

## Parenteral Nutrition in Adults Policy

<p><b><u>SUMMARY &amp; AIM</u></b></p> <p>This policy describes the standards for healthcare professionals to follow to use Parenteral Nutrition safely for appropriate clinical indications.</p>	<p><b><u>KEY REQUIREMENTS</u></b></p> <p>Use of PN can be associated with complications, some of which can be life threatening if not managed appropriately. Care is best provided by a multidisciplinary team (Nutrition Support Team) with expertise in managing this patient group.</p>
<p><b><u>TARGET AUDIENCE</u></b></p> <ul style="list-style-type: none"> <li>• Medical staff</li> <li>• Nursing staff</li> <li>• Pharmacy staff</li> <li>• Dietitians</li> <li>• Advanced Care Practitioners</li> </ul>	
<p><b><u>TRAINING REQUIREMENTS</u></b></p> <p>Support will be available via the use of this policy and the use of Trust authorised stationery for prescribing and monitoring PN.</p> <p>Training and competency assessment to perform roles defined in job descriptions is delivered by each department or clinical team.</p>	
<p><b><u>EVIDENCE OF IMPLEMENTATION</u></b></p> <p>Annual audits in line with section 6</p>	

## DOCUMENT CONTROL

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<p><b>Please note that the version of this document within AireShare is the only version that is maintained.</b></p> <p>Any printed copies should therefore be viewed as “uncontrolled” and as such, may not necessarily contain the latest updates and amendments.</p>	

### Approved documents related to this policy

Document name	Document reference / hyperlink
Nutrition Policy	<a href="#">Nutrition Policy</a>
Infection Prevention and Control Policy	<a href="#">Infection Prevention and Control Policy</a>
Fluid Balance Guidelines	<a href="#">Fluid Balance Guidelines</a>

Vascular Access Devices (VAD) guidance	<a href="#">Vascular Access Devices (VAD) guidance</a>
Gastrostomy Pathway Guidelines	<a href="#">Gastrostomy Pathway Guidelines</a>
Jejunal Feeding Guideline	<a href="#">Jejunal Feeding Guideline</a>
Nasogastric Tube Feeding Guideline	<a href="#">Nasogastric Tube Feeding Guideline</a>
Injectable Medicines Policy	<a href="#">Injectable Medicines Policy</a>
Medicines Administration Policy	<a href="#">Medicines Administration Policy</a>
Prescribing Policy	<a href="#">Prescribing Policy</a>
Monitoring Medicines Policy	<a href="#">Monitoring Medicines Policy</a>

### Statement of changes made from version 1.0

Version	Date	Section & description
2.0	Nov 2017	<p>Updated list of approved documents related to this policy. Included on document control page and not in body of policy as previous version.</p> <p>Section 4.1.3 Arrangements for out of hours referral for PN for patients on Critical Care Unit.</p> <p>Appendix D: ECG monitoring is recommended in patients at extremely high risk and in patients who have developed cardiac arrhythmias.</p>

### List of stakeholders who have been asked to review this document

*(list each person, a department or head of department with responsibilities)*

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Nursing and Midwifery Governance Group		24/11/2017
Patient and Carer Panel		01/09/2014



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## 1. INTRODUCTION

Parenteral Nutrition (PN) is the intravenous administration of a solution containing macronutrients, electrolytes and micronutrients, given as a treatment for the management of intestinal failure, where it is not possible to meet nutritional requirements by the oral and/or enteral route.

Use of PN can be associated with complications, some of which can be life threatening if not managed appropriately. Care is best provided by a multidisciplinary team (Nutrition Support Team) with expertise in managing this patient group.

As PN exposes the patient to greater risks than enteral feeding, whenever possible the enteral route should be used in order to maintain gut integrity and reduce the risk of bacterial translocation.

## 2. PURPOSE

The purpose of this policy is to set out the standards for healthcare professionals to follow to use PN safely for appropriate clinical indications.

## 3. SCOPE

This document applies to all healthcare professionals employed by ANHSFT that are involved in the prescribing, formulation, preparation, administration and monitoring of PN.

