**Canberra Health Services**

**Procedure**

**Administration of Total Parenteral Nutrition (TPN) – Adults**

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| Purpose |

The purpose of the Total Parenteral Nutrition(TPN) Clinical Procedure is to outline the process for the safe administration and management of TPN in adult patients at Canberra Health Services.

This clinical procedure provides information for clinical staff who care for patients receiving TPN in the acute hospital and the community setting.

Parenteral nutrition is complex and only some aspects of TPN administration and monitoring are encompassed by this clinical procedure.  Further clinical guidance in relation to parenteral nutrition can be found in the *NSW Agency for Clinical Innovation Parenteral Nutrition Pocketbook: For Adults* (refer to references).

This Standard Operating Procedure (SOP) describes for staff the process to

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| Scope |

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| Alerts |

* All patients who are to commence TPN must have a Central Venous Access Device (CVAD) in situ that has been confirmed to be in the correct position. The CVAD may be:
* Central Venous Catheter (CVC)
* Hickman’s line
* Implanted port
* Peripherally Inserted Central Catheter (PICC).
* The major risk for patients receiving TPN is central line associated bloodstream infection. Only staff who have achieved competence in CVAD Management and Aseptic Technique should access or manage a CVAD. See scope section for more information.
* TPN should not be disconnected for daily care.
* If a multi-lumen CVAD line is in place, one lumen from the CVAD must be allocated exclusively for TPN. In addition, when there is a multi-lumen CVAD in situ, it is desirable that the CVAD not be used for other purposes.
* The TPN solution is light sensitive and must be covered with the supplied light protective bag at all times.
* TPN should always be administered via a smart pump with infusion safety software.
* Patients on continuous TPN must have the TPN bags and lines changed every 24 hours.
* If a patient is on 16 hourly TPN infusions, the bags and lines should be discarded at the end of each infusion.
* For inpatients, nothing is to be added to TPN or fat emulsion (lipid) solutions, bags or lines. Some long-term patients may need to have vitamins added using a pre-loaded syringe. This is prescribed by the gastroenterologist.

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| Scope |

This clinical procedure applies to all adult CHS patients requiring TPN therapy.

This document applies to the following CHS staff working within their scope of practice:

* Medical staff
* Registered Nurses and Midwives
* Allied Health Professionals
* Students working under direct supervision.

Staff caring for patients with a CVAD must have achieved competence in CVAD management and Aseptic technique. Refer to *Central Venous Access Device (CVAD) Management Procedure* and *Aseptic Technique Procedure*.

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| Section 1 – Before commencing TPN |

* The TPN order must be written by a Registrar, Consultant or Fellow on an *Intravenous Fluid and Additive Order form* and the *Total Parental Nutrition (TPN) Order - Adult form*, available on the Clinical Forms Register.
* TPN is provided by Pharmacy. TPN is delivered to the ward from Pharmacy and must be stored under refrigerated conditions until required by the patient.
* Dietitian consultation should be sought regarding nutritional assessment of the patient.
* The patient should have baseline bloods (Liver Function Tests (LFTs), Triglycerides, Blood Glucose Level (BGL), Urea, Electrolytes and Creatinine (UEC), Comprehensive Metabolic Panel (CMP), Full Blood Count (FBC) and iron levels) prior to starting TPN.
* A baseline weight for the patient should be recorded on the *Total Parental Nutrition (TPN) Order – Adult form* and on the *Weight Chart form.*

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| Section 2 – Commencing TPN in Adults (Adult TPN solutions) |

**Equipment**

* Personal protective equipment (PPE) (including goggles/safety glasses)
* Alcohol based hand rub (ABHR)
* TPN flask (as per medical prescription) with light protective cover
* Clean non-sterile gloves
* Clean gown
* Light protected intravenous giving set (in outpatient settings, standard intravenous giving set can be used)
* Infusion pump device attached to IV pole
* Sterile dressing pack
* Sterile gauze
* Sterile gloves
* Chlorhexidine 2% alcohol 70% swabs x 3
* 10mL 0.9% Sodium Chloride x 1
* Blunt drawing up needle
* 10mL luer lock syringe
* IV-line label

