Adult Central Parenteral Nutrition Procedure

1. Purpose

The purpose of this procedure is to establish minimum practice standards for the care and management of parenteral nutrition (PN) delivered via a central line at WA Country Health Service (WACHS) facilities. The implementation of this procedure throughout the WACHS is dependent on regional governance approval processes in relation to site skill mix, and decisions in relation to the treating team and treating environment.

This procedure refers to delivery of PN via central venous access line (central PN), and not via a peripheral vascular line known as Peripheral Parental Nutrition (PPN).

For peripheral parenteral administration, refer to Adult Peripheral Parenteral Nutrition Procedure.

This document is to be read in conjunction with:

- WACHS Nutrition and Hydration Procedure
- WACHS Adult Peripheral Parenteral Nutrition Procedure
- WACHS Aseptic Technique Policy
- WACHS Hand Hygiene Policy
- CAHS Parenteral Nutrition Prescribing and Administration Guideline.

2. Procedure

Parenteral Nutrition (PN) is indicated when the gastrointestinal tract is not functional or accessible. Total parenteral nutrition (TPN) refers to situations when the patient's complete nutritional needs are delivered by PN and there is no other source of nutrition.

ATTENTION

Central PN is only administered via a central venous access device (CVAD), typically a Central Venous Catheter (CVC) or a Peripherally Inserted Central Catheter (PICC). Choose CVAD with at least 3 lumens and designate one lumen **exclusively** for administration of PN.

2.1 Patient Selection[1,2,3]

Indications

PN is indicated for use when enteral or oral nutrition is not possible or is unlikely to meet the nutrition requirements.

Situations where PN is appropriate:

- gastrointestinal tract is not functional or accessible (post operative ileus, extensive bowel resection, bowel obstruction, ischaemic bowel, fistula)

- following short term peripheral parenteral nutritional (PPN) support where the gut function has not resumed after 5-7 days
- major GI surgery when adequate enteral intake is not expected to resume within 5 to 10 days with well-nourished patients.

Recommended time frames for initiating central PN[2]:

- after 5 days for well nourished, stable adult patients who have been unable to receive adequate (50% or more of estimated requirements) oral/enteral nutrient intake, and oral/enteral nutrition is unlikely to resume within 5 days
- within 3 to 5 days in those who are nutritionally at risk and unlikely to achieve desired oral intake or enteral nutrition
- as soon as is feasible for patients with baseline moderate or severe malnutrition in whom oral intake or Enteral Nutrition (EN) is not possible or sufficient.

Contraindications

Central PN may not be indicated in the following circumstances:

- well-nourished patient expected to return to adequate oral / enteral feeding within 5-7 days
- a patient is receiving end of life care or where use is contradictory to the patient's goals of care (refer to WACHS Goals of Patient Care Guideline)
- when central access is not available
- insufficient oral intake with functionable and accessible GI tract
- known allergies to eggs, soya protein, peanut, corn, components of the container or to any of the ingredients in the feeding solution
- severe renal insufficiency without the possibility of dialysis or haemofiltration.

A multi-disciplinary team decision inclusive of treating team, dietetics, nursing and pharmacy is required to determine patient suitability for PN.

2.2 Nutritional Assessment

Refer to the dietitian for a formal assessment of anthropometry, biochemistry, clinical background, diet history and malnutrition assessment (using validated tools: MR 60.1.6 WACHS Dietetics - Subjective Global Assessment Form or MR 60.1.7 WACHS Dietetics – Patient Generated Subjective Global Assessment (PG-SGA) Tool.

For more information on nutrition assessments, please refer to WACHS Nutrition and Hydration Procedure.

The dietitian will make recommendations based on:

- starting formula/rates and target formula rates for PN
- requirement for electrolytes, vitamins and trace element infusions
- refeeding syndrome risk
- weaning from central PN to oral or enteral feeding
- suitability of solution based on any allergies or dietary sensitivities.

Assessing Biochemistry

The treating team should assess patient biochemistry, including electrolytes such as potassium, magnesium, and phosphate and replace prior to PN commencement where

possible. Refer to Appendix A of the WACHS Nutrition and Hydration Procedure for information and management of patients identified at risk of refeeding syndrome.

