

Procedure

Emergency Management of the Child Receiving Home Parenteral Nutrition (PN)

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| Author/Custodian | Director of Gastroenterology (GHLT) | Effective date | 02/01/2025 |
| Applicable to | All Children’s Health Queensland staff | Review date | 25/08/2026 |

HUMAN RIGHTS

This governance document has been human rights compatibility assessed. No limitations were identified indicating reasonable confidence that, when adhered to, there are no implications arising under the *Human Rights Act 2019*.

PURPOSE

This Procedure provides an Emergency Management Plan for all paediatric home Parenteral Nutrition (PN) patients who have had a febrile episode ($\geq 38.5^{\circ}\text{C} \times 1$ or $\geq 38^{\circ}\text{C} \times 2$), a Central Venous Access Device (CVAD) problem, hypoglycaemia, have fluid imbalance or disruption to their regular home PN. The recommendations within this Procedure should be applied to all paediatric home PN patients, with notification and consultation to Senior Gastroenterology staff at Queensland Children's Hospital (QCH).



Queensland
Government

SCOPE

This procedure applies to all Children's Health Queensland (CHQ) clinical staff caring for paediatric home PN patients who have presented to an emergency department for acute management. These patients are at increased risk of the following, which may occur concurrently:

- Infection or sepsis due to an indwelling device, particularly their CVAD.
- Hypoglycaemia due to abrupt or prolonged cessation of PN.
- Dehydration, electrolyte abnormalities and/or hypoalbuminaemia due to stomal and/or gastrointestinal (GI) losses, or abnormal GI function/anatomy (e.g., dysmotility disorders or short bowel syndrome).
- CVAD problems (for example, fractured, occluded, or dislodged line).

ALERT



Children with chronic Intestinal Failure (IF) who have a CVAD are at high risk of a bloodstream infection. Any fever ($\geq 38.5^{\circ}\text{C}$ x 1 or $\geq 38^{\circ}\text{C}$ x 2) should be a *presumed* bloodstream infection until proven otherwise¹

Children with Short Bowel Syndrome ("short gut") are at risk of microbial translocation, and recurrent infections increase the likelihood of IF-associated liver disease.

ALERT – Vascular access

Some children on home PN have extremely limited venous access options.



- **Rapid management of a possible CVAD infection includes blood culture collection (from each lumen) followed by commencement of IV antibiotics via the CVAD, within 30 minutes (maximum 60 minutes) of presentation.**
 - If the CVAD is functioning, it **MUST** be used to administer IV antibiotics following blood culture collection.
 - If the CVAD is *not* functioning, peripheral venous access should be attempted by the clinician with the most vascular access experience.
 - To differentiate systemic sepsis and causative organisms from a colonised CVAD, it is ideal to collect blood cultures from both the CVAD and peripherally.
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PROCEDURE

CLINICAL PRESENTATION

Children on home PN may present to the Emergency Department (ED) with:

- A. Fever ($\geq 38.5^{\circ}\text{C}$ x 1 or $\geq 38^{\circ}\text{C}$ x 2) or clinical evidence of CVAD/systemic infection
Hypoglycaemia
- B. Dehydration secondary to increased losses including stomal, diarrhoea and/or vomiting
- C. Disruption to CVAD (fractured, blocked, or dislodged line)

Acute management plan:

Each paediatric home PN patient will have an individualised '**Acute Management Plan**'. These can be found in ieMR (in 'Clinical Notes View' – 'Alerts and Adverse Reactions' folder; change viewable dates to 12 months), at triage in their local ED, and/or with the parent/carer.

All home PN patients who present to an ED should be discussed with the QCH Gastroenterology team prior to them leaving the ED for admission or discharge.

EMERGENCY MANAGEMENT

Triage:

Children receiving home PN who present to the ED at QCH shall be triaged as a **minimum Australian Triage Scale (ATS) Category 2** if they are demonstrating *any* of the following physiological symptoms²:

- Respiratory compromise
- Circulatory compromise
- Altered level of consciousness (drowsy or irritable)
- At risk of hypoglycaemia.

Children receiving home PN who have had a disruption to their PN but who are not displaying any of the symptoms above shall be triaged as a minimum ATS Category 3.