## 4. PROVISION OF PN TO ADULTS

### 4.1. *Prior to commencing PN*

- 4.1.1 All adults, identified by the consultant as requiring PN must be referred to the Nutrition Support Team for assessment. Contact a pharmacist (ext 3507) or dietitian (ext 4854 or 4856 or bleep 3098) between 09:00 to 15:00 hours Monday to Friday and complete the PN referral form. (Appropriate indications for PN are listed in **Appendix A**)
- 4.1.2 PN is not an emergency intervention in adults and in most cases can be started the next day. Good nutritional management requires forward thinking and timely assessment of nutritional needs.<sup>1</sup> If PN is required to commence during a weekend or bank holiday referral to the Nutrition Support Team must be made between 09:00 to 15:00 hours Monday to Friday. Patients already receiving PN will continue to be monitored by a pharmacist during the weekend and PN supplied each day.
- 4.1.3 Patients receiving level 2 or level 3 care on the Critical Care Unit that require PN to be commenced during a weekend or bank holiday should

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<sup>1</sup> NCEPOD: A Mixed Bag 2007

be referred to a pharmacist (ext 3507 or 3516) before 12:00 hours to enable PN to be prepared during [Pharmacy Aseptic Unit opening hours](#). Completion of an “Out of hours” PN referral form is required (available on Critical Care Unit or from Pharmacy). A standard PN regime using 50% of a Nutriflex Lipid Peri 1250 bag (or equivalent) will be administered every 24 hours until the patient is reviewed by the Nutrition Support Team on the next working day.

- 4.1.4 Central venous access must be established by the medical team prior to commencing PN. PN may be given via a peripherally inserted central catheter (PICC) inserted by a PICC trained nurse. (Choice of intravenous catheter is detailed in **Appendix B**)
- 4.1.5 Baseline bloods must be ordered by the medical team for Urea and Electrolytes, Calcium, Magnesium, Phosphate, Liver Bone Profile, Albumin, CRP, PT and Full Blood Count. (See **Appendix C**: Monitoring of the patient on PN)
- 4.1.6 The dietitian (or if unavailable then, other members of the Nutrition Support Team) will assess the patients risk of *refeeding syndrome* (See **Appendix D**).

## **4.2 Care and monitoring of patient whilst on PN**

- 4.2.1 Only nursing staff with a current competency in IV administration of medicines and Central Venous Catheter (CVC) competency must administer PN. (See **Appendix E**: Prescribing, Formulation and administration of PN regimen) .
- 4.2.2 Monitoring of the patient on PN will be carried out by the Nutrition Support Team in accordance with the parameters set out in Appendix 3.
- 4.2.3 For patients receiving PN for more than 14 days a rest period (as advised by the Nutrition Support Team on an individual basis) should be considered during each 24 hour period . Including a gradual rest period could help prevent fat deposition in the liver.
- 4.2.4 Any patient who is on PN for longer than 14 days must be identified to the Clinical Economy team by the PN pharmacist , so that the cost of their treatment can be reimbursed from the relevant Commissioner.

## **4.3 Transition from PN to enteral or oral nutrition**

- 4.3.1 As soon as the gastrointestinal tract is able to be used, enteral nutrition must be considered by the Nutrition Support Team.
- 4.3.2 PN should be reduced gradually as advised by the Nutrition Support Team on an individual basis ( to minimise metabolic complications such as rebound hypoglycaemia and biochemical imbalances unless

infection of the CVC is suspected. (**Appendix F:** Transition from parenteral to oral and/or enteral nutrition)

#### **4.4 Patients requiring long term PN at home**

4.4.1 All adults who require PN as a Home Care therapy must be referred to the Nutrition Support Team at Leeds Teaching Hospitals Trust as soon as the decision is made. There is no provision at ANHSFT to support patients at home with PN.

### **5. TRAINING & SUPPORT**

Support will be available via the use of this policy and the use of Trust authorised stationery for prescribing and monitoring PN.

Training and competency assessment to perform roles defined in job descriptions is delivered by each department or clinical team.

