Evidence-Based Nutrition Therapy for Sepsis in the ICU

ICU NURSING

GUIDELINE-BASED

Collaborating to provide optimal nutrition therapy

Learning Objectives

1. Explain the importance of nutrition therapy in the management of sepsis.
2. Identify evidence-based nutrition strategies for critically ill patients with sepsis.
3. Implement nursing practices that promote safe and effective nutrition support.

Sepsis and Nutrition: Why It Matters

Prevalence

- Affects approximately 49 million people globally each year [1]
- 1.7 million in the United States[2]

Mortality

- Approximately 11 million deaths globally due to sepsis [1]
- Death rates from sepsis in the US are ~15-20% (higher with septic shock)[3]

Nutrition implication

Appropriate nutrition provision may improve:

- in-hospital and 30-day mortality[4]
- 60-day mortality and increased ventilator-free days[5],
- inflammation and gut integrity[6]
- infectious morbidity[7] and insulin resistance[6]

Increased LOS and negatively impacted quality of life associated with loss of muscle mass[8]

Global Sepsis Alliance

Evidence: what is recommended—and how strong is the evidence?

			Evidence
Early EN in sepsis/septic shock	SSC 2026[6]	Start EN within 72 h when enteral feeding is feasible	Very low
The septic patient	ESPEN 2023[8]	Early and progressive EN should be used in septic patients after hemodynamic stabilization.	Strong
Early EN in sepsis	ASPEN-SSCM 2016[7]	Start EN within 24-48 hours, after resuscitation/stabilization	Very low
Energy	ASPEN 2022[9]	No clear outcome benefit of more vs less energy early Indirect calorimetry, or 12-25 kcal/kg in first 7-10 days	Moderate
Protein	ASPEN 2022[9] ESPEN 2023[8]	Protein matters, but best exact dose/timing still uncertain; provide ~1.2-2.0 g/kg	Low / Strong Consensus

Let’s take a journey...



ASPEN: Enteral Nutrition Care Pathway for Critically Ill Adult Patients[10]

Enteral Nutrition Care Pathway for Critically Ill Adult Patients

This ASPEN pathway provides steps and resources for managing critically ill adult patients requiring enteral nutrition (EN), starting at needs assessment through transition out of the ICU.

Determine EN Appropriateness and Beneficial Effects

- Determine if GI tract is functional, bowel sounds not necessary
- Assess that patient is unable to take sufficient oral nutrition
- EN provides beneficial effects including decreased infection over PN

Resources: 2016 Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient

Complete Nutrition Assessment

- Assess for presence of malnutrition
- Determine nutrient and therapy goals including macro- and micronutrient and fluid needs
- Assess organ function and if it impacts nutrient dosing

Resources: 2016 Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient
Determination of Nutrition Risk and Status in Critically Ill Patients: What Are Our Considerations?

Assess and Place Enteral Feeding Access Device

- Assess for current enteral access and its appropriateness for current clinical condition
- Determine aspiration risk and need for small bowel versus gastric feeding
- If needed, place small-bore naso-enteric feeding tube with desired gastric or small bowel tip location
- Confirm proper tube placement prior to feeding

Resources: 2016 Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient
Safe Practices for Enteral Nutrition Therapy JPEN 2016
Development of a Competency Model for Placement and Verification of Nasogastric and Nasoenteric Feeding Tubes for Adult Hospitalized Patients

Select Appropriate EN Formula

Consider the following question for formula selection: Does the patient have specific nutrient needs due to their condition?