2.3 Ordering and Prescribing Parenteral Nutrition

The standard central PN products used at WACHS sites are Olimel® N9 and Olimel® N7 (2000 mL bags). Each bag is a three-chamber system containing amino acids, glucose and lipids plus electrolytes. Refer to Table 1 for nutritional compositions of each bag.

Olimel® N9	Olimel® N7
2000 mL Parenteral Nutrition Solution with Electrolytes **800 mL** Amino Acids 14.2% (113.9 g) **800 mL** Glucose 27.5% (242 g) **400 mL** Lipid (ClinOleic) 20% (80 g) Sodium:70 mmol, Potassium: 60 mmol, Magnesium: 8 mmol; Calcium:7 mmol; Phosphate:30 mmol	**2000 mL** Parenteral Nutrition Solution with Electrolytes **800 mL** Amino Acids 11.1% (88.6 g) **800 mL** Glucose 35% (308 g) **400 mL** Lipid (ClinOleic) 20% (80 g) Sodium:70 mmol, Potassium: 60 mmol, Magnesium: 8 mmol; Calcium:7 mmol; Phosphate:30 mmol

Table 1: Nutritional composition of standard Central PN bags

Note: Olimel® is contraindicated in patients with a known allergy to egg, soya proteins, peanut protein, corn (maize) and/or corn products. Refer to OLIMEL N4-600E (TGA) for full product information.

Central PN is ordered and prescribed by the responsible treating team (for example Intensivist or Consultant) or ICU outreach team on the MR 60.1.11 WACHS Adult Central Parenteral Nutrition Form in consultation with dietitian and pharmacist as available. The following prescribing practices are recommended:

- PN is usually continuously infused over 24 hours via a controlled infusion pump into a high flow vein via a central venous catheter (CVC) or a Peripherally Inserted Central Catheter (PICC), usually the superior vena cava adjacent to the right atrium (refer to section 2.6 for intermittent PN).
- continuous administration of PN is the preferred method of infusion.
- typical infusion rates vary between 40-150 mL/hr and can usually be commenced at target infusion rate with adequate monitoring[2].
- patients at risk of refeeding syndrome (RFS), can commence PN infusion rates at 50% of the patient's basal requirement and increase gradually as per dietitian's recommendations[2].
- vitamins and trace elements are charted separately as below and require a separate cannula/lumen for administration (refer to Appendix C for full nutritional composition):
    - trace element solution (ADTE): dilute 1 syringe in 100 mL of 5% glucose and administer via intravenous infusion (central or peripheral) over 4 hours
    - multivitamins for injection (Cernevit®): dissolve 1 vial in 5 mL water for injection and administer by slow intravenous injection (central or peripheral) over at least 10 mins
    - vitamin K: Cernevit does not contain any vitamin K and the pre-mixed bags Olimel® N7-960E & Olimel® N9-840E contain variable levels of vitamin K per 2000 mL bag. For patient's receiving PN for >1 week additional 2 mg phytomenadione vitamin K1 weekly supplementation should be considered

- **Note:** may be contraindicated in patients on vitamin K antagonists (e.g. warfarin) as adding vitamin K can destabilize the patients' INR. Only to be given upon treating team's request.

Once commenced, PN prescription is to be reviewed daily by the treating team, who will monitor electrolytes and liaise with the dietitian and pharmacist, regarding PN rate, additional fluid, or electrolyte requirements.

Central PN bags are available from pharmacy. Bags can be stored in supplied overpouch to protect from light and contamination, and at temperatures below 25ºC as per local site procedures.

