CoMET Paediatric Metabolic Emergencies

This guideline is for use by healthcare staff, at CoMET undertaking critical care retrieval, transport and stabilization of children, and young adults.

CoMET is a Paediatric Critical Care Transport service and is hosted by the University Hospitals of Leicester NHS trust working in partnership with the Nottingham University Hospitals NHS Trust.

The guidance supports decision making by individual healthcare professionals and to make decisions in the best interest of the individual patient.

This guideline represents the view of CoMET, and is produced to be used mainly by healthcare staff working for CoMET, although, professionals, working in similar field will find it useful for easy reference at the bedside.

We are grateful to the many existing paediatric critical care transport services, whose advice and current guidelines have been referred to for preparing this document. Thank You.

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Approved By:	**Clincal Policy & Guidelines Committee**
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Education and Training

1. Annual Transport team update training days

2. Workshops delivered in Regional Transport Study days/ Outreach

Monitoring Compliance

What will be measured to monitor compliance	How will compliance be monitored	Monitoring Lead	Frequency	Reporting arrangements
Incident reporting	Review related Datix	Abi Hill – Lead Transport Nurse abi.hill6@nhs.net	Monthly	CoMET Lead Governance Meeting
Documentation Compliance	Documentation Audit	Abi Hill – Lead Transport Nurse abi.hill6@nhs.net	3 Monthly	CoMET Lead Governance Meeting

CoMET Paediatric Metabolic Emergencies

Hyperammonemia is a medical emergency – Do Not delay treatment.

If the initial plasma ammonia is >500µmol/L or >300µmol/L **with encephalopathy**, transfer immediately to PICU as the child with require haemofiltration **within 6 hours.**

Suspicion of hyperammonemia or a metabolic condition

- Assess and stabilise A to E
- Assess and record GCS carefully, consider early anaesthetic support if GCS <8
- Send samples listed under investigations urgently to the lab
- Stop feeds and start IV fluids containing 10% Glucose
- Investigate and treat for potential sepsis, consider IV aciclovir.

Ammonia 50 – 100µmol/L

Assess & stabilise A to E.

Paediatric consultant review.

D/W CoMET +/- metabolic consultant if appropriate.

Consider repeating ammonia in 2-4hours if suspected IEM.

Ammonia 100 – 200µmol/L

Send repeat Ammonia as soon as possible.

Obtain second IV access or IO.

Ammonia 100 – 200µmol/L → Discuss with the metabolic team +/- CoMET if clinically required.

Ammonia >200µmol/L → Contact CoMET: 0300 300 0023

Conference call with metabolic consultant.

Ammonia ≥200µmol/L

Send repeat Ammonia as soon as possible.

Obtain second IV access or IO.

Escalate Management immediately; do **NOT** wait for the results of 2nd sample.

Contact CoMET: 0300 300 0023

Conference call with metabolic consultant.

Start metabolic infusions & fluid regime within 30 minutes of decision to treat. Doses can be found in section 9 of the guide.

Contact anaesthetic team and consider intubation and ventilation.

Repeat ammonia level & blood gas 1 hour after starting metabolic infusions.

Metabolic Consultant **in hours** contactable via your tertiary centre switchboard;

QMC 01159249924
LRI 03003031573

Metabolic Consultant **out of hours** via Sheffield children's hospital switchboard

01142717000

2. Introduction

Inborn Errors of Metabolism (IEM) encompass a large group of individually rare disorders and can present as acute metabolic emergencies. They often result in significant morbidity and mortality therefore rapid recognition and instigation of treatment is essential. Managing metabolic disorders can be very complicated; it is best to seek early help from a specialist metabolic team if a metabolic emergency is suspected.

Children with a metabolic disorder often present with non-specific symptoms. The most common presentations are hyperammonaemia, metabolic acidosis with an expanded anion gap and hypocalcaemia. The most common acute clinical presentations include progressive encephalopathy. Children with metabolic disorders are at great risk of decompensation during episodes of illness and therefore need careful management to ensure they receive the optimum care to avoid states of catabolism[1]

3. Clinical Presentation[1,2,3,5,6]

Neonate	Child or Young Person
Vomiting	Vomiting
Lethargy	Lethargy
Respiratory distress	Encephalopathy
Hypotonia (central) with peripheral hypertonia	Ataxia
Dehydration	Agitation/confusion
Seizures	Focal Neurological Signs
Involuntary movements (boxing, cycling, slow limb elevations, myoclonic jerks)	Seizures
Abnormal Urine odour	