- High caloric requirements and/or fluid restriction – Select a more fluid restricted, energy dense formula
- Burn or trauma patients – Consider use of formula with additional glutamine
- Persistent diarrhea – Consider use of a mixed fiber-containing formula
- Suspected of malabsorption or lack of response to fiber – Consider use of a small-peptide formula
- Renal impairment – Consider use of an electrolyte altered formula
- If none of the above – Consider use of a standard formula

Resources: 2021 Guidelines for the Provision of Nutrition Support Therapy in the Adult Critically Ill Patient JPEN 2021
ESPEN practical and partially revised guideline: Clinical nutrition in the intensive care unit
Enteral Nutrition Formula Guide

Prescribe EN Correctly Using Standardized Process

- Use Computerized Provider Order Entry (CPOE) if available
- Use computerized Clinical Decision Support (CDS) tools including algorithms and alerts
- Prescribe formula, administration rate or method, and daily volume
- Use volume-based feeding protocols
- Prescribe continuous or intermittent delivery methods as appropriate

Resources: 2016 Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient
Safe Practices for Enteral Nutrition Therapy JPEN 2016

Required EN Order Elements

- Patient information
- Formula name (generic and / or trade name)
- Delivery site (route) and enteral access device
- Administration method and rate
- Nurse-driven EN protocols for volume-based feeding
- Communicate order to department that supplies EN formulas

Resources: 2016 Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient
Safe Practices for Enteral Nutrition Therapy JPEN 2016

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To view an interactive, online version of the pathway, visit nutritioncare.org/ENPathway.

aspen American Society for Parenteral and Enteral Nutrition

Enteral Nutrition Care Pathway for Critically Ill Adult Patients

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Procure, Prepare, and Label the Formula

- Formulas are supplied as ready-to-hang, closed-system, large volume bags or containers; smaller volume cans, bags, or cartons; and powdered formula
- Understand how the formula is ordered, prepared, and delivered to the bedside
- Formulas labels should reflect required order elements and include expiration dates

Resources: Safe Practices for Enteral Nutrition Therapy JPEN 2016

Ready-to-Hang, Closed-System, Large Volume Bags or Containers

- Hang time 24-48 hours
- Reduced infection risk
- Cannot add modular components
- Reduced nursing time

Resources: Safe Practices for Enteral Nutrition Therapy JPEN 2016

Smaller Volume Liquid Cans, Bags, or Cartons: Open System

- Hang time 8 hours
- Increased infection risk
- May add modular components
- Increased nursing time

Resources: Safe Practices for Enteral Nutrition Therapy JPEN 2016

Powdered Formulas Requiring Preparation

- Hang time 4 hours
- Increased infection risk
- Needs to be prepared in special formula room
- Requires sterile water
- Increased nursing time

Resources: Safe Practices for Enteral Nutrition Therapy JPEN 2016

Administer EN Safely and Appropriately

- Perform hand hygiene and wear gloves
- Confirm proper tube placement
- Confirm correct formula and verify patient's name on label; match all components listed on the label against the EN order including route of administration, infusion rate, and expiration date and time
- Verify patient identification
- Maintain patient head of bed (HOB) up at 45 degrees
- Initiate EN infusion
- Advance as tolerated using protocols
- Deliver medications safely

Resources: Safe Practices for Enteral Nutrition Therapy JPEN 2016

Monitor and Reevaluate Patient

- Initiate monitoring protocol
- Evaluate efficacy and goals of therapy
- Alter formula, rate, or volume as needed
- Document tolerance and advancement to goal feedings
- Do not use gastric residual volumes as part of routine care to monitor ICU patients receiving EN
- Reassess nutritional status periodically

Resources: 2016 Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient
Safe Practices for Enteral Nutrition Therapy JPEN 2016
Development of a Competency Model for Placement and Verification of Nasogastric and Nasoenteric Feeding Tubes for Adult Hospitalized Patients

Initiate Discharge Planning for Transition of Care

- Identify new care setting
- Identify prescriber and new care team
- Assess enteral access and if long term access is needed, place gastrostomy, jejunostomy or combined G/J as needed
- Determine if patient continues to need current EN prescription
- Communicate EN order, labs, frequency, and monitoring parameters to new care team

Resources: Safe Practices for Enteral Nutrition Therapy JPEN 2016

Enteral Nutrition Quality Improvement Program

- Develop error reporting program within institution QI/QA department
- Implement infection control for EN handling
- Monitor use of appropriate EN in ICU population
- Monitor tolerance to EN and use of supplemental PN in ICU population
- Measure percent of nutrient requirements received by patients

Resources: 2016 Guidelines for the Provision and Assessment of Nutrition Support Therapy in the Adult Critically Ill Patient
Safe Practices for Enteral Nutrition Therapy JPEN 2016
Development of a Competency Model for Placement and Verification of Nasogastric and Nasoenteric Feeding Tubes for Adult Hospitalized Patients

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ASPEN: Enteral Nutrition Care Pathway for Critically Ill Adult Patients[10]

Selected, abbreviated recommendations. Refer to the full ASPEN Pathway for complete recommendations.

