1. **Aim/Purpose of this Guideline**

1.1. The aim of this guideline is to provide information to all health care professionals to ensure appropriate and safe administration of Parenteral Nutrition (PN) and to aim to reduce complications including mechanical, infective and metabolic. PN is a high risk intravenous therapy, the use of which must be supervised and monitored by suitably trained staff. It should not be given without appropriate forethought and planning.

1.2. **Data Protection Act 2018 (General Data Protection Regulation – GDPR) Legislation**

The Trust has a duty under the DPA18 to ensure that there is a valid legal basis to process personal and sensitive data. The legal basis for processing must be identified and documented before the processing begins. In many cases we may need consent; this must be explicit, informed and documented. We can’t rely on Opt out, it must be Opt in.

DPA18 is applicable to all staff; this includes those working as contractors and providers of services.

For more information about your obligations under the DPA18 please see the ‘information use framework policy’, or contact the Information Governance Team rch-tr.infogov@nhs.net

2. **The Guidance**

Parenteral Nutrition (PN) refers to the provision of macronutrients (carbohydrate, nitrogen and lipid), micronutrients (vitamins, trace elements and minerals) electrolyte and fluid requirements in an intravenous nutrient solution.

2.1.1 PN should not be used in patients who have a functioning and accessible GI tract, where alternative methods e.g. enteral nutrition should be considered. Intraoperative placement of Nasojejunal tubes or surgical jejunostomy tubes should be considered in patients where it maybe anticipated that nasogastric feeding may fail or whereby postoperative insertion of enteral feeding tubes may be problematic.

2.1.2 PN may be useful for, but not limited to the following conditions:
- Gastrointestinal Fistulae.
- Post-operative ileus
- Bowel obstruction
- Short Bowel Syndrome
- Severe pancreatitis, if jejunal feeding is not tolerated.
- Multi organ failure.
- Inflammatory Bowel Disease.
- Patients with mucositis subsequent to chemotherapy.
- Radiation Enteritis
- Preoperative nutritional optimisation in those severely malnourished.

2.1.3 The rationale for PN, together with clear goals, should be established
at the initial assessment. Goals should then be reviewed at each contact to facilitate effective monitoring and appropriate use of PN.

2.1.4 Some patients treated with PN can absorb some fluid and nutrition taken orally and in these patients PN is supplementary to their oral/enteral intake, i.e. SPN.

2.1.5 Occasionally, the decision of whether to prescribe PN is complex and additional opinions may be necessary, for instance palliative care. In such circumstances it may be appropriate to start treatment for a time or period, with the provision that the outcome will be reviewed at the end of a specific time period or earlier if needed, to be stopped, changed or continued as appropriate.

2.1.6 The duration of PN in most conditions is dependent upon the return of normal intestinal function. However provision of PN for less than 3 days is usually not clinically indicated as the risk can far outweigh the benefits.

2.1.7 PN does not utilise the gastro-intestinal tract and therefore removes an important physiological and immunological barrier. This may therefore expose the patient to an increased risk of metabolic and/or septic complications.

2.1.8 Additional complications may include dehydration and electrolyte imbalances, thrombosis, hyperglycemia and hypoglycemia, infection, micronutrient deficiencies and liver failure.

2.2 Education

2.2.1 It is the responsibility of clinical ward managers to ensure that health care professionals undertaking clinical skills have received sufficient and appropriate training. PN patients must be cared for by registered nurses at the discretion of the ward manager. It is the responsibility of individual practitioners to attain and maintain competency in administering PN and ongoing patient management through frequent update and use of these skills. PN bags provide the perfect environment for a variety of potentially dangerous microorganisms. Patients receiving PN are often immunocompromised increasing the risk of an acquired line infection. As the PN is delivered directly into the intravenous system bypassing the body’s natural defenses against infection, asepsis when accessing the catheter is required at all times and is an absolute necessity (see appendices for standard operating procedure for connecting and disconnecting TPN and performing a dressing change).

2.2.3 It is recommended that as a minimum competency the Registered Nurse should have:

- Competency in the administration of injectable medicines
- Completion of the Parenteral Nutrition eLearning module available on ESR
- Read and understand the PN clinical guideline
- Demonstrate up to date evidence with the principles and practice of aseptic non touch technique (ANTT), and
• Be familiar and understand the required care and risks associated with intravascular access devices (IVAD) - refer to RCHT Intravascular Catheter guideline on the intranet document library for further management of IVAD, complications and troubleshooting. IntravascularCathetersInAdultsProtocol.pdf

2.2.4 Due to the extra training needs of staff working with PN patients, certain wards have now become designated PN cohort wards. These are wards that are experienced in caring for patients requiring PN and include; Upper GI and Colorectal surgery (Pendennis) and Gastroenterology and liver unit and oncology ward (Lowen).

Where the patient is not on a PN cohort ward, discussion with the nutrition support team (NST), ward manager, senior matron and/or site team must be made to ensure the patient receives safe and competent care. A plan should be made for the patient to transfer to a PN cohort ward as soon as is possible unless this is not clinically feasible.

PN cohort ward managers are accountable for providing a sufficient number of registered nurses who are competent in PN administration and management and can provide safe IVAD care.