In all other cases, the child should be triaged according to the Paediatric Physiological Discriminator table.

This assessment will be documented in FirstNet and will directly follow the primary survey. Risk factors either reported or observed should also be documented.

For further information, refer to [CHQ-WI-00749 Triage - Emergency Management of the Child Receiving Home Parenteral Nutrition \(PN\)](#).

Initial assessment and resuscitation (if required)

- Assess & resuscitate using '**ABC**' approach
- Ensure the most senior doctor is aware of the need for resuscitation
 - **A:** Provide high flow oxygen as needed
 - **B:** Support ventilation as required

- **C:** Attempt peripheral access immediately (or intra-osseous access in certain circumstances) and treat signs of shock with IV Sodium Chloride 0.9% in 20 mL/kg boluses.
- **Treat hypoglycaemia**
Initially with IV Glucose 10% 2 mL/kg and recheck BGL

A. FEVER ($\geq 38.5^{\circ}\text{C}$ OR TWICE CONSECUTIVE TEMPERATURE $\geq 38^{\circ}\text{C}$) OR CLINICAL EVIDENCE OF CVAD/SYSTEMIC INFECTION

ALERT

Parents/carers of children on home PN are asked to present to their local ED when their child has a fever ($\geq 38.5^{\circ}\text{C}$ x 1 or $\geq 38^{\circ}\text{C}$ x 2) to facilitate prompt treatment.

Any fever ($\geq 38.5^{\circ}\text{C}$ x 1 or $\geq 38^{\circ}\text{C}$ x 2) should be a *presumed* central line associated bloodstream infection (CLABSI) until proven otherwise¹



- As per [CHQ-GDL-01069 CHQ Guideline Fever in a Child with Central Venous Access Device \(Management of Suspected Central Venous Access Device Infection in Children\)](#).

All home PN patients attending an ED with a temperature as above should have CVAD blood cultures taken, and IV antibiotics commenced within 30 minutes (maximum 60 minutes) of presentation.

- **Antibiotics MUST be given via the CVAD if it is functioning.**

Fever – Investigations and diagnosis

Blood investigations should include blood cultures, FBC, Chem20, CRP and BGL:

- Blood cultures:
 - CVAD blood cultures should be collected prior to IV antibiotics commencing
 - For multiple lumen CVADs, a blood culture should be collected from each lumen
 - Peripheral blood cultures should also be taken if access is obtainable prior to commencement of IV antibiotics
- Full blood count (FBC), Electrolytes and liver function tests (ELFTs/CHEM20), C-Reactive Protein (CRP)
- Blood glucose level (BGL)

Other investigations *as clinically indicated*:

- Respiratory virus and SARS CoV 2 panel Polymerase Chain Reaction (PCR)
- Chest x-ray
- Urine microscopy, culture and sensitivity (MCS)
- Lumbar puncture
- ECHO
- Vascular ultrasound scan (USS) to exclude thrombophlebitis
- Exit site infection swab MCS

Fever – Treatment

Intravenous antibiotics:

- Start IV antibiotics within 60 minutes of presentation to the ED
- **Always use CVAD for IV antibiotics, unless:**
 - Significant rigors or hypotension after flushing CVAD, then CVAD should be removed as a priority
 - In this case, peripheral IV access should be obtained immediately
- First choice antimicrobial:
 - Commence Piperacillin/Tazobactam IV 100 mg/kg (Piperacillin component) (maximum 4 gram) every 6 hours
 - Add vancomycin if:
 - Patient is known to have MRSA
 - Patient is haemodynamically unstable needing fluid/inotropes (See [CHQ-GDL-01069 Fever in a Child with Central Venous Access Device \(Management of Suspected Central Venous Access Device Infection in Children\)](#)).
- If patient has an **immediate severe hypersensitivity (e.g. anaphylaxis) to Piperacillin/Tazobactam and/or Vancomycin, and/or is colonised with a multi-resistant (MRO)**, follow antibiotic plan in patient's individualised Acute Management Plan, and discuss alternative/additional antibiotic choice with QCH Gastroenterology team and QCH Infectious Diseases (ID) Consultant/Fellow on service. For more information, refer to figure 1 and Antimicrobial Dosing Recommendations Table 2 of: [CHQ-GDL-01069 Fever in a Child with Central Venous Access Device \(Management of Suspected Central Venous Access Device Infection in Children\)](#)