Commencing PN After Hours

The treating team or ICU outreach team may initiate PN after hours prior to full nutrition assessment by the dietitian. The following is suggested:

- recommend using Olimel® N9 as standard central PN solution until reviewed by dietitian or pharmacist.
- if patient is not at risk of RFS, commence 40 mL/hr PN of choice over 24 hours on MR 60.1.11 WACHS Adult Central Parenteral Nutrition Form.
- increase to 60 mL/hr on treatment Day 2 and continue to monitor.
- if at risk of RFS:
  - commence IV thiamine, IV Cernevit® and trace element
  - commence PN of choice at 50% estimated requirements (i.e. 20 mL/hr) over 24 hours on MR 60.1.11 WACHS Adult Central Parenteral Nutrition Form
  - monitor biochemistry, consider replacing potassium, magnesium and phosphate deficiencies prior to commencing PN; monitor daily with replacement of electrolytes as required
  - increase to 40 mL/hr on treatment Day 2 if electrolytes are stable and continue to monitor.
  - increase to target rate as per treating team or ICU outreach team.

2.4 Implementing Central Access

Document the date and time inserted and other relevant CVAD insertion and management details on MR179A WACHS Central Venous Access Device (CVAD) Insertion and Assessment Record and patient's healthcare record.

The methods used to check catheter position need to demonstrate the device has not been placed arterially. Once the CVC is deemed venous, it can be confirmed for use by the proceduralist and documented on the MR179A WACHS Central Venous Access Device (CVAD) Insertion and Assessment Record.

Refer to WACHS Central Venous Access Devices (CVAD) and Long Peripheral Venous Catheter (PVC) Management Clinical Practice Standard for full details on CVAD management.

2.5 Administering Parenteral Nutrition

Two (2) individuals (within their scope of practice) are required to perform the checking procedures as per the WACHS Medication Prescribing and Administration Policy at the

commencement of each bag which includes confirming programming of the pump and where possible for infusion rate changes.

The following steps outline processes for administering central PN:

- perform patient identification checks and ensure PN order is valid (refer to WACHS Patient Identification and Procedure Matching Policy)
- check the PN prescription against the label on the outside of the PN bag, including the PN solution volume, components, administration rate and expiry date/time. If there is a discrepancy, **do not connect PN to the patient. Contact the clinical pharmacist for confirmation**
- perform hand hygiene, don recommended personal protective equipment (PPE) and use non-sterile gloves when administering PN
- designate one lumen exclusively for administration of PN if a multi lumen catheter is in situ. In ICU always add a 3-way tap when commencing PN
- PN must always be administered through an infusion pump with a 1.2 micron filter attached to end of infusion line

Figure 1: Oxydetect™ check

- PN Solution will come in vacuum sealed bag. Check the Oxydetect™ indicator for visual confirmation that oxygen has not entered the bag. A light yellow colour indicates the product is safe to use. If the indicator is blue, do not use the product.
- To open the bag, avoid using scissors as this may damage the internal PN solution bag. Instead, use the slits located at the top and bottom of the outer bag to open it by hand

Figure 2: Activation of PN bag

- roll the PN bag to break the solution chambers and gently oscillate to mix the solution. After reconstitution the mixture is homogenised with a milky appearance
- decontaminate the needle free connector or hub by performing a “scrub the hub” technique for 20 seconds with a 2% chlorhexidine in 70% alcohol swab
    - If contraindicated use povidone iodine 10% in 70% alcohol. If alcohol is contraindicated use 10% povidone iodine aqueous solution
- flush the line with sodium chloride 0.9% 10 mL to assess patency
- connect PN line to the port, ensuring 1.2 micron filter attached to PN line. Do not contaminate the port
- administer at the prescribed rate using a volumetric infusion pump
- tape and secure the line and ensure a PN administration sticker is attached to the dressing site to indicate that the cannula is not for other fluids or medications
- continuous or uninterrupted PN delivery is important to minimise changes to blood glucose levels
- maintain the PN administration line and CVAD as a ‘closed’ system to minimise the risk of blood stream infections[4]. Once line is disconnected, PN must be discarded
- PN solution and line should be discarded at or before the expiry date and time
- PN bag must be used or discarded within 24 hours of commencement
- administration set should be changed with every new PN bag
- clinicians **must not**[8]:
    - collect blood samples from the PN CVAD lumen
    - introduce any additional medications to the PN infusion bag
    - administer any bolus IV medications via PN lumen/line
    - co-infuse blood transfusions
    - use the PN lumen for CVP measurements.

