Unexplained hypoglycaemia – management in children

Purpose
This document provides clinical guidance for all staff involved in the care and management of a child presenting to an Emergency Department (ED) in Queensland with unexplained hypoglycaemia.

This guideline has been developed by the department of Metabolic Medicine at the Queensland Children’s Hospital in consultation with senior ED clinicians and Paediatricians across Queensland. It has been endorsed for statewide use by the Queensland Emergency Care of Children Working Group in partnership with the Queensland Emergency Department Strategic Advisory Panel and the Healthcare Improvement Unit, Clinical Excellence Division.

Key points
- Hypoglycaemia is defined as a blood glucose level (BGL) of ≤2.6 mmol/L using a blood gas machine, iSTAT, or formal laboratory testing.
- Ketotic hypoglycaemia (KH) of childhood is the most common cause of hypoglycaemia in children.
- In the absence of a history of prolonged fasting (over 30 hours) and blood ketones >4, all children with a formal BGL ≤2.6 mmol/L should be investigated for an underlying disorder.
- Management of hypoglycaemia includes administration of a Glucose 10% bolus followed by a Glucose 10% + Sodium Chloride 0.9% IV infusion (which needs to be mixed onsite).
- Fluids containing less than Glucose 10% (such as Glucose 5% + Sodium Chloride 0.9%) are unsuitable.
- Hypoglycaemia is a medical emergency. If left untreated it can cause convulsions, irreversible brain damage and death.

Introduction
Maintaining glucose homeostasis relies on:
- an intact system of endocrine hormones (insulin, glucagon, growth hormone, cortisol)
- a system of intact metabolic pathways to be able to use fat, protein and glucose
- suitable substrates that are able to be metabolised to produce glucose/ketones for energy in times of fasting e.g. glycogen, protein, fat.

Some children become symptomatic of hypoglycaemia or hypoglycaemic faster than others.
Hypoglycaemia is defined as a blood glucose measurement (BGL) of \( \leq 2.6 \text{ mmol/L} \) using a blood gas machine, iSTAT, or formal laboratory testing.

As glucometers are unreliable at measuring low levels of glucose it is suggested that 3.0 mmol/L be considered a reasonable level to begin formal investigations.

### Possible causes of hypoglycaemia

<table>
<thead>
<tr>
<th>Possible causes</th>
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<tbody>
<tr>
<td>Severe vomiting or diarrhoeal illness</td>
</tr>
<tr>
<td>Prolonged fasting</td>
</tr>
<tr>
<td>Underlying medical conditions including:</td>
</tr>
<tr>
<td>• liver disease (i.e. end stage liver failure)</td>
</tr>
<tr>
<td>• hyperinsulinism</td>
</tr>
<tr>
<td>• hormone deficiencies such as hypopituitarism</td>
</tr>
<tr>
<td>• neonatal sepsis</td>
</tr>
<tr>
<td>• metabolic causes</td>
</tr>
<tr>
<td>Ingestions (in younger children)</td>
</tr>
<tr>
<td>Drugs and alcohol (in an adolescent)</td>
</tr>
</tbody>
</table>

The most common cause of hypoglycaemia in children is ketotic hypoglycaemia (KH) of childhood. This is a physiological condition that is a variant of normal and expected in a fasting state. Most children grow out of KH by mid-late primary school age.

In the absence of a history of prolonged fasting (over 30 hours) and blood ketones >4, all children with a BGL ≤ 2.6mmol/L should be investigated for an underlying disorder.

This is a critical time to obtain samples and gain a diagnosis.

Refer to the [Queensland Newborn Hypoglycaemia Guideline](http://www.qld.gov.au/health/professionals/services/perinatal-care/newborn-hypoglycaemia) for the management of newborns prior to initial discharge from hospital. The management of children with a diagnosis known to present with hypoglycaemia is beyond the scope of this guideline. Manage these children as per their emergency sick day management plan.

### Assessment

A child with hypoglycaemia may appear drowsy, listless and lethargic.

A thorough history and examination is important to identify other precipitating causes that need further investigation.

