# Parenteral Nutrition – NANO formulations 2026

## Newborn Use only

## ANPN-ANMF CONSENSUS GROUP

| | |
|---|---|
| **Key points** | This guideline is a collaborative outcome of the Australasian Neonatal Parenteral Nutrition (ANPN) and Australasian Neonatal Medicines Formulary (ANMF)<br>Parenteral nutrition is a medication.<br>The parenteral nutrition (PN) formulations detailed in this document reflect the consensus reached by the Australasian Neonatal Parenteral Nutrition (ANPN) group during their March–April 2026 meetings in Australia and New Zealand.<br><br>**For PN consensus purposes, NANO preterm infants are defined as (1) infants born between $22^{+0}$ and $23^{+6}$ weeks or (2) birthweight <600g irrespective of gestational age.[1,2]**<br><br>**The NANO PN formulations are designed to provide PN in the first few days of life - a critical window when excessive fluid loss, hyperglycaemia, and azotaemia are highly prevalent. Once the infant is deemed stable, we recommend changing over to standard preterm PN formulations - Refer to Parenteral Nutrition – Preterm infant**<br>Clinicians may consider individualised PN formulations in some clinical scenarios including acutely deteriorating infant. |
| **Indication** | NANO Preterm Infants in the first few days of life |
| **Action** | PN is a mixture of dextrose, amino acids, lipid emulsions, vitamins, electrolytes, minerals, and trace elements.[3] PN is given to prevent catabolism, promote growth, improve survival and support neurodevelopment in these neonates. |
| **Contraindications** | When enteral nutrition is possible and sufficient. |
| **Precautions** | Critical cardiovascular instability or metabolic instabilities - Such instabilities require correction before administering intravenous nutrition.[4] |
| **Clinical Practice** | **ANPN consensus April 2026**<br>This is a guideline only. Clinicians are encouraged to tailor fluid and PN management to the specific clinical circumstances and trajectory of the individual infant.<br>Refer to Appendices for full parenteral nutrient intake recommendations and intakes.<br>Consensus PN mixture is in 2 components:<br>Component A: Contains AA (as Primene), glucose, electrolytes, minerals and trace elements in bags.<br>Component B: Contains lipid emulsion, water and fat-soluble vitamins in syringe or bag.<br>**Consensus AA/glucose bags (Component A) are designed to deliver recommended AA at 60 mL/kg/day (Day 1 of life) and 135 mL/kg/day (stable phase).**<br><br>**NANO preterm infants are defined as (1) infants born between $22^{+0}$ and $23^{+6}$ weeks or (2) birthweight <600g irrespective of gestational age.**<br><br>**Suggested fluid and PN management of NANO preterm infants**<br>**Day 1 of life:**<br>Total IV fluids – 100-120 mL/kg/DAY, of which<br>60 mL/kg/DAY is NANO-STARTER<br>Remaining 40-60 mL/kg/day – given as 10% glucose, 5% glucose or 2.5% glucose based on blood glucose levels.<br>Lipid emulsion – 1-2 g/kg/DAY, either as extra fluids or included in total.<br>**Day 2 of life onwards (during early transition period with acute metabolic complications of excess fluid loss, hyperglycaemia and azotaemia):**<br>Total IV fluids may be up to 200 mL/kg/DAY, especially in the first week of life.<br>Maximum of 135 mL/kg/DAY as NANO-STANDARD<br>Remaining daily volume can be 10% glucose, 5% glucose or 2.5% glucose based on blood glucose levels.<br>Lipid emulsion: daily increase by 1 g/kg/DAY to a maximum of 3 g/kg/DAY, either as extra fluids or included in total.<br>**After early transition phase** |

<table>
<tr><td></td><td>Consider changing over from NANO formulations to standard preterm formulations</td></tr>
<tr><td>Maximum dose</td><td>* It's a guide only. Clinicians may prescribe PN above the maximum recommended range in some scenarios.<br>Amino acids (After day 1 of life): 4 g/kg/day[5-7]<br>Glucose (After day 1 of life): 17.3 g/kg/day (12 mg/kg/min)[8]<br>Lipids (after day 1 of life): 4 g/kg/day.[9]</td></tr>
<tr><td>Route</td><td>IV</td></tr>
<tr><td>Presentation</td><td>AA/Glucose bags (Compounded and supplied by Baxter Healthcare Pty Ltd)
<table>
<tr><th>Solution name</th><th>Ordering Code</th><th>Osmolality</th><th>Shelf life</th></tr>
<tr><td>NANO- Starter</td><td>NIC-NANOSTART</td><td>569 mOsm/L</td><td>61 days at 2-8$^0$C that includes 4 days <25$^0$C</td></tr>
<tr><td>NANO – Standard</td><td>NIC-NANOSTD</td><td>648 mOsm/L</td><td>61 days at 2-8$^0$C that includes 4 days <25$^0$C</td></tr>
<tr><td>Starter</td><td>NIC-STARTER2</td><td>944 mOsm/L</td><td>61 days at 2-8$^0$C that includes 4 days <25$^0$C</td></tr>
<tr><td>Starter-Concentrated</td><td>NIC-STARTCNC2</td><td>1226 mOsm/L</td><td>61 days at 2-8$^0$C that includes 4 days <25$^0$C</td></tr>
<tr><td>Standard preterm</td><td>NIC-PRESTD2</td><td>957 mOsm/L</td><td>61 days at 2-8$^0$C that includes 4 days <25$^0$C</td></tr>
<tr><td>Concentrated preterm</td><td>NIC-PRECONC2</td><td>1242 mOsm/L</td><td>61 days at 2-8$^0$C that includes 4 days <25$^0$C</td></tr>
<tr><td>High sodium preterm</td><td>NIC-PRENA2</td><td>997 mOsm/L</td><td>61 days at 2-8$^0$C that includes 4 days <25$^0$C</td></tr>
<tr><td>5% Glucose preterm</td><td>NIC-PRE5G2</td><td>680 mOsm/L</td><td>61 days at 2-8$^0$C that includes 4 days <25$^0$C</td></tr>
<tr><td>7.5% Glucose preterm</td><td>NIC-PRE7.5G2</td><td>818 mOsm/L</td><td>61 days at 2-8$^0$C that includes 4 days <25$^0$C</td></tr>
<tr><td>Peripheral preterm</td><td>NIC-NPVL2</td><td>919 mOsm/L</td><td>61 days at 2-8$^0$C that includes 4 days <25$^0$C</td></tr>
<tr><td>34 weeks to term</td><td>NIC-TERM2</td><td>846 mOsm/L</td><td>61 days at 2-8$^0$C that includes 4 days <25$^0$C</td></tr>
</table>
Lipid emulsion - SMOFlipid (Compounded and supplied by Fresenius-Kabi Pty Ltd)
<table>
<tr><td>Content</td><td>45mL syringe (for ≤1 Kg)</td><td>50mL syringe (for ≤1 Kg)</td><td>151mL bag (for >1 Kg)</td></tr>
<tr><td>SMOFlipid</td><td>32.5 mL</td><td>36 mL</td><td>109 mL</td></tr>
<tr><td>Soluvit N</td><td>2.5 mL</td><td>2.8 mL</td><td>8.4 mL</td></tr>
<tr><td>Vitalipid N infant</td><td>10 mL</td><td>11.2 mL</td><td>33.5 mL</td></tr>
<tr><td>FK Code</td><td>FKS045V</td><td>FKS045V</td><td>FKS045V</td></tr>
<tr><td>Stability</td><td>13 days at 2$^0$-8$^0$C</td><td>13 days at 2$^0$-8$^0$C</td><td>13 days at 2$^0$-8$^0$C</td></tr>
</table>
Glucose solutions (Compounded and supplied by Baxter Healthcare Pty Ltd)
<table>
<tr><td>Solution name</td><td>Osmolality</td><td>Shelf life</td></tr>
<tr><td>5% glucose</td><td>278 mOsm/L</td><td>90 days in room temperature</td></tr>
<tr><td>2.5% glucose – 50 mL</td><td>139 mOsm/L</td><td>No stability data available.</td></tr>
<tr><td>2.5% glucose in 0.225% sodium chloride – 50 mL</td><td>216 mOsm/L</td><td>90 days in room temperature</td></tr>
<tr><td>2.5% glucose in 0.45% sodium chloride – 50 mL</td><td>294 mOsm/L</td><td>90 days in room temperature</td></tr>
</table></td></tr>
<tr><td>Compatibility[22,23]</td><td>NOTE:<br>1. This list is accurate at the time of publication. For the most up to date information – please consult the hospital pharmacist for appropriate resource.<br>2. If there is no information concerning the compatibility of the medication with PN, it is recommended to be administered separately from the PN, but some clinical decisions are at the discretion of the treating team.<br>Y-site compatibility with aminoacid-glucose solution: Amikacin, aminophylline, amoxicillin, ampicillin, ampicillin/sulbactam, atracurium, aztreonam, bumetanide, buprenorphine, calcium gluconate, cefazolin, cefepime, cefotaxime, cefoxitin, ceftazidime, ceftizoxime, ceftriaxone, cefuroxime, clindamycin, clonazepam, dexamethasone, digoxin, dobutamine, dopamine, doxycycline, enalaprilat, epinephrine, erythromycin, fentanyl, fluconazole, gentamicin, heparin, hydrocortisone sodium phosphate and</td></tr>
</table>