Olimel® PN bags do not need to be covered with light protective bags while being infused as part of routine care. Alternative compounded formulations require light protection bags. Sites may choose to use light protective bags to differentiate from central PN and PPN, noting these are **not** required for non-compounded PN bags.

For more details on monitoring and troubleshooting PN administration, please refer to Appending A.

2.6 Overnight/Cyclic /Intermittent Parenteral Nutrition

If the patient is required to receive central PN for an extended period, cyclic PN may be used. With cyclical PN the patient is fed overnight, usually starting from 18:00 hrs for 12 hours to 16 hours.

Cyclical PN may be indicated to:

- provide stable patient with freedom from being connected to lines during day
- to reduce the risk of PN-induced liver dysfunction
- to supplement dietary requirements whilst encouraging oral intake or receiving supplemental enteral feeding throughout the day.

PN infusion rates and duration of hours are determined according to the volumes and formula required in consultation with dietitian and treating team. These are charted on MR 60.1.11 WACHS Adult Central Parenteral Nutrition Form. Staff must clearly specify the

hours during which PN is to be administered under 'run time' i.e. 1800 - 0600 hours. The infusion rate will usually be higher than standard PN rates.

2.7 Home Parenteral Nutrition

For patients admitted to a WACHS facility who are already commenced on home PN, the following is recommended:

- contact tertiary hospital managing the home PN patient, so they are aware of the admission and confirm infusion rates and solution
- if the patient has brought home PN bags with them, continue PN infusion as per home TPN program unless otherwise indicated by the treating team.

2.8 Patient Monitoring[1, 2, 4]

Requirements include:

- monitoring and reporting any signs of CVAD insertion site deterioration to the treating medical team. Refer to WACHS Central Venous Access Devices (CVAD) and Long Peripheral Venous Catheter (PVC) Management Clinical Practice Standard
- monitoring and recording the patient's vital signs 4 hourly for the duration of the PN infusion. Once stable, vital signs can be monitored daily as per treating medical team
- monitoring patient's temperature 4 hourly
- measuring patient weight both prior to PN commencement, then daily or as directed by the treating team or dietitian (monitor for signs of fluid retention or overload)
- maintaining daily strict fluid balance charts during PN administration as instructed by the treating team. Chart on MR 144 WACHS Fluid Balance Work Sheet.

Monitor blood glucose levels (BGLs) as follows:

- perform a baseline BGL prior to commencement of PN
- hourly for first 4 hours of initiation and with any rate changes
- 4 - 6 hourly as advised by the treating team; maintained between 5 – 10 mmol/L for 24 hours (based on the patient's clinical status)
- once stable, measure random BGLs twice daily at a minimum. More frequent monitoring may be required based on the patient's clinical status as directed by the treating medical team
- liaise with the treating team if BGL falls outside of normal limits
- if there is persistent hyperglycaemia, or the patient is usually on insulin, an insulin infusion may be required
- refer to MR157A WACHS Insulin Infusion Order Chart for commencement of insulin and revised protocol for blood glucose monitoring:
    - in the event that there is insufficient venous access or available central access lumens to administer insulin and PN separately, contact the treating medical team for insertion of additional access (e.g. PIVC) site for insulin/other medications. PN to be administered via PICC/CVC access only
- monitor for rebound hypoglycaemia after PN is ceased.

Monitor biochemistry as follows:

- minimum requirements include daily urea and electrolytes, magnesium, phosphate, calcium (adjust PN rates)
- full blood picture and liver function tests (including INR) every second day.

Deficient electrolytes should be replaced prior to PN commencing with additional blood

tests performed as clinically indicated. For long term hospitalised PN patients, a full vitamin and trace element analysis should be conducted every 3 months (or more often as required). A full nutritional analysis includes fat soluble vitamins (A, D, E), vitamin C, B group vitamins, folate, zinc, copper, manganese, selenium, iron studies, molybdenum, iodine and thyroid function test.

For more details on monitoring of PN and troubleshooting for both equipment (administration) and patient complications, please refer to Appendix A and Appendix B.

