>Acute Blood Pressure Management in Acute Stroke</td>
<td>Denise H. Rhoney, Pharm D., FCCP, FCCM, FNCS</td>
<td>(Activity information coming soon)</td>
</tr>
<tr>
<td>Apr 12, 2016</td>
<td>Preparing your Pharmacy Department for Compliance with USP &lt;800&gt;</td>
<td>Lindsey Amerine, Pharm.D., M.S., BCPS</td>
<td>(Activity information coming soon)</td>
</tr>
</tbody>
</table>
Parenteral Nutrition: Current Practices and Innovations

Beverly Holcombe, Pharm.D., BCNSP, FASHP
Clinical Practice Specialist
American Society for Parenteral and Enteral Nutrition
Silver Spring, Maryland

Disclosures
• The faculty and planners report no financial relationships relevant to this activity.

Objectives
• Describe system-based strategies to improve the safety of parenteral nutrition therapy.
• Describe management strategies for conserving and rationing parenteral nutrition components during shortages.
• Design a parenteral nutrition formulation for an adult to include appropriate dosing of macro- and micronutrients.
• Compare the composition and dosing regimens for intravenous fat emulsion products approved for use in the United States.
• Compare the advantages and disadvantages of compounded and commercially-available parenteral nutrition admixtures.

Introduction
• Parenteral nutrition (PN) is a complex therapy
• Pharmacists with no specialty training responsible for PN
• Challenges for pharmacists
  – Who wants this order “PN per pharmacy”?
  – Can I add this medication to the PN?
  – We’re getting a new CPOE system what components are required for the PN order?
  – Can we use adult trace elements for neonates?

Case Study: Preterm infant requiring PN

<table>
<thead>
<tr>
<th>Phase</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prescribe</td>
<td>PN with zinc X mcg/100 mL</td>
</tr>
<tr>
<td>Order Review &amp; Data Entry</td>
<td>Zinc dose correctly converted to mcg/kg to match compounder template</td>
</tr>
<tr>
<td></td>
<td>Zinc dose erroneously entered in compounder as mg not mg/kg—1000-fold error</td>
</tr>
<tr>
<td>Data Entry Check</td>
<td>Error not noted during work check and PN label check</td>
</tr>
<tr>
<td>Compound</td>
<td>PN prepared with dozens of vials of zinc sulfate, replenished syringe on compounder 10 times</td>
</tr>
<tr>
<td></td>
<td>Error not noted during manual syringe check</td>
</tr>
<tr>
<td>Administration</td>
<td>Numbers, not units, reported at label check</td>
</tr>
<tr>
<td>Error Identified</td>
<td>Unusual PN preparation reported</td>
</tr>
<tr>
<td>Patient Outcome</td>
<td>Treated for zinc overdose</td>
</tr>
<tr>
<td></td>
<td>Death</td>
</tr>
</tbody>
</table>
PN-Associated Errors

- Complex therapy
  - May contain more than 20 ingredients
  - Classified as high-alert medication
  - Complications may occur as result of the therapy or the process
- Only 58% of organizations have precautions in place to prevent errors and patient harm.¹
- 44% of survey respondents did not track PN errors.²


PN Safety Consensus Recommendations

- Standardized PN order format and template.
- Standardized electronic orders (CPOE) with direct interface to automated compounding device (ACD).
- Standardized label format and template.


PN Safety Recommendations

- Criteria to identify and evaluate pharmacists competent to review and evaluate orders and preparation of PN.
- Implement soft and hard limits on ACD.
- Develop and implement weight-based limits on ACD.
- Monitor and review ACD alert overrides.


Parenteral Nutrition Order Template: Adult Patient.


PN Safety Recommendations

- Increased training and competency assessment regarding <797> and compounding sterile products.
- Procedures and protocols to decrease of catheter-associated bloodstream infections.
- Use checklists and sign off sheets for critical aspects of the PN process


Parenteral Nutrition: Managing Shortages

Do you feel like Old Mother Hubbard?
Is your PN cupboard bare?

