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# Adult Peripheral Parenteral Nutrition Procedure

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## 1. Purpose

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

Parenteral Nutrition (PN) is indicated when the gastrointestinal tract is not functional or accessible. When central access is limited, delayed or not desirable, then PPN may be considered. Restrictions in formulation and flow rates mean that total nutritional requirements are not always met with PPN, therefore it is only intended to be used for short time periods, ideally fewer than 5 – 7 days<sup>1</sup>.

This document is to be used in conjunction with:

- [WACHS Nutrition Screening, Assessment and Management Procedure](#)
- [WACHS Adult Refeeding Syndrome Clinical Guideline](#)
- [WACHS Adult Parenteral Nutrition Clinical Practice Standard](#)
- [WACHS Peripheral Intravenous Cannula \(PIVC\) Guideline](#)
- [WACHS Aseptic Technique Policy](#)
- [WACHS Hand Hygiene Policy](#)

## 2. Procedure

### Key points:

- PPN is administered via a peripheral line only.
- PPN may only be initiated by the treating medical team with support from dietetics and pharmacist.
- PPN must be prescribed on the [MR 60.1.14 WACHS Adult Peripheral Parenteral Nutrition Form](#).

### 2.1 Patient selection<sup>1,2,3</sup>

#### Indications

PPN is indicated for use when a patient requires supplemental nutrition via parenteral route for a short duration (ideally less than 5-7 days).

Situations where PPN is appropriate:

- Patients who are malnourished and unable to meet nutrition and hydration needs via oral or enteral intake and only require short term support.
- Gastrointestinal tract is not functional or accessible (post operative ileus, bowel obstruction, ischaemia).
- As a bridge to implementing total parenteral nutrition (TPN) or enteral nutrition in malnourished patients. If parenteral nutrition is needed for longer than 5 days, then consideration for TPN should be made.

- Whilst awaiting access to enteral feeding (i.e. awaiting commencement of nasojejunal/nasogastric tube feeding).
- When central access is not available due to delays in central line placement.
- Short term use in home TPN patients when central line access is lost.
- Patient has good peripheral access.

### Contraindications

Patients who are/have:

- well-nourished and able to meet nutritional requirements/resume enteral or oral nutrition in 5 days or less
- receiving end of life care or where use is contradictory to the patient's goals of care (refer to WACHS [Goals of Patient Care](#))
- known hypersensitivity to eggs or soya proteins, peanut protein, corn (maize) and corn by-products, components of the container, or to any of the ingredients including active substances and/or excipients
- congenital abnormalities of amino acid metabolism
- severe hyperglycaemia
- fluid restricted patients (<2 L/day)
- renal failure or are on dialysis (PPN contains set quantities of electrolytes that may have inadequate clearance in these patients).
- difficult intravenous vascular access or predicted poor vascular access (refer to [WACHS Peripheral Intravenous Cannula \(PIVC\) Guideline](#) – Vascular Access Decision Pathway). Consider TPN via a central line, if possible, at your site.

**A multi-disciplinary team decision (including medical, dietetics, nursing and pharmacy) is required to determine patients who are suitable for PPN.**

### 2.2 Nutritional Assessment

Refer to the dietitian for a formal assessment of anthropometry, biochemistry, clinical background, diet history and complete a Subjective Global Assessment (SGA) within 48 hours of PPN commencing as required.

For more information on nutrition assessments, please refer to WACHS [Nutrition Screening, Assessment and Management Procedure](#).

The dietitian will make recommendations on:

- starting rates and target rates for PPN
- requirement for electrolytes, vitamins and trace element infusions (given via a separate cannula from PPN)
- refeeding syndrome risk
- transition from PPN to oral, enteral or TPN.

### Assessing Biochemistry

The treating medical team should assess biochemistry, including electrolytes such as potassium, magnesium, and phosphate; and replace prior to PPN commencement where possible.

Refer to the [WACHS Adult Refeeding Syndrome Clinical Guideline](#).

## 2.3 Ordering and prescribing PPN solution

**Baxter PeriOlimel® N4-600E is the standard PPN formulation available for peripheral administration in WACHS:**

- available as 2000 mL three chamber bag
- delivered over 24 hours
- administered via a peripheral vein due to its lower osmolality (760 mOsmol/L)
- does not contain vitamins or trace elements (these are to be charted and administered separately)
- contains 5880 kJ, 50.6 g protein and 165 g glucose (refer to [Appendix A](#) for full nutritional composition).