2.9 Ceasing or weaning Parenteral Nutrition

The dietitian, treating team and ICU outreach team (if available) will make the decision collaboratively regarding the continuation or cessation of PN prior to the next scheduled bag change.

The following must be considered prior to ceasing or weaning PN:

- Oral intake and/or enteral nutrition achieve 50%–75% of requirements for energy, protein, and micronutrients, unless impaired gastrointestinal function precludes 100% absorption of nutrient needs[2]
- Weaning PN can generally be a rapid process. Suggested when weaning, PN rate can be reduced by half for 2 hours and then cease (or as per the dietitian/treating team instructions). Monitor BGL with each rate change
- For patients who have had a long or complicated admission and received PN for a significant length of time, a longer weaning period may be required
- Rate changes are to be prescribed on the rate change section of the MR 60.1.11 WACHS Adult Central Parenteral Nutrition Form
- Do not reconnect a PN bag that has been disconnected. It must be discarded.
- Monitor BGL 1 hour after cessation, then 2-6 hourly for 24 hours
- Once PN is ceased and the line disconnected, (using aseptic technique) flush port with 10 mL sodium chloride 0.9% to enable use for other infusions
- Review insulin infusion if being administered
- Abrupt cessation/interruption of PN when there is no other form of nutrition (oral/enteral) should be avoided where possible to reduce the risk of hypoglycaemia.
- If PN is abruptly ceased or interrupted, treating medical team is to prescribe glucose 10% and administer at the same rate as the discontinued PN until PN is replaced/resumed. If PN is not to be recommenced, treating team to wean IV glucose/insulin infusion (if being administered) as per typical PN weaning (as per above) with monitoring BGL (1 hour after cessation, then 2-6 hourly for 24 hours).

3. Roles and Responsibilities

The **responsible treating team or ICU Outreach team** is responsible for:

- ordering and prescribing daily PN on MR 60.1.11 WACHS Adult Central Parenteral Nutrition Form
- liaising with the dietitian for recommendations on PN solution and rates of infusion
- charting trace element and multivitamin infusion on MR170A WA Hospital Medication Chart – Short Stay
- ordering daily morning bloods while the patient is receiving PN
- replacing deficient electrolytes
- reviewing blood and maintenance fluids
- monitoring the patient for potential complications

- including use of PN in discharge summary.

The **dietitian** is responsible for:
- conducting nutrition assessment of anthropometry, biochemistry, clinical, medical and diet history
- establishing refeeding syndrome risk
- calculating energy and protein requirements
- providing guidance on starting and target rate
- monitoring weight, fluid balance, biochemistry, blood glucose levels, and bowel function or stoma output
- advising on weaning from PN to oral or enteral nutrition
- establishing transitional feed once oral or enteral intake commences.

The **nurse** is responsible for:
- caring of the CVAD
- managing the infusion and associated equipment
- ensuring accurate patient weight and height is documented on admission and daily weights are undertaken as directed by the treating medical team
- performing and documenting baseline vital signs
- monitoring regular BGLs and liaising with the treating medical team if outside acceptable parameters
- reviewing the patient's previous 24-hour fluid balance status and assessing the current total intake and output. Consider concurrent IV therapy regimens
- liaising with the treating medical team to incorporate maintenance IV fluid requirements as necessary.

The **pharmacist** is responsible for:
- completing a comprehensive medication review as required
- ensuring all medications are given by the most appropriate route of administration taking into account the patient's ability to absorb medications enterally
- providing guidance on electrolyte replacement
- maintaining appropriate stock of PN available.

All staff are required to comply with the directions in WACHS policies and procedures as per their roles and responsibilities. Guidelines are the recommended course of action for WACHS and staff are expected to use this information to guide practice. If staff are unsure which policies procedures and guidelines apply to their role or scope of practice, and/or are unsure of the application of directions they should consult their manager in the first instance.

4. Monitoring and Evaluation

WACHS clinical leads for Medical, Nursing, Pharmacy and Dietetics will monitor compliance with this procedure. Routine monitoring will include PN orders, number of days PN is administered, and any clinical incidents associated with PN administration.