| | |
|---|---|
| | succinate, imipenem-cilastatin, insulin, isoproterenol, leucovorin calcium, levetiracetam, lidocaine, linezolid, lorazepam, magnesium sulfate, methylprednisolone, metronidazole, milrinone, morphine sulfate, multivitamins, nitroglycerin, norepinephrine, octreotide acetate, ondansetron, penicillin G, pentobarbital, phenobarbital 20 mg/mL*, piperacillin sodium, piperacillin-tazobactam, potassium chloride, propofol, ranitidine, sodium nitroprusside, tacrolimus, ticarcillin disodium, ticarcillin disodium-clavulanate potassium, tobramycin sulfate, trimethoprim-sulfamethoxazole, urokinase, vancomycin, vecuronium, zidovudine.<br>***Phenobarbital at concentration of 64 mg/mL is incompatible.**<br>**Y site compatibility with lipid emulsion containing PN:** Amikacin, aminophylline, amoxicillin, ampicillin, ampicillin/sulbactam, aztreonam, bumetanide, buprenorphine, calcium gluconate, cefazolin, cefotaxime, cefoxitin, ceftazidime, ceftizoxime, ceftriaxone, cefuroxime, clindamycin phosphate, dexamethasone sodium phosphate, digoxin, dobutamine, enalaprilat, erythromycin lactobionate, fentanyl, fluconazole, gentamicin, hydrocortisone sodium phosphate and succinate, imipenem-cilastatin, insulin, isoproterenol, leucovorin calcium, levetiracetam, lidocaine, magnesium sulfate, meropenem, methylprednisolone sodium succinate, metronidazole, milrinone, morphine sulfate at 1mg/mL, nitroglycerin, norepinephrine, octreotide acetate, ofloxacin, oxacillin sodium, penicillin G potassium, piperacillin sodium, piperacillin-tazobactam, potassium chloride, ranitidine, sodium nitroprusside, tacrolimus, ticarcillin disodium, ticarcillin disodium-clavulanate potassium, trimethoprim-sulfamethoxazole, vancomycin, zidovudine. |
| **Incompatibility** | **NOTE:**<br>1. This list is accurate at the time of publication. For the most up to date information – please consult the hospital pharmacist for appropriate resource.<br>2. If there is no information concerning the compatibility of the medication with PN, it is recommended to be administered separately from the PN, but some clinical decisions are at the discretion of the treating team.<br>**Y-site with aminoacid-glucose solution:** aciclovir, amphotericin B, cefazolin, fluorouracil, furosemide, ganciclovir, immunoglobulin, methotrexate, midazolam, phenytoin, potassium phosphate, sodium bicarbonate, sodium phosphate.<br>**Y-site with lipid emulsion containing PN:** aciclovir, amphotericin B, cefazolin, fluorouracil, furosemide, ganciclovir, immunoglobulin, methotrexate, midazolam, phenytoin, potassium phosphate, sodium bicarbonate, sodium phosphate, tobramycin. |
| **Administration** | • All PN solutions are to be administered as continuous intravenous infusion over 24 hours.<br>• All PN solutions may be administered with accurate flow control.<br>• Infusion system should be under regular visual inspection.<br>• Peripheral infusions should be checked frequently for signs of extravasation or sepsis.<br>• The pump should have free flow prevention if opened during use, and have lockable settings<br>• PN solutions must be administered through a terminal filter: Lipid emulsions through a 1.2-1.5 µm filter; AA/glucose bags through a 0.22 µm filter.<br>• PN solutions should be protected against light in order to prevent generation of oxidants.<br>• Cycling PN: Administration may be reduced at the discretion of clinician after careful consideration of balance between potential benefit and risk of hypoglycaemia. In such cases, careful fluid management and blood glucose monitoring is needed. |
| **Monitoring** | • Azotaemia (High blood urea nitrogen), hyperglycaemia, metabolic acidosis, hypertriglyceridemia and conjugated hyperbilirubinemia are frequently encountered on PN. Periodic measurements of the following biochemical parameters are suggested during PN therapy.<br>• Blood urea nitrogen (BUN): Most data originate from infants ≥24+0 weeks. Six studies reported BUN levels. The criteria for abnormal BUN in studies varied from >10 mmol/L to 21.4 mmol/L. Given the data supporting the importance of early AA administration in preterm infants, limiting AA intake based on serum BUN alone is not warranted. BUN levels up to 14.3 mmol/L may be considered acceptable in VLBW infants on PN provided there are no other parameters to suggest protein intolerance (eg hyperammonaemia >122 µmol/L).[7] |

- Hyperglycaemia: Mild hyperglycaemia (>8.3 mmol/L) is not uncommon. If blood glucose >10 mmol/L (moderate hyperglycaemia),[10,11] further management to control hyperglycaemia needs to be considered including reducing glucose infusion rate, glucose concentration, or insulin infusion.
- Cholestasis: Defined as serum level of direct bilirubin > 20% of total serum bilirubin or serum level of direct bilirubin > 34 mmol/L (mg/dL x 17.10).[12]
- Hypoalbuminemia: Defined as serum albumin <18 g/L in preterm and <25 g/L in term neonates.[13]
- Hypertriglyceridemia (HT) (Plasma triglyceride >3.0 mmol/L): ESPGHAN 2018 Guidelines recommend monitoring of triglycerides in preterm and term infants.[9] 2015 Consensus survey revealed 62% of respondents monitor plasma triglyceride levels either routinely or in specific circumstances.[14] A retrospective study in an Australian NICU showed HT incidence of 32.5% in 23-25 weeks and 16.1% in 26-28 weeks. Severe HT (>4.5 mmol/L) was noted in 10% in 23-25 weeks and 4.5% in 26-28 weeks. There was no significant association of HT with either mortality or severe retinopathy of prematurity in multivariate analysis.[15]
    - Suggested routine PN biochemistry orders

| Test | First 3-7 days | Thereafter |
|---|---|---|
| Electrolytes, BUN, Bicarbonate ($HCO_3$), Creatinine | Daily or as needed | Once or twice a week |
| Calcium, Phosphorus, Magnesium, albumin | D2,5 and 7 | Once a week |
| Triglyceride | 24 hours after each increase | Once a week or when sick |
| Blood glucose | 4-6 hourly | Once or twice a day |
| Liver function test including alkaline phosphatase | As needed | Once weekly or fortnightly |

**Adverse Reactions**

Commonly encountered PN related complications:
- Azotaemia (High blood urea nitrogen (BUN))
- Hyperglycaemia
- Metabolic acidosis
- Hypertriglyceridemia
- Conjugated hyperbilirubinemia
- Line related extravasation injuries
- Blood stream infections

**Stability**

Refer to presentation section.

**Storage**

As per the manufacturer's instructions (Refer to presentation section).

**Evidence**

**Overview**

The Australasian Neonatal Parenteral Nutrition (ANPN) consensus group was established in 2010, developing its first standardized AA/glucose and lipid emulsions in 2012. These formulations have been continually reviewed and refined through two subsequent consensus updates in 2017 and 2022. Within the extremely preterm population, infants born between 22 and 23 weeks form a unique niche that has historically lacked a precise descriptive term. To differentiate this group, recent publications have introduced the term "nano-preterm" for infants born at $22^{+0}$ to $23^{+6}$ weeks and/or weighing less than 600g at birth.[1,2] We adapted these criteria to define the nano-preterm population for our parenteral nutrition consensus. Using this definition, our consensus aims to standardize early parenteral nutritional support for the nano-preterm population during their first few days of life—a critical window when excessive fluid loss, hyperglycaemia, and azotaemia are highly prevalent. After this critical period, clinicians should transition these infants to the standard consensus preterm PN formulations that have been successfully utilized in our NICUs for years for infants born at 24 weeks' gestation and older.

Australasian Neonatal Parenteral Nutrition (ANPN) consensus group was established in 2010 and several standard AA/glucose and lipid emulsions were developed in 2012. Since then, 2 subsequent consensus updates occurred in 2017 and 2022 and formulations have been reviewed and updated since then.[6,16] The updated formulations presented in this document reflect the outcomes of the consensus meeting convened in March–April 2026.

**ANPN consensus March-April 2026**

- Existing consensus formulations have been reviewed and validated for continued use.
- Recognized the critical need to develop targeted formulations for the growing population of infants born at 22 0/7 to 23 6/7 weeks' gestation or weighing <600g, specifically designed to mitigate their highest-risk early complications: extreme fluid loss, hyperglycaemia, and azotaemia.
- Designed 2 new formulations to provide optimal nutrition while explicitly addressing the unique fluid and metabolic risks of this population: These are named NANO-STARTER and NANO-STANDARD.
- NANO-STARTER formulation contains less AA (25g/L) and glucose content (5% glucose) in comparison to the existing STARTER formulation (37.5% AA and 10% glucose).
    - NANO-STARTER provides 1.5 g/kg/day of AA at 60 mL/kg/day on DAY 1 of life (In contrast to other preterm infants aiming for 2 g/kg/day at 60 mL/kg/day)
    - NANO-STARTER contains 5% glucose in comparison to other preterm formulations that contain 10% glucose.
- NANO-STANDARD formulation contains less AA (26g/L) and glucose (5% glucose) content in comparison to the existing STANDARD formulation (30g/L of AA and 10% glucose).
- NANO-STANDARD provides 3.5 g/kg/day of AA at 135 mL/kg/day (In contrast to STANDARD preterm formulation providing 4 g/kg/day at 135 mL/kg/day)
- With increasing postnatal age, it is at the clinicians' discretion to change from one formulation to another (example, NANO-STANDARD to STANDARD preterm).

**Fluids**

- NANO infants: These infants typically need 100-200 mL/kg/day of fluids in the first few days of life. The NANO consensus formulations are designed to provide adequate nutrients at 150 mL/kg/DAY. This includes 135 mL/kg/day of AA/Dextrose formulation and 3 g/kg/day of lipid emulsion (which is equivalent to 18 mL/kg/DAY, of which 15 mL/kg/day is water). Remaining fluid can be given as glucose solution (5% glucose, 2.5% glucose or other strengths of glucose based on blood glucose levels).
- Other preterm and term infants: The current standard consensus formulations provide recommended nutrient intakes in a total fluid intake of 150 mL/kg/day. This includes 135 mL/kg/day of AA/Dextrose formulation and 15 mL/kg/day water in the 20% lipid emulsion.
- For those infants on restricted fluid regimen, or unwell babies requiring infusions of inotropes and opioid analgesics, concentrated PN formulations (Starter-concentrated and concentrated preterm) can be used.

**Energy**

- In clinical practice, energy content is generally accepted as 4 kcal per g of carbohydrate and protein and 9 kcal per g of lipid.[17] For our consensus formulations, we adopted the recommendations provided by the compounding facilities – 4 kcal/g of protein, 3.8 kcal/g of glucose, 9 kcal/g of lipid.

  The current consensus formulations provide the following:

    - NANO-STARTER PN at 60 mL/kg/day with 1 g/kg/day of lipid: 26.4 kcal/kg/day.
    - NANO-STARTER PN at 60 mL/kg/day with 2 g/kg/day of lipid: 35.4 kcal/kg/day.
    - Starter PN at 60 mL/kg/day with 1 g/kg/day of lipid: 42 kcal/kg/day.
    - Starter PN at 60 mL/kg/day with 2 g/kg/day of lipid: 51 kcal/kg/day.
    - NANO- Standard preterm PN at 135 mL/kg/day with 3 g/kg/day of lipid: 66.7 kcal/kg/day.
    - Standard preterm PN at 135 mL/kg/day with 3 g/kg/day of lipid: 97 kcal/kg/day.
    - 34 wk- term PN at 135 mL/kg/day with 3 g/kg/day of lipid: 93 kcal/kg/day.