Determine EN Appropriateness and Beneficial Effects

- **Is GI tract functional (bowel sounds not necessary)?**
- EN preferred over PN

Complete Nutrition Assessment

- **Assess for malnutrition (screening is important to starting this process!)**
- Determine nutrient and therapy goals

Assess and Place Enteral Feeding Access Device

- **Assess current EN access/appropriateness**
- **Aspiration risk, need for bowel feeds**
- **Confirm tube placement**

Select Appropriate EN Formula

Consider conditions including:

- high calorie/fluid restricted
- burn/trauma
- persistent diarrhea **(consider fiber/formula change)**
- renal impairment

Prescribe EN Correctly Using Standardized Process

- Prescribe formula, rate or method, and daily volume
- Use **volume-based feeding** protocols

Required EN Order Elements

- Formula name
- Delivery site (route) and enteral access device
- Administration method, rate
- Nurse-driven EN protocols for volume-based feeding

ASPEN: Enteral Nutrition Care Pathway for Critically Ill Adult Patients[10]

Selected, abbreviated recommendations. Refer to the full ASPEN Pathway for complete recommendations.

Procure, Prepare, and Label the Formula

- Ready-to-hang, closed-system, large volume bags; smaller volume cartons; and powdered formula

Administer EN Safely and Appropriately

- **Confirm correct formula, rate, expiration date**
- **Head of bed up at 45 degrees**
- **Initiate EN, advance as tolerated using protocols**

Monitor and Reevaluate

- Evaluate efficacy, goals of therapy
- **Document tolerance and advancement to goal feedings**
- **Do not use GRV as part of routine care to monitor ICU patients receiving EN**

Initiate Discharge Planning for Transition of Care

- Assess enteral access and if long term access is needed
- Determine if patient continues to need current EN prescription

Enteral Nutrition Quality Improvement Program

- Develop error reporting program within institution QI/QA department
- Implement infection control for EN handling
- Monitor use of appropriate EN in ICU population
- Monitor tolerance to EN and use of supplemental PN in ICU population
- Measure percent of nutrient requirements received by patients

Hemodynamic Instability and Enteral Nutrition

ASPEN (2016): *Question:* Are patients with severe sepsis candidates for early EN therapy?[7]

Usually reasonable to discuss/continue EN[7,8]

- Vasopressor requirement is stable or decreasing.
- Resuscitation complete.
- No ongoing large-volume fluid boluses.
- Lactate/perfusion trend is improving.
- No signs of bowel ischemia or major abdominal deterioration.

Pause, hold, or escalate concern[7,8]

- Escalating vasopressor doses
- Continuing need for fluid resuscitation.
- New severe abdominal pain, distention, emesis, increasing NGT output or GRVs (>500 mL).
- Increasing metabolic acidosis.
- Worsening unexplained lactate or perfusion.
- Concern for ischemic bowel, obstruction, or perforation.

Metabolic safety: glucose, electrolytes, and refeeding risk

Glucose

SSC 2026: initiate insulin at ≥180 mg/dL (10 mmol/L).