### History

History taking should include the following:

- How long has the child fasted before becoming hypoglycaemic?
- Has the child suffered symptoms of vomiting, diarrhoea or fasted in the last three days?
- Is the child sometimes difficult to wake in the morning?
• How long does the child usually fast overnight?
• Was the hypoglycaemia precipitated by a protein meal?
• Has the child had recent exposure to fruit or honey (consider hereditary fructose intolerance)?
• Could the child have had any medications or alcohol? (especially insulin, metformin, beta-blockers, quinine, chloroquine, salicylates and valproate)

Examination

Red flags to suggest an underlying disorder
• midline defects – consider pituitary hormone deficiencies
• organomegaly – consider storage disorders such as glycogen storage disease
• small genitalia in a male child – consider pituitary hormone deficiencies
• hyperpigmentation – consider adrenal insufficiency
• short stature
• macrosomia
• growth hormone deficiency or overgrowth syndrome
• hyperinsulinism – especially in an infant
• hypoglycaemia precipitated by shorter (<6 hour) fasting period

Seek senior emergency/paediatric advice as per local practice if suspect an underlying disorder.

Investigations

The presence of blood or urinary ketones at the time of presentation is essential to differentiating possible causes of the hypoglycaemia and obtaining a final diagnosis. Blood ketones can be rapidly performed in ED and should be measured at the same time as formal confirmation of blood glucose. If testing urinary ketones, it is important to obtain the first urine passed after the hypoglycaemia is confirmed.
Blood collection

Ideal blood collection for the initial investigation of unexplained hypoglycaemia

### Preferred blood collection (volume 5 mL)

<table>
<thead>
<tr>
<th>Tube type</th>
<th>Tube description</th>
<th>Volume required</th>
<th>Tests required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum</td>
<td>Red or yellow pedi-pot</td>
<td>3 mL</td>
<td>• free fatty acids</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• β-hydroxybutyrate</td>
</tr>
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<td></td>
<td></td>
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<td>• cortisol</td>
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<td></td>
<td></td>
<td></td>
<td>• growth hormone</td>
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<td>Lithium heparin no gel</td>
<td>Green pedi-pot or adult pot</td>
<td>0.5 mL</td>
<td>• acylcarnitine</td>
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<td></td>
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<td></td>
<td>• plasma amino acids</td>
</tr>
<tr>
<td>Fluoro-oxalate</td>
<td>Grey pedi-pot</td>
<td>1 mL</td>
<td>• glucose</td>
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<td></td>
<td></td>
<td></td>
<td>• lactate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Can be performed on VBG</td>
</tr>
<tr>
<td>EDTA</td>
<td>Purple pedi-pot</td>
<td>0.5 mL</td>
<td>• ammonium</td>
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<td>Notify and send to lab urgently. Check with lab if needs to be on ice</td>
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Prioritised blood collection for child with blood collection difficulties

### Essential blood collection (required volume 2 mL)

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<td>Fluoro-oxalate</td>
<td>Grey pedi-pot</td>
<td>1 mL</td>
<td>As per table above</td>
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<td>0.5 mL</td>
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<td>Red or yellow pedi-pot</td>
<td>0.5 mL</td>
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<td>Purple pedi-pot</td>
<td>0.5 mL</td>
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Urine

A urine metabolic screen includes urine amino acids and organic acids.

**Critical urine sample**
The first urine passed after the episode of hypoglycaemia (BGL ≤ 2.6 mmol/L) is the **CRITICAL SAMPLE**. It must be collected and sent for a urine metabolic screen regardless of age and time since hypoglycaemic episode.

**Management**

Refer to Appendix 1 for a summary of the management of a child presenting to ED with hypoglycaemia.

**ALERT** – Hypoglycaemia is a medical emergency. If left untreated it can cause convulsions, irreversible brain damage and death.

**Acute management**

Obtain IV/IO access rapidly for child with BGL < 3.0 mmol/L on a glucometer.

Upon obtaining IV access:

- obtain formal BGL on blood gas machine, iSTAT or formal laboratory testing
- draw 5 mL of blood (ideally) for further investigations (See Investigations section)
- measure blood ketones using a blood ketone monitor

**Management of child with formal BGL > 2.6 mmol/L**

- If low normal BGL, push fluids with initial high sugar content (apple juice, flavoured ice block) followed by more complex carbohydrates
- If formal BGL is greater than 3.0 mmol/L, do not send bloods for further investigation

**Management of child with hypoglycaemia (formal BGL ≤ 2.6 mmol/L)**

Children with a history of prolonged fasting (over 30 hours) and blood ketones >4 can be managed as KH. In addition to treating the hypoglycaemia, blood and urine should be collected from all remaining children to screen for an underlying disorder (refer to Investigation section).