2.3 Nutritional screening and how to refer patients for PN

2.3.1 All patients should be screened on admission to hospital using the MUST screening tool and a nutrition care plan completed where appropriate. Patients unable to meet their requirements orally or who cannot have enteral feeding should be referred to the NST on Maxims under ‘nutrition team’.

2.3.2 PN referrals should be made during normal working hour’s before 11am Monday – Friday. Except under exceptional circumstances, referrals will only be reviewed during normal working hours. The NST do not currently provide a 24/7 day service.

2.3.3 PN should be anticipated and there are very few indications for commencing PN as an emergency (i.e. out of hours/ weekend). However, if this felt to be required then it should usually be discussed with the on call pharmacist.

2.3.4 It is imperative that the referring team consider nutritional management as part of the patients’ overall medical or surgical management plan. This should ensure timely PN referrals for nutritional assessment and prevent out of hours or weekend referrals.

2.3.5 Please refer to link for out of hours Pharmacy provision (Technical Services On-Call Instructions PH-TS-GEN-WI-80) PH-TS-GEN-WI-80.doc in most cases administration can be delayed until the NST can advise on a tailored regimen and appropriate IVAD on the next working day.

2.3.6 Out of hours it is recommended that the RCHT IV Fluid Therapy Adults Guidelines are followed FluidBalanceGuidelines.pdf.
2.3.7 Significantly undernourished patients and/or those at risk of refeeding syndrome may require Pabrinex and/or micronutrients and electrolyte replacement prior to PN.

2.3.8 For PN and medicines compatibility please contact ward Pharmacist for advice. Drugs or other solutions must not to be added to the bag after it leaves Pharmacy, as this could adversely affect stability (appendix 6).

2.4 Intravascular access devices (IVAD) used for PN

2.4.1 Selecting the correct IVAD for the patient can minimise the risk of infection and complications and support vessel preservation. The NST will offer advice on the appropriate IVAD for administration of PN and liaise with the VAT and Interventional radiologist. The VAT is an expert nurse led team and inserts peripherally inserted central catheters (PICC) and/or midlines for patients at the bedside. They will assess the patient for suitability for PICC once discussed with the NST, and this is usually within 24-48 hours of receipt of referral (Monday – Friday).

2.4.2 The VAT will not place a PICC or midline for PN unless that patient has been assessed by a member of the NST in the first instance to ascertain that PN is the appropriate and the safest and optimal way to deliver nutritional support.

2.4.3 PN MUST NOT BE GIVEN BY CANNULA in this Trust and dextrose/saline or infusion can be considered whilst awaiting PICC/ Midline placement for PN.

2.4.4 Midlines are only used for a small group of patients and are generally an interim device where the VAT is unable to place a PICC and generally these would be placed in theatre on CEPOD list. Alternatively request a central venous catheter note these need to be removed within 10 days.

2.4.6 All patients should have a dedicated lumen clearly labelled for PN only.

2.4.7 Tunneled Central Venous catheter (CVC) i.e. HICKMAN, BARD, COOK are placed in interventional radiology and are normally recommended for patients on HPN or patients on long-term PN. This should be discussed with the NST and Consultant radiologist.

2.4.8 Blood sampling should not be routinely from IVAD only where vascular access is difficult or blood cultures required in a suspected infection and/or sepsis. This should only be performed by a HCP competent in the procedure.

2.4.9 PN containing final concentrations exceeding 10% dextrose and/or 5% protein (nitrogen) should be administered via a CVC with tip placement in the superior vena cava this is because PN is hypertonic and it can increase the risk of thrombosis and damage to vascular tissue.

2.5 Administration of PN

2.5.1 PN should be introduced progressively and closely monitored, usually
starting at no more than 50% of estimated needs for the first 24-48 hours. The rate of administration of PN will be recommended by the NST the patient's risk of Refeeding syndrome, glycaemic control and fluid balance will all be incorporated in the decision.

2.5.2 Ensure that the PN is administered at the prescribed rate which is clearly labelled on the PN bag and on the PN prescription which should be completed and signed.

2.5.3 The integrity of each PN bag must be checked prior to administration to ensure there are no leaks in the bag. If a leak is identified the bag must not be used as the risk of microbial contamination is high.

2.5.4 All PN bags must be covered by a light protective bag during infusion to reduce vitamin degradation (supplied).

2.5.5 PN solution must be administered using a volumetric pump fitted with occlusion and air-in-line alarms. This will reduce the risk of continued administration when there is a potential embolus in the line (air/precipitate).

2.5.6 All PN bags must be discarded 24 hours after the infusion has commenced and a new PN bag started even if solution remains in the bag.

2.5.7 Under no circumstances can additions of any kind be made to the PN bag on the ward.

2.5.8 Any unused PN bags should be returned to Pharmacy as soon as possible.

2.5.9 A gradual change from continuous to cyclical feeding should be made with patients who have received PN for more than 2 weeks.

2.5.10 If PN is disconnected for any reason, the same bag and giving set must not be reconnected.

2.5.11 Existing injection sites on the administration set must not be used for the giving of additional medication as PN is incompatible with numerous medications.