**Procedure**

1. Attend hand hygiene
2. Clean dressing trolley
3. Collect equipment
4. Remove TPN from refrigerator and place on trolley
5. Check TPN prescription order against the prepared TPN with another nurse or doctor. Check TPN for discolouration.
6. Explain the procedure to the patient and obtain verbal consent for the administration of TPN
7. Attend hand hygiene
8. Attend patient identification check with second staff member at the patient’s bedside utilising the three core identifiers. Confirm patient information on
9. patient identification band
10. TPN prescription
11. TPN light sensitive cover, and
12. TPN bag with verbal confirmation from patient.
13. Attend hand hygiene
14. Roll up light protective cover to allow access to TPN access port
15. Attend hand hygiene
16. Apply clean nonsterile gloves
17. Access insertion port on TPN bag by removing blue tab (when using ‘SMOF Kabiven’ brand flask)
18. Swab insertion port on TPN bag vigorously with chlorhexidine 2% alcohol 70% swab for 10 seconds. Allow to dry for **30 seconds.**
19. While TPN is still lying flat on the trolley, spike the prepared TPN bag using standard aseptic non touch technique (ANTT)
20. Hang the bag on the intravenous pole and re-apply light protect cover
21. Label IV line as per *National Standard for User applied Labelling of Injectable Medicines, Fluids and Lines procedure*
22. Insert line in IV pump and use machine to prime line. (Alternatively, the line can be primed before the line is inserted in the machine, according to clinician preference.)
23. Select the TPN setting on the infusion pump
24. With the clinician who completed the initial prescription check, set infusion rate and volume to be infused as per the TPN prescription
25. Remove gloves and attend hand hygiene, don safety goggles and gown
26. Set up sterile field
27. Attend hand hygiene
28. Apply sterile gloves
29. Draw up 0.9% Sodium Chloride flush using blunt drawing up needle (maintaining sterile ANTT)
30. Using sterile gauze, lift dedicated TPN CVAD lumen and place sterile towel underneath
31. While still holding CVAD lumen, swab CVAD bung vigorously with chlorhexidine 2% alcohol 70% swab for 10 seconds. Allow to dry for **30 seconds**
32. Flush lumen with 10mLs of 0.9% Sodium Chloride using pulsatile action to ensure patency
33. While still holding CVAD lumen, swab CVAD bung vigorously with chlorhexidine 2% alcohol 70% swab for 10 seconds, allow to dry for **30 seconds,** place on sterile towel and discard gauze.
34. Using sterile gauze in your dominant hand, lift TPN infusion line
35. With non-dominant hand, use sterile gauze to remove infusion line cap and discard cap and gauze
36. Using sterile gauze in your non-dominant hand, lift lumen and connect to TPN infusion line
37. Remove sterile gloves and perform hand hygiene
38. Commence TPN infusion
39. Dispose of used equipment in line with organisational requirements
40. Sign TPN administration order with second staff member and document in clinical notes and Fluid Balance Chart.

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| Section 3 – Monitoring TPN Administration |

**The RN caring for an inpatient having TPN must:**

* Ensure that the patient has blood monitoring as ordered (usually daily biochemistry including phosphate initially and at least weekly full blood counts and liver function tests).
* Measure and record the patient’s BGL four times a day (QID) on commencement of TPN, then daily when BGLs are normal (as determined by the patient’s treating medical team). Document BGL on the *Glucose Monitoring Chart form*.
* Measure and record the patient’s weight on the *Weight Chart form* on commencement of TPN, then twice weekly.
* Maintain at least 4 hourly vital signs on patients for the duration of TPN, unless otherwise ordered by the treating medical team. Document vital sign observations on the *General Observation Chart (MEWS)*.