**Protein-energy Ratio (PER)**

- ESPGHAN Recommends 30 to 40 Kcal/g of protein or 2.5-3.3 g of protein/100 kcal.[5] NICE recommends 20-30 non-nitrogen calories/g of protein.[18] However, optimal glucose and lipid intakes that maximize protein accretion and growth in preterm infants have not been determined at various parenteral amino acid intakes.[5] It is also unclear whether these recommendations apply to NANO infants. Taking into consideration of potential intolerance to high protein and glucose intakes in NANO infants, consensus was to administer lower AA and glucose. This resulted in 19 kcal/g of protein in NANO-STANDARD formulation. For other preterm infants, current standard preterm and PN at 135 mL/kg/day and lipid emulsion at 3 g/kg/day provides 24 kcal/g of protein.

**Amino acids (AA)**

• The recommendations by ESPGHAN, ASPEN and NICE are below:

| Parenteral protein intake (g/kg/DAY) | | | | |
|---|---|---|---|---|
| Network | Preterm | | Term | |
| | Initial | Goal | Initial | Goal |
| ESPGHAN | At least 1.5 | 2.5-3.5 | At least 1.5 | No higher than 3 |
| ASPEN | ≤3 | 3-3.5 | 2.5-3.0 | 2.5-3.0 |
| NICE | 1.5-2.0 | 3-4 | 1-2 | 2.5-3.0 |

NANO infants: Due to azotaemia, consensus NANO formulations are designed to provide 1.5 g/kg/Day of AA on day 1 and 3.5 g/kg/day during stable phase.

The Other starter, standard preterm and term formylations are designed to provide AA per the recommendations in the table

**Carbohydrates**

NANO formulations contain glucose 5% and other standard formulations contain 10% glucose.

**Lipids**

• The current Consensus is to commence Intravenous Lipid Emulsion (IVLE) on day 1 of PN administration.

• The current consensus is to commence at 1-2 g/kg/day and increase by 1 g/kg each day to 3 g/kg/day.

• The current consensus lipid formulation is SMOF lipid (Soy Oil, MCT Oil, Olive Oil, Fish Oil Mixture).

• The consensus IVLE formulations are designed to deliver:

o 1 g/kg/day at 6 ml/kg/day

o 2 g/kg/day at 12 ml/kg/day

o 3 g/kg/day at 18 ml/kg/day

• The contents of the consensus IVLE formulations are listed in Appendix 2.

**Sodium (Na)**

- No additional Na is added to starter formulations, however phosphate in the formulations is an organic sodium glycerophosphate organic phosphorus (sodium glycerophosphate). This contains 2 mmol sodium per 1 mmol of Phosphorus.
- Standard preterm formulations provide 5.4 mmol/kg/DAY of Na at 135 mL/kg/day.
- Standard 34wk-term formulation provides 3.4 mmol/kg/day of Na at 135 mL/kg/day.

**Potassium (K)**

- Starter formulation at 60 mL/kg/day: 0 mmol/kg/day
- Standard preterm formulation at 135 mL/kg/day: 3 mmol/kg/day
- 34 week-Term formulation at 135 mL/kg/day: 2.7 mmol/kg/day

**Acetate**

- Starter formulation at 60 mL/kg/day: 0 mmol/kg/day
- Standard preterm formulation at 135 mL/kg/day: 2 mmol/kg/day
- 34 wk-Term formulation at 135 mL/kg/day: 1.1 mmol/kg/day.

**Calcium (Ca), phosphorus (P)**

• The current consensus formulations provide the following Calcium and Phosphorus intakes:

| PN formulation | Rate | Ca, mmol/kg/DAY | P, mmol/kg/DAY | Ca:P ratio |
|---|---|---|---|---|
| Starter | 60 mL/kg/day | 0.8 | 1.0 | 0.8:1.0 |
| Standard preterm | 135 mL/kg/day | 2.7 | 2.7 | 1:1 |
| 34wk-Term | 135 mL/kg/day | 1.2 | 1.2 | 1:1 |

**Magnesium (Mg)**

The consensus formulations provide 0.2 mmol/kg/day of Magnesium.

**Trace Elements (TE)**

The current consensus is to use the new Baxter trace element formula as the preferred Trace Elements formula and add extra Zinc and Selenium to optimise intakes. (Refer to Appendices 1, 3 and 4).

**Heparin**

•The consensus AA/Dextrose formulations have heparin 0.5 IU/mL of heparin.

**Physicochemical stability**

• Physicochemical stability of the latest AA/dextrose formulations have been tested by Baxter Pharmaceuticals and confirmed to be stable for up to 61 days at 2-80C and 5 days at below 250C.

**Hanging time**

Based on established clinical practice within our NICUs and supported by majority consensus, the standard hang time for both parenteral nutrition (PN) solutions and lipid emulsions is 48 hours.

**Route of administration**

Consensus: PN formulations with osmolality below 1000 mOsm/L can be administered peripherally for short term use provided that close monitoring of the IV site for any extravasation/phlebitis is followed.[19,20]

| | |
|---|---|
| | In view of the dearth of evidence, the consensus group agreed to continue the peripheral PN formulation in case of concerns regarding the amount of calcium infused through peripheral veins.<br><br>**Late preterm (34+0 to 36+6 weeks) and term neonates**<br><br>The current consensus: PN is widely used in Australian facilities in late preterm and term neonates who are not enterally fed. The consensus group followed the human milk approach to develop the PN formulations for this group and nutrient intake estimates are based on the average composition and intake of human milk.[21]<br><br>**PN during transition to enteral feeds**<br><br>Consensus group acknowledged the inadequate nutrients during enteral feed increase and weaning of PN. Consensus group recommends switching over from standard formulation to concentrated formulations once enteral feed volumes reach 50-60 mL/kg/day.<br><br>**Cessation of PN**<br><br>• Amino acid/Dextrose infusion: There is no clear evidence to guide the practice. The risk of late onset sepsis with intravenous access and the cost of PN are to be considered. The 2015 consensus survey revealed that majority of the NICUs in ANZ cease AA/Dextrose formulation once the infant tolerates 120-140 ml/kg/day of enteral feeds.[14]<br>• Lipids: Mature human milk contains 3.5 g of fat per 100 mL. 2015 consensus survey reported majority of NICUs cease IV lipids once the infant tolerates 100 - 120 mL/kg/day of enteral feeds.[14]<br><br>**PN in non-tertiary neonatal facilities**<br><br>• Many non-tertiary nurseries manage moderate to late preterm and growth restricted term neonates often requiring partial PN. No clearcut guidelines can be drawn from the literature for this setting.<br><br>• The benefits of PN in this group need to be balanced against the potential risks of therapy, skill mix and the resource availability.<br><br>• Short term PN via peripheral cannula can be given for these infants if enteral feeding cannot be established by day 3-5 of life. |
| **References** | 1. Shukla VV, Souder JP, Imbrock G, Hu M, Rahman AKMF, Travers CP, et al. Hospital and Neurodevelopmental Outcomes in Nano-Preterm Infants Receiving Invasive vs Noninvasive Ventilation at Birth. JAMA Network Open. 2022;5(8):e2229105-e.<br>2. Scarboro SD, Harper CA, 3rd, Karsaliya G, Ghoraba H, Moshfeghi DM, Al-Khersan H, et al. The Incidence and Timing of Treatment-Requiring Retinopathy of Prematurity in Nanopremature and Micropremature Infants in the United States: A National Multicenter Retrospective Cohort Study. Ophthalmol Retina. 2024;8(3):279-87.<br>3. Hamdan M, Puckett Y. Total Parenteral Nutrition. [Updated 2023 Jul 4]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2026 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK559036/.<br>4. Fivez T, Kerklaan D, Mesotten D, Verbruggen S, Wouters PJ, Vanhorebeek I, et al. Early versus Late Parenteral Nutrition in Critically Ill Children. N Engl J Med. 2016;374(12):1111-22.<br>5. van Goudoever JB, Carnielli V, Darmaun D, de Pipaon MS, Braegger C, Bronsky J, et al. ESPGHAN/ESPEN/ESPR/CSPEN guidelines on pediatric parenteral nutrition: Amino acids. Clinical Nutrition. 2018;37(6):2315-23.<br>6. Bolisetty S, Pharande P, Nirthanakumaran L, Do TQ-P, Osborn D, Smyth J, et al. Improved nutrient intake following implementation of the consensus standardised parenteral nutrition formulations in preterm neonates–a before-after intervention study. BMC pediatrics. 2014;14(1):1-7. |

7. Osborn DA, Schindler T, Jones LJ, Sinn JK, Bolisetty S. Higher versus lower amino acid intake in parenteral nutrition for newborn infants. Cochrane Database of Systematic Reviews. 2018(3).
8. Mesotten D, Joosten K, van Kempen A, Verbruggen S, Braegger C, Bronsky J, et al. ESPGHAN/ESPEN/ESPR/CSPEN guidelines on pediatric parenteral nutrition: carbohydrates. Clinical Nutrition. 2018;37(6):2337-43.
9. Lapillonne A, Mis NF, Goulet O, van den Akker CH, Wu J, Koletzko B, et al. ESPGHAN/ESPEN/ESPR/CSPEN guidelines on pediatric parenteral nutrition: lipids. Clinical Nutrition. 2018;37(6):2324-36.
10. Bottino M, Cowett RM, Sinclair JC. Interventions for treatment of neonatal hyperglycemia in very low birth weight infants. Cochrane database of systematic reviews. 2009(1).
11. Sinclair JC, Bottino M, Cowett RM. Interventions for prevention of neonatal hyperglycemia in very low birth weight infants. Cochrane Database of Systematic Reviews. 2011(10).
12. Burke B, Robbins J, Hobbs C. American Academy of Pediatrics Subcommittee on Hyperbilirubinemia Management of hyperbilirubinemia in the newborn infant 35 or more weeks of gestation. Pediatrics. 2004;114(1):297-316.
13. Zlotkin S, Casselman C. Percentile estimates of reference values for total protein and albumin in sera of premature infants (less than 37 weeks of gestation). Clinical Chemistry. 1987;33(3):411-3.
14. Tan A, Osborn D, Sinn J, Schindler T, Lui K, Bolisetty S. Neonatal Parenteral Nutrition Consensus Group Survey. Neonatal Parenteral Nutrition Consensus Group 2015 Meeting, 27 February 2015, Sydney.
15. Sinclair R, Schindler T, Lui K, Bolisetty S. Hypertriglyceridaemia in extremely preterm infants receiving parenteral lipid emulsions. BMC pediatrics. 2018;18(1):1-7.
16. Bolisetty S, Osborn D, Schindler T, Sinn J, Deshpande G, Wong CS, et al. Standardised neonatal parenteral nutrition formulations–Australasian neonatal parenteral nutrition consensus update 2017. BMC pediatrics. 2020;20(1):59.
17. Joosten K, Embleton N, Yan W, Senterre T, Braegger C, Bronsky J, et al. ESPGHAN/ESPEN/ESPR/CSPEN guidelines on pediatric parenteral nutrition: Energy. Clinical Nutrition. 2018;37(6):2309-14.
18. NICE guideline. Neonatal parenteral nutrition. www.nice.org.uk/guidance/ng154. Published: 26 February 2020.
19. Dugan S, Le J, Jew RK. Maximum tolerated osmolarity for peripheral administration of parenteral nutrition in pediatric patients. Journal of Parenteral and Enteral Nutrition. 2014;38(7):847-51.
20. Metjian T, Seri I, Jew R, editors. Osmolarity of peripherally administered hyperalimentation and the incidence of phlebitis in the neonatal intensive care unit. 35th Annual ASHP Clinical Meeting; 2000.
21. Koletzko B, Poindexter B, Uauy R, editors. Nutritional care of preterm infants. By S Karger; 2014. P 55.
22. MerativeTM Micromedex® Complete IV Compatibility (electronic version). Merative, Ann Arbor, Michigan, USA. Available at: https://www.micromedexsolutions.com/ (cited: July/02/2026).
23. Baxter Medical information. March 2019. Co-infusion (Y site) of drugs with TPN. Adapted from Handbook of Drug-Nutrient interactions. Accessed July/02/2026.