4. Investigations For Suspected Inborn Errors of Metabolism[2,3,5]

Blood Investigations	Urine Investigations	CSF Investigations **
FBC	Organic Acids	Glucose & Lactate
Clotting	Point of care Ketones	Amino Acids – glycine
Glucose, Lactate*, free fatty acids & 3-hydroxybutyrate		Threonine
LFT, U&E, bone profile, CK, Plasma amino acid profile & Cortisol		Serine
Ammonia* & Acylcarnitines		
Venous Blood Gas		
Point of Care Glucose & Ketones		

* Ammonia samples must be hand delivered to the lab immediately, call ahead to make them aware you are taking the sample.
* Plasma Ammonia & Lactate can be artefactually raised if the sample is haemolysed or the limb has been squeezed during sample taking – aim for free flowing samples.
If an LP is undertaken as part of a septic screen. **Do NOT do an LP if a patient is Encephlopathic.

5. Initial General Management of All Patients Suspected of Presenting Acutely With An Inherited Metabolic Disease[5,8]

Children who have a known metabolic condition will often have their own emergency management plan if this is available please follow that. If further support is required please speak with their named metabolic team.

Otherwise follow these steps below;

- **Stop feeds & start IV maintenance fluids**;
  - *Maintenance fluid type;*
    - 0.9% Sodium Chloride & 10% Glucose in General metabolic emergencies.
    - If Hyperammonaemic on FULL doses of metabolic infusions; Plain 10% Glucose (use 0.18% sodium Chloride & 10% Glucose if not on full doses of metabolic infusions).
  - *Additives;*
    - Potassium Chloride if passing urine and normal potassium levels.
  - *Amount;*
    - Maintenance plus deficit for dehydration.
- **Give 3mL/kg bolus of 10% glucose** IV initially (equal to 300mg/kg)
- **Give 10mL/kg fluid bolus; 0.9% Sodium chloride or Plasmalyte**, reassess the need for further fluid boluses and repeat if required.
- Consider starting broad spectrum antibiotics and Aciclovir.
- **Metabolic infusions *(usually Sodium Benzoate, Sodium Phenylbutyrate, Arginine and/or Carnitine)*** should be started as soon as possible. Doses and administration details are outlined in the drug monograph in section 9 of this guideline.
- **Check blood sugar hourly**. Aim to keep blood sugar in the range 6 – 10mmol/L. If plasma glucose exceeds 14mmol/L and there is glycosuria, do NOT reduce the amount of 10% glucose, start IV **Insulin**. Start at 0.025units/kg/hour, may need to increase to 0.3units/kg/hour to control hyperglycaemia. If there is evidence of lactic acidosis seek advice from a metabolic consultant before giving insulin (lactic acidosis can be exacerbated by insulin and it may be necessary to reduce the concentration of the glucose infusion in this circumstance)
- Treat any infection and constipation (which increases ammonia absorption from the gut), Lactulose is recommended.

It is important to assess patients for encephalopathy by recording a GCS on presentation and carefully reassessing, as this allows for timely recognition of deterioration.

Contact CoMET on 0300 300 0023, who will facilitate a conference call with the on-call regional metabolic consultant and specialist metabolic team to support the initial assessment and management of the patient. Early involvement of the specialist team is recommended to guide ongoing management and any condition-specific treatment adaptations.

6. Hyperammonaemia[5]

Hyperammonaemia is a medical emergency and treatment should not be delayed. Metabolic infusions (Sodium benzoate, Sodium phenylbutyrate, Arginine and Carnitine) should be sourced and given as soon as possible. Doses and instructions for administration can be found in section 9 of this guideline. Normal ammonia values should be less than 50μmol/l but mildly raised levels are common.

In addition to the general management mentioned above:

- If the initial plasma ammonia level is >150μmol/l urgently repeat the level, undertake investigations outlined in this guideline, and obtain a second IV access.
- If the repeat level remains between 100-200 μmol/l seek advice from a metabolic consultant before giving any ammonia specific therapy as the patient may be suitably managed using nutritional therapy
- For ammonia levels >200μmol/l start metabolic infusions as soon as possible and contact a metabolic consultant and the CoMET team for advice.
- Consider a single oral dose of N-Carbamyl glutamate (Carglumic acid) if advised by the metabolic consultant
- Give IV maintenance fluids + any fluid deficit as outlined in section 5 of this guideline
- If the ammonia level is >500μmol/l or >300μmol/l with encephalopathy the child will need a time critical transfer to metabolic centre as they will require haemofiltration within 6 hours
- Avoid hyperventilation as alkalosis enhances ammonia toxicity
- Avoid giving bicarbonate if pH is >7.2

7. Metabolic Acidosis[7]

If the metabolic acidosis is due to Diabetic Ketoacidosis, please refer to the DKA guidelines.