### ATTENTION

TPN bags (Olimel ® N7-960E and Olimel ® N9-840E are hypertonic and must NOT be administered peripherally

PPN is to be ordered and prescribed by treating medical team on the [MR 60.1.14 WACHS Adult Peripheral Parenteral Nutrition Form](#) in consultation with dietitian and pharmacist as available.

- Typical infusion rates vary between 40-80 mL/hr; maximum rate is 80 mL/hr over 24 hours.
- Unless the patient is at risk of refeeding syndrome, PPN can be commenced at maximum rate (80 mL/hr over 24 hours).
- If the patient is at refeeding risk, commence at a lower rate for the first 24 hours as per treating medical team and dietitian and consider charting IV thiamine and Cernevit®.
- The PPN bag must be used or discarded within 24 hours of commencement.
- Vitamins and trace elements are charted separately as below and require a separate cannula for administration (refer to [Appendix B](#) for full nutritional composition):
  - trace element solution (e.g. ADTE®): dilute 1 syringe in 100 mL of glucose 5% and administer via intravenous infusion (central or peripheral) over 1 to 4 hours
  - multivitamins for injection (e.g. Cernevit®): dissolve 1 vial in 5 mL water for injection and administer by slow intravenous injection (central or peripheral) over at least 10 minutes.
- Once commenced, PPN prescription is to be reviewed daily by the treating medical team, who will monitor electrolytes and liaise with the dietitian and pharmacist, regarding PPN rate, additional fluid or electrolyte requirements.

PPN bags are available from pharmacy. Bags should be stored in supplied overpouch to protect from light and contamination, and at temperatures below 25°C.

### Commencing PPN after hours

The treating medical team may initiate PPN after hours prior to full nutrition assessment by the dietitian. The following is suggested:

- Commencing PPN at 40 mL/hr for first 24 hours on [MR60.1.14 WACHS Adult Peripheral Parenteral Nutrition Form](#).
- Monitor and increase to 80 mL/hr by Day 2.
- Full nutrition assessment by dietitian on next workday.

- If at risk of refeeding syndrome:
  - monitor biochemistry, consider replacing potassium, magnesium and phosphate deficiencies prior to commencing PPN; monitor daily with replacement of electrolytes as required
  - consider commencing IV thiamine, IV Cernevit® and trace element.

Refer to [WACHS Adult Refeeding Syndrome Clinical Guideline](#) for more information on Refeeding Syndrome.

## 2.4 Implementing peripheral access



### ATTENTION

PPN must be delivered via dedicated large diameter peripheral veins using a 20 or 22 G peripheral polyurethane cannula. The smaller cannula size inserted into a large diameter blood vessel allows for maximal dilution of PPN which can reduce the risk of thrombophlebitis.

The preferred site of the peripheral intravenous cannula (PIVC) is inside the lateral forearm. PPN must not be administered via a PIVC in the lower limb or hand **unless** access is difficult and the PIVC is inserted by an appropriately skilled clinician. In circumstances where the patient has existing central access it may be appropriate to administer PPN via a dedicated central lumen after discussion with treating medical team.

Document the date and time inserted, and other relevant PIVC insertion and management details on the [MR179 WACHS Peripheral Intravenous Cannula Insertion and Observation Record](#) and patient's healthcare record.