Refer to:

- [CHQ-GDL-01202 Children's Health Queensland Paediatric Antibiotic Guidelines](#) For Vancomycin dosing and monitoring, see [CHQ Paediatric Medication Guideline - Vancomycin](#)
- **PN compatibility:** For PN & antibiotic compatibility information, see [Paediatric Injectables Guidelines Royal Children's Hospital Melbourne](#) (available via CKN) and the [Paediatric Injectable Drugs 'The Teddy Bear Book'](#). Please contact the QCH Pharmacy team for further advice on PN/edication compatibilities if not listed in these sources.

Intravenous fluid or PN:

- If the patient is haemodynamically compromised and/or has electrolyte imbalance:
If required, administer IV Sodium Chloride 0.9% 10-20 mL/kg boluses to address intravascular depletion, as per [CHQ-GDL-01025 CHQ Guideline Intravenous Fluid Guidelines – Paediatric and Neonatal](#)
Manage electrolyte imbalance
See also: [CHQ-GDL-60010 Sepsis – Recognition and emergency management in children](#)
Commence IV maintenance fluids: IV Sodium Chloride 0.9% & Glucose 10% (glucose concentration to be chosen based on patient threshold for hypoglycaemia with cessation of PN). Most home PN patients have a glucose concentration in their PN formulation that is equal to or exceeds 10%.
See Appendix 2 of [CHQ-GDL-01025 Intravenous Fluid Guidelines – Paediatric and Neonatal](#) for guidance on preparing IV Sodium Chloride 0.9% with Glucose 10% solution. Consult with QCH Senior Pharmacist or Pharmacist on-call if required.

If the patient is hypoglycaemic:

- Treat hypoglycaemia initially with IV Glucose 10% 2 mL/kg and recheck BGL
- BGL monitoring frequency:
 - As a baseline
 - If the patient is symptomatic
 - If there is a delay in commencement of usual home PN or IV fluids with glucose
- Once the patient is commenced on IV fluids (the glucose concentration may differ to their home PN)

If the patient is haemodynamically stable:

- Where the patient's CVAD is usable, the patient's usual home PN formula (in individualised dual chamber bag) may be commenced following discussion with the QCH Gastroenterology team.
- The paediatric home PN patient's PN formula is often highly modified and is not interchangeable with hospital stock of PN solutions. Seek advice from the QCH Gastroenterologist/Fellow on-call, Senior Dietitian, or Surgical Pharmacist.
- IV fluids should be commenced (IV Sodium Chloride 0.9% & Glucose 10%) if the patient's home PN solution is unavailable and/or their CVAD is unusable.
- Home PN ordering in ieMR:
- During hours, contact the PN Dietitian for PN ordering. See [CHQ-PROC-63853 Dietitian Ordering of Paediatric Inpatient Parenteral Nutrition](#)
- Outside hours, contact the on-call dietitian or on-call pharmacist for home PN order details.

ALERT

A peripheral intravenous cannula (PIVC) is not appropriate to use for administration of IV solutions more than Glucose 10%



Paediatric PN 20/100 is the only PN solution that is suitable for peripheral administration. Amino-acid / glucose solutions are highly irritating to peripheral veins. The peripheral access must additionally be of a sufficiently large bore to tolerate the fluid volumes and minimise phlebitis/ irritation.

Extravasation of PN (peripheral or central) requires urgent medical review and management (see page 7-8).

Fever - Ongoing management:

- Inform the on-call QCH Gastroenterologist or Fellow of the home PN patient's presentation/admission
- For management of a suspected CLABSI once a patient is admitted, contact the QCH ID Consultant/Fellow on service for advice on antibiotic choice and CVAD management. Refer to [CHQ-GDL-01069 Fever in a Child with Central Venous Access Device \(Management of Suspected Central Venous Access Device Infection in Children\)](#) (see Figure 2, p 6).
- If at least 2 sets of blood cultures are negative after 48 hours, AND the patient is afebrile for more than 24 hours AND clinically well with no focus identified, IV antibiotics can be ceased, and the patient discharged.