2.5.12 Do not give blood or blood products simultaneously with PN in the same line.

2.5.13 Never attach 3-way tap to PN infusion lumen.

2.5.14 Never share PN infusion lumen with any other infusion.

2.5.15 Never attempt to “catch up rapidly” if the infusion is running too slowly as this may cause thrombophlebitis, metabolic and electrolyte disturbances.

2.5.16 Ensure that the PN is administered at the prescribed rate which is clearly labelled on the PN bag and on the PN prescription which should be
2.7. Refeeding Syndrome

2.7.1 Refeeding syndrome is when metabolic complications occur due to severe fluid and electrolyte shifts in very undernourished individuals as feeding is commenced. Potential consequences include: hypophosphatemia, hypokalemia, hypomagnesaemia, altered glucose metabolism, fluid balance abnormalities and some vitamin deficiencies (thiamine). Fluid balance abnormalities can lead to cardiac, respiratory, neuromuscular, renal, metabolic, haematological, hepatic, and gastrointestinal problems.

2.7.2 Onset can occur within 12-72 hours after commencement of feed. Symptoms include irregular pulse, lethargy and muscle weakness and shortness of breath, cardiac arrest and death.

2.7.3 Rate of administration of PN will be recommended by the NST the patient’s risk of Refeeding syndrome, glycaemic control and fluid balance will all
be incorporated in the Nutritional management plan.

2.8 Clinical Monitoring

2.8.1 Fluid balance
A daily fluid balance is essential for all patients on PN to ensure that hydration is maintained and to prevent fluid overload. Fluid balance also guides the NST with any required electrolyte replacement in addition or the absence of serum electrolyte results.

2.8.2 Capillary blood glucose monitoring
This should be monitored 6 hourly until nutritional target is met over approximately 3 – 4 days. Thereafter once to twice daily or as advised by NST.

2.8.3 Hyperglycemia
This may occur due to stress-induced insulin resistance or due to excess carbohydrate. Failure to recognise hyperglycemia may result in osmotic diuresis.

2.8.4 Biochemistry
It is the responsibility of the medical or surgical team to ensure that appropriate blood and urine testing as requested by NST is carried out and monitored. The NST will review blood and urine biochemistry as part of the daily assessment and PN prescribing.

2.8.5 Prior to commencing PN the following data must be available:

- FBC & CRP
- Blood glucose
- Urea & Electrolytes (U&Es) including magnesium
- Liver and bone profile
- Serum triglyceride
- Clotting factors (INR and APTT)

2.8.6 On commencement of PN repeat biochemistry:

- Repeat U&Es, LFTs, calcium, magnesium and phosphate daily for first 5 days and continue daily until electrolytes and LFT’s are stable or on the advice of the NST.
- Repeat hematology and clotting factors (as above) 3 x weekly.
- Repeat serum triglyceride weekly. The NST may request additional blood biochemistry.

2.8.7 Liver Dysfunction

Abnormal liver function in patients on PN is related to underlying sepsis in up to 70% of cases. However abnormal liver function can also be due to the glucose and/or lipid content of PN or cholestasis. To reduce this risk the NST will prescribe Cyclical PN i.e. over 12 hours once the patient is established on PN and consider prescribing specialized formulations.
2.8.9 Cessation of PN

PN will usually be stopped when oral or enteral nutrition intake is deemed adequate by the NST and is a multi-disciplinary decision. After cessation of PN the NST may maintain contact in order to audit clinical outcome and performance. When appropriate the NST will discharge to the ward dietitian as appropriate for follow up for oral/enteral nutritional support.

2.9 Home Parenteral Nutrition

2.9.1 There are a few indications for home PN (HPN) however it may be necessary in patients who have complete intestinal failure or insufficient functioning bowel to maintain an adequate nutritional status via the enteral route.

2.9.2 This is a complicated and a specialist treatment, requiring 24-hour access to advice and support, and should be co-ordinated through a specialist centre through the NST. Patients require an extensive period of specialised training to manage PN and this is normally undertaken in the patient’s home environment. Not all patients/family/carers wish to be independent with setting up and disconnecting HPN. If the patients are independent with managing HPN the patient should be supported and encouraged to continue with this as an inpatient if they wish and are well enough to manage.

2.10 HPN Patient Admission to RCHT

2.10.1 The NST should be informed of the patient’s admission as soon as possible by bleep or referred on MAXIMS. It is important to inform a member of the NST when a patient on Home Parenteral Nutrition is admitted to the hospital with suspected CRBSI.

2.10.2 Patients are advised to treat a temperature >38°C as a medical emergency and are recommended to attend ED for urgent medical treatment and/or remove VAD if symptomatic or in septic shock.

2.10.3 All HPN patients should have their PN passport with them and their most current PN prescription will be imported onto MAXIMS. This will inform the admitting team what the patient is receiving, both nutritionally, electrolyte composition and fluid provision.

2.10.4 Where the receiving team is unclear regarding HPN prescribing and the NST are not available i.e. out of hours or weekends, it may be safer to omit PN and support the patient with IV fluids and monitor and maintain electrolytes.

2.10.5 HPN patients where possible are advised to bring in their prescribed PN/fluids/electrolyte bags from home as these are tailored for specific patients requirements. HPN brought in from home should be stored in the Pharmacy medical fridge within 2 hours of removal from home fridge. Failure to do this will result in wastage of the PN and should not be administered to the patient.

