

# Hypoglycaemia (low blood sugar) and ketotic hypoglycaemia

**This leaflet explains what hypoglycaemia and ketotic hypoglycaemia are, what causes them, symptoms to look out for and gives feeding guidelines to manage a hypoglycaemic episode.**

## What is hypoglycaemia?

Hypoglycaemia is having a blood glucose (also known as blood sugar) level that is too low to provide energy for the body's cells.

## What is glucose?

Glucose is a sugar that is made from the breakdown of carbohydrates found in foods. It is the main source of fuel for the body (including the brain). It may be stored in the liver and muscles for later use, but spare glucose is converted to fat. The level of glucose in the blood is controlled by complex hormone and energy pathways.

## What is a healthy range of blood glucose?

The normal range of blood glucose throughout the day and night is around 3.5 – 6 mmols/litre. However, this varies according to a number of factors; your child's doctor will talk with you about what should be a normal range for him or her.

## Why is hypoglycaemia a concern?

The brain depends on glucose, and too little can affect its ability to function. Severe or very prolonged hypoglycaemia could result in fits or serious brain injury. We think your child may be at risk of low blood sugar and you will have been given some advice and treatment to prevent this problem.

## Causes in young children

### Single episodes:

- Sickness and diarrhoea, or another illness that may cause them to not eat enough.
- Fasting for a prolonged period of time.
- Prolonged exercise with lack of food.

### Recurrent episodes:

- Ketotic hypoglycaemia.
- Medications your child may be taking.
- Congenital (present at birth) error in energy metabolism or unusual hormone problem (rare causes).

## What is ketotic hypoglycaemia?

A common reason for recurrent episodes of low blood sugar in young children is ketotic hypoglycaemia which is a disorder which occurs in young children, generally following a long period of time without food. It usually first appears when a child is between 18 months and 5 years old. Children with ketotic hypoglycaemia are more likely than others to have hypoglycemia during illness, after having fasted (overnight, for example) and after strenuous exercise. They may be small and thin for their age, and have less muscle mass than their friends.

This illness causes a low blood sugar (hypoglycaemia) and a build-up of ketones in the body's tissues and fluids (ketosis). Ketones are chemicals made when supplies of sugar to the body are low and the body must break down fat for energy. Ketones collect in the urine and the doctor can test for them. Other tests are usually done during the first or second episode to make sure your child does not have another reason for low blood sugars.

Treatment of this illness is simply making sure that your child avoids prolonged periods of fasting. Give him frequent, small meals and snacks, especially before bedtime. Bedtime snacks that are rich in carbohydrates e.g. milk, toast, cereal or banana can be given. If your child is underweight, nutritional supplements may be given.

Hypoglycaemia is more of a problem during acute illness when your child may not eat well and the body is under stress. We have given you a special energy drink to give to your child when they are unwell to prevent their blood sugar falling.

## Symptoms of low blood sugar

While each child may experience symptoms of hypoglycemia differently, the most common include:

- Shakiness and dizziness.
- Sweating.
- Hunger.
- Headache.
- Irritability.
- Pale skin colour.
- Sudden moodiness or behavioural changes, such as crying for no apparent reason.
- Clumsy or jerky movements.
- Difficulty paying attention, or confusion.
- Tingling sensations around the mouth.

If you notice these symptoms you should give your child something to eat and start your special energy drink if they are unwell. If your child's hypoglycemia is not severe, he or she should feel better within 10 to 15 minutes of eating or drinking something.

If your child does not respond to having something to eat or is unable to eat or drink because they are too drowsy, refusing to eat or vomiting they should be taken immediately to hospital. If they are unconscious, call 999 for an ambulance.

## What will happen next?

Your child may have had some tests to check for other causes of low blood sugar. These are sent away for testing and it may take a while for the results to return to the hospital doctor. The energy drink can be used even if we are not sure what has caused your child's low blood sugar levels as it will also help children who have other causes for their low blood sugar.

You will be given a follow-up appointment to discuss these test results and your child will be seen regularly until they grow out of the condition.