Evaluation of this procedure will be carried out by the Dietetic Coordinator, in consultation with stakeholders. Regional evaluation of performance measures may include, but are not limited to:
- CIMS Datix incident data
- Regional Clinical Governance audit tools.

5. References

1. National Institute for Health and Clinical Excellence. CG32 Nutrition support in adults: oral nutrition support, enteral tube feeding and parenteral nutrition (CG32). Manchester: NICE; 2006, updated 2017: [On-line] Available: Overview | Nutrition support for adults: oral nutrition support, enteral tube feeding and parenteral nutrition | Guidance | NICE.
2. ASPEN 2017, 'When is Parenteral Nutrition Appropriate?', Journal of Parenteral and Enteral Nutrition, vol. 41. No.3, pp. 324-377 (access: When Is Parenteral Nutrition Appropriate? - Worthington - 2017 - Journal of Parenteral and Enteral Nutrition).
3. Pittiruti M, Hamilton H, Biffi R, MacFie J, Pertkiewicz M. ESPEN guidelines on parenteral nutrition: Central venous catheters (access, care, diagnosis and therapy of complications). Clin Nutr. Aug 2009;28(4):365-377 (access: ESPEN Guidelines on Parenteral Nutrition).
4. Dietitians Association of Australia. Parenteral nutrition manual for adults in health care facilities: Deakin; 2018: [On-line] Available: https://dietitiansaustralia.org.au (members only).
5. Guenter P, Worthington P, Ayers P, Boullata JI, Gura KM, Marshall N, et al. Standardized Competencies for Parenteral Nutrition Administration: The ASPEN Model. Nutrition in Clinical Practice. 2018;33(2):295-304 (access: Standardized Competencies for Parenteral Nutrition Administration).
6. Government of Western Australia South Metropolitan Health Service Adult Total Parenteral Nutrition (TPN). Perth: Fiona Stanley Fremantle Hospitals Group; 2023.
7. Government of Western Australia East Metropolitan Health Service Parenteral Nutrition: Central Management Clinical Practice Standard. Perth: Royal Perth Bentley Group; 2018.
8. Government of Western Australia North Metro Health Service. Nursing Practice Guideline Total Parenteral Nutrition Perth: Sir Charles Gairdner Osborne Park Health Care Group 2020.

6. Definitions

Term	Definition
Parenteral Nutrition (PN)	The provision of nutrition via a central or peripheral vein and is required when oral and enteral nutrition is insufficient or unsafe[1]
Total Parenteral Nutrition (TPN)	The intravenous delivery of nutrients (glucose, amino acids, lipids, electrolytes, vitamins, minerals and trace elements) via a central vein that provides 100% of the patient's nutritional requirements.
Peripheral Parenteral Nutrition (PPN)	Delivery of parenteral nutrition via a peripheral vein only, using a solution that has a lower concentration of nutrients and lower osmolarity than standard PN (central) solutions.

7. Document Summary

Coverage	WACHS-wide
Audience	Nurses, medical officers, dietitians and pharmacists involved in administering PN
Records Management	Health Record Management Policy
Related Legislation	*Health Services Act 2016* (WA)
Related Mandatory Policies / Frameworks	• MP 0122/19 - Clinical Incident Management Policy 2019 • MP 0171/22 - Recognising and Responding to Acute Deterioration Policy • MP 0053/17 - WA Clinical Alert (Med Alert) Policy • MP 0175/22 - Consent to Treatment Policy • MP 0131/20 - High Risk Medication Policy • Clinical Governance, Safety and Quality Framework
Related WACHS Policy Documents	• Adult Peripheral Parenteral Nutrition Procedure • Aseptic Technique Policy • Central Venous Access Devices (CVAD) and Long Peripheral Venous Catheter (PVC) Management Clinical Practice Standard • Clinical Observations and Assessments Clinical Practice Standard (physiological, neurovascular, neurological and fluid balance) • Enteral Tubes and Feeding – Adults Clinical Practice Standard • Goals of Patient Care Guideline • Hand Hygiene Policy • High Risk Medications Procedure • Medication Prescribing and Administration Policy • Nutrition and Hydration Procedure • Patient Identification and Procedure Matching Policy
Related Forms	• MR60.1.10 WACHS Adult Enteral Feeding Form • MR60.1.11 WACHS Adult Central Parental Nutrition Form • MR60.1.12 WACHS Oral Nutrition Support Chart • MR111 WACHS Nursing Admission, Screening and Assessment Tool - Adults • MR120 WACHS Adult Nursing Care Plan • MR140A WACHS Adult Observation and Response Chart (AORC) • MR 144 WACHS Fluid Balance Work Sheet • MR 144C WACHS Diabetics - Food Intake Chart • MR156A WACHS Insulin Subcutaneous Order and Blood Glucose Record – Adult Form • MR157A WACHS Insulin Infusion Order Chart • MR170A WA Hospital Medication Chart – Short Stay MR179A WACHS Central Venous Access Device (CVAD) Insertion and Assessment Record