2.11 Catheter Related Sepsis in Patients Receiving PN – see figure
catheter related sepsis protocol

2.11.1 the most frequent complication for patients receiving PN is a catheter related blood stream infection (CRBSI/line infection). This can be a severe complication with significant morbidity and mortality.

2.11.2 If line sepsis is suspected, blood cultures should be taken from the line and peripheral blood and the line should not be used until the results are available. In many cases the line can be salvaged with appropriate antibiotic treatment but certain infections necessitate line removal, in particular fungal line infection (see flow chart).

Await the microbiology report and do not remove the catheter unless the patient is symptomatic (as per flow chart).

Hickman lines need to be removed by a competent and experienced practitioner under aseptic conditions i.e. Vascular Surgeon on CEPOD list or a Consultant Radiologist (at the discretion of the Radiologist).

For tunneled lines or implanted ports in HPN patients with difficult venous access, antibiotics may be used down the line/port.

Antimicrobial prescribing guidelines are available at RCHT antimicrobial guidance section on the intranet document library. The choice of antibiotic is governed by the sensitivity pattern of the infecting organism. It is recommended to discuss individual cases with a Consultant Microbiologist if you are unsure how to proceed. Antibiotic therapy for established line sepsis should be given intravenously.
2.12. Catheter related sepsis protocol

**Symptoms:** chills, flu-like symptoms (especially during Parenteral Nutrition infusion)

**Signs:** fever >38°C, rigors

1. Stop Parenteral Nutrition
2. Central and peripheral blood cultures
3. Blood tests, MEWS score chart
4. Screen for other causes of infection
5. Establish peripheral iv access

**No shock**
Await culture results

**Mild shock**
Relative tachycardia and hypotension

Peripheral iv antibiotics (blind)
Vancomycin 1g bd ± gentamicin 3-5mg/kg od depending on renal function

**Blood cultures negative**

**Blood cultures positive**

- Any other organism from CVC culture
- Candida, Staph aureus, GRE or Pseudomonas

**Septic shock**
Fever, hypotension, tachycardia requiring inotropes or ITU

1. Remove CVC
2. Send tip for culture
3. Peripheral antibiotics according to sensitivities

1. Remove CVC
2. Send tip for culture
3. Blind antibiotic regime (d/w micro)

**Fever >38°C**
Restart

**No fever**
Take cultures and restart algorithm

**Home**
2.12.1. Review patient technique for connection/ disconnection of Parenteral Nutrition (may need to involve Healthcare at Home/ other outside agency involved in delivery of Parenteral Nutrition). This can be arranged by the Nutrition team to review.

2.12.2. Consider prophylactic Tauridine lock (TaurolockTM contains anticoagulant and antimicrobial substances, instilled in catheter between Parenteral Nutrition infusions) especially if recurrent bacterial or fungal infection or limited IV access options. Decision to be made jointly with senior member of NST and Microbiology.

2.13. Nutrition Support Team Contacts

For further support and information please contact as below:

Consultant Gastroenterologist - contact through switchboard/netpage
Consultant Biochemist - contact through switchboard/netpage
Lead Dietitian - bleep 3087
Lead Nutrition Nurse Specialist - bleep 3089
Nutrition Pharmacist - bleep 3210
Pharmacy Technician - bleep 3210

3. Monitoring compliance and effectiveness

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>Correct documentation and completion of Parenteral nutrition care plan. Including accurate completion of fluid balance charts, peripheral and central line care plans, blood monitoring as per guideline.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>Ward managers and Nutrition Support team.</td>
</tr>
<tr>
<td>Tool</td>
<td>Root cause analysis of Datix incidents- retrospective case notes review. Daily review by Nutrition Support team. Administration of Parenteral Nutrition through a central line will be monitored through the Saving Lives (DH 2007) High Impact Intervention no.1 CVC, as part of the ongoing care bundle. Lines used for Parenteral Nutrition will in addition be monitored by the NST. Confidence in Caring Metrics electronic platform.</td>
</tr>
<tr>
<td>Frequency</td>
<td>Monthly sample of ten charts per clinical area for fluid balance. Otherwise as they arise and annually.</td>
</tr>
<tr>
<td>Reporting arrangements</td>
<td>Incidents that are uploaded to NRLS are included in the Risk and Safety clinical governance reports and presented to Nutrition Steering Group. All serious incidents are subject to root cause analysis along with recommendations and actions. Outcomes of case note reviews will be reported to Strategic Nutrition Steering Group (SNSG). Matrons monitor the monthly CIC results for their area of responsibility and report at divisional governance groups.</td>
</tr>
</tbody>
</table>
Acting on recommendations and Lead(s) | The SNSG is responsible for interrogating required Serious Incident Actions and to designate a named lead where appropriate. The Nutrition Steering Group.

Change in practice and lessons to be shared | As monitoring includes using incidents, complaints and serious incidents as a resource for monitoring practice it is actions identified from root cause analysis that determine whether local, Divisional or Corporate learning will need to be shared and changes implemented. Designated leads will forward where appropriate the lessons to be shared with all the relevant stakeholders.