The problem usually disappears on its own by the time your child is 5 or 6 years old and until then the hospital will regularly review your child and advise what to do and who to contact if your child is unwell.

## Contacting us

If you need further advice, please contact the ward where your child was last cared for in hospital or ask to speak to your child's paediatric consultant on 0118 322 5111.

**Paediatric Emergency Department:** 0118 322 6875 / 6876

**Kempton Day Bed Unit:** 0118 322 7512 / 8754 (Mon-Fri 7am-7pm)

**Lion/Dolphin Wards:** 0118 322 7519 / 8075 (outside of these hours)

To find out more about our Trust visit [www.royalberkshire.nhs.uk](http://www.royalberkshire.nhs.uk)

**Please ask if you need this information in another language or format.**

Dr N Pritchard, Paediatric Consultant & Louise Gubb, Dietitian, RBFT Paediatric Unit, November 2022.

Next review due: November 2024

## **Appendix 1**

**WARNING:** We do not recommend that this written information is used unless you have also discussed how to use this treatment with your child's paediatrician and / or paediatric dietitian.

### **Emergency Regimen (ER): for infants age under 1 year**

#### **Feeding guidelines and use of glucose energy drinks for children with recurrent hypoglycaemia**

##### **How long can my baby fast (go without a feed) for?**

Your baby can fast for up to 6 hours.

As your baby gets older they will be able to fast for longer. Newborn and young infants normally demand feed every 3 to 4 hours. When your baby begins to sleep longer at night, give a feed just before they go to bed, once during the night (you may need to wake your baby for this feed) and on waking in the morning.

##### **What should I do if my baby will not wake for a feed during the night?**

If your baby will not wake or take a feed during the night and is fasting for longer than the recommended time, contact your hospital doctor for further advice.

##### **What is the Emergency Regimen?**

This is a special feeding plan used if your baby is unwell and/or is not feeding well:

- Glucose polymer feeds are given to provide your baby with energy.
- These feeds are given frequently day and night.

##### **When should I give the ER?**

Any time your baby is not feeding well, this is usually during illness

- If you are unsure if your baby is unwell, give a glucose polymer feed and continue to assess.
- If your baby is definitely unwell, start the full ER of frequent glucose polymer feeds.

##### **When should I contact the hospital doctor if my baby is on the ER?**

Please contact the hospital if:

- You are concerned and want advice.
- Your baby is frequently vomiting or refusing to take ER feeds.
- Your baby has diarrhoea, unless very mild.
- Your baby is drowsy, floppy, not responding normally ('glazed look').
- Your baby is not improving on ER feeds.

## How do I make the ER feeds (10% Carbohydrate/Glucose Polymer)?

**10% SOS (pink) sachets** – 1 sachet made up to 200mls with cool boiled water.

OR if not available use white scoops provided or electronic scales to weigh Maxijul.

## Super Soluble Maxijul powder

5 level white scoops Maxijul or 20g Maxijul made up to 200mls with cool boiled water.



**5 x level white scoops per 200mls water**

## Suggested feed volumes

- **Age 0-3 months:** Feed: 45-80ml every 2 hours or 70-120ml every 3 hours day & night.
- **Age 4-6 months:** Feed: 85-100ml every 2 hours or 130-150ml every 3 hours day & night.
- **Age 7-9 months:** Feed: 90-100ml every 2 hours or 130-150ml every 3 hours day & night.
- **Age 10-12 months:** Feed: 100ml every 2 hours or 150ml every 3 hours day & night.

## How do I give the ER?

Give feeds every 2 or 3 hours day and night. First try to give your baby's usual formula. If this is not tolerated, give the ER feeds of glucose polymer. If your baby is vomiting give small frequent sips of feed.

## My baby is breast fed – how do I give the ER?

Try to breast feed every 2 to 3 hours day and night. If your baby is not breast feeding well try giving ER feeds of glucose polymer from a bottle. If your baby refuses a bottle contact your hospital doctor or go to your local hospital.