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| Section 4 – Disconnecting TPN  |

**Equipment**

* PPE (including goggles/safety glasses)
* Alcohol based hand rub (ABHR)
* Clean nonsterile gloves
* Chlorhexidine 2% alcohol 70% swab x 1
* 0.9% Sodium Chloride flush – either 10mL syringe, drawing up needle and 10mL 0.9% Sodium Chloride or a 10mL 0.9% Sodium Chloride Posiflush

**Procedure**

1. Attend hand hygiene
2. Ensure patient privacy
3. Confirm patient has completed the TPN infusion as prescribed and turn off pump.
4. Confirm patient identification using the three core identifiers on the TPN prescription order, patient identification band and verbal confirmation from patient
5. Explain procedure to patient and obtain verbal consent to disconnect TPN
6. Attend hand hygiene
7. Apply clean non sterile gloves
8. Disconnect TPN line from CVAD
9. Swab CVAD bung vigorously with chlorhexidine 2% alcohol 70% swab for 10 seconds. Allow to dry for **30 seconds.**
10. Flush lumen with 10mLs of 0.9% Sodium Chloride using pulsatile action
11. Dispose of TPN flask into the clinical waste bin
12. Attend hand hygiene
13. Document in the clinical notes and fluid balance chart.

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| Section 5 – Home Parenteral Nutrition (HPN) – Patient Education and Discharge Planning |

Parenteral nutrition is a costly treatment with significant infection risks and complications. Home Parenteral Nutrition (HPN) can only be justified for patients with clearly defined indications. HPN is approved through the Canberra Health Services Drug and Therapeutics Committee (CHS DTC). Approval is required to get funding by Canberra Health Services of the parenteral nutrition solution, equipment and consumables which are provided through a supplier (for example, Baxter or Fresenius Kabi). Canberra Health Services remains the clinical provider and provides the clinical management for the patient.

In addition to the clinical indication for HPN, the physical, cognitive and emotional abilities of the patient and/or carers should be considered and if the home environment is appropriate for HPN. Extensive patient and/or carer training in the management of HPN is required while an inpatient, with this usually taking several weeks (possibly up to 6 weeks) depending on the patient and and/or carer’s ability to learn the techniques to ensure safe home practice.

The role of the hospital ward RN is to educate the patient and/or carer to independently administer parenteral nutrition with the ability to recognise problems and complications and respond appropriately.

**Procedure**

1. It is recommended to have a planned timeline for the setting up of the HPN patient, coordinated by the hospital ward Clinical Nurse Consultant (CNC), covering a two week period. The hospital ward CNC informs the following clinicians of the new HPN patient:
* CNC Post Acute Care at Rehabilitation, Aged and Community Services (RACS) (ACT Residents Only), phone: 5124 7958
* Discharge Liaison Nurse (DLN) – to refer the patient to community nursing. NSW Residents should be referred to the relevant Local Health District Community Nursing Service.
* HPN manufacturer to order HPN bags, equipment and consumables. See Attachment A for information on ordering from the suppliers.
1. Education of the patient and/or family/carer in the management of HPN occurs in hospital. This process can take two or more weeks depending on the medical condition of the patient and/or the family/carer’s ability to undertake the care independently. Patient and/or family carer education related to HPN is divided into four areas:
* Care of the CVAD
* Administration of TPN procedures
* Monitoring for complications, for example, CVAD and pump troubleshooting, sepsis
* How to order supplies

**Patient/Family Carer Education**

Nursing staff are to ensure the patient/family member/carer:

* Has been issued with product information from HPN manufacturer (for example, *Parenteral Nutrition At Home Patient Guide* from Baxter or *Fresenius Kabi@Home Nutrition Delivered* fromFresenius Kabi)
* Demonstrates principles of asepsis when doing procedures
* Demonstrates safe use of equipment and pump
* Demonstrates safe handling and storage of HPN
* Recognises mechanical problems related to CVAD and responds appropriately
* Recognises signs and symptoms of infection and responds appropriately
* Recognises signs and symptoms of fluid imbalance and responds appropriately
* Recognises signs and symptoms of hyperglycaemia and hypoglycaemia and responds appropriately.