B. DEHYDRATION SECONDARY TO INCREASED LOSSES

ALERT



Paediatric patients with Short Bowel Syndrome with a (drainage) gastrostomy, jejunostomy or ileostomy are at significant risk of electrolyte and fluid imbalance.

Losses may be due to increased stomal losses, increased vomiting and/or diarrhoea. The patient may present with significant weight loss, electrolyte abnormalities, and hypovolaemia¹

Dehydration – Investigations And Diagnosis

Blood investigations:

- FBC, ELFTs (CHEM20), CRP
- Blood glucose level (BGL)
- Blood cultures when febrile ($\geq 38.5^{\circ}\text{C} \times 1$ or $\geq 38^{\circ}\text{C} \times 2$):
 - CVAD blood cultures should be collected prior to IV antibiotics commencing
 - For CVADs with multiple lumens, a blood culture should be collected from each lumen
 - Peripheral blood cultures should also ideally be taken if access is obtainable prior to commencement of IV antibiotics (within 60 minutes of arrival)
 - Investigations as per **section A: Fever** (p. 3-4).

Other investigations – *as clinically indicated*:

- Stool sample MCS including viruses, bacteria, c. diff
- Urine MCS
- Abdominal USS
- Chest x-ray

Dehydration – Treatment:

- Provide IV fluid replacement if clinical evidence of dehydration and/or if significant weight loss as per [CHQ-GDL-01025 Intravenous Fluid Guidelines – Paediatric and Neonatal](#)
- Consider cessation of enteral feeding (oral, gastrostomy or jejunostomy) if clinically indicated by increased losses – Consult with on-call QCH Gastroenterologist or Fellow and Senior/PN Dietitian.
- If the patient is haemodynamically stable and their home PN is due for connection:
 - Where the patient's CVAD is functioning, the patient's usual home PN formula (in individualised, dual-chamber bag) may be commenced following discussion with the Senior/PN Dietitian or QCH Gastroenterology team.
 - The home PN patient's PN formula is individualised and is not interchangeable with hospital stock PN supplies. Seek advice from the on-call Gastroenterologist, Senior/PN Dietitian, or Gastro/Surgical Pharmacist.
 - A PIVC is NOT suitable for administration of any PN solutions where glucose concentration exceeds 10%.
 - For PN and antibiotic compatibility information, see the [Paediatric Injectables Guidelines Royal Children's Hospital Melbourne](#) (available via CKN) and the [Paediatric Injectable Drugs 'The Teddy Bear Book'](#). Please contact the QCH Pharmacy team for advice on PN/medication compatibilities if not listed in these sources.

- If the patient is also febrile ($\geq 38.5^{\circ}\text{C} \times 1$ or $\geq 38^{\circ}\text{C} \times 2$), manage as per **section A: Fever** (p. 3-4).
- **Inform the on-call Gastroenterologist or Fellow of the home PN patient's presentation/admission.**

C. DISRUPTION TO CVAD (OCCLUSION, FRACTURE, DISLODGE)MENT)

For all home PN patients presenting to the ED with a CVAD problem, notify the on-call Gastroenterologist or Gastroenterology Fellow of patient's presentation. During hours, the Vascular Access Management Service (VAMS) CN or nurse navigator (NN) PN can provide advice on CVAD issues.

CVAD types include:

- Tunnelled cuffed central venous catheter (tcCVC)
- Tunnelled non-cuffed central venous catheter (tncCVC)
- Peripherally inserted central catheter (PICC)
- Totally implanted venous port device (TIVPD)

CVAD problems may include:

- PN extravasation
- PICC or CVC occlusion
- tcCVC fracture
- Accidental disconnection of needleless access device (NAD) or "bung"
- Accidental removal or dislodgement of PICC or CVC
- TIVPD needle disconnection

For accidental disconnection of NAD or TIVPD needle dislodgement, refer to flowchart in:

[CHQ-PROC-03455 Management of Compromised Central Venous Access Device \(CVAD\)](#)

For management of accidental disconnection, see:

[CHQ-WI-03458 Central Venous Access Device \(CVAD\) –Accidental Disconnection](#)

PN EXTRAVASATION

PN is a vesicant solution and extravasation can cause severe injury due to its high osmolality³.