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>Line infections</th>
</tr>
</thead>
</table>
| Lead                    | Tracy Lee nutrition nurse specialist  
Emily Hunt Nutrition support nurse |
| Tool                    | Parenteral nutrition database |
| Frequency               | 3-monthly reports disseminated to the PN cohort wards and IPAC team and matrons. |
| Reporting arrangements  | Nutrition steering group  
Vascular access team  
IPAC steering group meeting |
| Acting on recommendations and Lead(s) | Nutrition steering group and/or IPAC |
| Change in practice and lessons to be shared | Education and sharing of best practice |

4. **Equality and Diversity**

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement which can be found in the 'Equality, Inclusion & Human Rights Policy' or the [Equality and Diversity website](#).

4.2. **Equality Impact Assessment**

The Initial Equality Impact Assessment Screening Form is at Appendix 2.
Appendix 1. Governance Information

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Adult Parenteral Nutrition in the Hospital Setting Clinical Guideline V6.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Issued/Approved:</td>
<td>May 2019</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>May 2019</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>May 2022</td>
</tr>
<tr>
<td>Directorate / Department responsible (author/owner):</td>
<td>Clinical Support Services &amp; Cancer Division, Tracy Lee, Nutrition specialist nurse (nutrition support team)</td>
</tr>
<tr>
<td>Contact details:</td>
<td>01872 252409</td>
</tr>
<tr>
<td>Brief summary of contents</td>
<td>The document aims to ensure safe administration of Parenteral Nutrition. To prevent the complications associated with the administration. To give clear advice and guidance for staff involved in the administration of Parenteral Nutrition.</td>
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<tr>
<td>Suggested Keywords:</td>
<td>Parenteral nutrition, nutrition, nutritional support, PN, TPN, refeeding syndrome, CRBSI</td>
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<td>Target Audience</td>
<td>RCHT KCCG CFT</td>
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<tr>
<td>Executive Director responsible for Policy:</td>
<td>Executive Director of Nursing</td>
</tr>
<tr>
<td>Date revised:</td>
<td>December 2018</td>
</tr>
<tr>
<td>This document replaces (exact title of previous version):</td>
<td>Clinical Guideline for Adult Parenteral Nutrition in the Hospital Setting v5.0</td>
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<tr>
<td>Approval route (names of committees)/consultation:</td>
<td>Strategic Nutrition Steering Group RCHT Matrons &amp; clinical divisional leads Vascular access team Therapies CG Forum Clinical Support Care Group Governance DMB</td>
</tr>
<tr>
<td>Care Group Manager confirming approval processes</td>
<td>Robin Jones</td>
</tr>
<tr>
<td>Name and Post Title of additional signatories</td>
<td>Not required</td>
</tr>
<tr>
<td>Name and Signature of Care Group/Directorate Governance Lead confirming approval by specialty and care group management meetings</td>
<td>{Original Copy Signed}</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Kevin Wright Governance Lead CS Care Group</td>
<td></td>
</tr>
<tr>
<td>Signature of Executive Director giving approval</td>
<td>{Original Copy Signed}</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Publication Location (refer to Policy on Policies – Approvals and Ratification):</td>
<td>Internet &amp; Intranet √ Intranet Only</td>
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<td></td>
<td></td>
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<tr>
<td>Document Library Folder/Sub Folder</td>
<td>Clinical / Dietetics</td>
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<tr>
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<td>Training need identified?</td>
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### Version Control Table

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<th>Version No</th>
<th>Summary of Changes</th>
<th>Changes Made by (Name and Job Title)</th>
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<td>Apr 09</td>
<td>V3.0</td>
<td>Previous version history not known.</td>
<td>Amanda Thompson</td>
</tr>
<tr>
<td>May 12</td>
<td>V4.0</td>
<td>Procedure for setting up Total Parenteral nutrition via peripheral and central lines in adults.</td>
<td>Tracy Lee</td>
</tr>
<tr>
<td>Dec 14</td>
<td>V5.0</td>
<td>Changes to practice, updated flowcharts, re-formatting to meet RCHT criteria.</td>
<td>Tracy Lee</td>
</tr>
<tr>
<td>February 2019</td>
<td>V6.0</td>
<td>Reviewed guideline</td>
<td>Tracy Lee</td>
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### All or part of this document can be released under the Freedom of Information Act 2000

*This document is to be retained for 10 years from the date of expiry.*

*This document is only valid on the day of printing*

**Controlled Document**

This document has been created following the Royal Cornwall Hospitals NHS Trust Policy for the Development and Management of Knowledge, Procedural and Web Documents (The Policy on Policies). It should not be altered in any way without the express permission of the author or their Line Manager.
## Appendix 2. Initial Equality Impact Assessment Form

**Name of the strategy / policy / proposal / service function to be assessed**

**Adult Parenteral Nutrition in the Hospital Setting Clinical Guideline V6.0**

<table>
<thead>
<tr>
<th>Directorate and service area:</th>
<th>New or existing document:</th>
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<tbody>
<tr>
<td>Nutrition Support Team, Therapies Department</td>
<td>Existing</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Name of individual completing assessment:</th>
<th>Telephone:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tracy Lee</td>
<td>01872 252409</td>
</tr>
</tbody>
</table>