### **6. PROCESS FOR MONITORING COMPLIANCE**

<b>Standard to be monitored</b>	<b>Process for monitoring</b>	<b>Frequency</b>	<b>Person responsible for</b>	<b>Committee responsible for</b>
Compliance with PN policy	Audit	Annually	Nutrition Support Team	Nutrition and Hydration Group

### **7. ABBREVIATIONS & TERMS USED**

<b>Term</b>	<b>Meaning</b>
Enteral Feeding	Nutrition support directly into the gastrointestinal tract via a tube
Parenteral Nutrition (PN)	Intravenous administration of a solution containing macronutrients, electrolytes and micronutrients, given as a treatment for the management of intestinal failure, where it is not possible to meet nutritional requirements by the oral/enteral route.
Patient	A person who is receiving medical care from the Trust.
Re-feeding Syndrome	Severe fluid and electrolyte shifts associated with initiating nutrition support in malnourished patients, and the metabolic implications which occur as a result of this (Solomon and Kirby 1990).



## 8. DUTIES (ROLES & RESPONSIBILITIES)

List key personnel with duties within this document eg; Assistant Directors of Operations and Clinical Directors, Heads of Nursing, Matrons, Ward Sister/Charge Nurse and Departmental Heads

Role	Duty
Chief Executive / Board of Directors	Overall responsibility for the strategic and operational management of the Trust, including ensuring that Trust policies comply with all legal, statutory and best practice requirements.
Executive Medical Director	Has the delegated responsibility for providing assurance to the Board of Directors for them to discharge their duties in relation to this Policy. Has overall responsibility for the safe and secure handling of medicines as part of the Care Quality Commission registration requirements. Responsible for ensuring that medical staff are aware of the content of this policy and that they are trained to follow this and other related policies to ensure that PN is prescribed and administered only when appropriate.
Director of Nursing	Responsible for ensuring that nurses/midwives/ODPs, nursing associates <sup>2</sup> and student nurses/midwives/ODPs/nursing associates are aware of their responsibilities relating to this policy, that they are trained appropriately and that the policy is applied to every day practice.
Clinical Director of Pharmacy and Medicines Management	Responsible for establishing, monitoring and reporting on systems for the safe and secure handling of medicines within all premises of the Trust, from the time of receipt until use or removal from the organisation, with access only by authorised staff. The Clinical Director of Pharmacy and Medicines Management has overall responsibility for the Pharmacy and is therefore accountable for ensuring Pharmacists follow this policy.
Medical and non-medical Prescribers	All prescribers must be aware of their responsibilities for prescribing PN; ensuring that individual patients obtain maximum benefit with the minimum of risk and unwanted side effects. All prescribers are contractually obliged to comply with this policy and are accountable for their actions.
Pharmacists	Pharmacists are responsible for monitoring the safe, clinical and cost effective use of medicines for individual patients. Pharmacists are responsible for advising on the formulation and administration of PN for individual patients and ensuring that prescribing complies with the Trust formulary.
Dietitians	Dietitians are responsible for calculating individual nutritional requirements and devising a plan to safely meet these needs considering the use of PN and / or enteral feeding. Dietitians are also responsible for supervising the transition from PN to oral or enteral feeding.
Nutrition nurse	The Nutrition Nurse will provide training for staff caring for patients receiving PN

<sup>2</sup> At the time of writing the NMC is consulting on guidelines for Nursing Associates including any responsibilities for medicines. They have been included in this policy in anticipation of their role developing to include some responsibility for medicines subject to training and competency assessment .

	and will assess and monitor care given.
Nutrition Support Team	The Nutrition Support Team consists of a Consultant Gastroenterologist, the Nutrition Nurse, a Dietitian and a Pharmacist and are responsible for the safe and effective use of PN at the individual patient level. The Nutrition Support Team are responsible for auditing practice and ensuring ongoing development.
Heads of Nursing, Matrons, Ward Sisters, Charge Nurses and Departmental Heads	Responsible for ensuring that the policy is implemented in their clinical area and that staff only undertake tasks that they are trained and competency assessed to perform.
Trust staff	Employees and other workers are responsible for of all applicable procedural documents as stated within individual job descriptions

## **APPENDIX A - INDICATIONS FOR PARENTERAL NUTRITION**

PN is indicated in those patients who have been assessed by the Nutrition Support Team as malnourished or are at risk of malnutrition, who have either:

- An inadequate or unsafe oral and/or enteral nutritional intake for them as an individual

OR

- A non functional, inaccessible or perforated gastrointestinal tract.