Management of suspected extravasation:

- Immediately stop PN administration if not already done so, and attempt aspiration of CVAD
- Seek VAMS or surgical advice regarding CVAD management
- See [CHQ-PROC-60579 Infiltration and Extravasation: Prevention/Recognition, Management and Treatment](#)

CVAD OCCLUSION – INVESTIGATIONS AND MANAGEMENT

CVAD occlusion – Investigations as clinically indicated:

- If febrile, manage as per **section A: Fever** (p. 3-4)
- If delay to commencement of usual home PN regime or IV Sodium Chloride 0.9% with Glucose 10% solution, monitor BGL
- Chest x-ray to confirm placement of distal tip of CVAD

- Line study ("AF central line check") to check patency of CVAD and presence of fibrin sheath
- Vascular USS to exclude thrombus

CVAD occlusion – management:

- For CVAD patency troubleshooting steps and algorithm, see [CHQ-WI-03457 Central Venous Access Device \(CVAD\) – Patency, Flushing & Locking](#)
- Alteplase may be indicated following investigations. Refer to: [CHQ-PMG-01266 Alteplase to clear fibrin-related occlusion in central venous access devices](#)

CVAD fracture - management:

- Clamp the portion of the CVC / PICC closer to the exit site. Stop and disconnect any IV infusion/s.
- Using aseptic non-touch technique (ANTT), clean the damaged catheter portion with 2% chlorhexidine and 70% alcohol and seal the damaged portion with an occlusive, transparent, sterile dressing.
- **Repair:** Tunnelled Cuffed Central venous catheters (tcCVC) are the only CVADs at QCH that are repairable. BioFlo™ PICCs (including those inserted as tncCVCs) cannot be repaired.
- If a PICC or tncCVC is fractured, removal should be expedited to reduce the risk of infection.
- Refer to [CHQ-PROC-03455 Management of Compromised Central Venous Access Device \(CVAD\)](#)

tcCVC repair

- Contact:
 - In hours: Contact the VAM CN, NN PN or Safety CNC, and gastroenterology team.
 - Outside hours: Contact the Safety CNC, and the on-call Gastroenterology Consultant / Fellow.
- Only clinicians trained in line repair should use the tcCVC repair kits. Trained repairers at QCH include VAMS and Safety CNCs. These staff members have undertaken the appropriate training and have been credentialed to do so. The Nurse Manager, PFSU or Safety CNC may be able to provide information on which staff members are currently on shift and most likely to assist.
- **Location of CVC repair kits:** Must match the CVC brand and size. Repair kit may be obtained by contacting VAMS or NN PN (in hours) or pick up kit from **QCH clinical directorate 7D** (gastroenterology nursing desk area).

Occlusion and fracture – management when CVAD unusable:

- Peripheral IV access should be obtained rapidly
- Commence peripheral IV fluids: Sodium Chloride 0.9% with Glucose 10% at maintenance rate through the PIVC.
 - See Appendix 2 of [CHQ-GDL-01025 Intravenous Fluid Guidelines – Paediatric and Neonatal](#) for guidance on preparing IV Sodium Chloride 0.9% with Glucose 10% solution. Consult with QCH Senior Pharmacist or Pharmacist on-call if required.
- A PIVC is NOT suitable for administration of any PN solutions where the IV glucose concentration exceeds 10%.

Antibiotic considerations in the compromised CVAD or TIVPD

As per flowchart [CHQ-PROC-03455 Management of Compromised Central Venous Access Device \(CVAD\)](#):

- **If contamination of CVC with body fluids (e.g., patients with a stoma) likely and patient is afebrile** prescribe empiric single dose prophylactic antibiotic via a PIVC.
- Take blood culture at 24 hours post fracture, or at any time if febrile (as per **section A: Fever** p. 3-4).
- Review blood culture in 24-48 hours. If blood culture is positive, contact ID Consultant / Fellow for advice on treatment.