1. **Policy Aim**
   - Who is the strategy / policy / proposal / service function aimed at?
   - Safe administration of Total Parenteral Nutrition. Prevention of complications associated with the administration of Parenteral Nutrition.
   - To promote timely, optimal and safe delivery of nutrition

2. **Policy Objectives**
   - Safe and timely introduction and administration of Parenteral Nutrition.
   - Clear advice and guidance for staff involved in the administration of Parenteral Nutrition.
   - Evidence based practice
   - Provide consistent trust-wide guidance

3. **Policy – intended Outcomes**
   - Patients will clearly benefit from the safe administration of Parenteral Nutrition and the prevention of associated complications by reducing the risk of re-feeding and line complications i.e. metabolic, mechanical and infective. To provide clear and consistent advice to enable practitioners to make informed decisions.

4. **How will you measure the outcome?**
   - Through data gathering and collation of annual report and discussion at NST governance meetings, Predominantly line infections and PN costs, wastage and referral's.

5. **Who is intended to benefit from the policy?**
   - Patients who require Parenteral Nutrition
   - Healthcare professionals managing

6a **Who did you consult with**

   - Workforce
   - Patients
   - Local groups
   - External organisations
   - Other

   - X

   **Please record specific names of groups**
   - Strategic Nutrition Steering Group Nutrition support team
   - Nutrition and dietetic department. Infection control- Consultant Nurse
   - Pharmacy- PTSU

What was the outcome of the consultation?

- Agreed.
7. The Impact
Please complete the following table. **If you are unsure/don’t know if there is a negative impact you need to repeat the consultation step.**

Are there concerns that the policy **could** have differential impact on:

<table>
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<th>Equality Strands:</th>
<th>Yes</th>
<th>No</th>
<th>Unsure</th>
<th>Rationale for Assessment / Existing Evidence</th>
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<tbody>
<tr>
<td>Age</td>
<td>X</td>
<td></td>
<td></td>
<td>This guideline relates only to adult patients. This policy will prevent discrimination or inappropriate feeding or withholding of artificial feeding for older people through proper assessment of the clinical need, risk assessment. Assessment of mental capacity and consideration of best interest.</td>
</tr>
<tr>
<td>Sex (male, female, trans-gender / gender reassignment)</td>
<td>X</td>
<td></td>
<td></td>
<td>This guideline relates to clinical need and documentation</td>
</tr>
<tr>
<td>Race / Ethnic communities /groups</td>
<td>X</td>
<td></td>
<td></td>
<td>This guideline relates to clinical need and documentation</td>
</tr>
<tr>
<td>Disability - Learning disability, physical impairment, sensory impairment, mental health conditions and some long term health conditions.</td>
<td>X</td>
<td></td>
<td></td>
<td>This guideline relates to clinical need and documentation</td>
</tr>
<tr>
<td>Religion / other beliefs</td>
<td>X</td>
<td></td>
<td></td>
<td>This guideline relates to clinical need and documentation</td>
</tr>
<tr>
<td>Marriage and Civil partnership</td>
<td>X</td>
<td></td>
<td></td>
<td>This guideline relates to clinical need and documentation</td>
</tr>
<tr>
<td>Pregnancy and maternity</td>
<td>X</td>
<td></td>
<td></td>
<td>This guideline relates to clinical need and documentation</td>
</tr>
<tr>
<td>Sexual Orientation, Bisexual, Gay, heterosexual, Lesbian</td>
<td>X</td>
<td></td>
<td></td>
<td>This guideline relates to clinical need and documentation</td>
</tr>
</tbody>
</table>

**You will need to continue to a full Equality Impact Assessment if the following have been highlighted:**
- You have ticked “Yes” in any column above and
- No consultation or evidence of there being consultation- this excludes any policies which have been identified as not requiring consultation. **or**
- Major this relates to service redesign or development

8. Please indicate if a full equality analysis is recommended. **Yes**   **No**   **X**

9. If you are not recommending a Full Impact assessment please explain why.
No potential for differential impact identified.

<table>
<thead>
<tr>
<th>Date of completion and submission</th>
<th>Members approving screening assessment</th>
<th>Policy Review Group (PRG)</th>
</tr>
</thead>
<tbody>
<tr>
<td>05/02/2019</td>
<td>APPROVED</td>
<td></td>
</tr>
</tbody>
</table>

This EIA will not be uploaded to the Trust website without the approval of the Policy Review Group.