**ALERT** - Hypoglycaemia should be treated with Glucose 10% +Sodium Chloride 0.9% IV fluids. A Glucose 5% infusion is usually not sufficient to maintain BGL or clear ketones.
Management of hypoglycaemia in children

<table>
<thead>
<tr>
<th>Initial bolus dose (IV)</th>
<th>2 mL/kg of 10% glucose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Following IV bolus</td>
<td>Commence an infusion of <strong>Glucose 10%</strong> + Sodium Chloride 0.9% at maintenance rate. Take a 1L bag of Glucose 5% with Sodium Chloride 0.9%, withdraw 100 mL of fluid from the bag and discard. Inject 100 mL of 50% glucose into the bag and mix well. Refer to <strong>QCH IV Fluid Guideline</strong>. If dehydrated, commence maintenance fluids plus replacement of deficit over 24 hours.</td>
</tr>
<tr>
<td>Monitoring</td>
<td>IV site hourly for signs of extravasation due to the hyperosmolality of the infusion (see <strong>Insertion and management of peripheral and central venous access devices</strong> (QH only)</td>
</tr>
</tbody>
</table>

IM glucagon is unlikely to benefit a child with KH.

IO route is recommended if unable to obtain IV access.

- Consider seeking senior emergency/paediatric advice as per local practice for child with a BGL ≤ 2.6 mmol/L, a history of fasting over 30 hours **and** blood ketones >4.
- Seek senior emergency/paediatric advice as per local practice for child BGL ≤ 2.6 mmol/L without a history of fasting over 30 hours **and** blood ketones >4. Additional investigations are required.

**Ongoing management**

- Seek senior emergency/paediatric advice as per local practice if no clinical improvement following initial glucose bolus and IV fluid infusion. Consider seeking paediatric metabolic advice.
- Seek relevant specialist advice as clinically indicated by results of the hypoglycaemia screen for ongoing investigations and management.

Review the IV fluid calculation and glucose concentration for children with ongoing symptoms of clinical concern following initial bolus and IV infusion. Consider alternate/concurrent diagnoses.

On admission to the ward or SSU:

- Continue Glucose 10% + Sodium Chloride 0.9% at maintenance rate (plus additional fluids to replace deficit if dehydrated).
- administer Ondansetron for children over 12 months of age with nausea or vomiting (note ketones alone can cause nausea which may not settle until ketones have cleared).
- encourage oral fluids (see below) and diet, preferably with foods containing carbohydrates.
- once tolerating oral intake IV fluids may be discontinued or changed to Glucose 5% + Sodium Chloride 0.9% at a reduced rate.
- organise discharge medications (glucose gel and glucose 10% polymer, +/- Ondansetron) early in admission.
Ondansetron for the management of nausea or vomiting in children

<table>
<thead>
<tr>
<th>Dose</th>
<th>Given orally or sublingually at a dose of 0.15 mg/kg (maximum 8 mg). Tablets and wafers are available in 4 mg and 8 mg doses. Recommended doses are as follows:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• 8-15 kg: 2 mg</td>
</tr>
<tr>
<td></td>
<td>• 15-30 kg: 4 mg</td>
</tr>
<tr>
<td></td>
<td>• greater than 30 kg: 8 mg</td>
</tr>
<tr>
<td></td>
<td>Not recommended for children aged less than 6 months, weight less than 8 kg or with ileus.</td>
</tr>
</tbody>
</table>

| Considerations | Ondansetron prolongs the QT interval in a dose–dependent manner. Exercise caution in children who have or may develop prolongation of QTc (such as those with electrolyte disturbances, heart failure or on medications that may lead to a prolongation of the QTc). |

Fluids

Appropriate oral fluids include:

- 10% glucose polymer (Polyjoule, CarbPlus, SOS formulas)
- 100% apple juice

The following fluids are unsuitable:

- glucolyte (2.5% glucose + 3% sucrose)
- hydralyte ice blocks (1.6% glucose)

Monitoring

Children with hypoglycaemia require routine observation as dictated by their clinical condition.

BGL monitoring

BGL monitoring is not required for children receiving a Glucose 10% infusion as the risk of hypoglycaemia is minimal unless hyperinsulinism is suspected.

Consider BGL monitoring for the following children:

- symptoms of clinical concern such as pallor, vomiting, tachycardia or drowsiness
- ketones that are absent or inappropriately low (consider hyperinsulinism and continue BGL monitoring until insulin level is known).

It is the treating doctor’s responsibility to document if BGL monitoring is required.