For children presenting with a persistent metabolic acidosis and an increased anion gap stop feeds and start IV maintenance + fluid deficit as outlined in section 5 of this guideline. Discuss with metabolic consultant. Carnitine, Hydroxocobalamin and Biotin may also be needed (speak to the metabolic consultant). See drug monograph in section 8 for dosing and administration information.

If the metabolic acidosis does not correct with IV glucose therapy and bicarbonate corrections discuss with the metabolic consultant and CoMET team. Haemofiltration may be required.

If the anion gap is not increased the acidosis may be caused by bicarbonate loss and should therefore be treated with bicarbonate replacement. Look for Renal or Gastrointestinal losses.

$$\text{Anion gap} = [Na^+] - ([Cl^-] + [HCO_3^-]) \textit{ (Normal Range 10-16)}$$

Useful Contact numbers;

Sheffield Children's Hospital - 01142717000
Birmingham Children's Hospital - 0121 333 9999
Great Ormond Street Hospital - 020 7405 9200
Leicester Royal Infirmary- 03003031573
Royal Manchester Children's Hospital - 0161 276 1234
Queens Medical Centre- 01159249924

8. Location of Metabolic Medications

Hospital	Drug Stocked	Location
Kettering Hospital	**No Drugs Stocked**	Consider contacting Northampton Pharmacy for shipment
King's Mill Hospital	**Arginine, Biotin, Carnitine, Hydroxocobalamin, Sodium Benzoate & Sodium Phenylbutyrate** **Sodium Phenylbutyrate**	**NICU Metabolic Box** **Ward 25**
Leicester Royal Infirmary	**Arginine, Carnitine, Sodium Phenylbutyrate, Sodium Benzoate**	**Paeds ED (Drug Room)**
Lincoln County Hospital	**Arginine, Biotin, Carnitine, Hydroxocobalamin, Sodium Benzoate & Sodium Phenylbutyrate.** **Carnitine, Hydroxocobalamin, Sodium Benzoate**	**NICU Metabolic Box** **Rainforest Ward.**
Northampton General	**Arginine, Carnitine, Hydroxocobalamin, Sodium Benzoate, Sodium Phenylbutyrate**	**Emergency Drug Cupboard & Main Pharmacy**
Pilgrim Hospital	**Arginine, Biotin, Carnitine, Hydroxocobalamin, Sodium Benzoate, Sodium Phenylbutyrate**	**Children's Ward 4a** (drugs cupboard in our HDU room)
Queens Hospital Burton	**No Drugs Stocked**	Contact Royal Derby Hospital
Queens Medical Centre	**Arginine, Carnitine, Sodium Benzoate & Sodium Phenylbutyrate** **Biotin, Carglumic Acid & Hydroxocobalamin**	**D33** (East Block, level D) **Pharmacy**
Royal Derby Hospital	**Arginine, Carnitine, Sodium Benzoate & Sodium Phenylbutyrate.** **Hydroxocobalamin** **Biotin**	**CED** (If not available contact pharmacy – OOH call on call pharmacist.) **310, 410, ICU** **Pharmacy**