Related Training Packages	Nil
Aboriginal Health Impact Statement Declaration (ISD)	ISD Record ID: 3001
National Safety and Quality Health Service (NSQHS) Standards	1.03, 1.07, 1.27, 2.06, 2.10 4.04, 4.13, 4.14, 4.15, 5.27, 5.28
Aged Care Quality Standards	Nil
Chief Psychiatrist's Standards for Clinical Care	Nil
Other Standards	Nil

8. Document Control

Version	Published date	Current from	Summary of changes
3.00	11 February 2025	11 February 2025	• update from Clinical Practice Standard to Procedure including change of title.
4.00	20 November 2025	20 November 2025	• policy title and content updated to reflect central parenteral nutrition • reference to Adult Refeeding Syndrome Clinical Practice Standard removed. • allergen product information reviewed and updated as required.

9. Approval

Policy Owner	Chief Operating Officer Rural Services
Co-approver	Executive Director Nursing and Midwifery Executive Director Clinical Excellence
Contact	Area Coordinator Dietetics
Business Unit	Health Programs, Central Office
EDRMS #	ED-CO-15-94424

This document can be made available in alternative formats on request.

Appendix A: Troubleshooting Equipment Issues[4,5]

Problems	Management
PN line breakage / accidental disconnection	DO NOT reconnect a damaged or disconnected PN line to the CVAD: • Clamp and cap the CVAD. • Clamp the disconnected PN bag, line and filter; place in a sealed plastic container and save for inspection by pharmacy. • Notify the treating team and clinical pharmacist. • Contact the treating team to prescribe 10% glucose and administer at the same rate until PN, bag line and filter is replaced. • Continue to monitor BGL as clinically indicated in liaison with the treating team.
Filter breakages, blockages, or missing filter	DO NOT connect PN to patient: • Notify the clinical pharmacist and the treating team. • Contact MO to prescribe 10% glucose and administer at the same rate of PN until PN bag, line and filter is replaced. • Continue to monitor BGL as clinically indicated in liaison with the treating team.
Central VAD compromise	• Includes infected insertion site, cracked ports, accidental dislodgement, leakage of solution at insertion site. • Stop and disconnect PN; clamp and save PN solution and line for inspection by pharmacy. • Notify the clinical pharmacist and the treating team. • MO to prescribe 10% glucose and administer at the same rate of PN via peripheral IV cannula, to prevent rebound hypoglycaemia. • New CVAD should be organised as soon as possible by treating team. • Recommence PN when the next bag is available and new CVAD has been deemed safe to use. • Continue to monitor BGL as clinically indicated in liaison with the treating team.
PN infusion completed and next bag is not available	• Notify clinical pharmacist and treating team. • Contact MO to prescribe an infusion of 10% glucose and administer at the same rate of PN until replacement PN is available. • Continue to monitor BGL as clinically indicated in liaison with treating team.
PN order is incorrect or the bag is perforated, leaking or contaminated	DO NOT connect the faulty PN: • Notify the clinical pharmacist and the treating team • Clamp the disconnected PN bag, line and filter; place in a sealed plastic container and save for inspection by pharmacy. • Contact MO to prescribe 10% glucose and administer at the same rate as PN until PN is replaced. • Continue to monitor BGL clinically indicated in liaison with the treating team.
Patient undergoing a surgical or other procedure	• Continue PN as prescribed unless ordered otherwise by treating team. Send MR60.1.11 WACHS Adult Central Parental Nutrition Form with patient. • If the PN infusion is to be ceased for the procedure, reinforce with the procedural staff that the PN line should remain connected to the patient. • If the line is disconnected, the solution must be discarded and a new bag of PN obtained.