| VERSION/NUMBER | DATE |
|---|---|
| **Original 1.0** | **2/07/2026** |
| **REVIEW (3 years)** | **2/07/2029** |

**Authors Contribution of the current version**

| | |
|---|---|
| Author/s | Srinivas Bolisetty, Pramod Pharande, Girish Deshpande, Louise Murphy, on behalf of Australasian Neonatal Parenteral Nutrition consensus group |
| ANMF pharmacists | Kerrie Knox, Gloria Yoo, Mohammad Irfan Azeem, Thao Tran, Simarjit Kaur, Cindy Chen |
| ANMF contributors | Nilkant Phad, Bhavesh Mehta, Jutta van den Boom, Amber Seigel, Rebecca Barzegar, Celia Cunha da Silva, Benjamin Emerson-Parker, Rebecca O'Grady, Michelle Jenkins, Renae Gengaroli, Bryony Malloy, Dianne Lee, Marvin Dangui, Joanne Cross |
| Final editing | Srinivas Bolisetty |

## Appendix 1 - Preterm neonates <34 weeks - 2026 consensus formulations and ESPGHAN 2018 recommendations

| Unit/kg/day | ESPGHAN 2018 Day 1 | ESPGHAN 2018 Growing | Australasian 2022 consensus: 135 mL/kg/day of standard preterm and 3 g/kg/day of lipid formulation |
|---|---|---|---|
| Energy, Kcal<br>NANO infants | 45-55 | 90-120 | 97<br>66.7 |
| Protein, g<br>NANO infants<br>Other preterm | <br><br>≥1.5 | <br><br>≤3.5 | <br>1.5 on day 1 and 3.5 growing<br>4 |
| Carbohydrate, g | 5.8-11.5 | 5.8-17.3 | 13.5 |
| Fat, g | 0-1 | 3-4 | 3 |
| Na, mmol | 0-2 | 3-5 | 5.4 |
| K, mmol | 0-3 | 2-5 | 3 |
| Cl, mmol | 0-3 | 3-5 | 1.7 |
| Acetate, mmol | | | 2.0 |
| Ca, mmol | 0.8-2.0 | 1.6-3.5 | 2.7 |
| P, mmol | 1.0-2.0 | 1.6-3.5 | 2.7 |
| Ca:P ratio | 0.8:1.0 | 1:1 | 1:1 |
| Mg, mmol | 0.2 | 0.2 | 0.2 |
| Iron, µg | 0 | 50-200 | - |
| Zn, µg[$] | 400-500 | 400-500 | 441 |
| Cu, µg[$] | 40 | 40 | 27 |
| Se, µg[$] | 7 | 7 | 6 |
| I, µg[$] | 1-10 | 1-10 | 1.4 |
| Cr, µg | 0 | 0 | - |
| Mo, µg | 1<br>Long term PN | 1<br>Long term PN | <br>- |
| Mn, µg | <1<br>Long term PN | <1<br>Long term PN | - |
| Vit A, IU | 700-1500 | 700-1500 | 920 |
| Vit D, IU | 80-400 | 80-400 | 160 |
| Vit E, IU | 2.8-3.5 | 2.8-3.5 | 2.8 |
| Vit K, µg | 10 | 10 | 80[#] |
| Thiamine, µg | 350-500 | 350-500 | 310 |
| Riboflavin, µg | 150-200 | 150-200 | 360[#] |
| Niacin, mg | 4.0-6.8 | 4.0-6.8 | 4 |
| Pyridoxine, µg | 150-200 | 150-200 | 400[#] |
| Folate, µg | 56 | 56 | 40[*] |
| Vit B12, µg | 0.3 | 0.3 | 0.5[#] |
| Pantothenate, mg | 2.5 | 2.5 | 1.5* |
| Biotin, µg | 5-8 | 5-8 | 6 |
| Vit C, mg | 15-25 | 15-25 | 10[*] |
| Acetate, mmol | | | 3.51 |

[*]Below Recommended dietary intake (RDI), [#]Above RDI. [$]TE intakes are achieved by adding 1 mL Baxter paediatric TE formula with additional 1270 µg Zn and 15 µg Se in 1 Litre.

## Appendix 2 - Term neonates - 2026 consensus formulations and ESPGHAN 2018 recommendations

| Nutrient, Unit/kg/day | ESPGHAN 2018 | | | Australasian 2022 consensus: 135 mL/kg/day of 34 week-Term PN and 3 g/kg/day of lipid formulation |
|---|---|---|---|---|
| | Day 0 | ≤30 days | 1-12 months | |
| Energy, Kcal | | 90-100 | 90-100 | 93 |
| Protein, g | ≥1.5 | ≤3.0 | 1.0-2.5 | 3.1 |
| Carbohydrate, g | 3.6-7.2 | 3.6-17.3 | 8.6-14 | 16.2 |
| Fat, g | | 3.0-4.0 | 3.0-4.0 | 3 |
| Sodium, mmol | 0-3.0 (0-7days) | 2.0-5.0 | 2.0-3.0 | 3.4 |
| Potassium, mmol | 0-2.0 (0-7days) | 1.0-3.0 | 1.0-3.0 | 2.7 |
| Chloride, mmol | 0-5.0 (0-7days) | | | 3.1 |
| Calcium, mmol | 0.8 | 0.8 | | 1.2 |
| Phosphate, mmol | 0.5 | 0.5 | | 1.2 |
| Magnesium, mmol | 0.2 | 0.2 | 0.2-0.3 | 0.2 |
| Iron, µmol | 0 | 0(<3 weeks) | 1.8-3.6 | 0 |
| Zn, µg | 250 | 250 | 100 (>3 months) | 257 |
| Cu, µg | 20 | 20 | 20 | 20.3 |
| Se, µg | 2-3 | 2-3 | 2-3 | 3.0 |
| I, µg | ≥1 | ≥1 | ≥1 | 1.0 |
| Cr, µg | 0 | 0 | 0 | |
| Mo, µg | 0.25 Long term PN | 0.25 Long term PN | 0.25 Long term PN | 0 |
| Mn, µg | <1 Long term PN | <1 Long term PN | <1 Long term PN | 0 |
| | | | | |
| Vit A, IU | 462-989 | 462-989 | 462-989 | 920 |
| Vit D, IU | 40-150 | 40-150 | 40-150 | 160 |
| Vit E, IU | 2.8-3.5 | 2.8-3.5 | 2.8-3.5 | 2.8 |
| Vit K, µg | 10 | 10 | 10 | 80[#] |
| Thiamine, µg | 350-500 | 350-500 | 350-500 | 310 |
| Riboflavin, µg | 150-200 | 150-200 | 150-200 | 360[#] |
| Niacin, mg | 4.0-6.8 | 4.0-6.8 | 4.0-6.8 | 4 |
| Pyridoxine, µg | 150-200 | 150-200 | 150-200 | 400[#] |
| Folate, µg | 56 | 56 | 56 | 40[*] |
| Vit B12, µg | 0.3 | 0.3 | 0.3 | 0.5[#] |
| Pantothenate, mg | 2.5 | 2.5 | 2.5 | 1.5* |
| Biotin, µg | 5-8 | 5-8 | 5-8 | 6 |
| Vit C, mg | 15-25 | 15-25 | 15-25 | 10[*] |

*Below Recommended dietary intake (RDI), [#]Above RDI. [$]TE intakes are achieved by adding 0.75 mL Baxter paediatric TE formula with additional 400 µg Zn in 1 Litre.

## Appendix 3. 2026 Consensus Amino acid - Glucose formulations

### NANO-STARTER PN

| | NANO-STARTER PN | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1000 mL | 40 mL/kg | 50 ml/kg | 60 ml/kg | 70 ml/kg | 80 ml/kg | 90 ml/kg | 100 ml/kg | 110 ml/kg |
| Amino acids, g | 25 | 1.0 | 1.3 | 1.5 | 1.8 | 2.0 | 2.3 | 2.5 | 2.8 |
| Glucose, g | 50 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 |
| Sodium, mmol | 34 | 1.4 | 1.7 | 2.0 | 2.4 | 2.7 | 3.1 | 3.4 | 3.7 |
| Potassium, mmol | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Calcium, mmol | 14 | 0.6 | 0.7 | 0.8 | 1.0 | 1.1 | 1.3 | 1.4 | 1.5 |
| Magnesium, mmol | 1.5 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 |
| Phosphate, mmol | 17 | 0.7 | 0.9 | 1.0 | 1.2 | 1.4 | 1.5 | 1.7 | 1.9 |
| Chloride, mmol | 4.8 | 0.2 | 0.2 | 0.3 | 0.3 | 0.4 | 0.4 | 0.5 | 0.5 |
| Acetate, mmol | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Zn, microg | 3250 | 130.0 | 162.5 | 195.0 | 227.5 | 260.0 | 292.5 | 325.0 | 357.5 |
| Selenium, ug | 30 | 1.2 | 1.5 | 1.8 | 2.1 | 2.4 | 2.7 | 3.0 | 3.3 |
| Iodine, ug | 10 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 |
| Copper, ug | 200 | 8.0 | 10.0 | 12.0 | 14.0 | 16.0 | 18.0 | 20.0 | 22.0 |
| Heparin, units | 500 | 20.0 | 25.0 | 30.0 | 35.0 | 40.0 | 45.0 | 50.0 | 55.0 |
| GIR, mg/kg/min | | 1.4 | 1.8 | 2.1 | 2.4 | 2.8 | 3.1 | 3.5 | 3.8 |
| Energy, kcal/kg/day | 290 | 11.6 | 14.5 | 17.4 | 20.3 | 23.2 | 26.1 | 29.0 | 31.9 |
| Osmolarity (mOsm/L) | 569 | | | | | | | | |
| Bag volume, mL | 500 | | | | | | | | |
| Solution pH | | | | | | | | | |

Alert - below minimal recommended amino acid if no enteral intake

Alert - above maximal starter amino acid intake

**Stability up to 61 days @ 2-8$^0$C that includes 4 days (96 hours) below 25$^0$C**

1g of AA = 4 kcal and 1g of glucose = 3.8 kcal (Estimates used by Baxter Healthcare Pty Ltd)

Numbers are rounded off to 1 decimel point where appropriate.