After insulin begins, a typical target range is 144–180 mg/dL.[6]

Electrolytes

Trend potassium, magnesium, and phosphorus closely when nutrition is initiated or advanced, especially if intake was poor before ICU admission.[8]

Refeeding risk

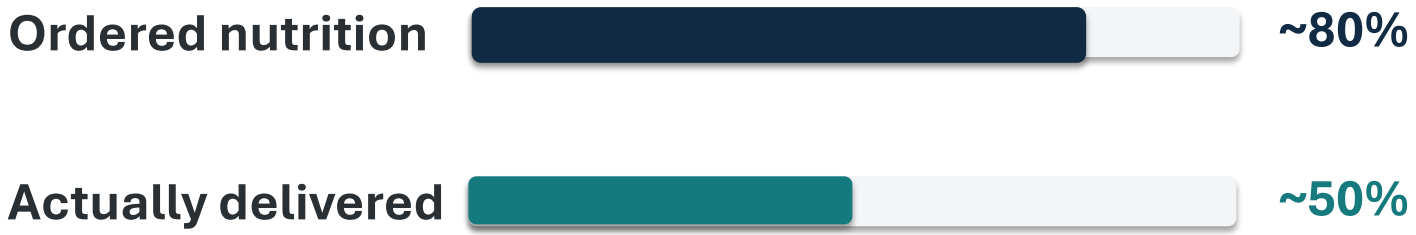
High-risk patients may need slower advancement, plus thiamine/electrolyte replacement per protocol.[7,8,11]

- Communicate electrolyte abnormalities after feeding starts quickly.

The hidden problem: prescribed nutrition vs delivered nutrition

Why nutrition goes missing[7]

- Procedure holds
- Tube dislodgement or clogging
- Hemodynamic instability
- Tolerance concerns



Quality-improvement: documenting why feeds stopped and when they restarted is a nursing intervention important to the team approach to nutrition therapy

Rounding Checklist [6,7,8,9]

1. **Is the patient still stable enough to feed? —** Trend vasopressors, lactate, and abdominal/GI red flags.
2. **What is the order? —** Formula, route, rate, goal, modulars, flush plan, and hold parameters.
3. **What has actually been delivered? —** Any interruptions, delayed restarts, tube issues, or changes after procedures?
4. **Is the tube/access safe? —** Position/verification per policy, securement, and patency.
5. **How is tolerance? —** Emesis, distention, stool pattern, abdominal findings, and need for prokinetics or route reassessment.
6. **How is the metabolic response? —** Glucose, potassium, magnesium, phosphate, fluid balance

Progressive case: Admission

Patient snapshot

68-year-old with pneumonia and septic shock

Intubated, ventilated, and sedated

Received fluids, antibiotics, and norepinephrine per SSC guidelines

MAP now 63–67 with ongoing upward titration overnight

Lactate 4.8 → 5.2 mmol/L

No EN started yet

Abdomen soft, but patient is still in active shock

Considerations

Would you start EN right now?

What features say “not yet”?

What would you watch for over the next 6–12 hours?

Progressive case: Day 2 improvement

Update

After resuscitation:

Norepinephrine is lower and stable

No additional large fluid boluses overnight

Lactate 5.2 → 2.8 mmol/L

Abdomen remains soft; no emesis

Gastric tube is verified and ready

A standard EN formula is ordered

Considerations

- Confirm route, rate, goal, and tube safety.
- Start/restart per order/protocol and monitor closely.
- Document hemodynamic trend supporting feed initiation.
- Trend glucose, K, Mg, phosphate, stool/emesis, and abdominal findings.
- Communicate if delivery is interrupted or intolerance appears.

Progressive case, part 3: complications and underdelivery

New problems

EN was held twice for CT and a bedside procedure.

The patient now has 4 loose stools in 12 hours.

Phosphate fell from 2.8 to 1.8 mg/dL.

Glucose is 196–214 mg/dL after feeds advanced.

Response

Review meds/bowel regimen and stool context.

Replace electrolytes and consider refeeding risk.

Clarify restart plan after procedures.

Escalate persistent diarrhea or underdelivery to the Provider and Clinical Nutrition team.

Considering the diarrhea, low phosphate, and repeated feed interruptions, which action is highest priority?

A. Stop EN and switch to PN immediately

B. Continue exactly as is; loose stool is expected

C. Reassess cause of diarrhea, replace electrolytes, review restart failures, and escalate persistent underdelivery

D. Increase the rate to make up missed calories

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