Appendix B - Troubleshooting Patient Complications[4,5]

Complication	Potential Causes	Treatments
Infection from catheter site resulting in general sepsis	Fungal / bacterial contamination	Antibiotics Re-educate on hygienic procedures for site management
Technical complications	Vein thrombosis, pneumothorax, haemothorax, haematoma, embolism, vein perforation	Refer to MO
Hyperglycaemia	High glucose infusion rate, preceding sepsis, diabetes, stress response	Reduce glucose infusion rate, consider insulin, monitor BGL 4 hourly
Hypoglycaemia	PN infusion rate reduced too fast during discontinuation of feeding / feed stopped suddenly	Slow tapering of feed over 1-2 hours
Abnormal LFTs	Multifactorial, relating to disease. Can be related to overfeeding.	Does not require PN to be ceased - refer to MO for advice
Low Mg / Ca / PO4 / electrolytes / Na / K	Refeeding Syndrome or malnutrition, medications e.g. diuretics	Correct electrolytes (IV) before increasing infusion rate, monitor bloods regularly
High Mg / Ca / PO4 / electrolytes / Na / K	Renal or liver disease, medications e.g. piperacillin with tazobactam	Regularly monitor bloods, *consider* reducing rate, *consider* insulin to ↓ K
Micronutrient deficiencies	Long term PN	Regular blood monitoring, replacement of micronutrients, check Zn, Cu, Fe, Vit K
Fatty liver / hepatobiliary complications	Excessive energy/PN rate (ensure carbohydrate intake no more than 5 g/kg/day)	Dietitian to re-assess energy requirements and modify as required, monitor LFTs / INR; check baseline LFTs prior to feeding
Respiratory failure	Excessive glucose (unlikely in all-in-one bags)	Ensure glucose < 5 mg/kg per minute
Hypertriglyceridaemia	High lipid component (unlikely in all-in-one bags)	Decrease lipid component; minimum is 3 times a week, check baseline triglycerides prior to commencing PN
Fluid overload	Excessive fluid intake / administration Compromised renal or cardiac function Re-feeding syndrome	Review volume of parenteral nutrition and other fluids received from IV medications. Monitor fluid status using a fluid balance chart. Discuss appropriate fluid allowance / sources with MO. Consider changing to a more concentrated parenteral nutrition formulation. Initiate parenteral nutrition gradually.

Appendix C: Cernevit® and Baxter ADTE trace element formulation

Cernevit®

Vitamin	Amount per vial of Cernevit
B1 (thiamine)	3.51 mg
B2 (riboflavin)	4.14 mg
B3 (niacin)	46 mg
B5 (pantothenic acid)	17.25 mg
B6 (pyridoxine)	4.53 mg
B7 (biotin)	69 microg
B9 (folic acid)	414 microg
B12 (cyanocobalamin)	6 microg
C (ascorbic acid)	125 mg
A (retinol palmitate)	3500 units
D3 (cholecalciferol)	5.5 microg
E (dl-alpha-tocopherol)	11.2 units

Baxter ADTE Trace Element Solution

Element	Amount per 10 mL syringe
Zinc	100 micromol (6.5 mg)
Copper	8 micromol (508 microg)
Selenium	1 micromol (80 microg)
Iron	20 micromol (1.1 mg)
Manganese	1 micromol (55 microg)
Chromium	0.2 micromol (10 microg)
Molybdenum	0.2 micromol (19 microg)
Iodine	1 micromol (130 microg)

Micronutrients | Baxter Professional Australia
CERNEVIT (TGA)