During training the patient is encouraged to take responsibility for self-monitoring and recording in a logbook or diary in preparation for discharge. This may include monitoring of:

* fluid balance
* BGLs
* weight
* temperature.

If the patient is found to be stable after several weeks on parenteral nutrition a decrease in monitoring activities is indicated. Generally stable patients do not need to monitor BGL or temperature at home. If the patient becomes unstable then home monitoring activities may need to be increased.

1. The HPN regimen requires regular evaluation (this may be weekly initially to up to six monthly depending on the stability of the patient). A recommended standard of care for the management of patients receiving HPN is for this evaluation to be multidisciplinary. Review of the HPN should be arranged with the consultant clinician (gastroenterologist managing parenteral nutrition) and dietitian (for example, gastroenterology outpatient dietitian). The gastroenterologist orders the frequency of blood collection for monitoring of electrolytes and chemistry; and the schedule for the patient and/or family carer to monitor BGLs, weight, and temperature. Blood is collected by a pathology service prior to review by the gastroenterologist or GP. The dietitian organises follow up appointments as required. The patient should be given a contact list for the HPN manufacturer, community nursing, dietitian, emergency services, gastroenterologist, GP and hospital pharmacy.

**Discharge to start HPN**

Patient has:

* HPN approved by the CHS Drug and Therapeutics Committee
* CVAD in situ
* Been referred to Community Nursing CNC Acute Post Acute Care (ACT residents only)
* Been referred to community nursing and Link Team for support and monitoring or if NSW resident referred to Local Health District Community Nursing Service.
* Appointments with gastroenterologist, GP and dietitian
* Blood collection schedule
* Contact list for HPN manufacturer (see Attachment A), community nursing, dietitian, emergency services, gastroenterologist and GP
* Home Monitoring Protocol
* Product information from HPN manufacturer (for example, *Parenteral Nutrition At Home Patient Guide* from Baxter or *Fresenius Kabi@Home Nutrition Delivered* fromFresenius Kabi)
* HPN solutions
* Equipment: ambulatory pump, IV set, backpack for ambulatory pump, IV pole
* List of consumables
* Consumables
1. It is recommended that the patient is assessed for safety and independence in the performance of TPN administration early in the discharge planning process. It is recommended that the patient’s home be assessed for the suitability of their storage of a month’s supply of consumables in their original boxes in a clean and dry area, the selection of an area for HPN connection and disconnection and appropriate location of power points for the pump. A dedicated fridge is required to store the HPN and vitamins. Vitamins should not be stored in the refrigerator door. The patient may consider purchasing a folding table, or a stainless steel/plastic tray to provide a clean surface on which to perform HPN management.

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| Evaluation  |

**Outcome**

Patients requiring TPN therapy are managed as per this procedure.

**Measures**

* Review of clinical incident reports related to TPN administration.
* Review of feedback from consumers regarding TPN administration
* On review of this procedure review of 10 clinical records of patients who have received TPN to ensure procedure was followed.

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| Related Legislation, Policies and Procedures |

**Policies**

* Informed Consent (Clinical)
* Medication Handling
* Nursing and Midwifery Continuing Competence

**Procedures**

* Aseptic Technique
* Central Venous Access Device (CVAD) Management- Children, Adolescents and Adults (Not Neonates)
* Clinical Record Management
* Patient Identification and Procedure Matching
* Infection Prevention and Control - Healthcare Associated Infections
* National Standard for User applied Labelling of Injectable Medicines, Fluids and Lines

**Legislation**

* *Human Rights Act* 2004
* *Health Records (Privacy and Access) Act* 1997
* *Work Health and Safety Act* 2015
* *Medicines, Poisons and Therapeutic Goods Act* 2008
* *Australian Charter Healthcare Rights*