- Are you currently experiencing a shortage of one or more PN components?
- In the last 5 years have you had to reduce the dose of a component from a patient’s PN?
- Have you observed patient harm or suboptimal patient outcome as a result of PN component shortage?

http://inkspiredmusings.blogspot.com/2012/05/old-mother-hubbard-nursery-rhyme-time.html

Nutrient Deficiencies Associated with Trace Element Shortages

- **Zinc**
  - 3 premature infants with dermatitis (2012)
  - 4 infants - 3 with dermatitis, 1 death (2013)
  - 1 adult with biochemical deficiency (2014)
  - 1 adult with impaired wound healing (2014)
- **Selenium**
  - 5 pediatric patients with biochemical deficiency (2012)
- **Copper**
  - 1 adult with anemia and leukopenia (2013)
  - 1 adult with anemia (2014)

When is my cupboard full?
(When is a shortage resolved?)

- Product available through normal supply channels
- No allocations, direct orders or drop shipments
- Able to procure sufficient product to prescribe and administer full dose daily
- FDA considers shortage resolved

PN Component Dosing Strategies After Shortages Resolve

- Rationing and conservation strategies are intended to be used only during shortages.
- Resume prescribing and administering the normal/usual/full dose daily of components to patients that require them.
- The lack of observed adverse events/deficiencies and the potential cost savings associated with “partial” dosing should not be the impetus to continue less than optimal dosing.

Parenteral Nutrition:

Adult Dosing Guidelines
**PN Macronutrient Adult Dosing Guidelines: Amino Acids**

<table>
<thead>
<tr>
<th>Patient Population</th>
<th>Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stable Patients</td>
<td>0.8-1 g/kg/d</td>
</tr>
<tr>
<td>Critically Ill</td>
<td>1.5-2 g/kg/d</td>
</tr>
</tbody>
</table>

**PN Macronutrient Adult Dosing Guidelines: Energy**

<table>
<thead>
<tr>
<th>Patient Population</th>
<th>Usual Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stable patient</td>
<td>20-35 kcal/kg/d</td>
</tr>
<tr>
<td>Critically ill</td>
<td>25-30 kcal/kg/d</td>
</tr>
<tr>
<td>Critically ill obese</td>
<td>&lt;25 kcal/kg/d</td>
</tr>
</tbody>
</table>

**PN Macronutrient Adult Dosing Guidelines: Dextrose**

<table>
<thead>
<tr>
<th>Patient Population</th>
<th>Usual Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>70-85% non-protein energy</td>
</tr>
<tr>
<td></td>
<td>Maximum 7 g/kg/d (4.5 mg/kg/min)</td>
</tr>
<tr>
<td></td>
<td>Minimum 50 g/d</td>
</tr>
<tr>
<td>Stable patient</td>
<td>4-5 mg/kg/min</td>
</tr>
<tr>
<td>Critically ill</td>
<td>≤4 mg/kg/min</td>
</tr>
</tbody>
</table>

**PN Macronutrient Adult Dosing Guidelines: Fat Emulsion**

<table>
<thead>
<tr>
<th>Patient Population</th>
<th>Usual Dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>15-30% non-protein energy</td>
</tr>
<tr>
<td></td>
<td>Maximum 2.5 g/kg/d</td>
</tr>
<tr>
<td></td>
<td>Prevent essential fatty acid deficiency 1-2% energy as linoleic acid and 0.5% as α-linolenic acid (Soybean oil emulsion 100 g/week)</td>
</tr>
<tr>
<td></td>
<td>1 g/kg/d</td>
</tr>
<tr>
<td>Critically ill</td>
<td>&lt;1 g/kg/d</td>
</tr>
</tbody>
</table>

**Daily Electrolyte Guidelines for Adults**

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Requirement</th>
<th>Salts Used in PN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium</td>
<td>10-15 mEq</td>
<td>Gluconate*, chloride</td>
</tr>
<tr>
<td>Magnesium</td>
<td>8-20 mEq</td>
<td>Sulfate*, chloride</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>20-40 mmol</td>
<td>Sodium, potassium, glycerophosphate***</td>
</tr>
<tr>
<td>Sodium</td>
<td>1-2 mEq/kg**</td>
<td>Chloride, acetate, phosphate</td>
</tr>
<tr>
<td>Potassium</td>
<td>1-2 mEq/kg**</td>
<td>Chloride, acetate, phosphate</td>
</tr>
<tr>
<td>Acetate</td>
<td>As needed to maintain acid-base balance</td>
<td>Sodium, potassium, phosphate</td>
</tr>
<tr>
<td>Chloride</td>
<td>As needed to maintain acid-base balance</td>
<td>Sodium, potassium, phosphate</td>
</tr>
</tbody>
</table>

* Preferred salt for use in PN admixtures.
** Multiple salts of these may be used to provide total of 1-2 mEq/kg
*** Imported product, not FDA approved.