### **Short term indications**

Type 1 intestinal failure is self limiting (likely duration of less than 14 days) and often peri-operative in nature. Type 1 intestinal failure may include:

- Major gastrointestinal surgery (where there is no suitable enteral feeding access or enteral feeding is contra-indicated e.g. where there is intra-abdominal sepsis/perforation).
- Enterocutaneous fistulae (where position, volume or sepsis prevent enteral feeding)
- Gastro-intestinal obstruction (if suitable enteral feeding is not possible i.e. jejunal feeding below an upper gastrointestinal obstruction)
- Prolonged post-operative ileus
- Severe malabsorption
- Inability to meet full needs via the enteral route due to poor gastrointestinal function.

Other points to consider:

- The choice of route of feeding should be determined by gastrointestinal function.
- Where possible, enteral nutrition should be given according to the patient's tolerance.
- Where applicable enteral nutrition e.g. Naso-gastric (NG) or Naso-jejunal (NJ) and PN can be used together to meet nutritional requirements.

### **Long term indications**

Prolonged episodes of intestinal failure (Type 2 or 3), sometimes requiring home PN.

- Short bowel e.g. resections due to Crohn's disease
- Ischaemic Vascular Disease
- Radiation enteritis
- Motility disorders e.g. scleroderma
- Chronic idiopathic intestinal pseudo-obstruction

## APPENDIX B – CHOICE OF INTRAVENOUS CATHETER

- PN may be administered via a centrally placed catheter, a midline catheter (up to 20cm size are located on Intensive Care Unit (ICU)) or a peripherally inserted central catheter (PICC).
- PICCs are available from the Haematology and Oncology Day Unit (HODU) and should only be inserted by medical and nursing staff trained and competency assessed to insert them.
- A centrally placed multiple lumen catheter is essential if the patient also requires one or more of the following: -
  - a) central venous pressure monitoring to facilitate fluid balance assessment
  - b) inotropes or other medications required to be given centrally
  - c) central access due to poor peripheral veins
  - d) a large number of intravenous medicines with potential for interaction
- In all of the above groups where a centrally placed multiple lumen catheter is required, a specific lumen should be dedicated for PN at the time of catheter insertion. This lumen should be identified with a green bionector.
- A PICC or midline catheter should be used for all patients who require PN, where a centrally placed multiple lumen catheter is not already present and is not due to be inserted. The lumen of the PICC or midline catheter identified for PN must be identified with a bionector .

## APPENDIX C – MONITORING THE PATIENT ON PN BY THE MEDICAL TEAM

All parameters shown in the table below are required initially as part of baseline assessment of the patient and then at the frequency indicated. When patients are receiving PN for more than two weeks the frequency of monitoring may be reduced if biochemically stable on an established PN regimen and clinical condition permits.

- Blood samples should be taken early morning, preferably by the phlebotomist or Acute Care Team.
- Blood samples should not be taken from the PN lumen as this increases risk of infection and leads to spurious results.
- Blood samples should be marked “Urgent - On Parenteral Nutrition”
- Results are required by the Nutrition Support Team by 11:00 hours on weekdays and weekends.

Parameter	Frequency	Rationale
Temperature and blood pressure	4 hourly	Sign of infection / fluid balance
Capillary blood glucose	Monitor every 6 hours until stable. Then <u>Daily</u> unless clinical condition necessitates more /less frequent monitoring. Need to be monitored in the rest period during cyclical PN	Glucose intolerance is common. Good glycaemic control is necessary. Insulin sliding scale may be required.
Body weight	Once or twice a week, unless clinical condition necessitates more or less frequent monitoring	Assists with interpretation of fluid balance & assessment of nutritional status
Fluid balance	Daily	To ensure patient not becoming over or under hydrated. Trend analysis is important.
Sodium, Potassium, Urea, Creatinine	Baseline Daily until stable then once or twice a week	Assessment of renal function, fluid status, electrolyte status. Interpret with knowledge of fluid balance and