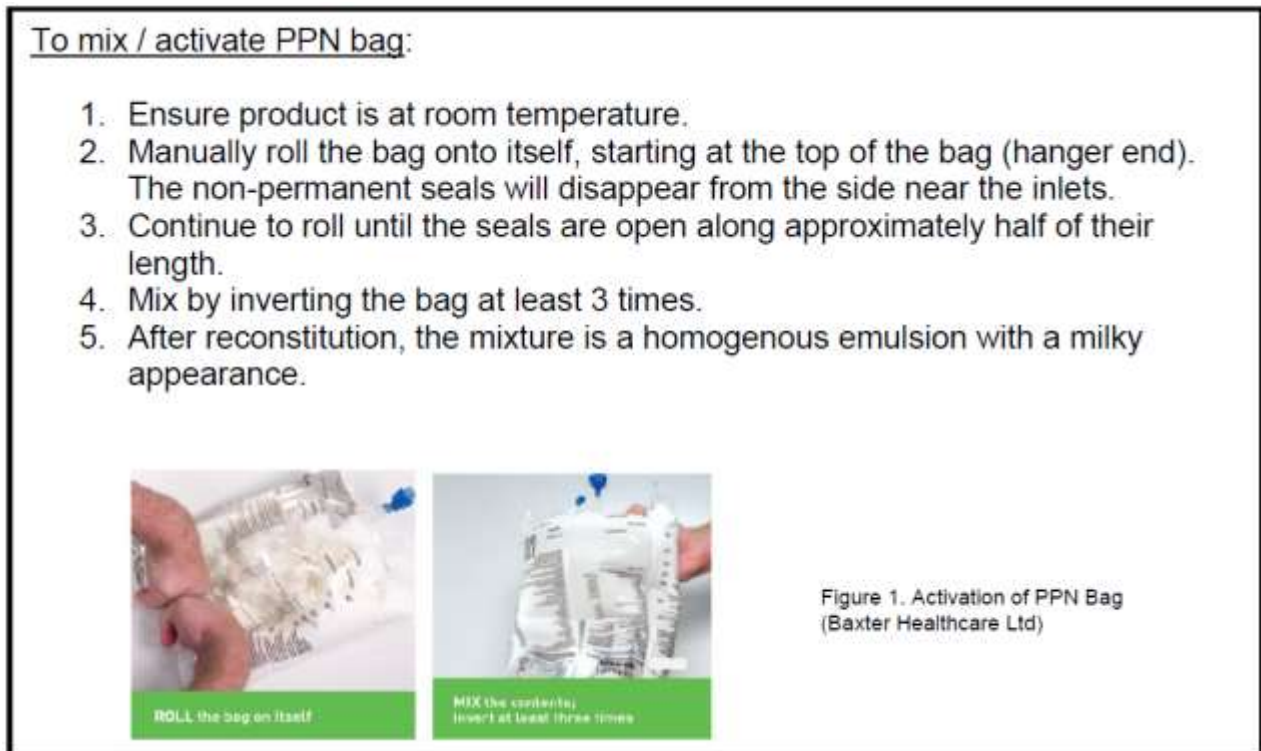
Refer to [WACHS Peripheral Intravenous Cannula \(PIVC\) Guideline](#) for full details on PIVC insertion and management.

## 2.5 Administration of PPN

Two appropriately credentialed staff, as per [WACHS Medication Administration and Prescribing Policy](#), are required to perform the checking procedure which include programming the pump and signing the [MR60.1.14 WACHS Adult Peripheral Parental Nutrition Form](#) on commencement of the bag and for all changes to the infusion rate.

Ensure the triphasic PPN bag is mixed well and 1.2 micron filter connected to the giving set **prior** to attaching the PPN bag to the dedicated peripheral cannula, see [Figure1 Activation of PPN bag](#).

Figure 1: Activation of PPN bag



- Perform patient identification checks and ensure PPN order is valid (refer to [WACHS Patient Identification Policy](#)).
- Identify the dedicated 20 G or 22 G cannula intended for PPN. Ensure the cannula is patent and peripheral intravenous access score (PIVAS) <1. Liaise with treating medical team for a new PIVC if required.
- Perform hand hygiene and don personal protective equipment (PPE) and use non-sterile gloves when administering PPN.
- 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.
- Flush the line with sodium chloride 0.9% 10 mL to assess patency.
- Connect PPN line to the port, ensuring 1.2 micron filter attached to PPN line. Do not contaminate the port.
- Administer at the prescribed rate using a volumetric infusion pump.
- Tape and secure the line and ensure a PPN administration sticker is attached to the dressing site to indicate that the cannula is not for other fluids or medications.
- Continuous or uninterrupted PPN delivery is important to minimise changes to blood glucose levels.
- Do not administer intravenous medications through the dedicated PIVC whilst PPN is running.
- Ensure the PPN line is not inadvertently disconnected from the patient. Once disconnected, the PPN line should not be reconnected due to the increased risk of infection.