## Appendix 3. 2026 Consensus Amino acid - Glucose formulations

## NANO-STANDARD PN

| | NANO- STANDARD PN | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1000 ml | 40 mL/kg | 50 ml/kg | 60 ml/kg | 70 ml/kg | 80 ml/kg | 90 ml/kg | 100 ml/kg | 110 ml/kg | 120 ml/kg | 130 ml/kg | 135 ml/kg | 140 ml/kg | 150 ml/kg |
| **Amino acids, g** | 26 | 1.0 | 1.3 | 1.6 | 1.8 | 2.1 | 2.3 | 2.6 | 2.9 | 3.1 | 3.4 | 3.5 | 3.6 | 3.9 |
| **Glucose, g** | 50 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5 | 6.8 | 7.0 | 7.5 |
| **Sodium, mmol** | 40 | 1.6 | 2.0 | 2.4 | 2.8 | 3.2 | 3.6 | 4.0 | 4.4 | 4.8 | 5.2 | 5.4 | 5.6 | 6.0 |
| **Potassium, mmol** | 22 | 0.9 | 1.1 | 1.3 | 1.5 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.9 | 3.0 | 3.1 | 3.3 |
| **Calcium, mmol** | 20 | 0.8 | 1.0 | 1.2 | 1.4 | 1.6 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.7 | 2.8 | 3.0 |
| **Magnesium, mmol** | 1.5 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| **Phosphate, mmol** | 20 | 0.8 | 1.0 | 1.2 | 1.4 | 1.6 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.7 | 2.8 | 3.0 |
| **Chloride, mmol** | 11.8 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.1 | 1.2 | 1.3 | 1.4 | 1.5 | 1.6 | 1.7 | 1.8 |
| **Acetate, mmol** | 15.1 | 0.6 | 0.8 | 0.9 | 1.1 | 1.2 | 1.4 | 1.5 | 1.7 | 1.8 | 2.0 | 2.0 | 2.1 | 2.3 |
| **zinc, ug** | 3250 | 130.0 | 162.5 | 195.0 | 227.5 | 260.0 | 292.5 | 325.0 | 357.5 | 390.0 | 422.5 | 438.8 | 455.0 | 487.5 |
| **Selenium, ug** | 30 | 1.2 | 1.5 | 1.8 | 2.1 | 2.4 | 2.7 | 3.0 | 3.3 | 3.6 | 3.9 | 4.1 | 4.2 | 4.5 |
| **Iodine, ug** | 10 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.4 | 1.5 |
| **Copper, ug** | 200 | 8.0 | 10.0 | 12.0 | 14.0 | 16.0 | 18.0 | 20.0 | 22.0 | 24.0 | 26.0 | 27.0 | 28.0 | 30.0 |
| **Heparin, units** | 500 | 20.0 | 25.0 | 30.0 | 35.0 | 40.0 | 45.0 | 50.0 | 55.0 | 60.0 | 65.0 | 67.5 | 70.0 | 75.0 |
| **GIR, mg/kg/min** | | 1.4 | 1.8 | 2.1 | 2.4 | 2.8 | 3.1 | 3.5 | 3.8 | 4.2 | 4.5 | 4.7 | 4.9 | 5.2 |
| **Energy, kcal/kg/day** | 294 | 11.8 | 14.7 | 17.6 | 20.6 | 23.5 | 26.5 | 29.4 | 32.3 | 35.3 | 38.2 | 39.7 | 41.2 | 44.1 |
| **Osmolarity (mOsm/L)** | 648 | | | | | | | | | | | | | |
| **Bag volume, mL** | 500 | | | | | | | | | | | | | |
| **Solution pH** | | | | | | | | | | | | | | |

**Stability up to 61 days @ 2-8$^0$C that includes 4 days (96 hours) below 25$^0$C**

1g of AA = 4 kcal and 1g of glucose = 3.8 kcal (Estimates used by Baxter Healthcare Pty Ltd)

Numbers are rounded off to 1 decimel point where appropriate.

## Appendix 3. 2026 Consensus Amino acid - Glucose formulations

### STARTER PN

| | 1000 mL | 40 mL/kg | 50 ml/kg | 60 ml/kg | 70 ml/kg | 80 ml/kg | 90 ml/kg | 100 ml/kg | 110 ml/kg |
|---|---|---|---|---|---|---|---|---|---|
| **Amino acids, g** | 37.5 | 1.5 | 1.9 | 2.3 | 2.6 | 3.0 | 3.4 | 3.8 | 4.1 |
| **Glucose, g** | 100 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 | 11.0 |
| **Sodium, mmol** | 34 | 1.4 | 1.7 | 2.0 | 2.4 | 2.7 | 3.1 | 3.4 | 3.7 |
| **Potassium, mmol** | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Calcium, mmol** | 14 | 0.6 | 0.7 | 0.8 | 1.0 | 1.1 | 1.3 | 1.4 | 1.5 |
| **Magnesium, mmol** | 1.5 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 |
| **Phosphate, mmol** | 17 | 0.7 | 0.9 | 1.0 | 1.2 | 1.4 | 1.5 | 1.7 | 1.9 |
| **Chloride, mmol** | 7.1 | 0.3 | 0.4 | 0.4 | 0.5 | 0.6 | 0.6 | 0.7 | 0.8 |
| **Acetate, mmol** | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **Zn, microg** | 3250 | 130.0 | 162.5 | 195.0 | 227.5 | 260.0 | 292.5 | 325.0 | 357.5 |
| **Selenium, ug** | 30 | 1.2 | 1.5 | 1.8 | 2.1 | 2.4 | 2.7 | 3.0 | 3.3 |
| **Iodine, ug** | 10 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 |
| **Copper, ug** | 200 | 8.0 | 10.0 | 12.0 | 14.0 | 16.0 | 18.0 | 20.0 | 22.0 |
| **Heparin, units** | 500 | 20.0 | 25.0 | 30.0 | 35.0 | 40.0 | 45.0 | 50.0 | 55.0 |
| **GIR, mg/kg/min** | | 2.8 | 3.5 | 4.2 | 4.8 | 5.5 | 6.3 | 6.9 | 7.6 |
| **Energy, kcal/kg/day** | 530 | 21.2 | 26.5 | 31.8 | 37.1 | 42.4 | 47.7 | 53.0 | 58.3 |
| **Osmolarity (mOsm/L)** | 944 | | | | | | | | |
| **Bag volume, mL** | 500 | | | | | | | | |
| **Solution pH** | 5.96 | | | | | | | | |

Alert - above maximal starter amino acid intake

**Stability up to 61 days @ 2-8$^0$C that includes 4 days (96 hours) below 25$^0$C**

**1g of AA = 4 kcal and 1g of glucose = 3.8 kcal (Estimates used by Baxter Healthcare Pty Ltd)**

Numbers are rounded off to 1 decimel point where appropriate.

## Appendix 3. 2026 Consensus Amino acid - Glucose formulations

### STARTER – Concentrated PN

| | STARTER - concentrated PN | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1000 mL | 40 mL/kg | 50 ml/kg | 60 ml/kg | 70 ml/kg | 80 ml/kg | 90 ml/kg | 100 ml/kg | 110 ml/kg |
| Amino acids, g | 50 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 |
| Glucose, g | 125 | 5.0 | 6.3 | 7.5 | 8.8 | 10.0 | 11.3 | 12.5 | 13.8 |
| Sodium, mmol | 50 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 |
| Potassium, mmol | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Calcium, mmol | 21 | 0.8 | 1.1 | 1.3 | 1.5 | 1.7 | 1.9 | 2.1 | 2.3 |
| Magnesium, mmol | 1.5 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 |
| Phosphate, mmol | 25 | 1.0 | 1.3 | 1.5 | 1.8 | 2.0 | 2.3 | 2.5 | 2.8 |
| Chloride, mmol | 9.5 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.0 |
| Acetate, mmol | 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Zn, microg | 4250 | 170.0 | 212.5 | 255.0 | 297.5 | 340.0 | 382.5 | 425.0 | 467.5 |
| Selenium, ug | 30 | 1.2 | 1.5 | 1.8 | 2.1 | 2.4 | 2.7 | 3.0 | 3.3 |
| Iodine, ug | 15 | 0.6 | 0.8 | 0.9 | 1.1 | 1.2 | 1.4 | 1.5 | 1.7 |
| Copper, ug | 300 | 12.0 | 15.0 | 18.0 | 21.0 | 24.0 | 27.0 | 30.0 | 33.0 |
| Heparin, units | 500 | 20.0 | 25.0 | 30.0 | 35.0 | 40.0 | 45.0 | 50.0 | 55.0 |
| GIR, mg/kg/min | | 3.5 | 4.4 | 5.2 | 6.1 | 6.9 | 7.8 | 8.7 | 9.5 |
| Energy, kcal/kg/day | 675 | 27.0 | 33.8 | 40.5 | 47.3 | 54.0 | 60.8 | 67.5 | 74.3 |
| Osmolarity (mOsm/L) | 1226 | | | | | | | | |
| Bag volume, mL | 500 | | | | | | | | |
| Solution pH | 5.99 | | | | | | | | |

Alert - above maximal starter amino acid intake

**Stability up to 61 days @ 2-8$^0$C that includes 4 days (96 hours) below 25$^0$C**

**1g of AA = 4 kcal and 1g of glucose = 3.8 kcal (Estimates used by Baxter Healthcare Pty Ltd)**

Numbers are rounded off to 1 decimel point where appropriate.