## When can I stop giving the ER feeds?

As your baby starts to recover you can return to their normal feeds and routine. Try to do this within 48 hours of starting the ER feeds.

## **Appendix 2:**

**WARNING:** We do not recommend that this written information is used unless you have also discussed how to use this treatment with your child's paediatrician and / or paediatric dietitian.

### **Emergency Regimen (ER): for children age under 2 years**

#### **Feeding guidelines and use of glucose energy drinks for children with recurrent hypoglycaemia**

##### **What is the Emergency Regimen?**

This is a special feeding plan used if your child is unwell and/or is not feeding well:

- Glucose polymer feeds are given to provide your child with energy.
- These feeds are given frequently day and night.

##### **When should I give the ER?**

Any time your child is not feeding well, this is usually during illness:

- If you are unsure if your baby is unwell, give a glucose polymer feed and continue to assess.
- If your baby is definitely unwell, start the full ER of frequent glucose polymer feeds.

##### **When should I contact the hospital doctor if my child is on the ER?**

Please contact the hospital if:

- You are concerned and want advice.
- Your child is frequently vomiting or refusing to take ER feeds.
- Your child has diarrhoea, unless very mild.
- Your child is drowsy, floppy, not responding normally ('glazed look').
- Your child is not improving on ER feeds.

##### **How do I make the ER feeds (15% Carbohydrate/Glucose Polymer)?**

**15% SOS (blue) sachets** – 1 sachet made up to 200mls with cool boiled water ("No added sugar" fruit squash can be used to flavour the drink).

OR if not available, use white scoops provided or electronic scales to weigh Maxijul.

##### **Super Soluble Maxijul powder**

8 level white scoops Maxijul or 30g Maxijul made up to 200mls with cool boiled water ("No added sugar" fruit squash can be used to flavour the drink).



**8 x level white scoops per 200mls water**

### **Suggested feed volumes**

- **Age 1-2 years:** Aim for 1200ml in 24 hours. Offer 100ml every 2 hours or 150ml every 3 hours day & night.

### **How do I give the ER?**

Give glucose polymer drinks every 2 or 3 hours day and night. If your child is vomiting give the drinks as small frequent sips.

### **Can I give any other drinks?**

Yes – commercial drinks can be given as well but you will need to continue the glucose polymer drinks.

Low calorie drinks are not suitable because they are too low in energy.

### **When can I stop giving the ER drinks?**

When your child starts eating again you can give fewer ER drinks but continue some night drinks. ER drinks can be stopped once your child is eating normally again. Try to do this within 48 hours of starting the ER.

### **Appendix 3:**

**WARNING:** We do not recommend that this written information is used unless you have also discussed how to use this treatment with your child's paediatrician and / or paediatric dietitian.

## **Emergency Regimen (ER): for children age 2-10 years**

### **Feeding guidelines and use of glucose energy drinks for children with recurrent hypoglycaemia**

#### **What is the Emergency Regimen?**

This is a special feeding plan used if your child is unwell and/or is not feeding well:

- Glucose polymer feeds are given to provide your child with energy.
- These feeds are given frequently day and night.

#### **When should I give the ER?**

Any time your child is not feeding well, this is usually during illness:

- If you are unsure if your baby is unwell, give a glucose polymer feed and continue to assess.
- If your baby is definitely unwell, start the full ER of frequent glucose polymer feeds.

#### **When should I contact the hospital doctor if my child is on the ER?**

Please contact the hospital if:

- You are concerned and want advice.
- Your child is frequently vomiting or refusing to take ER feeds.
- Your child has diarrhoea, unless very mild.
- Your child is drowsy, floppy, not responding normally ('glazed look').
- Your child is not improving on ER feeds.

#### **How do I make the ER feeds (20% Carbohydrate/Glucose Polymer)?**

**20% SOS (orange) sachets** – 1 sachet made up to 200mls with cool boiled water ("No added sugar" fruit squash can be used to flavour the drink).

OR if not available use white scoop provided or electronic scales to weigh Maxijul.