In the case of a compromised CVAD, if the patient has an **immediate severe hypersensitivity (e.g. anaphylaxis) to Vancomycin and Teicoplanin, and/or has a MRO**, follow antibiotic plan in patient's individualised Acute Management Plan, and discuss alternative/additional antibiotic choice with the QCH ID Consultant/Fellow on service. For more information, refer to Antimicrobial Dosing Recommendations in Table 2 of: [CHQ-GDL-01069 Fever in a Child with Central Venous Access Device](#)

SUPPORTING DOCUMENTS

PROCEDURES, GUIDELINES AND PROTOCOLS

- [CHQ-WI-00749: Triage - Emergency Management of the Child Receiving Home Parenteral Nutrition \(PN\).](#)
- [CHQ-GDL-01069 – Fever in a Child with Central Venous Access Device \(Management of Suspected Central Venous Access Device Infection in Children\)](#)
- [CHQ-GDL-01202 Children's Health Queensland Paediatric Antibiocard: Empirical Antibiotic Guidelines](#)
- [CHQ Paediatric Medication Guideline - Vancomycin CHQ-GDL-01025 Intravenous Fluid Guidelines – Paediatric and Neonatal](#)
- [CHQ-GDL-63853 Dietitian Ordering of Paediatric Inpatient Parenteral Nutrition](#)
- [CHQ-WI-03457 Central Venous Access Device \(CVAD\) – Patency, Flushing & Locking](#)
- [CHQ-PROC-60579 Infiltration and Extravasation: Prevention/Recognition, Management and Treatment](#)
- [CHQ-PROC-03455 Management of Compromised Central Venous Access Device \(CVAD\)](#)
- [CHQ-WI-03460 – Totally Implanted Venous Port Device \(TIPVD\) - Needling](#)
- [CHQ-NS-01045 – Parenteral nutrition: Nursing Care of the Paediatric Patient](#)

KEY CONTACTS

| Position | Contact Details |
|---|--|
| Paediatric Gastroenterologist / Fellow, QCH | <p>Contact patient's Primary Gastroenterologist or Fellow during hours through QCH switch 07 3068 1111</p> <p>Afterhours: page on-call Gastroenterologist/Fellow through QCH switch 07 3068 1111</p> |
| Paediatric Infectious Diseases (ID) Consultant/ Fellow, QCH | <p>During hours, call via QCH switch 07 3068 1111</p> <p>After-hours: page on-call Infectious Diseases Consultant/Fellow through QCH switch 07 3068 1111</p> |

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| Paediatric Vascular Assessment and Management Service (VAMS) QCH | Contact CN during hours Mon-Fri on 07 3068 3440 |
| Nurse Navigator (NN) PN, QCH | Contact during hours Mon-Fri 0419 383 936 |
| Infection Management and Prevention Service (IMPS), QCH | Contact during hours, call via QCH switch 07 3068 1111 |
| Safety Clinical Nurse Consultant (CNC), QCH | Call 07 3068 4444 |
| Nurse Manager, PFSU, QCH | Call via QCH switch 07 3068 1111 |
| Pharmacy Department, QCH | <p>During hours: Call via QCH switch 07 3068 1111 - request Surgical/Gastroenterology pharmacist or Senior Surgical Pharmacist</p> <p>After hours: Page On-call Pharmacist through switch</p> |

CONSULTATION

Key stakeholders who reviewed this version:

- Director GHLT department
- Gastroenterologist and home PN lead consultant
- Vascular Assessment and Management Service (VAMS) nursing team
- Infection Management and Prevention Service (IMPS)
- Infectious Diseases (ID) Consultant
- Nurse navigator PN
- Nurse educator, Emergency Department
- Senior PN dietitians
- Pharmacist Surgical Lead
- Pharmacist Advanced - Antimicrobial Stewardship
- Pharmacist Critical Care Lead
- Pharmacist Advanced – Safety and Quality
- CHQ Medicines Advisory Committee (MAC) (17/08/2023)