# Appendix 3. 2026 Consensus Amino acid - Glucose formulations

## STANDARD PRETERM PN

| | Standard Preterm PN | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1000 mL | 40 mL/kg | 50 ml/kg | 60 ml/kg | 70 ml/kg | 80 ml/kg | 90 ml/kg | 100 ml/kg | 110 ml/kg | 120 ml/kg | 130 ml/kg | 135 ml/kg | 140 mL/kg | 150 ml/kg |
| Amino acids, g | 30 | 1.2 | 1.5 | 1.8 | 2.1 | 2.4 | 2.7 | 3.0 | 3.3 | 3.6 | 3.9 | 4.1 | 4.2 | 4.5 |
| Glucose, g | 100 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 | 11.0 | 12.0 | 13.0 | 13.5 | 14.0 | 15.0 |
| Sodium, mmol | 40 | 1.6 | 2.0 | 2.4 | 2.8 | 3.2 | 3.6 | 4.0 | 4.4 | 4.8 | 5.2 | 5.4 | 5.6 | 6.0 |
| Potassium, mmol | 22 | 0.9 | 1.1 | 1.3 | 1.5 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.9 | 3.0 | 3.1 | 3.3 |
| Calcium, mmol | 20 | 0.8 | 1.0 | 1.2 | 1.4 | 1.6 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.7 | 2.8 | 3.0 |
| Magnesium, mmol | 1.5 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Phosphate, mmol | 20 | 0.8 | 1.0 | 1.2 | 1.4 | 1.6 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.7 | 2.8 | 3.0 |
| Chloride, mmol | 12.7 | 0.5 | 0.6 | 0.8 | 0.9 | 1.0 | 1.1 | 1.3 | 1.4 | 1.5 | 1.7 | 1.7 | 1.8 | 1.9 |
| Acetate, mmol | 15.1 | 0.6 | 0.8 | 0.9 | 1.1 | 1.2 | 1.4 | 1.5 | 1.7 | 1.8 | 2.0 | 2.0 | 2.1 | 2.3 |
| Zn, microg | 3267 | 130.7 | 163.4 | 196.0 | 228.7 | 261.4 | 294.0 | 326.7 | 359.4 | 392.0 | 424.7 | 441.0 | 457.4 | 490.1 |
| Selenium, ug | 30 | 1.2 | 1.5 | 1.8 | 2.1 | 2.4 | 2.7 | 3.0 | 3.3 | 3.6 | 3.9 | 4.1 | 4.2 | 4.5 |
| Iodine, ug | 10 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.4 | 1.5 |
| Copper, ug | 200 | 8.0 | 10.0 | 12.0 | 14.0 | 16.0 | 18.0 | 20.0 | 22.0 | 24.0 | 26.0 | 27.0 | 28.0 | 30.0 |
| Heparin, units | 500 | 20.0 | 25.0 | 30.0 | 35.0 | 40.0 | 45.0 | 50.0 | 55.0 | 60.0 | 65.0 | 67.5 | 70.0 | 75.0 |
| GIR, mg/kg/min | | 2.8 | 3.5 | 4.2 | 4.8 | 5.5 | 6.3 | 6.9 | 7.6 | 8.3 | 9.0 | 9.4 | 9.7 | 10.4 |
| Energy, Kcal/kg/day | 500 | 20.0 | 25.0 | 30.0 | 35.0 | 40.0 | 45.0 | 50.0 | 55.0 | 60.0 | 65.0 | 67.5 | 70.0 | 75.0 |
| Osmolarity (mOsm/L) | 957 | | | | | | | | | | | | | |
| Bag volume, mL | 750 | | | | | | | | | | | | | |
| Solution pH | 6.21 | | | | | | | | | | | | | |

Alert - above maximal recommended amino acid intake

**Stability up to 61 days @ 2-8$^{0}$C that includes 4 days (96 hours) below 25$^{0}$C**

1g of AA = 4 kcal and 1g of glucose = 3.8 kcal (Estimates used by Baxter Healthcare Pty Ltd)

Numbers are rounded off to 1 decimel point where appropriate.

## Appendix 3. 2026 Consensus Amino acid - Glucose formulations

### Concentrated PRETERM PN

| | Concentrated preterm PN | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1000 mL | 40 mL/kg | 50 ml/kg | 60 ml/kg | 70 ml/kg | 80 ml/kg | 90 ml/kg | 100 ml/kg | 110 ml/kg |
| Amino acids, g | 40 | 1.6 | 2.0 | 2.4 | 2.8 | 3.2 | 3.6 | 4.0 | 4.4 |
| Glucose, g | 125 | 5.0 | 6.3 | 7.5 | 8.8 | 10.0 | 11.3 | 12.5 | 13.8 |
| Sodium, mmol | 54 | 2.2 | 2.7 | 3.2 | 3.8 | 4.3 | 4.9 | 5.4 | 5.9 |
| Potassium, mmol | 35 | 1.4 | 1.8 | 2.1 | 2.5 | 2.8 | 3.2 | 3.5 | 3.9 |
| Calcium, mmol | 27 | 1.1 | 1.4 | 1.6 | 1.9 | 2.2 | 2.4 | 2.7 | 3.0 |
| Magnesium, mmol | 1.5 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 |
| Phosphate, mmol | 27 | 1.1 | 1.4 | 1.6 | 1.9 | 2.2 | 2.4 | 2.7 | 3.0 |
| Chloride, mmol | 16.6 | 0.7 | 0.8 | 1.0 | 1.2 | 1.3 | 1.5 | 1.7 | 1.8 |
| Acetate, mmol | 26 | 1.0 | 1.3 | 1.6 | 1.8 | 2.1 | 2.3 | 2.6 | 2.9 |
| Zn, microg | 4700 | 188.0 | 235.0 | 282.0 | 329.0 | 376.0 | 423.0 | 470.0 | 517.0 |
| Selenium, ug | 30 | 1.2 | 1.5 | 1.8 | 2.1 | 2.4 | 2.7 | 3.0 | 3.3 |
| Iodine, ug | 15 | 0.6 | 0.8 | 0.9 | 1.1 | 1.2 | 1.4 | 1.5 | 1.7 |
| Copper, ug | 300 | 12.0 | 15.0 | 18.0 | 21.0 | 24.0 | 27.0 | 30.0 | 33.0 |
| Heparin, units | 500 | 20.0 | 25.0 | 30.0 | 35.0 | 40.0 | 45.0 | 50.0 | 55.0 |
| GIR, mg/kg/min | | 3.5 | 4.4 | 5.2 | 6.1 | 6.9 | 7.8 | 8.7 | 9.5 |
| Energy, kcal/kg/day | 635 | 25.4 | 31.8 | 38.1 | 44.5 | 50.8 | 57.2 | 63.5 | 69.9 |
| Osmolarity (mOsm/L) | 1242 | | | | | | | | |
| Bag volume, mL | 750 | | | | | | | | |
| Solution pH | 6.17 | | | | | | | | |

Alert - above maximal recommended amino acid intake

**Stability up to 61 days @ 2-8$^0$C that includes 4 days (96 hours) below 25$^0$C**

1g of AA = 4 kcal and 1g of glucose = 3.8 kcal (Estimates used by Baxter Healthcare Pty Ltd)

Numbers are rounded off to 1 decimel point where appropriate.

# Appendix 3. 2026 Consensus Amino acid - Glucose formulations

## High sodium PRETERM PN

| | High sodium PRETERM | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1000 mL | 40 mL/kg | 50 ml/kg | 60 ml/kg | 70 ml/kg | 80 ml/kg | 90 ml/kg | 100 ml/kg | 110 ml/kg | 120 ml/kg | 130 ml/kg | 135 ml/kg | 140 ml/kg | 150 ml/kg |
| **Amino acids, g** | 30 | 1.2 | 1.5 | 1.8 | 2.1 | 2.4 | 2.7 | 3.0 | 3.3 | 3.6 | 3.9 | 4.1 | 4.2 | 4.5 |
| **Glucose, g** | 100 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 | 11.0 | 12.0 | 13.0 | 13.5 | 14.0 | 15.0 |
| **Sodium, mmol** | 60 | 2.4 | 3.0 | 3.6 | 4.2 | 4.8 | 5.4 | 6.0 | 6.6 | 7.2 | 7.8 | 8.1 | 8.4 | 9.0 |
| **Potassium, mmol** | 22 | 0.9 | 1.1 | 1.3 | 1.5 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.9 | 3.0 | 3.1 | 3.3 |
| **Calcium, mmol** | 20 | 0.8 | 1.0 | 1.2 | 1.4 | 1.6 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.7 | 2.8 | 3.0 |
| **Magnesium, mmol** | 1.5 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| **Phosphate, mmol** | 20 | 0.8 | 1.0 | 1.2 | 1.4 | 1.6 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.7 | 2.8 | 3.0 |
| **Chloride, mmol** | 21.7 | 0.9 | 1.1 | 1.3 | 1.5 | 1.7 | 2.0 | 2.2 | 2.4 | 2.6 | 2.8 | 2.9 | 3.0 | 3.3 |
| **Acetate, mmol** | 26 | 1.0 | 1.3 | 1.6 | 1.8 | 2.1 | 2.3 | 2.6 | 2.9 | 3.1 | 3.4 | 3.5 | 3.6 | 3.9 |
| **Zn, microg** | 3267 | 130.7 | 163.4 | 196.0 | 228.7 | 261.4 | 294.0 | 326.7 | 359.4 | 392.0 | 424.7 | 441.0 | 457.4 | 490.1 |
| **Selenium, ug** | 30 | 1.2 | 1.5 | 1.8 | 2.1 | 2.4 | 2.7 | 3.0 | 3.3 | 3.6 | 3.9 | 4.1 | 4.2 | 4.5 |
| **Iodine, ug** | 10 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.4 | 1.5 |
| **Copper, ug** | 200 | 8.0 | 10.0 | 12.0 | 14.0 | 16.0 | 18.0 | 20.0 | 22.0 | 24.0 | 26.0 | 27.0 | 28.0 | 30.0 |
| **Heparin, units** | 500 | 20.0 | 25.0 | 30.0 | 35.0 | 40.0 | 45.0 | 50.0 | 55.0 | 60.0 | 65.0 | 67.5 | 70.0 | 75.0 |
| **GIR, mg/kg/min** | | 2.8 | 3.5 | 4.2 | 4.8 | 5.5 | 6.3 | 6.9 | 7.6 | 8.3 | 9.0 | 9.4 | 9.7 | 10.4 |
| **Energy, kcal/kg/day** | 500 | 20.0 | 25.0 | 30.0 | 35.0 | 40.0 | 45.0 | 50.0 | 55.0 | 60.0 | 65.0 | 67.5 | 70.0 | 75.0 |
| **Osmolarity (mOsm/L)** | 997 | | | | | | | | | | | | | |
| **Bag volume, mL** | 750 | | | | | | | | | | | | | |
| **Solution pH** | 6.21 | | | | | | | | | | | | | |

Alert - above maximal recommended amino acid intake

**Stability up to 61 days @ 2-8$^0$C that includes 4 days (96 hours) below 25$^0$C**

1g of AA = 4 kcal and 1g of glucose = 3.8 kcal (Estimates used by Baxter Healthcare Pty Ltd)

Numbers are rounded off to 1 decimel point where appropriate.