9. Emergency Metabolic Drugs Monograph for IV Infusions

infusions for children <12kg			
Medication	**Loading Dose**	**Maintenance Dose**	**Preparation**
Sodium Benzoate **Usually available as;** **1gram/5ml (200mg/mL)** **Or** **2gram/10ml (200mg/mL) ampoules**	250mg/kg Over 90 Minutes = 5ml/kg over 90 minutes.	250mg/kg/day by continuous infusion = 0.2ml/kg/hr *Following metabolic advice there are occasions when doses up to 500mg/kg/day can be administered.*	Mix **3g** (15ml of 200mg/mL solution) with **45ml** 10% glucose. Final concentration; **3000mg/60ml** = *50mg/ml* **To administer loading dose, make up as per preparation to get 50mg/ml. Remove the dose required for the loading dose into another syringe and administer this over 90mins. Keep the remainder of the made up 50mg/ml in the original syringe to administer as maintenance dose following administration of loading dose.*
Sodium Phenylbutyrate **Usually available as;** **1gram/5ml (200mg/mL)** **Or** **2gram/10ml (200mg/mL) ampoules**	250mg/kg over 90 Minutes = 5ml/kg over 90 Minutes	250mg/kg/day by continuous infusion = 0.2ml/kg/hr *Following metabolic advice there are occasions when doses up to 500mg/kg/day can be administered.*	Mix **3g** (15ml of 200mg/mL solution) with **45ml** 10% glucose. Final concentration; **3000mg/60ml** = 50mg/ml **To administer loading dose, make up as per preparation to get 50mg/ml. Remove the dose required for the loading dose into another syringe and administer this over 90mins. Keep the remainder of the made up 50mg/ml in the original syringe to administer as maintenance dose following administration of loading dose.*
L-Arginine **For patients <20kg**	150mg/kg over 90 Minutes = 3ml/kg over 90 Minutes *300mg/kg over 90 minutes can be given at metabolic consultant request = 6ml/kg over 90 Minutes*	150 – 300mg/kg/day by continuous infusion = 0.12-0.26ml/kg/hr	Mix 2.5g (25ml of **100mg/ml)** with **25ml** 10% Glucose. Final Concentration; 2500mg/50ml = 50mg/ml **Other Arginine concentrations are available – if used please check calculations**
L-Carnitine ***Do not administer Carnitine if any suspicion of cardiomyopathy***	100mg/kg over 30minutes	100mg/kg/day	Can be given undiluted or further diluted in 10% glucose (volume not critical, but max 50ml). *Preparation for loading & maintenance dose the same. Administer loading dose and then make up maintenance dose.

Metabolic infusions for children >12kg.

Doses are unchanged but for ease of administration, the following method of making up the infusion is recommended.

Sodium Benzoate **Usually available as;** **1gram/5ml (200mg/mL)** **Or** **2gram/10ml (200mg/mL) ampoules**	250mg/kg Over 90 Minutes = 5ml/kg over 90 minutes.	250mg/kg/day by continuous infusion = 0.2ml/kg/hr *Following metabolic advice there are occasions when doses up to 500mg/kg/day can be administered.*	Mix **15g** (75ml of 200mg/mL solution) with **225ml** 10% Glucose. Final concentration; 15gram/300ml = 50mg/ml. Remove and discard **275ml from a 500ml bag of** 10% Glucose. Add **75ml** of Sodium Benzoate to remainder of 10% Glucose bag. **To administer loading dose, make up as per preparation to get 50mg/ml. Calculate the volume required for the loading dose, either remove from the 300ml bag or remove excess volume from 300ml bag with a syringe and keep remainder either in the syringe or bag to administer as maintenance dose after administration of loading dose.*
Sodium Phenylbutyrate **Usually available as;** **1gram/5ml (200mg/mL)** **Or** **2gram/10ml (200mg/mL) ampoules**	250mg/kg Over 90 Minutes = 5ml/kg over 90 minutes.	250mg/kg/day by continuous infusion = 0.2ml/kg/hr *Following metabolic advice there are occasions when doses up to 500mg/kg/day can be administered.*	Mix **15g** (75ml of 200mg/mL solution) with **225ml** 10% Glucose. Final concentration; 15gram/300ml = 50mg/ml. Remove and discard **275ml from a 500ml bag of** 10% Glucose. Add **75ml** of Sodium Phenylbutyrate to remainder of 10% Glucose bag. **To administer loading dose, make up as per preparation to get 50mg/ml. Calculate the volume required for the loading dose, either remove from the 300ml bag or remove excess volume from 300ml bag with a syringe and keep remainder either in the syringe or bag to administer as maintenance dose after administration of loading dose.*
Sodium Benzoate & Sodium Phenylbutyrate **1gram/5ml (200mg/mL)** **Or** **2gram/10ml (200mg/mL) ampoules** **Combination**	250mg/kg over 90 minutes = 5ml/kg over 90mins will deliver 250mg/kg of Sodium Benzoate **and** 250mg/kg of Sodium Phenylbutyrate.	0.2ml/kg/hr will deliver 250mg/kg/day of Sodium Benzoate **and** 250mg/kg/day of Sodium Phenylbutyrate.	****Combination preparation**;** Mix **15g (75ml of 200mg/mL solution)** of Sodium Benzoate **& 15g (75ml of 200mg/mL solution)** of Sodium Phenylbutyrate **with 150ml 10% Glucose**. Final Concentration; 1**5g Benzoate & 15g Phenylbutyrate/300ml**