## 2.6 Monitoring and management of PPN

### Monitoring of PPN infusion and patient:

1. Ensure the PIVC is reviewed:

- 15 minutes after commencement of PPN by nursing staff.
  - every 4 hours by nursing staff for site assessment and dressing integrity
  - daily by treating medical team
  - on any complaints of pain or inflammation at the cannula site or PIVAS score > 2, pause the infusion, **do not** disconnect and notify the treating medical team for a prompt review of the PIVC site.
2. Monitor and record the patient's vital signs 4 hourly for the duration of the PPN infusion.
  3. Monitor patient's temperature 4 hourly.
  4. Measure patient weight both prior to PPN commencement then daily or as directed by the treating medical team or dietitian.
  5. Maintain daily strict fluid balance charts during PPN administration as instructed by the medical team. Chart on [MR 144 WACHS Fluid Balance Work Sheet](#).
  6. Monitor blood glucose levels (BGLs):
    - baseline BGL prior to commencement of PPN
    - hourly for first 2 hours of initiation and then 4 - 6 hourly as advised by the treating medical team for the first 48 hrs (based on the patient's clinical status)
    - after 48 hours of administration, 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 treating medical 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. A concurrent glucose 10% infusion is not required while the patient is on PPN.
    - Monitor for rebound hypoglycaemia after PPN is ceased.
    - Refer to [MR157A WACHS Insulin Infusion Order Chart](#) for commencement of insulin and revised protocol for blood glucose monitoring.
  7. Monitor biochemistry:
    - minimum requirements include:
      - daily urea and electrolytes, magnesium, phosphate, calcium
      - full blood picture and liver function tests every second day
    - Tests are to be ordered by the treating medical team. Responsibility for replacement of any electrolytes is with the treating medical team.
    - Replace deficient electrolytes prior to PPN commencing.
    - If intravenous electrolyte replacement is required a second PIVC must be inserted.
    - Additional bloods as clinically indicated.

Refer to WACHS [Peripheral Intravenous Cannula \(PIVC\) Guideline](#) for full details on PIVC management.

## 2.7 Management of extravasation

Extravasation is the unintentional instillation or leakage of a medicine or substance out of a blood vessel into surrounding tissue and may result in tissue necrosis if the substance is

vesicant or highly irritating<sup>2</sup>. PPN can cause local pain and inflammation including aching, stinging and tightness upon extravasation but rarely causes tissue necrosis or destruction.

Suspect extravasation if:

- patient complains of stinging, burning, pain or discomfort
- evidence of swelling, erythema, oedema or leakage at the site
- absence or change of free flow of the infusion
- loss of blood return or change in blood flow to affected limb.

If extravasation is suspected:

- Stop infusion. **Do not** remove cannula. Notify the treating medical team for a prompt review of the PIVC site.



ATTENTION

ALERT: If extravasation has occurred, the [WACHS PIVC Complication – extravasation information and management guide](#).

## 2.8 Ceasing or weaning PPN

The dietitian and/or treating medical team will make the decision regarding the continuation or cessation of PPN prior to the next scheduled bag change or if extravasation is suspected. The following must be considered prior to ceasing or weaning PPN:

- If the patient is receiving oral, enteral nutrition or TPN, PPN can be ceased without a rate reduction (cease immediately).
- If the patient is **not** receiving oral, enteral nutrition or TPN, follow the rate reduction as prescribed by treating medical team (usually by halving the rate for 2 hours before ceasing).
- Avoid abruptly stopping PPN when the patient is not receiving additional nutrition as this may cause rebound hypoglycaemia.
- If PPN is disconnected abruptly or if PPN runs through before the next bag is ready, contact the treating medical team to arrange 10% glucose to be infused at the same rate as the PPN until a replacement bag is sourced.
- If a PPN is disconnected from the PIVC, it is not to be reconnected due to infection risk.

## 3. Roles and Responsibilities

**All staff** are required to work within policies and guidelines to make sure that WACHS is a safe, equitable and positive place to be.

The **treating medical team** is responsible for:

- ensuring a PIVC using 20 or 22G is present and patent
- ordering and prescribing daily PPN on [MR60.1.14 WACHS Adult Peripheral Parental Nutrition Form](#)

- charting trace element and multivitamin injection on [MR170A WA Hospital Medication Chart](#)
- considering the need for IV Proton Pump Inhibitor for stress ulcer prophylaxis
- liaising with the dietitian for recommendations on rates of PPN infusion
- ordering daily morning bloods while the patient is receiving PPN
- replacing deficient electrolytes
- reviewing blood and maintenance fluids
- monitoring patient for potential complications
- including use of PPN in NaCS discharge summary.

The **Dietitian** is responsible for:

- conducting nutrition assessment of anthropometry, biochemistry, clinical, medical and diet history
- establishing re-feeding 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 transition from PPN to oral, enteral nutrition or total parenteral nutrition (TPN)
- establishing transitional feed once oral or enteral intake commences.