Ketone monitoring

Test urine for ketones after 12 - 24 hours of treatment to ensure urine ketones have cleared or are clearing. If ketones are present, continue to monitor 12 – 24-hourly until cleared.
Escalation outside of ED

Clinicians can contact the services below if escalation of care outside of senior clinicians within the ED is needed, as per local practices. Transfer is recommended if the child requires a higher level of care.

<table>
<thead>
<tr>
<th>Reason for contact by clinician</th>
<th>Contact</th>
</tr>
</thead>
</table>
| For specialist advice on the management, disposition and follow-up of the following children with unexplained hypoglycaemia:  
  - if considering admission  
  - as required for children admitted to a SSU | Onsite/local paediatric service as per local practice or the Queensland Lifespan Metabolic Medicine Service.  
(07) 3068 1111 and ask for the metabolic clinician on-call |
| For assistance with local inter-hospital transfers of non-critical patients. | Onsite/local paediatric service as per local practice |
| For assistance with inter-hospital transfer of non-critical patients into and out of Queensland Children’s Hospital.  
View the QH Inter-hospital transfer request form (QH only). | Children's Advice and Transport Coordination Hub (CATCH)  
(07) 3068 4510 (24-hour service) |
| For assistance with decision making regarding safe and appropriate inter-hospital transfer of children in Queensland. | View the Queensland Paediatric Transport Triage tool – Medical or call CATCH on (07) 3068 4510 (24-hour service) |
| For access to generalist and specialist acute support and advice via videoconferencing, as per locally agreed pathways, in regional, rural and remote areas in Queensland. | Telehealth Emergency Management Support Unit (TEMSU)  
1800 11 44 14 (24-hour service)  
TEMSU (access via QH intranet) |
| To request aeromedical inter-hospital transfer in Queensland. | Retrieval Services Queensland (RSQ)  
1300 799 127 (24-hour service)  
RSQ (access via QH intranet) |

Disposition

All patients with unexplained hypoglycaemia require a period of observation. Admission to an inpatient service is usually required but admission to an SSU (where relevant) may be considered.

Children with refactory BGLs despite IV therapy or rebound hypoglycaemia on cessation of fluids require admission to an inpatient service.
Discharge from the ward or SSU

On discharge, caregiver/s should be provided with:

- script for the following:
  - 1 tube of glucose gel
  - +/- Ondansetron
  - +/- 1 can of 10% glucose polymer with the age-appropriate recipe (Lucozade is an appropriate alternative if aged over 5 years)

- education including:
  - signs, symptoms and emergency management of hypoglycaemia
  - written instructions on management to prevent a recurrent hypoglycaemic episode as per Appendix 2 - Sick Day Plan
  - advice against purchasing a glucometer or monitoring BGLs at home (as results can be inaccurate and misleading)

Follow-up

In the event that an overnight fast rather than an intercurrent vomiting illness precipitated the hypoglycaemic episode, discuss with the on-call Metabolic Physician, Queensland Children's Hospital. The administration of night time cornstarch may be required on discharge.

First presentation of unexplained hypoglycaemia

- formal written referral to the Department of Metabolic Medicine, Queensland Children's Hospital to review results of initial metabolic screening. Consultation can be conducted via telehealth if required.

Subsequent presentations

- liaise with Department of Metabolic Medicine, Queensland Children's Hospital to determine the need for further outpatient follow-up and if needed book into local General Paediatric outpatient clinic.

Related documents

- Sick day plan

References

Guideline approval

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<th>Version no.</th>
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<td>Effective date</td>
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<tr>
<td>Author/custodian</td>
<td>Metabolic Nurse Practitioner</td>
<td></td>
<td></td>
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Keywords

Paediatric, guideline, metabolic, hypoglycaemia, ketotic hypoglycaemia, inborn errors or metabolism, investigation of hypoglycaemia, 04100, 60024

Accreditation references

NSQHS Standards (1-8): 1, 4, 8

Disclaimer

This guideline is intended as a guide and provided for information purposes only. The information has been prepared using a multidisciplinary approach with reference to the best information and evidence available at the time of preparation. No assurance is given that the information is entirely complete, current, or accurate in every respect.

The guideline is not a substitute for clinical judgement, knowledge and expertise, or medical advice. Variation from the guideline, taking into account individual circumstances may be appropriate.