administration; Both Sodium Benzoate & Sodium Phenylbutyrate can be added to the same bag.		*Following metabolic advice there are occasions when doses up to 500mg/kg/day can be administered.*	=50mg/ml Sodium Benzoate plus 50mg/ml Sodium Phenylbutyrate Remove and discard **350ml** from a 500ml bag of 10% Glucose Add **75ml** (15g) of Sodium Benzoate & **75ml** (15g) of Sodium Phenylbutyrate to the remainder of 10% Glucose bag. **To administer loading dose, make up as per preparation to get 50mg/ml. Calculate the volume required for the loading dose, either remove from the 300ml bag or remove excess volume from 300ml bag with a syringe and keep remainder either in the syringe or bag to administer as maintenance dose after administration of loading dose.*
L-Arginine **For patients >20kg**	150mg/kg over 90 Minutes = 3ml/kg over 90 Minutes *300mg/kg over 90 minutes can be given at metabolic consultant request = 6ml/kg over 90 Minutes*	150 – 300mg/kg/day by continuous infusion = 0.12-0.26ml/kg/hr	Mix **10g** (100ml) with 100ml 10% Glucose. Final Concentration; **10g/200ml** = 50mg/ml Remove and discard **400ml from a 500ml bag of** 10% Glucose. Add **100ml** L- Arginine to the remainder of 10% Glucose bag.
L – Carnitine ***Do not administer carnitine if any suspicion of cardiomyopathy***	100mg/kg over 30minutes.	12 – 30kg; 100mg/kg/day 30kg & above; 3g/day	Can be given undiluted or further diluted in 10% glucose (Volume not critical, but max 50ml). *Preparation for loading and maintenance dose is the same. Administer loading dose and then make up maintenance dose*

Administration route; **Sodium Benzoate, Sodium Phenylbutyrate, Arginine and Carnitine can all be administered via a peripheral cannula.**

IV Compatibilities; **Sodium Benzoate, Arginine, Carnitine and Sodium Phenylbutyrate can be infused together at Y-site along with maintenance fluids which contain Glucose, Sodium Chloride & Potassium Chloride.**

Please contact pharmacy for further information on IV compatibilities.

10. Metabolic Medications

Metabolic Medications			
Medication	**Loading Dose**	**Maintenance Dose**	**Preparation**
Carglumic Acid	250mg/kg as a single ENTERAL dose		Mix 200mg tablet with 2.5 ml of water to make 80mg/ml. Shake gently. Draw up appropriate dose volume and administer immediately down NGT. Flush NGT with additional water to clear.
Biotin Injection	5 – 50mg daily		Give as a slow intravenous injection over 3-5 minutes.
Biotin Tablet	10mg daily	5-20mg Once Daily	Tablets can be crushed & dispersed in water.
Hydroxocobalamin	0.25mg – 1mg once daily		IM. Injection can be given orally.

References;

1. Kripps, K.A., Baker, P.R., Thomas, J.A., Skillman, H.E., Bernstein, L., Gaughan, S., Burns, C., Coughlin, C.R., McCandless, S.E., Larson, A.A., Kochar, A., Stillman, C.F., Wymore, E.M., Hendricks, E.G., Woontner, M. and Van Hove, J.L.K. (2021) Review: Practical strategies to maintain anabolism by intravenous nutritional management in children with inborn metabolic diseases. Molecular Genetics and Metabolism (online).
2. Saudubray J-M, Baumgartner M, Walter J (Eds.). Inborn Metabolic Diseases Diagnosis and Treatment 6th edition; 2016.
3. Melbourne, T., 2022. Clinical Practice Guidelines: Metabolic disorders. [online] Rch.org.au. Available at: https://www.rch.org.au/clinicalguide/guideline_index/Metabolic_disorders/
4. RCH Clinical Handbook 7th Edn, 2003, Blackwell Science.
5. British Inherited Metabolic Disease Group: Undiagnosed hyperammonaemia. Diagnosis and immediate management, 2008.
6. North West & North Wales Paediatric Transport Service. Guidelines for the Management of Neonatal and Paediatric Hyperammonaemia, 2025.
7. SC(NHS)FT Investigation of Suspected Inherited Metabolic Disorders 2019 (CAEC ID 1067)
8. Sheffield Children's Hospital's: 'Guideline for the Emergency Treatment of Inborn Errors of Metabolism'
9. The Yorkshire and Humber Paediatric Critical Care operational Delivery Network: Neonatal and paediatric Hyperammonaemia Guideline, 2025.