**U.S. IV Adult Multivitamins Recommended Daily Dose**

<table>
<thead>
<tr>
<th>Component</th>
<th>Dose per 10 mL</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (retinol)</td>
<td>1 mg</td>
</tr>
<tr>
<td>D (ergocalciferol)</td>
<td>5 mcg</td>
</tr>
<tr>
<td>E (dl-alpha tocopheryl acetate)</td>
<td>10 mcg</td>
</tr>
<tr>
<td>K (phyloquinone)*</td>
<td>150 mcg</td>
</tr>
<tr>
<td>C (ascorbic acid)</td>
<td>200 mg</td>
</tr>
<tr>
<td>B-1 (thiamin)</td>
<td>6 mg</td>
</tr>
<tr>
<td>B-2 (riboflavin)</td>
<td>3.6 mg</td>
</tr>
<tr>
<td>Niacinamide</td>
<td>40 mg</td>
</tr>
<tr>
<td>Dexpanthenol</td>
<td>15 mg</td>
</tr>
<tr>
<td>B-6 (pyridoxine)</td>
<td>6 mg</td>
</tr>
<tr>
<td>B-12 (cyanocobalamin)</td>
<td>5 mcg</td>
</tr>
<tr>
<td>Biotin</td>
<td>60 mcg</td>
</tr>
<tr>
<td>Folic Acid</td>
<td>600 mcg</td>
</tr>
</tbody>
</table>

* One manufacturer provides product that is phyloquinone-free.
**Parenteral Nutrition:**

**Fat Emulsions on the Horizon**

A non-critically ill adult patient with normal hepatic and renal function requires PN for a prolonged post-op ileus. The order is "pharmacy to manage PN".

Using the scale below assess your knowledge and confidence to order an initial PN for this patient.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have no clue</td>
<td>I'll try but need help</td>
<td>I can do this</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Intravenous Fat Emulsions: Functions**

- Source of essential fatty acids
- Alternative to carbohydrates as a source of non-protein energy
- Standard soy-based oil (SO) IV fat emulsions (IVFE) meet the requirement to prevent EFAD in patients receiving PN

**Alternative Oil-based Emulsions**

- Used outside the U.S. for many years
- Alternative oils
  - Olive
  - Medium chain
  - Fish
  - Combinations
- Products approved in U.S.
  - Mixture of olive oil and soybean oil emulsion (4:1)
  - Clinolipid (Clinoleic outside U.S.)

**What’s Different**

- Phytosterol content
- Vitamin E content
- Inflammatory characteristics due to oil source

---

**American Regent. US products
***Available under temporary importation; not FDA approved.
### Comparison of IV Fat Emulsions

<table>
<thead>
<tr>
<th>OIL</th>
<th>Intralipid</th>
<th>Olmegaven</th>
<th>Clinoleic/ Clinolipid</th>
<th>SMOFlipid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soybean</td>
<td>100%</td>
<td>20%</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>MCT</td>
<td>30%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olive</td>
<td>80%</td>
<td>25%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fish</td>
<td>100%</td>
<td>15%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glycerol (%)</td>
<td>2.25</td>
<td>2.5</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Egg Phospholipid (%)</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
<td>1.2</td>
</tr>
<tr>
<td>Phytosterols (mg/L)</td>
<td>439 ± 5.7</td>
<td>3.66</td>
<td>274 ± 2.6</td>
<td>207</td>
</tr>
<tr>
<td>Vitamin E (mg/L)</td>
<td>38 mg</td>
<td>150-296 mg</td>
<td>32 mg</td>
<td>163-225 mg</td>
</tr>
</tbody>
</table>

Courtesy of Kathy Gura, PharmD, BCNSP, FASHP, FPPAG, FASPEN

### Inflammatory Characteristics of Oils

- **More Pro-inflammatory**
  - Safflower Oil
  - Soybean Oil
  - Fish Oil
- **Less Pro-inflammatory**
  - Medium Chain Triglyceride Oil
  - Parenteral nutrition without Fat Emulsions