This guideline does not address all elements of standard practice and accepts that individual clinicians are responsible for:

- Providing care within the context of locally available resources, expertise, and scope of practice
- Supporting consumer rights and informed decision making in partnership with healthcare practitioners including the right to decline intervention or ongoing management
- Advising consumers of their choices in an environment that is culturally appropriate and which enables comfortable and confidential discussion. This includes the use of interpreter services where necessary
- Ensuring informed consent is obtained prior to delivering care
- Meeting all legislative requirements and professional standards
- Applying standard precautions, and additional precautions as necessary, when delivering care
- Documenting all care in accordance with mandatory and local requirements

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For copyright permissions beyond the scope of this licence contact: Queensland Emergency Care of Children working group, Children’s Health Queensland Hospital and Health Service, email QldPaedEmergCare@health.qld.gov.au.
Child presents to ED with BGL < 3.0 mmol/L on glucometer*

- Obtain IV access for formal testing (IO if unable to obtain IV)
- Check BGL on ABG machine / iSTAT / formal lab tests
- Check blood ketones

Confirmed BGL ≤ 2.6 mmol/L

- If low normal BGL, push fluids with initial high sugar content (apple juice, flavoured ice block) followed by more complex carbohydrates.
- If BGL > 3.0mmol/L, do not send bloods for further investigation

Consider possibility of an underlying disorder (see Guideline)

Fasting > 30 hours & ketones > 4?

Possible underlying disorder

- Blood:
  - ideal volume = 5 mL
  - if collection difficulties, minimum volume required = 2 mL
  See over page for required tests and collection tubes.

- Urine:
  - Put a urine bag on for first pass urine
  - Collect and send for a urine metabolic screen regardless of age and time since hypoglycaemic episode

Seek senior emergency/paediatric advice re BGL monitoring

Refer to Paediatric/Metabolic team as per local practice

Manage as ketotic hypoglycaemia of childhood

- IV bolus of 2 mL/kg of Glucose 10%
- After bolus, commence infusion of Glucose 10% + Sodium Chloride 0.9% at maintenance rate
- Monitor IV site hourly for signs of extravasation

Clinical improvement?

- Admit to SSU/inpatient service
- Continue Glucose 10% + Sodium Chloride 0.9%
- +/- Ondansetron
- Encourage:
  - oral fluids (10% glucose polymer or 100% apple juice)
  - oral diet (carbohydrates preferred)
- Organise discharge medication (glucose gel, 10% glucose polymer, +/- Ondansetron)
- Monitor urinary ketones
  - after 12-24 hours of treatment
  - continue 12-24-hourly until clear

BGL is NOT required while on 10% glucose infusion unless hyperinsulinism is suspected

Tolerating oral intake

- Discontinue IV fluids/reduce to Glucose 5% + Sodium Chloride 0.9% at lower rate

Consider discharge with education

Follow-up as per Paediatric +/- Metabolic advice

*Excluding children with a diagnosis known to present with hypoglycaemia (manage as per their emergency sick day plan).

# Make an outpatient referral to the Metabolic team, Queensland Children’s Hospital if an overnight fast precipitated hypoglycaemic event.

CHQ-GDL-60004 – Unexplained hypoglycaemia – Emergency management in children
## Blood collection for initial investigations of unexplained hypoglycaemia

### Preferred blood collection (minimum volume 5 mL)

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<td>Serum</td>
<td>Red or yellow pedi-pot</td>
<td>0.5 mL</td>
<td>• cortisol</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• insulin</td>
</tr>
</tbody>
</table>

#### Second priority investigations (2 mL volume)

<table>
<thead>
<tr>
<th>Tube type</th>
<th>Tube description</th>
<th>Volume</th>
<th>Tests required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum</td>
<td>Red or yellow pedi-pot</td>
<td>0.5 mL</td>
<td>• growth hormone</td>
</tr>
<tr>
<td>EDTA</td>
<td>Purple pedi-pot</td>
<td>0.5 mL</td>
<td>As per table above</td>
</tr>
<tr>
<td>Serum</td>
<td>Red or yellow pedi-pot</td>
<td>1.0 mL</td>
<td>• E/LFTs</td>
</tr>
</tbody>
</table>
Appendix 2

Sick Day Plan
10% Carbohydrate Solution

Why does my child have a Sick Day Plan?
Your child has a sick day plan because he or she has had at least one episode of a low blood sugar level. This plan aims to prevent blood sugars from dropping to a level that can harm your child.

When do I use the sick day plan?
- At the first sign of illness or if your child is eating less than normal.
- Offer your child small amounts of your chosen carbohydrate solution regularly.
- Write down how much your child drinks.