Equality Analysis Assessment

5.1 The Trust recognises the diversity of the staff and local community it serves. Our aim therefore is to provide a safe environment free from discrimination, harassment and victimisation and treat all individuals fairly with dignity and respect and, as far as is reasonably possible, according to their needs.

5.2 As part of its development, an Equality Analysis on this policy have been undertaken and its impact on equality have been reviewed and no detriment was identified.

OR if 5.2 above does not apply seek wording from The Head of Equality on uhl-tr.equalitymailbox@nhs.net

EDI Statement

We are fully committed to being an inclusive employer and oppose all forms of unlawful or unfair discrimination, bullying, harassment and victimisation. It is our legal and moral duty to provide equity in employment and service delivery to all and to prevent and act upon any forms of discrimination to all people of protected characteristic: Age, Disability (physical, mental and long-term health conditions), Sex, Gender reassignment, Marriage and Civil Partnership, Sexual orientation, Pregnancy and Maternity, Race (including nationality, ethnicity and colour), Religion or Belief, and beyond.

We are also committed to the principles in respect of social deprivation and health inequalities.

Our aim is to create an environment where all staff are able to contribute, develop and progress based on their ability, competence and performance. We recognise that some staff may require specific initiatives and/or assistance to progress and develop within the organisation.

We are also committed to delivering services that ensure our patients are cared for, comfortable and as far as possible meet their individual needs.

1. Key Words

Metabolic, IEM, hyperammonemia, metabolic acidosis

CONTACT AND REVIEW DETAILS	
Guideline Lead (Name and Title) **Rebecca Etherington – CoMET Nurse** **Mohammad Zoha – CoMET Consultant**	**Executive Lead** **Gang Xu – Medical Director**
Details of Changes made during review: Hyperammonemia parameters altered General guideline formatting Locations of drugs stocked updated Drug preparation formatted and included how to draw up medications	

Appendix 1;

Version 5, November 2024, Review November 2028, Expiry November 2029. Checked: Andrew Wignell, PICU Pharmacist/Alicia Aldous, Paediatric Neurology Pharmacist Approved: PICU Consultants.

Paediatric Critical Care Unit Pharmacopoeia

Preparation of Fluids not Available as Pre-made Bags

Nottingham Children's Hospital

THIS GUIDELINE IS FOR PCCU USE ONLY.
All fluid bags can be given a 24 hour expiry. Fluid bags must be shaken well to ensure good mixing of solutions before administration

Fluid Required	Glucose Bag	Amount of Sodium Chloride 5mmol/mL (30%) Injection to add	Potassium Addition Using 2mmol/mL (15%) Injection	Route of Administration
Glucose 10%	500mL pre-made bag	-	10mmol or 20mmol can be added to each 500mL bag	Peripheral or Central (Central Preferred)
Glucose 10% / 0.45% Sodium Chloride	500mL pre-made bag	37.5mmol (7.5mL)		
Glucose 10% / 0.9% Sodium Chloride	500mL pre-made bag	75mmol (15mL)		
***Glucose 12.5%**	Prepare 500mL bag as below	-	10mmol or 20mmol can be added to each 500mL bag	Peripheral or Central (Central Preferred)
***Glucose 12.5% / 0.45% Sodium Chloride**	Prepare 500mL bag as below	37.5mmol (7.5mL)		
***Glucose 12.5% / 0.9% Sodium Chloride**	Prepare 500mL bag as below	75mmol (15mL)		
#Glucose 15%	Prepare 500mL bag as below	-	10mmol or 20mmol can be added to each 500mL bag	Central Only
#Glucose 15% / 0.45% Sodium Chloride	Prepare 500mL bag as below	37.5mmol (7.5mL)		
#Glucose 15% / 0.9% Sodium Chloride	Prepare 500mL bag as below	75mmol (15mL)		
Glucose 20%	500mL pre-made bag	-	10mmol or 20mmol can be added to each 500mL bag	Central Only
Glucose 20% / 0.45% Sodium Chloride	500mL pre-made bag	37.5mmol (7.5mL)		
Glucose 20% / 0.9% Sodium Chloride	500mL pre-made bag	75mmol (15mL)		