### A.S.P.E.N. Position Statement

Based on substantial biochemical and clinical evidence, alternative oil-based IVFEs may have the following effects when compared to standard SO IVFEs:

- Less pro inflammatory effects
- Less immune suppression
- More antioxidant effects
- May potentially be a better alternative energy source


### Clinical Use of Alternative Oil IVFE

- Original IVFE use/approval energy and essential fatty acids; safety
- Challenging to get new products approved in U.S.
- Difficult to demonstrate specific therapeutic indication for alternative oil IVFE

### Status of Alternative Oil IVFE in U.S.

- Soy-oil based IVFEs continue to be the standard of care
- Mixture of olive and soybean oils emulsion (4:1) approved but not on market
  - Approved for use in adults
  - Not for pediatric patients and neonates
- Fish oil-based IVFE on compassionate use for parenteral nutrition-associated liver disease (PNALD)

### Parenteral Nutrition:

Commercially-available products vs. Compounded admixtures
Commercially-Available PN Products

- Industry-manufactured
- Fixed combination of amino acids and dextrose
  - May include IVFE
  - May include fixed amount of electrolytes
- Components separated by internal membrane (multi-chamber bag)
- Membrane must be broken and components mixed prior to administration
- NOT complete, ready-to-hang; NOT “premixed”

Considerations: Cost

- Multiple analyses
- Different variables
  - Salaries
  - Equipment and supplies
  - Need for additional electrolytes
- Individual institution must conduct cost analysis considering the many factors associated with PN therapy
  - Small institutions
  - Low PN volume

Considerations: Safety

- Potential to reduce errors
  - Simplified compounding
  - Potential to reduce catheter-associated bloodstream infections
- Safety concerns
  - Additive quantity and compatibility questions
  - Not complete—must add vitamins and trace elements
  - Membrane must be broken and mixed
  - Labelling in % concentration and ions

Considerations: Clinical Use

- Useful during PN component shortages
- Fixed ratio of macronutrients not appropriate for all adult patients
  - Obesity
  - Critical care
- Fixed electrolyte content not optimal for all patients

Commercially-Available PN: Bottom Line

- Offer advantages with regard to compounding
- May reduce costs—institution specific analysis
- May reduce catheter-associated bloodstream infections
- Useful during shortages
- Fixed macronutrients and electrolytes may not meet needs of adult patients
Take Home Messages

- Pharmacists with no specialty training are responsible for various aspects of the PN process.
- The safety of PN therapy can be improved by evaluating the system and implementing a standardized process.
- Providing PN during shortages requires vigilance and continuous assessment of the entire process to optimize patient care and avoid patient harm.
- The decision to use commercially-available or traditional compounded PN requires a thorough and detailed analysis of all aspects of the PN process and system.

ASHP PN Resource Center

http://www.pnsafeuse.org/home

American Society for Parenteral and Enteral Nutrition

http://www.nutritioncare.org/guidelines_and_clinical_resources/

Stay tuned for Q&A!

- Email questions to pgr@unc.edu
- Complete the evaluation and process your CPE online at elearning.ashp.org/my-activities
- Next webcast: Tuesday, July 14, Noon ET
  - Cytomegalovirus Infection in Solid Organ Transplant
  - Presented by Ruth-Ann Lee, Pharm.D., CPP
SELF – ASSESSMENT QUESTIONS

The presentation self-assessment questions are listed here for your convenience. Note the correct answers for future reference.

1. Parenteral nutrition-associated medication errors
   a. Can be eliminated by using an automated compounding.
   b. Rarely result in patient harm or suboptimal patient outcomes.
   c. Can occur at any point in the process from prescribing to monitoring.
   d. Are routinely documented in medication error reporting systems.

2. Measures to improve the safety of parenteral nutrition therapy include
   a. Implementing an electronic standardized order format.
   b. Eliminating weight-based dose warnings on the automated compounding.
   c. Developing institution-specific compatibility and stability guidelines.
   d. Eliminating credentialing of providers who prescribe PN.

3. Strategies to safely manage a shortage of parenteral nutrition component include
   a. Purchasing as much product as possible.
   b. Administering neonatal-specific products to adults.
   c. Compounding in a single, central location.
   d. Extending beyond-use-dating for PN components.
Parenteral Nutrition References and Readings