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| Search Terms  |

CVAD, Home parenteral nutrition, HPN, Nutrition, Total parenteral nutrition, TPN

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| Attachments |

Attachment A – Information Regarding Suppliers of HPN

**Disclaimer**: *This document has been developed by Canberra Health Services specifically for its own use. Use of this document and any reliance on the information contained therein by any third party is at his or her own risk and Canberra Health Services assumes no responsibility whatsoever.*

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| *Date Amended* | *Section Amended* | *Divisional Approval* | *Final Approval*  |
| *14/07/2021* | *Complete Review* | *Jacqui Taylor,* *ED-Medicine* | *CHS Policy Committee* |
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*This document supersedes the following:*

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| *Document Number* | *Document Name* |
| *CHHS16/081* | *Administration of Total Parenteral Nutrition (TPN) – Adults and Children (not NICU)* |
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## Attachment A – Information Regarding Suppliers of HPN

Baxter and Fresenius Kabi are suppliers of HPN for CHS patients.

**Baxter**

There are two Baxter Healthcare Departments that manufacture, coordinate and distribute products for HPN patients:

**1.** **Baxter Pharmacy Services:** prepares HPN solutions for patients on prescription from the Gastroenterologist via the hospital Pharmacy Department.

HPN bags and preloaded vitamin syringes (if required) are delivered to the patient’s home via courier once a week. The patient or carer must be present to collect the HPN bags in person. The HPN bags in over pouches and preloaded vitamin syringes are to be unpacked and put into the refrigerator (maintained at 2 to 8ᴼC) as soon as possible after receipt of the delivery. The patient or family carer should complete a stock take on receipt of the delivery and contact Baxter Pharmacy Service promptly if there any issues.

**2.** **Baxter Customer Support**: supplies a Bodyguard 323 Ambulatory Pump, IV pole, backpack and consumables on order from the hospital ward CNC on a ‘Baxter Home Parenteral Nutrition New Patient Request Form’. The consumables are delivered to the patient’s home via courier on a monthly basis. The patient or carer must be present to collect the consumables in person.

The Baxter Customer Support Specialist contacts the patient two weeks prior to the monthly consumables’ delivery for a stock take. The patient or family carer should do a stock take the day prior to the monthly phone call from the Baxter Customer Support Specialist.

**Baxter Contact Details**

**Baxter Pharmacy Service – for enquires from clinicians or patients regarding the Baxter HPN bag and vitamin syringes**

T: 1800 229 837 (Monday – Friday 8:30am – 5:00pm) Option 1 for Pharmacy

After Hours Emergency T: 1800 229 837; Department: “Nutrition Services” for HPN issues.

E: pharmacyservices@baxter.com

**Baxter Customer Support – for enquires from clinicians or patients regarding Baxter consumables and loan pump**

T: 1800 229 837 (Monday – Friday 8:00am – 5:00pm) Option 2 for HomeCare

E: HomecareAU@baxter.com

After Hours Emergency: T: 1800 229 837; Department: “Nutrition Services” for Pump issues.

**Fresenius Kabi**

**Fresenius Kabi@Home**

Provides home delivery of HPN solutions, pumps, IV sets and consumables.

The hospital-based clinician registers the patient for the service on a ‘Fresenius Kabi@Home Parenteral Nutrition Delivery Service Patient Registration Form’.

**Clinical Support**

* T: 1800 930 957 (24 hours per day, 7 days per week) connects the clinician to Fresenius Kabi@Home pharmacist for clinical support and assistance with custom formulations if required.
* Provides coordination of services between hospital, patient and Fresenius Kabi@Home.

**Patient Support**

* T: 1800 930 957 (24 hours per day, 7 days per week) connects the patient to Fresenius Kabi@Home coordinator to answer questions such as information regarding the delivery schedule or organising a replacement pump.

**IV Pump**

* The Ambix Activ pump is provided to all home patients for the delivery of their HPN solutions.
* Two Ambix Activ pumps are provided free of charge per patient to ensure that there is always a back-up pump in the unlikely event of a malfunction.
* Pump accessories such as backpack, tabletop or full-length IV stands are all available upon request.