# Appendix 3. 2026 Consensus Amino acid - Glucose formulations

## 7.5% Glucose PRETERM PN

| | 7.5% glucose Preterm PN | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1000 mL | 40 mL/kg | 50 ml/kg | 60 ml/kg | 70 ml/kg | 80 ml/kg | 90 ml/kg | 100 ml/kg | 110 ml/kg | 120 ml/kg | 130 ml/kg | 135 ml/kg | 140 ml/kg | 150 ml/kg |
| Amino acids, g | 30 | 1.2 | 1.5 | 1.8 | 2.1 | 2.4 | 2.7 | 3.0 | 3.3 | 3.6 | 3.9 | 4.1 | 4.2 | 4.5 |
| Glucose, g | 75 | 3.0 | 3.8 | 4.5 | 5.3 | 6.0 | 6.8 | 7.5 | 8.3 | 9.0 | 9.8 | 10.1 | 10.5 | 11.3 |
| Sodium, mmol | 40 | 1.6 | 2.0 | 2.4 | 2.8 | 3.2 | 3.6 | 4.0 | 4.4 | 4.8 | 5.2 | 5.4 | 5.6 | 6.0 |
| Potassium, mmol | 22 | 0.9 | 1.1 | 1.3 | 1.5 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.9 | 3.0 | 3.1 | 3.3 |
| Calcium, mmol | 20 | 0.8 | 1.0 | 1.2 | 1.4 | 1.6 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.7 | 2.8 | 3.0 |
| Magnesium, mmol | 1.5 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| Phosphate, mmol | 20 | 0.8 | 1.0 | 1.2 | 1.4 | 1.6 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.7 | 2.8 | 3.0 |
| Chloride, mmol | 12.7 | 0.5 | 0.6 | 0.8 | 0.9 | 1.0 | 1.1 | 1.3 | 1.4 | 1.5 | 1.7 | 1.7 | 1.8 | 1.9 |
| Acetate, mmol | 15.1 | 0.6 | 0.8 | 0.9 | 1.1 | 1.2 | 1.4 | 1.5 | 1.7 | 1.8 | 2.0 | 2.0 | 2.1 | 2.3 |
| Zn, microg | 3267 | 130.7 | 163.4 | 196.0 | 228.7 | 261.4 | 294.0 | 326.7 | 359.4 | 392.0 | 424.7 | 441.0 | 457.4 | 490.1 |
| Selenium, ug | 30 | 1.2 | 1.5 | 1.8 | 2.1 | 2.4 | 2.7 | 3.0 | 3.3 | 3.6 | 3.9 | 4.1 | 4.2 | 4.5 |
| Iodine, ug | 10 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.4 | 1.5 |
| Copper, ug | 200 | 8.0 | 10.0 | 12.0 | 14.0 | 16.0 | 18.0 | 20.0 | 22.0 | 24.0 | 26.0 | 27.0 | 28.0 | 30.0 |
| Heparin, units | 500 | 20.0 | 25.0 | 30.0 | 35.0 | 40.0 | 45.0 | 50.0 | 55.0 | 60.0 | 65.0 | 67.5 | 70.0 | 75.0 |
| GIR, mg/kg/min | | 2.1 | 2.6 | 3.1 | 3.6 | 4.2 | 4.7 | 5.2 | 5.7 | 6.3 | 6.8 | 7.0 | 7.3 | 7.8 |
| Energy, kcal/kg/day | 405 | 16.2 | 20.2 | 24.3 | 28.4 | 32.4 | 36.5 | 40.5 | 44.6 | 48.6 | 52.7 | 54.7 | 56.7 | 60.8 |
| Osmolarity (mOsm/L) | 818 | | | | | | | | | | | | | |
| Bag volume, mL | 750 | | | | | | | | | | | | | |
| Solution pH | 6.22 | | | | | | | | | | | | | |

Alert - above maximal recommended amino acid intake

**Stability up to 61 days @ 2-8$^0$C that icnludes 4 days (96 hours) below 25$^0$C**

1g of AA = 4 kcal and 1g of glucose = 3.8 kcal (Estimates used by Baxter Healthcare Pty Ltd)

Numbers are rounded off to 1 decimel point where appropriate.

# Appendix 3. 2026 Consensus Amino acid - Glucose formulations

## 5% Glucose PRETERM PN

| | 5% glucose Preterm PN | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1000 mL | 40 mL/kg | 50 ml/kg | 60 ml/kg | 70 ml/kg | 80 ml/kg | 90 ml/kg | 100 ml/kg | 110 ml/kg | 120 ml/kg | 130 ml/kg | 135 ml/kg | 140 ml/kg | 150 ml/kg |
| **Amino acids, g** | 30 | 1.2 | 1.5 | 1.8 | 2.1 | 2.4 | 2.7 | 3.0 | 3.3 | 3.6 | 3.9 | 4.1 | 4.2 | 4.5 |
| **Glucose, g** | 50 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 | 6.0 | 6.5 | 6.8 | 7.0 | 7.5 |
| **Sodium, mmol** | 40 | 1.6 | 2.0 | 2.4 | 2.8 | 3.2 | 3.6 | 4.0 | 4.4 | 4.8 | 5.2 | 5.4 | 5.6 | 6.0 |
| **Potassium, mmol** | 22 | 0.9 | 1.1 | 1.3 | 1.5 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.9 | 3.0 | 3.1 | 3.3 |
| **Calcium, mmol** | 20 | 0.8 | 1.0 | 1.2 | 1.4 | 1.6 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.7 | 2.8 | 3.0 |
| **Magnesium, mmol** | 1.5 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| **Phosphate, mmol** | 20 | 0.8 | 1.0 | 1.2 | 1.4 | 1.6 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.7 | 2.8 | 3.0 |
| **Chloride, mmol** | 12.7 | 0.5 | 0.6 | 0.8 | 0.9 | 1.0 | 1.1 | 1.3 | 1.4 | 1.5 | 1.7 | 1.7 | 1.8 | 1.9 |
| **Acetate, mmol** | 15.1 | 0.6 | 0.8 | 0.9 | 1.1 | 1.2 | 1.4 | 1.5 | 1.7 | 1.8 | 2.0 | 2.0 | 2.1 | 2.3 |
| **Zn, microg** | 3267 | 130.7 | 163.4 | 196.0 | 228.7 | 261.4 | 294.0 | 326.7 | 359.4 | 392.0 | 424.7 | 441.0 | 457.4 | 490.1 |
| **Selenium, ug** | 30 | 1.2 | 1.5 | 1.8 | 2.1 | 2.4 | 2.7 | 3.0 | 3.3 | 3.6 | 3.9 | 4.1 | 4.2 | 4.5 |
| **Iodine, ug** | 10 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.4 | 1.5 |
| **Copper, ug** | 200 | 8.0 | 10.0 | 12.0 | 14.0 | 16.0 | 18.0 | 20.0 | 22.0 | 24.0 | 26.0 | 27.0 | 28.0 | 30.0 |
| **Heparin, units** | 500 | 20.0 | 25.0 | 30.0 | 35.0 | 40.0 | 45.0 | 50.0 | 55.0 | 60.0 | 65.0 | 67.5 | 70.0 | 75.0 |
| **GIR, mg/kg/min** | | 1.4 | 1.8 | 2.1 | 2.4 | 2.8 | 3.1 | 3.5 | 3.8 | 4.2 | 4.5 | 4.7 | 4.9 | 5.2 |
| **Energy, kcal/kg/day** | 310 | 12.4 | 15.5 | 18.6 | 21.7 | 24.8 | 27.9 | 31.0 | 34.1 | 37.2 | 40.3 | 41.9 | 43.4 | 46.5 |
| **Osmolarity (mOsm/L)** | 680 | | | | | | | | | | | | | |
| **Bag volume, mL** | 750 | | | | | | | | | | | | | |
| **Solution pH** | 6.22 | | | | | | | | | | | | | |

Alert - above maximal recommended amino acid intake

**Stability up to 61 days @ 2-8$^0$C that includes 4 days (96 hours) below 25$^0$C**

1g of AA = 4 kcal and 1g of glucose = 3.8 kcal (Estimates used by Baxter Healthcare Pty Ltd)

Numbers are rounded off to 1 decimel point where appropriate.

## Appendix 3. 2026 Consensus Amino acid - Glucose formulations

## Peripheral PRETERM PN

| | Peripheral Preterm PN | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1000 mL | 40 mL/kg | 50 ml/kg | 60 ml/kg | 70 ml/kg | 80 ml/kg | 90 ml/kg | 100 ml/kg | 110 ml/kg | 120 ml/kg | 130 ml/kg | 135 ml/kg | 140 ml/kg | 150 ml/kg |
| **Amino acids, g** | 30 | 1.2 | 1.5 | 1.8 | 2.1 | 2.4 | 2.7 | 3.0 | 3.3 | 3.6 | 3.9 | 4.1 | 4.2 | 4.5 |
| **Glucose, g** | 100 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 | 11.0 | 12.0 | 13.0 | 13.5 | 14.0 | 15.0 |
| **Sodium, mmol** | 40 | 1.6 | 2.0 | 2.4 | 2.8 | 3.2 | 3.6 | 4.0 | 4.4 | 4.8 | 5.2 | 5.4 | 5.6 | 6.0 |
| **Potassium, mmol** | 22 | 0.9 | 1.1 | 1.3 | 1.5 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.9 | 3.0 | 3.1 | 3.3 |
| **Calcium, mmol** | 10 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.4 | 1.5 |
| **Magnesium, mmol** | 1.5 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| **Phosphate, mmol** | 10 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.4 | 1.5 |
| **Chloride, mmol** | 21.7 | 0.9 | 1.1 | 1.3 | 1.5 | 1.7 | 2.0 | 2.2 | 2.4 | 2.6 | 2.8 | 2.9 | 3.0 | 3.3 |
| **Acetate, mmol** | 26 | 1.0 | 1.3 | 1.6 | 1.8 | 2.1 | 2.3 | 2.6 | 2.9 | 3.1 | 3.4 | 3.5 | 3.6 | 3.9 |
| **Zn, microg** | 3267 | 130.7 | 163.4 | 196.0 | 228.7 | 261.4 | 294.0 | 326.7 | 359.4 | 392.0 | 424.7 | 441.0 | 457.4 | 490.1 |
| **Selenium, ug** | 30 | 1.2 | 1.5 | 1.8 | 2.1 | 2.4 | 2.7 | 3.0 | 3.3 | 3.6 | 3.9 | 4.1 | 4.2 | 4.5 |
| **Iodine, ug** | 10 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 | 1.4 | 1.4 | 1.5 |
| **Copper, ug** | 200 | 8.0 | 10.0 | 12.0 | 14.0 | 16.0 | 18.0 | 20.0 | 22.0 | 24.0 | 26.0 | 27.0 | 28.0 | 30.0 |
| **Heparin, units** | 500 | 20.0 | 25.0 | 30.0 | 35.0 | 40.0 | 45.0 | 50.0 | 55.0 | 60.0 | 65.0 | 67.5 | 70.0 | 75.0 |
| **GIR, mg/kg/min** | | 2.8 | 3.5 | 4.2 | 4.8 | 5.5 | 6.3 | 6.9 | 7.6 | 8.3 | 9.0 | 9.4 | 9.7 | 10.4 |
| **Energy, kcal/kg/day** | 500 | 20.0 | 25.0 | 30.0 | 35.0 | 40.0 | 45.0 | 50.0 | 55.0 | 60.0 | 65.0 | 67.5 | 70.0 | 75.0 |
| **Osmolarity (mOsm/L)** | 919 | | | | | | | | | | | | | |
| **Bag volume, mL** | 750 | | | | | | | | | | | | | |
| **Solution pH** | 5.92 | | | | | | | | | | | | | |