Parameter	Frequency	Rationale
		medication. Urine sodium may be helpful in complex cases with gastrointestinal fluid loss.
Liver bone profile and prothrombin time (PT) or INR	Baseline and daily until stable then twice weekly	Abnormalities common during PN. May be due to sepsis, other disease or nutritional intake.
C – reactive protein (CRP)	Baseline, and daily if indicated or twice weekly until stable	A general marker of infection and inflammation
Phosphate, Magnesium	Baseline and then daily	Depletion is common and under recognised. Low concentrations indicate poor nutritional status. To monitor refeeding syndrome.
Calcium, Albumin Use Corrected Calcium	Baseline and daily if indicated	Hypo or hypercalcaemia may occur. Hypocalcaemia may be secondary to magnesium deficiency. Low albumin reflects disease not protein status.
Zinc	If excessive gastrointestinal fluid loss measure baseline then fortnightly	Deficiency common with gastrointestinal losses. Zinc essential for wound healing.
Full blood count	Baseline Twice weekly until stable then weekly	Check for anaemia due to iron or folate deficiency. Signs of infection.
B12 and Folate	If in normal range, baseline assessment is sufficient when patient on PN for less than 3 months.	Check for anaemia due to B12 or folate deficiency.

<b>Parameter</b>	<b>Frequency</b>	<b>Rationale</b>
Triglyceride levels	Monitor in lipaemic patients. Consider in pancreatitis, sepsis, impaired renal or hepatic function.	Check that patient is eliminating fat
Trace elements	Not monitored unless on PN for more than 3 months or a particular deficiency suspected.	

## APPENDIX D - PN REGIMEN FOR ADULTS WHO ARE AT RISK OF REFEEDING SYNDROME

Refeeding syndrome is a group of clinical symptoms and signs that can occur in the malnourished or starved individual upon the reintroduction of nutrition. Over-rapid and unbalanced provision of parenteral nutrition can result in shifts in fluid and electrolytes. These biochemical abnormalities can result in a spectrum of presentations from fluid retention, to cardiac arrhythmias, respiratory insufficiency and ultimately death.

ECG monitoring is recommended in patients at extremely high risk (see table below) and in patients who have developed cardiac arrhythmias.

Risk of re-feeding syndrome	Assessment	Introducing PN
At risk	Any patient who has had very little or no food intake for over 5 days.	<p><i>Introduce feeding at <b>50%</b> requirements for the first 2 days before increasing to full requirements if no biochemical abnormalities.</i></p> <p>Meet requirements for fluids, electrolytes, vitamins and trace elements from day 1 of feeding.</p>
High risk	<p><b>Any patient in a starved state is at a higher risk of refeeding syndrome if they have one of the following:</b></p> <ul style="list-style-type: none"> <li>• BMI &lt; 16 kg/m<sup>2</sup></li> <li>• Unintentional weight loss &gt; 15% within the last 3-6 months</li> <li>• Very little or no nutrition for &gt; 10 days</li> <li>• Low levels of potassium, magnesium or phosphate prior to feeding</li> </ul> <p><b>Or if a patient has 2 or more of the following:</b></p>	<p>Commence feeding at <b>10 kcal/kg</b></p> <p>Increase slowly to meet full requirements by 4-7 days</p> <p>Any increase in PN should be dependent on trends in biochemistry. Monitor potassium, magnesium and phosphate daily.</p> <p>Immediately before and during the first 10</p>



	<ul style="list-style-type: none"> <li>• BMI &lt; 18.5 kg/m<sup>2</sup></li> <li>• Unintentional weight loss &gt; 10% within the last 3-6 months</li> <li>• Very little or no nutrition for &gt; 5 days</li> <li>• A history of alcohol abuse, or some drugs including insulin, chemotherapy, antacids or diuretics</li> </ul>	<p>days of feeding supplement with:</p> <p>Pabrinex IVHP one pair of ampoules daily</p> <p>OR</p> <p>Via NG tube Thiamine 100mg tablets, 1 tablet (crushed and mixed with water) three times daily and Vigranon<sup>®</sup> B syrup 10mls or Forceval soluble 1 tablet daily</p> <p>OR</p> <p>ORAL Thiamine 100mg tablets, 1 tablet three times daily, vitamin B Co strong 2 tablets three times daily (for a maximum of 10 days) and Forceval capsule once daily</p>
Extremely high risk	<ul style="list-style-type: none"> <li>• Patients in a starved state with BMI &lt; 14 kg/m<sup>2</sup></li> <li>• Very little or no nutrition for &gt; 15 days</li> </ul>	<p>Consider starting the PN at <b>5 kcal/kg</b></p> <p>Vitamins and minerals will need to be supplemented (as per high risk advice)</p>