DEFINITIONS

| Term | Definition |
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| Australasian Triage Scale (ATS) | The Australasian Triage Scale (ATS) is a clinical tool used when patients present to emergency departments throughout Australia and New Zealand. It ensures that patients are seen in a timely manner, commensurate with their clinical urgency. |
| Home parenteral nutrition (HPN) | Nutrition therapy provided through the intravenous administration of nutrients outside of the hospital setting. |
| Home parenteral nutrition (HPN) bag | Dual chamber PN bag, which is an individualised formulation for each home PN patient. The home PN bag contains glucose, amino acids, electrolytes, lipid emulsion, trace elements, and may include vitamins. Presents as a 2-compartment bag which requires activation and mixing into a single solution before administration. |
| Intestinal failure (IF) | Chronic IF (CIF) is the "reduction of gut function below the minimum necessary for the absorption of macronutrients and/or water and electrolytes", requiring long-term intravenous supplementation to maintain health and/or growth. |
| Paediatric Physiological Discriminator Table | A tool used to identify features found to be significant predictors of serious illness and injury in children and young people. This tool supports decision-making when applying the ATS in children. |
| Parenteral nutrition (PN) | Intravenous solution which includes amino acids, glucose, fat emulsion, electrolytes, trace elements and may also have vitamins. Solutions with glucose >10% require CVAD for administration. |

REFERENCES

| No. | Reference |
|-----|---|
| 1 | ESPGHAN/ESPEN/ESPR/CSPEN Guidelines on Pediatric Parenteral Nutrition, 2018, <i>Clinical Nutrition</i> , vol. 37, issue 6 Part B. Published Guidelines - ESPGHAN |
| 2 | Australian Government. (2013), 'Emergency Triage Education Kit', Department of Health and Aging website: Canberra, [online] Available at: Triage-Education-Kit.aspx (acem.org.au) |
| 3 | Gorski, L, Hadaway, L, Hagle, ME, McGoldrick, M, Orr, M and Doellman, D (2016), Infusion Therapy Standards of Practice, <i>Journal of Infusion Nursing</i> , vol. 39, no. 1S. |
| 4 | Pironi et al. ESPEN guideline on home parenteral nutrition (2020), <i>Clinical Nutrition</i> ; 39, 1645-1666, ESPEN guideline on home parenteral nutrition |
| 5 | ESPGHAN/ESPEN/ESPR/CSPEN (2018), Guidelines on pediatric parenteral nutrition, <i>Clinical Nutrition</i> ; vol. 37, no. 6 part B, pp. 2303-2430. |

ASSURANCE STRATEGY

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| Strategy | <p>Home PN patient incidents reported via Riskman monitored and managed by NUM in conjunction with Nurse Navigator PN and, as appropriate, VAMS.</p> <p>Children on Home PN who present to QCH Emergency Department are reviewed by Nurse Navigator PN (weekdays, or outside hours as retrospective chart review and follow up with carer).</p> |
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| Audit/review tools | Audit/review tools frequency | Key performance indicator |
|--------------------|------------------------------|--|
| Nil | Ongoing | 100% of children on home PN who present to an Emergency Department are treated in accordance with this Procedure |

PROCEDURE REVISION AND APPROVAL HISTORY

| Version No. | Modified by | Amendments authorised by | Approved by | Comments |
|-------------------|--|--|--|--|
| 1.0 | Nurse Educator, Department of Emergency Medicine | District Nursing Governance Committee, Executive Critical Care Division, RCH; DDNS | General Manager Operations | |
| 2.0 | Nurse Navigator PN | Medicines Advisory Committee | General Manager Operations | |
| 3.0 | Nurse Navigator PN | Medicines Advisory Committee | EDHS | |
| 4.0 13/11/2019 | Nurse Navigator PN | Medicines Advisory Committee | Executive Director Clinical Services (QCH) | |
| 5.0 20/02/2023 | Nurse Navigator PN | Director GHLT | Executive Director Medical Services | |
| 6.0 25/08/2023 | Nurse Navigator PN | Medicines Advisory Committee | Executive Director Medical Services | |
| 6.1 02/01/2024 | Governance Officer (Documents) | Manager Governance Unit | | Minor change to include mandatory Human Rights section |

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| Key words | PN, parenteral nutrition, total parenteral nutrition, parental nutrition, home PN, home TPN, TPN, short gut, fever, febrile, CVAD, fracture, central venous access device, central line, PICC, port, implantable device, 01052, VAMS |
| Accreditation references | (1) NSQHS Standards (1-8): Standard 1 – Clinical Governance; Standard 3 – Preventing and Controlling Healthcare-Associated Infection; Standard 4 – Medication Safety; Standard 8 – Recognising and Responding to Acute Deterioration ISO 9001:2015 Quality Management Systems: (4-10): 8.5 Service Provision |