A summary of the results will be published on the Trust’s web site.
Appendix 3. For PN and medicines compatibility

Medications have varying degrees of compatibility with PN when used in combination. However, provided separate lumens are used on a multi-lumen line, with differing exit sites (the trust primarily use opposite exit site lines), then the 2 components are not considered as being able to mix and all drugs are usable via this route of administration. The exception to this is blood product and chemotherapy which must be given via a separate vascular access device or, a break in PN given, restarting at the next prescribed dose and time.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hartman’s</td>
<td>Opposite lumen to PN (PICC/CVC)</td>
<td>Compatible with PN</td>
<td>Consult NST if piggybacking</td>
</tr>
<tr>
<td>NaCl 0.9%</td>
<td>Opposite lumen to PN (PICC/CVC)</td>
<td>Compatible with PN</td>
<td>Consult NST if piggybacking</td>
</tr>
<tr>
<td>Dextrose 5%/10%</td>
<td>Opposite lumen to PN (PICC/CVC)</td>
<td>Compatible with PN</td>
<td>Consult NST if piggybacking Remember dextrose contains calories</td>
</tr>
<tr>
<td>Dextrose 4%/ NaCl 0.18%</td>
<td>Opposite lumen to PN (PICC/CVC)</td>
<td>Compatible with PN</td>
<td>Consult NST if piggybacking Remember dextrose contains calories</td>
</tr>
<tr>
<td>Blood/Blood Products</td>
<td>Separate cannula far from central line</td>
<td>Incompatible with PN – potential for agglutination of blood</td>
<td></td>
</tr>
<tr>
<td>Drugs</td>
<td>Avoid running into Y-sites, may be able to run into opposite lumen</td>
<td>Variation between salts and PN constituent parts</td>
<td>Consult Pharmacy in hours, out of hours give IV’s through separate cannula or consult pharmacy.</td>
</tr>
</tbody>
</table>
## Appendix 4. Nursing Care & Monitoring on PN

<table>
<thead>
<tr>
<th>Nursing intervention</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daily weight before Parenteral Nutrition and twice weekly (Daily if there is a concern about fluid balance)</td>
<td>Weekly measurements are used to assess change in tissue mass and therefore adequacy of energy provision. Takes into account muscle and fat. Support aims/goals related to achieving and ideal body weight.</td>
</tr>
<tr>
<td>6 hourly temperature, pulse, respirations &amp; Blood pressure.</td>
<td>Observe for evidence of infection/ general wellbeing</td>
</tr>
<tr>
<td>Accurate fluid balance chart</td>
<td>To maintain accurate fluid balance- prevent under/over hydration.</td>
</tr>
<tr>
<td>Capillary blood glucose monitoring 6 hourly for 48 hours – then BD or OD if blood glucose between 4-10mmols.</td>
<td>To detect hyperglycaemia and/or hypoglycaemia. Patient may require sliding scale Insulin if Blood sugar &gt;10mmols</td>
</tr>
<tr>
<td>Twice daily VIP score as per policy</td>
<td>To detect exit site infection/ leakage</td>
</tr>
<tr>
<td>VAD dressing changes as per policy see appendix 3</td>
<td>To maintain line integrity and reduce risk of CRBSI.</td>
</tr>
<tr>
<td>Twice weekly urinary sodium or at the advice of the NST</td>
<td>For nitrogen balance and electrolytes</td>
</tr>
</tbody>
</table>
Appendix 5. Guidance for connecting and setting up PN through a dedicated lumen - ensure labelled

Method

Equipment

- Patients prescription chart
- Prescribed bag of PN
- Intravenous infusion stand
- Volumetric pump
- Clean dressing trolley
- Clean receiver tray
- PN intravenous administration giving set and filters (unless bag pre-spiked with specific filtration and needle free system connector)
- Basic dressing pack – includes sterile gloves/ sterile towel/ gallipot/ gauze
- Swabs containing 2% chlorhexidine in 70% isopropyl alcohol
- 10ml Sodium chloride 0.9% for injection
- Sterile 10ml syringe (nothing smaller)
- 1x needle
- 1x Red cap
- Sharps bin

Pre procedure

1. Assemble all your equipment before you start.
2. PN solutions should be removed from refrigeration 2-3 hours prior to infusion in order to reach approximate room temperature
3. Explain and discuss the procedure with the patient.
4. Before administering any PN Consult the patient’s prescription chart. Check contents against prescription. Check the PN is without particles or any abnormality
5. Ensure patient not allergic to CHG or any other allergies.

Procedure

1. Wash hands using Ayliff technique
2. Open outer wrapping of PN to be infused and cover with silver protective cover hang bag on a drip stand, check all relevant details i.e. expiry date and volume.
3. Clean trolley
4. Alcogel hands
5. Draw up 10ml 0.9% sodium chloride solution for injection using ANTT
6. Place the syringe in a clinically clean receiver or tray on the bottom shelf of the dressing trolley.
7. Collect the other equipment and place it on the bottom shelf of the dressing trolley.
8. Alcogel or wash hands
9. Remove the protective covering from the giving set and insert it into the giving port of the bag (not applicable if PN already spiked in Pharmacy Technical Services Unit).
10. Roll back light cover to reveal exit port. Clean exit port with Chlorhexidine 2% in Isopropyl wipes and leave to dry for 30 seconds.
11. Prime the intravenous administration set and hang it on the infusion stand. Take care not to contaminate the giving set end and keep in the sterile pack until connection
12. Insert giving set into the pump and set rate and volume.
13. Wash hands thoroughly using soap and water or alcohol hand rub before leaving the treatment room
14. Proceed to the patient. Explain procedure and rationale to patient
15. Check patient’s identity against prescription chart and prepared drugs.
16. Open the sterile dressing pack by holding the corners, avoid touching the inside contents with your fingers. Arrange items for easy access using orange bag.
17. Place other equipment onto dressing pack. Place CHG swabs into sterile container and saline syringe on corner.
18. Alcogel wash hands put on sterile gloves
19. Holding lumen in one hand slide dressing towel under the catheter
20. Ensuring patients CVC exposed clean end of needle-free connector for 30 seconds with CHG swab including clamp allow to air dry completely
21. If changing NFAD ensue lumen clamped, remove existing NFAD, clean end of lumen with CHG allow to air dry completely and replace with new NFAD.
22. Attach empty 10mL syringe and attempt aspiration of 5mL of blood and discard (to check patency of line). If unable to aspirate refer to CVC policy

In the absence of a blood return for midlines and central venous access devices, an attempt should be made to flush the device; if resistance is met force should not be applied.