The **nurse** is responsible for:

- care of the PIVC
- administering PPN via dedicated 20 G or 22 G cannula
- managing the infusion and associated equipment
- ensuring accurate patient weight and height is documented at admission and daily weight as required by the treating medical team
- performing and document baseline vital signs
- monitoring regular BGL and liaise with treating medical team if outside acceptable parameters
- reviewing the patient's previous 24 hour fluid balance status and assess the current total intake and output. Consider concurrent IV therapy regimens
- liaising with treating medical team to incorporate maintenance IV fluid requirements into PPN prescription as necessary.

The **pharmacist** is responsible for:

- completing a comprehensive medication review as required
- providing guidance on electrolyte replacement
- maintaining appropriate stock of PPN available.

## 4. Monitoring and Evaluation

### 4.1 Monitoring

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

### 4.2 Evaluation



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. Compliance

This policy is a mandatory requirement under the [Health Services Act 2016](#) (WA).

Failure to comply with this procedure may constitute a breach of the WA Health Code of Conduct (Code). The Code is part of the [Integrity Policy Framework](#) issued pursuant to Section 26 of the [Health Services Act 2016](#) and is binding on all WACHS staff which for this purpose includes trainees, students, volunteers, researchers, contractors for service (including all visiting health professionals and agency staff) and persons delivering training or education within WACHS.

WACHS staff are reminded that compliance with all policies and procedures is mandatory.

## 6. References

1. Government of Western Australia South Metropolitan Health Service [Peripheral parenteral nutrition \(PPN\) management](#). Perth: Fiona Stanley Fremantle Hospitals Group; 2023 [Cited 09 May 2023]
2. Government of Western Australia East Metropolitan Health Service [Clinical Practice Standard for Parenteral Nutrition: Peripheral \(PPN\) Management](#) Perth: Royal Perth Bentley Group; 2018 [Cited 09 May 2023]
3. Sugrue D, Jarrell AS, Kruer R, Davis S, Johnson D, Tsui E, Snyder S, Crow J. 2018. Appropriateness of peripheral parenteral nutrition use in adult patients at an academic medical center. *Clinical Nutrition*. 117-121 (accessed: [Appropriateness of peripheral parenteral nutrition use in adult patients at an academic medical center - PubMed \(nih.gov\)](#))
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. Ayers P, Holcombe B, Plogsted S, Guenter P. Parenteral Nutrition Handbook. 2nd Ed. Silver Spring (USA): American Society for Parenteral and Enteral Nutrition; 2014.
6. 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](#)

## 7. Definitions

Term	Definition
<b>Total Parenteral Nutrition (TPN)</b>	The intravenous delivery of nutrients (glucose, amino acids, lipids, electrolytes, vitamins, minerals and trace elements) via a central vein. Can provide up to 100% of the patient’s nutritional requirements.
<b>Peripheral Parenteral Nutrition (PPN)</b>	Similar to TPN but has a lower concentration of nutrients and lower osmolarity than TPN solutions, allowing for peripheral venous administration. It is not likely to provide 100% of nutritional requirements.
<b>Extravasation</b>	The unintentional leakage of a medicine or substance out of the blood vessel and into surrounding tissue.
<b>Phlebitis</b>	The presence of inflammation within and surrounding a vein. Clinically associated with pain, tenderness, induration and/or erythema along the course of the superficial vein.