- Patients at risk of refeeding syndrome need to have the following blood tests checked daily until stable:
  - U&Es
  - Phosphate
  - Magnesium
  - Corrected calcium
- If these blood levels are low then they should be corrected by the appropriate route e.g. oral or IV. There is no requirement to delay feeding whilst correcting electrolytes.



## **APPENDIX E – PRESCRIBING, FORMULATION, AND ADMINISTRATION OF PN REGIMEN**

- PN is formulated in a single infusion container for adults.
- Standard PN regimens are purchased and additions of electrolytes, vitamins and trace elements are made by the Pharmacy Aseptic Unit on the instruction of the pharmacist.
- The standard PN regimens are suitable for many patients who require short term nutritional support.
- The choice of regimen is determined by assessment of the patient's clinical condition and calculation of nutritional requirements by the Nutrition Support Team.
- The PN regimen is then prescribed on the ANHSFT Adult PN prescription chart each day and **MUST** be signed by both a prescriber and pharmacist before administration.
- A dedicated lumen or line must be used for PN and identified with a bionector
- Any other medications, blood products or CVP readings must be administered via a separate lumen or line.
- A volumetric pump must be used to ensure accurate delivery of PN.
- Ensure that the PN bag and IV administration set are out of direct sunlight when connected to the patient.
- The IV administration set and PN solution must be changed every 24 hours, observing strict aseptic technique.
- Check patient allergy status
- Check the label for patient's name, details of PN regimen and infusion rate against the PN prescription chart.
- Record the batch number, volume and start time of infusion on the PN prescription chart as with any other infusion.
- Partly used PN bags must never be reconnected. Discard and contact pharmacy for a new one.
- Check the pump and bag every hour. Record fluid balance accurately.
- Record the time that the PN infusion is discontinued.

## **APPENDIX F – TRANSITION FROM PARENTERAL TO ORAL AND/OR ENTERAL NUTRITION**

The aims during the transition from parenteral to oral and/or enteral nutrition are to:

- a) use the gastrointestinal tract as soon as possible
- b) meet the patient's nutritional requirements whilst minimising the risks associated with PN
  - As soon as the patient is able to take fluids or oral diet, enteral nutrition should be considered as an alternative to PN whilst the patient's appetite is returning.
  - Whilst oral diet and/or enteral nutrition is being established, PN should be continued at a reduced rate. However if the risk of continuing PN (such as an infected line) is greater than the risk of not meeting the patient's nutritional requirements, then PN should be stopped immediately.
  - The dietitian will monitor and advise during the transition period between parenteral oral diet and/or enteral nutrition.

### **PN to enteral nutrition (no oral intake)**

- At all times during the transition, the patient's fluid balance should be monitored closely.
- As soon as the gastrointestinal tract is functioning, enteral nutrition should be started. PN should be continued and the dietitian informed. If the patient has swallowing problems, the Speech and Language Therapist should also be informed.

### **PN to oral diet**

- At all times during the transition, the patient's fluid balance should be monitored closely. As soon as the patient is able to take fluids or diet the dietitian should be informed.
- PN should be continued during the introduction of fluids up to free fluids. As soon as the patient is allowed free fluids, oral nutritional supplements, e.g. Fortisip Compact, Fortijuce, can be introduced.
- As the patient commences oral diet or oral nutritional supplements, the volume of PN may be reduced as advised by the dietitian.
- If the patient has a tracheostomy tube, they are at increased risk of aspiration during the transition from parenteral feeding to oral diet. The patient's swallow should be assessed by an appropriately trained nurse before any oral food or fluid is given. If dysphagia is present, the patient should be referred to a Speech and Language Therapist for assessment. In some cases, the Speech and Language Therapist may recommend referral for videofluoroscopy before proceeding to oral diet.