23. Connect 10ml syringe containing the 0.9% saline into catheter hub and flush using push pause technique and end positive pressure. (This creates turbulence removing any debris and prevents blood back flowing)
24. Remove cover from the giving set and connect to the needle free connector.
25. Remove gloves, wash hands with soap and water and commence volumetric pump at prescribed rate and volume.
26. Ensure CVC is unclamped and start infusion

Post procedure
1. Dispose of waste and complete documentation i.e. fluid chart, CVC care plan and PN prescription
2. Wash hands

It is essential that the needle-free access device (NFAD) is thoroughly cleaned for 30 seconds and allowed to dry for 30 seconds, and that the luer end key part of the syringe and the connecting key part of the giving set remain sterile prior to attaching to the needle-free access device.
Appendix 6. Guidance for disconnecting and setting up PN through a dedicated lumen

Method

Equipment
- Basic dressing pack – includes sterile gloves/ sterile towel/ gallipot/ gauze
- Swabs containing 2% chlorhexidine in 70% isopropyl alcohol
- 10ml Sodium chloride 0.9% for injection
- Sterile 10ml syringe (nothing smaller)
- X1 needle
- X1 red cap
- X1 needleless NFDA
- Clean receiver tray
- Clean dressing trolley

Pre Procedure
1. Assemble all your equipment before you start.
2. Explain and discuss the procedure with the patient.
3. Before administering any flush consult the patient’s prescription chart.
4. Ensure patient not allergic to CHG or has any other allergies

Procedure
1. Wash hands using Ayliff technique
2. Clean trolley using detergent wipe and then Alcowipe the top surface
3. Open dressing pack on the top of trolley
4. Alcogel hands
5. Open the dressing pack wrapping by holding the corners, avoid touching the inside contents with your fingers. Arrange items for easy access using orange bag.
6. Open remaining items onto your onto sterile field.
7. Prepare the patient; remove clothing to ensure catheter is easily accessible.
8. Turn off the volumetric pump and slide down the roller clamp down to off position
9. Alcogel your hands and put sterile gloves on
10. Place the sterile towel in position under the catheter
11. Disconnect the infusion by unscrewing the giving set from the hub connector.
12. Wipe the hub connector with chlorhexidine wipe allow to air dry completely
13. Connect 10ml syringe containing the 0.9% saline into catheter hub and flush using push pause technique and clamp as adding last 1ml to create end positive pressure. (this creates turbulence removing any debris and prevents blood back flowing)

Post Procedure
1. Dispose of waste, wash hands with soap and water and complete documentation

It is essential that the needle-free access device (NFAD) is thoroughly cleaned for 30 seconds and allowed to dry for 30 seconds, and that the luer end key part of the syringe and the connecting key part of the giving set remain sterile prior to attaching to the needle-free access device.
Appendix 7. IVAD Dressing change

Method

Equipment

- Basic dressing pack – includes sterile gloves/ sterile towel/ gallipot/ gauze
- 1 x3ml applicator 2% Chlorhexidine in 70% Isopropyl (chloraPrep.ie CHG)
- Transparent semi permeable dressing i.e. Tegaderm IV advanced
- Griplock securement device
- Mepore tape
- Clean dressing trolley

Pre procedure

1. Assemble all your equipment before you start.
2. Explain and discuss the procedure with the patient.
3. Ensure patient not allergic to CHG

Procedure

1. Wash hands using Ayliff technique
2. Clean trolley using detergent wipe and then Alcowipe the top surface
3. Assemble equipment on bottom of the trolley
4. Open dressing pack onto the surface of the trolley
5. Alcogel hands.
6. Open the dressing pack wrapping by holding the corners, avoid touching the inside contents with your fingers. Arrange items for use using the yellow bag as a glove or forceps.
7. Open remaining equipment onto your sterile field
8. Alcogel hands
9. Place the sterile towel from the dressing pack (touching corners only) at the catheter exit site to create an aseptic field
10. Remove the old dressing and Griplock securement device making sure you do not pull on the catheter.
11. Observe the catheter for signs of infection, redness, crusting, pus and/or leakage * VIP score
12. Alcogel hands and put on sterile gloves.
13. Wipe around the catheter site with the chloraPrep working outwards, allow to completely air dry.
14. Position clean Griplock securement device, insert catheter and apply dressing

Post procedure

1. Dispose of waste, wash hands with soap and water and complete documentation

NB *points to check when observing the catheter redness, crusting, pus, leakage, extravasation. If any of the above are noted or you have any concerns notify the medical or surgical team responsible for the patient.