How do I make the carbohydrate solution?
- Using the recipe, put the required amount of water into a container and add the product.
- Use the scoop that comes with the product to make sure the dose is correct.
- Mix well and store in the fridge.

Recipes

Poly-Joule recipes

<table>
<thead>
<tr>
<th>Options</th>
<th>Recipes</th>
<th>Where to buy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poly-Joule</td>
<td>2 scoops (10 g) of Poly-Joule in 100 mL water</td>
<td>Poly-Joule can be ordered from your local pharmacy</td>
</tr>
<tr>
<td>Poly-Joule + Ribena</td>
<td>5 teaspoons Ribena syrup + 1 ½ scoop (about 8 g) Poly-Joule in 100 mL water</td>
<td></td>
</tr>
<tr>
<td>Poly-Joule + cordial</td>
<td>3 teaspoons cordial syrup (regular cordial, NOT diet) + 1 ½ scoop (about 8 g) Poly-Joule in 100 mL water</td>
<td></td>
</tr>
</tbody>
</table>

CarbPlus recipes

<table>
<thead>
<tr>
<th>Options</th>
<th>Recipes</th>
<th>Where to buy</th>
</tr>
</thead>
<tbody>
<tr>
<td>CarbPlus</td>
<td>1 heaped scoop (11 g) CarbPlus in 100 mL water</td>
<td>CarbPlus can be ordered from your local pharmacy</td>
</tr>
<tr>
<td>CarbPlus + Ribena</td>
<td>1 teaspoon Ribena syrup + 1 level scoop (10 g) of CarbPlus in 100 mL water</td>
<td></td>
</tr>
<tr>
<td>CarbPlus + cordial</td>
<td>1 teaspoon cordial syrup (NOT diet) + 1 level scoop (10 g) of CarbPlus in 100 mL water</td>
<td></td>
</tr>
</tbody>
</table>

Recipes using other products

<table>
<thead>
<tr>
<th>Product</th>
<th>Recipe</th>
<th>Where to buy</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOS 10</td>
<td>Add contents of sachet to 200 mL of water</td>
<td>Phone Vitafl® Australia on 1800 230 069 or email: enquiry@vitafl®.com.au</td>
</tr>
<tr>
<td>Lucozade Energy</td>
<td>Add 55 mL of Lucozade Energy to 45 mL of water to make 100ml</td>
<td>Can be bought from the sport drink aisle of most large grocery stores</td>
</tr>
</tbody>
</table>
Appendix 2

Hypoglycaemia and Ketones

The blood sample taken from your child in the emergency department showed a low blood sugar level and ketones.

What is hypoglycaemia?
Hypoglycaemia is the medical name given to a low blood sugar level (less than 2.8 mmol/L). A child with hypoglycaemia requires urgent medical treatment to increase the blood sugar level. Hypoglycaemic episodes can cause harm if not treated promptly.

What are ketones?
Ketones are chemicals that occur as the body breaks down fat for energy.

Why did this happen?
This is the body’s normal response when you do not eat for a while. Your child may have had an illness (such as vomiting and diarrhoea) or injury which stopped them from eating.

Signs and symptoms
- shakiness
- pale skin colour
- sweating
- hunger
- confusion, sudden moodiness or behaviour changes

Investigating hypoglycaemia
Blood and urine samples are often collected to look for medical conditions that cause hypoglycaemia. These tests take some time to complete so the results are usually not ready when your child is well enough to go home. When you are discharged you will be given a follow-up appointment to receive these results.

These tests rule out all the known causes of hypoglycaemia for your child’s age. If these tests are normal your child will likely have a condition called ketotic hypoglycaemia of childhood. This is very common in childhood and a condition most children grow out of by ten years of age.

What is the treatment?
There are some steps you can take to stop your child having another episode of hypoglycaemia.

When your child is well:
- try some solutions from the Sick Day Plan so you know which one they like best
- keep a supply of the preferred drink in the house

When your child is unwell or not eating:
- do NOT give your child water
- try and get your child to eat some food or drink milk
- follow the Sick Day Plan to top up their diet
- once they are back to their usual diet you can stop the Sick Day Plan

Monitoring your child’s blood sugar levels at home (using a glucometer) is not recommended. The results can be incorrect. It is better to look at your child’s symptoms.

When to seek medical help?
In an emergency, always call 000 immediately. Contact your local doctor or visit the emergency department of your nearest hospital if your child has:
- more than three vomits
- any signs or symptoms of hypoglycaemia
- any other health problems that concern you