**Stability up to 61 days @ 2-8$^0$C that includes 4 days (96 hours) below 25$^0$C**

1g of AA = 4 kcal and 1g of glucose = 3.8 kcal (Estimates used by Baxter Healthcare Pty Ltd)

Numbers are rounded off to 1 decimel point where appropriate.

## Appendix 3. 2026 Consensus Amino acid - Glucose formulations

## 34 week-Term PN

| | 34 week-Term PN | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1000 mL | 40mL/kg | 50ml/kg | 60 ml/kg | 70ml/kg | 80ml/kg | 90 ml/kg | 100ml/kg | 110ml/kg | 120ml/kg | 130ml/kg | 135ml/kg | 140ml/kg | 150ml/kg |
| **Amino acids, g** | 23 | 0.9 | 1.2 | 1.4 | 1.6 | 1.8 | 2.1 | 2.3 | 2.5 | 2.8 | 3.0 | 3.1 | 3.2 | 3.5 |
| **Glucose, g** | 100 | 4.0 | 5.0 | 6.0 | 7.0 | 8.0 | 9.0 | 10.0 | 11.0 | 12.0 | 13.0 | 13.5 | 14.0 | 15.0 |
| **Sodium, mmol** | 25 | 1.0 | 1.3 | 1.5 | 1.8 | 2.0 | 2.3 | 2.5 | 2.8 | 3.0 | 3.3 | 3.4 | 3.5 | 3.8 |
| **Potassium, mmol** | 20 | 0.8 | 1.0 | 1.2 | 1.4 | 1.6 | 1.8 | 2.0 | 2.2 | 2.4 | 2.6 | 2.7 | 2.8 | 3.0 |
| **Calcium, mmol** | 9 | 0.4 | 0.5 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.2 | 1.3 | 1.4 |
| **Magnesium, mmol** | 1.5 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.1 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| **Phosphate, mmol** | 9 | 0.4 | 0.5 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.2 | 1.3 | 1.4 |
| **Chloride, mmol** | 22.9 | 0.9 | 1.1 | 1.4 | 1.6 | 1.8 | 2.1 | 2.3 | 2.5 | 2.7 | 3.0 | 3.1 | 3.2 | 3.4 |
| **Acetate, mmol** | 8.5 | 0.3 | 0.4 | 0.5 | 0.6 | 0.7 | 0.8 | 0.9 | 0.9 | 1.0 | 1.1 | 1.1 | 1.2 | 1.3 |
| **Zn, microg** | 1896 | 75.8 | 94.8 | 113.8 | 132.7 | 151.7 | 170.6 | 189.6 | 208.6 | 227.5 | 246.5 | 256.0 | 265.4 | 284.4 |
| **Selenium, ug** | 22.5 | 0.9 | 1.1 | 1.4 | 1.6 | 1.8 | 2.0 | 2.3 | 2.5 | 2.7 | 2.9 | 3.0 | 3.2 | 3.4 |
| **Iodine, ug** | 7.5 | 0.3 | 0.4 | 0.5 | 0.5 | 0.6 | 0.7 | 0.8 | 0.8 | 0.9 | 1.0 | 1.0 | 1.1 | 1.1 |
| **Copper, ug** | 150 | 6.0 | 7.5 | 9.0 | 10.5 | 12.0 | 13.5 | 15.0 | 16.5 | 18.0 | 19.5 | 20.3 | 21.0 | 22.5 |
| **Heparin, units** | 500 | 20.0 | 25.0 | 30.0 | 35.0 | 40.0 | 45.0 | 50.0 | 55.0 | 60.0 | 65.0 | 67.5 | 70.0 | 75.0 |
| **GIR, mg/kg/min** | | 2.8 | 3.5 | 4.2 | 4.8 | 5.5 | 6.3 | 6.9 | 7.6 | 8.3 | 9.0 | 9.4 | 9.7 | 10.4 |
| **Energy, kcal/kg/day** | 472 | 18.9 | 23.6 | 28.3 | 33.0 | 37.8 | 42.5 | 47.2 | 52.0 | 56.6 | 61.4 | 63.7 | 66.1 | 70.8 |
| **Osmolarity(mOsm/L)** | 846 | | | | | | | | | | | | | |
| **Bag volume, mL** | 1200 | | | | | | | | | | | | | |
| **Solution pH** | 5.94 | | | | | | | | | | | | | |

**Stability up to 61 days @ 2-8$^0$C that includes 4 days (96 hours) below 25$^0$C**

1g of AA = 4 kcal and 1g of glucose = 3.8 kcal (Estimates used by Baxter Healthcare Pty Ltd)

Numbers are rounded off to 1 decimel point where appropriate.

## Appendix 4. Glucose solutions and Glucose infusion rate (GIR)

## 2.5% glucose*
## *Hypotonic solution

| 2.5% Glucose | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | ml/kg/day | | | | | | | | |
| **mL/kg/day** | **40** | **50** | **60** | **70** | **80** | **90** | **100** | **110** | **120** |
| **GIR, mg/kg/min** | 0.7 | 0.9 | 1.0 | 1.2 | 1.4 | 1.6 | 1.7 | 1.9 | 2.1 |
| **Energy, Kcal/kg/day** | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| **Osmolarity, mOsm/L** | 139 | | | | | | | | |
| **Shelflife** | No stability data from Baxter Healthcare Pty Ltd | | | | | | | | |

Numbers are rounded off to 1 decimel point where appropriate.

## 2.5% glucose in 0.225% sodium chloride*
## *Hypotonic solution

| 2.5% Glucose in 0.225% sodium chloride | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | ml/kg/day | | | | | | | | |
| **mL/kg/day** | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 |
| **GIR, mg/kg/min** | 0.7 | 0.9 | 1 | 1.2 | 1.4 | 1.6 | 1.7 | 1.9 | 2.1 |
| **Sodium, mmol/Kg/day** | 1.6 | 2 | 2.3 | 2.7 | 3.1 | 3.5 | 3.9 | | |
| **Energy, kcal/kg/day** | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| **Osmolarity, mOsm/L** | 216 | | | | | | | | |
| **Shelf lfe** | 90 days in room temeprature | | | | | | | | |
| Numbers are rounded off to 1 decimel point where appropriate. | | | | | | | | | |

## 2.5% Glucose in 0.45% sodium chloride*
***Isotonic, but watch sodium intake from the solution**

| 2.5% Glucose in 0.45% sodium chloride | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | ml/kg/day | | | | | | | | |
| **mL/kg/day** | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 |
| **GIR, mg/kg/min** | 0.7 | 0.9 | 1 | 1.2 | 1.4 | 1.6 | 1.7 | 1.9 | 2.1 |
| **Sodium, mmol/Kg/day** | 3.1 | 3.9 | 4.6 | 5.4 | 6.2 | 6.9 | 7.7 | | |
| **Energy, kcal/kg/day** | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| **Osmolarity, mOsm/L** | 294 | | | | | | | | |
| **Shelf lfe** | 18 months. Store below 30 degree celsius. Do NOT FREEZE | | | | | | | | |
| Numbers are rounded off to 1 decimel point where appropriate. | | | | | | | | | |

## 5% glucose

| 5% Glucose | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | ml/kg/day | | | | | | | | |
| **mL/kg/day** | **40** | **50** | **60** | **70** | **80** | **90** | **100** | **110** | **120** |
| **GIR, mg/kg/min** | 1.4 | 1.7 | 2.1 | 2.4 | 2.8 | 3.1 | 3.5 | 3.8 | 4.2 |
| **Energy, Kcal/kg/day** | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
| **Osmolarity, mOsm/L** | 278 | | | | | | | | |

## 10% glucose

| 10% Glucose | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ml/kg/day | | | | | | | | | | | | |
| **mL/kg/day** | **40** | **50** | **60** | **70** | **80** | **90** | **100** | **110** | **120** | **130** | **135** | **140** | **150** |
| **GIR, mg/kg/min** | 2.8 | 3.5 | 4.2 | 4.9 | 5.6 | 6.3 | 7.0 | 7.6 | 8.3 | 9.0 | 9.4 | 9.7 | 10.4 |
| **Energy, Kcal/kg/day** | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 | 52 | 54 | 56 | 60 |
| **Osmolality, mOsm/L** | 556 | | | | | | | | | | | | |

## Appendix 5. Consensus Lipid emulsion

**Lipid emulsion - SMOFlipid (Compounded and supplied by Fresenius-Kabi Pty Ltd)**

| Content | 45mL syringe (for ≤1 Kg) | 50mL syringe (for ≤1 Kg) | 151mL bag (for >1 Kg) |
|---|---|---|---|
| SMOFlipid | 32.5 mL | 36 mL | 109 mL |
| Soluvit N | 2.5 mL | 2.8 mL | 8.4 mL |
| Vitalipid N infant | 10 mL | 11.2 mL | 33.5 mL |
| FK Code | FKS045V | FKS045V | FKS045V |
| Stability | 13 days at $2^0$-$8^0$C | 13 days at $2^0$-$8^0$C | 13 days at $2^0$-$8^0$C |