#### **Super Soluble Maxijul powder**

10 level white scoops Maxijul or 40g Maxijul made up to 200mls with cool boiled water ("No added sugar" fruit squash can be used to flavour the drink).





**10 x level white scoops per 200mls water**

### **Suggested drink volumes**

- **Age 2 years:** Aim 1200ml in 24 hours. Offer 100ml every 2 hours or 150ml every 3 hours day & night.
- **Age 3-4 years:** Aim 1300ml to 1400ml in 24 hours. Offer 110ml every 2 hours or 170ml every 3 hours day & night.
- **Age 5-6 years:** Aim 1500ml to 1600ml in 24 hours. Offer 130ml every 2 hours or 200ml every 3 hours day & night.
- **Age 7-8 years:** Aim 1700ml in 24 hours. Offer 135ml every 2 hours or 210ml every 3 hours day & night.
- **Age 9 years:** Aim 1800ml in 24 hours. Offer 150ml every 2 hours or 220ml every 3 hours day & night.

### **How do I give the ER?**

Give glucose polymer drinks every 2 or 3 hours day and night. If your child is vomiting give the drinks as small frequent sips.

### **Can I give any other drinks?**

Yes – commercial drinks can be given as well but you will need to continue the glucose polymer drinks.

Low calorie drinks are not suitable because they are too low in energy.

### **When can I stop giving the ER drinks?**

When your child starts eating again you can give fewer ER drinks but continue some night drinks. ER drinks can be stopped once your child is eating normally again. Try to do this within 48 hours of starting the ER.

## Appendix 4:

**WARNING:** We do not recommend that this written information is used unless you have also discussed how to use this treatment with your child's paediatrician and / or paediatric dietitian.

### **Emergency Regimen (ER): for children over 10 years**

#### **Feeding guidelines and use of glucose energy drinks for children with recurrent hypoglycaemia**

##### **What is the Emergency Regimen?**

This is a special feeding plan used if your child is unwell and/or is not feeding well:

- Glucose polymer feeds are given to provide your child with energy.
- These feeds are given frequently day and night.

##### **When should I give the ER?**

Any time your child is not feeding well, this is usually during illness:

- If you are unsure if your baby is unwell, give a glucose polymer feed and continue to assess.
- If your baby is definitely unwell, start the full ER of frequent glucose polymer feeds.

##### **When should I contact the hospital doctor if my child is on the ER?**

Please contact the hospital if:

- You are concerned and want advice.
- Your child is frequently vomiting or refusing to take ER feeds.
- Your child has diarrhoea, unless very mild.
- Your child is drowsy, floppy, not responding normally ('glazed look').
- Your child is not improving on ER feeds.

##### **How do I make the ER feeds (25% Carbohydrate/Glucose Polymer)?**

**25% SOS (yellow) sachets** – 1 sachet made up to 200mls with cool boiled water ("No added sugar" fruit squash can be used to flavour the drink).

##### **Suggested drink volumes**

- **Age 10 years: aim 1800ml in 24 hours.** Offer 150ml every 2 hours or 220ml every 3 hours day & night.
- **Age 11, 12 and 13 years: aim 2000ml in 24 hours.** Offer 170ml every 2 hours or 250ml every 3 hours day & night.

- **Age 14 and 15 years: aim 2200ml in 24 hours.** Offer 180ml every 2 hours or 270ml every 3 hours day & night.
- **Age 16, 17 and 18 years: aim 2400ml in 24 hours.** Offer 200ml every 2 hours or 300ml every 3 hours day & night.

### **How do I give the ER?**

Give glucose polymer drinks every 2 or 3 hours day and night. If your child is vomiting give the drinks as small frequent sips.

### **Can I give any other drinks?**

Yes – commercial drinks can be given as well but you will need to continue the glucose polymer drinks.

Low calorie drinks are not suitable because they are too low in energy.

### **When can I stop giving the ER drinks?**

When your child starts eating again you can give fewer ER drinks but continue some night drinks. ER drinks can be stopped once your child is eating normally again. Try to do this within 48 hours of starting the ER.