## 8. Document Summary

<b>Coverage</b>	WACHS-wide
<b>Audience</b>	Nurses, medical officers, dietitians and pharmacists involved in administering PPN
<b>Records Management</b>	<a href="#">Health Record Management Policy</a>
<b>Related Legislation</b>	<a href="#">Health Services Act 2016</a> (WA)
<b>Related Mandatory Policies / Frameworks</b>	<ul style="list-style-type: none"> <li>• MP 0038/16 <a href="#">Insertion and Management of Peripheral Intravenous Cannulae in Healthcare Facilities Policy</a></li> <li>• <a href="#">Clinical Governance, Safety and Quality Framework</a></li> </ul>
<b>Related WACHS Policy Documents</b>	<ul style="list-style-type: none"> <li>• <a href="#">Adult Parenteral Nutrition Clinical Practice Standard</a></li> <li>• <a href="#">Adult Refeeding Syndrome Clinical Guideline</a></li> <li>• <a href="#">Aseptic Technique Policy</a></li> <li>• <a href="#">Clinical Observations and Assessments Clinical Practice Standard (physiological, neurovascular, neurological and fluid balance)</a></li> <li>• <a href="#">Goals of Patient Care Guideline</a></li> <li>• <a href="#">Hand Hygiene Policy</a></li> <li>• <a href="#">High Risk Medications Procedure</a></li> <li>• <a href="#">Infection Prevention and Control Policy</a></li> <li>• <a href="#">Medication Prescribing and Administration Policy</a></li> <li>• <a href="#">Nutrition Screening, Assessment and Management Procedure</a></li> <li>• <a href="#">Patient Identification Policy</a></li> <li>• <a href="#">Peripheral Intravenous Cannula (PIVC) Guideline</a></li> <li>• <a href="#">WACHS Medication Administration and Prescribing Policy</a></li> </ul>
<b>Other Related Documents</b>	<ul style="list-style-type: none"> <li>• WACHS <a href="#">PIVC Complication – extravasation information and management guide</a></li> </ul>
<b>Related Forms</b>	<ul style="list-style-type: none"> <li>• <a href="#">MR 60.1.14 WACHS Adult Peripheral Parenteral Nutrition Form</a></li> <li>• <a href="#">MR140A Adult Observation and Response Chart (A-ORC)</a></li> <li>• <a href="#">MR170A WA Hospital Medication Chart – Short Stay</a></li> <li>• <a href="#">MR 144 WACHS Fluid Balance Work Sheet</a></li> <li>• <a href="#">MR156A Insulin Subcutaneous Order and Blood Glucose Record - Adult</a></li> <li>• <a href="#">MR179 WACHS Peripheral Intravenous Cannula Insertion and Observation Record</a></li> <li>• <a href="#">MR157A WACHS Insulin Infusion Order Chart</a></li> </ul>
<b>Related Training Packages</b>	<ul style="list-style-type: none"> <li>• <a href="#">WACHS PPN Education and Training Checklist</a></li> </ul>
<b>Aboriginal Health Impact Statement Declaration (ISD)</b>	ISD Record ID: 2118
<b>National Safety and Quality Health Service (NSQHS) Standards</b>	5.27, 5.28, 1.03, 1.07, 1.27, 2.06, 2.10 4.04, 4.13, 4.14, 4.15

<b>Aged Care Quality Standards</b>	N/A
<b>National Standards for Mental Health Services</b>	N/A

## 9. Document Control

Version	Published date	Current from	Summary of changes
1.00	6 September 2023	6 September 2023	<ul style="list-style-type: none"> <li>New Procedure.</li> </ul>
1.01	22 January 2024	6 September 2023	<ul style="list-style-type: none"> <li>minor amendment to improve clarity of information</li> <li>section 2.5 - update to who can check PPN order prior to administration.</li> </ul>

## 10. Approval

<b>Policy Owner</b>	Chief Operating Officer
<b>Co-approver</b>	Executive Director Nursing and Midwifery Executive Director Clinical Excellence
<b>Contact</b>	Area Coordinator Dietetics
<b>Business Unit</b>	Health Programs, Central Office
<b>EDRMS #</b>	ED-CO-23-277584
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**This document can be made available in alternative formats on request.**

**Appendix A: PeriOlimel® N4 formulation**

<b>Constituents</b>	<b>2000 mL PeriOlimel ® N4-600E</b>
Amino Acids (g)	50.6 (contains 17 amino acids, including 8 essential amino acids)
Glucose (g)	165
Lipids (g)	60
Lipid source	ClinOleic (80:20 Olive: Soy) (= 15% SFA, 65% MUFA, 20% PUFA)
Total Energy (kcal)	1400
Total Energy (KJ)	5880
Non-Protein Energy (kcal)	1200
Non-protein Energy (KJ)	5040
Sodium (mmol)	42
Potassium (mmol)	32
Calcium (mmol)	4
Phosphate (total) (mmol)	17
Magnesium (mmol)	4.4
Acetate (mmol)	55
Chloride (mmol)	49
pH	6.4
Osmolarity (mOsm/L)	760

[SOURCE: Baxter Health Care](#)

## Appendix B: 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 international units
D3 (cholecalciferol)	220 international units
E (dl-alpha-tocopherol)	11.2 international 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)

[Source: Baxter Health Care](#)