

# ENTERAL AND PARENTERAL NUTRITIONAL CARE

## Statement of Best Practice

- Feeding with mother's own breastmilk is protective against sepsis, NEC and death.
- All mothers should be informed about this and strongly encouraged to express their own milk in the first 24 hours of the baby's life (or before birth) irrespective of their milk feeding preferences.

## Simplified Nutritional Strategy

- Patients with a bowel rest of >5 days for any medical/surgical condition might require a modification to the simplified nutritional strategy. Please refer to separate guideline (Special Considerations for Nutritional Care of Patients with Stoma).
- The simplified nutritional strategy will depend on birth or current weight. Babies will change risk group/strategy as they grow according to the list below:
  - High risk: < 1.2 kg
  - Moderate risk:  $\geq 1.2 - \leq 1.5$  kg
  - Low risk: > 1.5 kg

## General Nutritional Considerations for Parenteral and Enteral Nutrition

- For a detailed specification of the composition of the different parenteral nutrition solutions please refer to the EXCEL TPN prescription form.
- Aim for a minimum total of 120 kcal/kg/day (50 kcal/kg/day of non-protein calories or 25 kcal of non-protein calories per 1 g of protein intake) once on steady state intake.
- Aim for  $\leq 10$  mg/kg/min glucose intake, 3.5 g/kg/day of protein intake (max. 4 g/kg/day) and 3.5 g/kg/d (max. 4 g/kg/d) of lipid intake.
- Do not exceed 156 ml/kg/day Start-Up or Maintenance PN (Babiven®) or 103 ml/kg/day Concentrated PN (Babiven®); do not exceed 22 ml/kg/day SMOF Lipid
- Aim for linear growth from 28 weeks onwards at >17 g/kg/d per day up to 2 kg weight and then 30 g per day over a 7 day period.
- Aim to keep growth (weight, length and head circumference) between birth centile and centile at 3 weeks of life

## Special Considerations for Total/Partial Parenteral Nutrition

- There is no need to build up TPN volume. The volume of PN (including lipids) should equate to the total daily available fluid volume after exclusion of other infusions and feeds.
- All Parenteral Nutrition (Babiven® bags without lipids) can be used up to a maximum of 48 h. Lipids should always be given over approx. 24 h.
- If a sidearm is required prescribe Dextrose 5 % or 10 % according to total carbohydrate intake and glucose levels plus additional Na, K and Ca.
- Calcium can only be given centrally except in emergencies.

### **Establishing PN Infusion Rate**

1. Total daily fluid intake in ml/day = Total daily fluid intake in ml/kg/day x weight
  2. Total daily PN volume in ml/day = Total daily fluid intake in ml/day – oral intake and/or infusions in ml/day
  3. Total daily lipid volume in ml/day if receiving Babiven Maintenance = Total daily PN volume/7.8
  4. Total daily lipid volume in ml/day if receiving Babiven Concentrate = Total daily PN volume/5.5
  5. Lipid volume in ml/h = Total daily lipid volume/24 h
  6. Total daily Babiven® volume (PN Bag) = Total daily PN volume - total daily lipid volume
  7. Babiven® volume (PN Bag) in ml/h = Total daily Babiven® volume (PN Bag)/24 h
- Alternatively use the Infusion Rate Chart for Maintenance or Concentrated PN below

### **Monitoring**

- Anthropometry - measure weight on alternate days, head circumference and length weekly
- Daily – nutritional intake (fluid, protein, fat, carbohydrates, electrolytes, energy), blood glucose, triglycerides, urine analysis and blood pressure measurement until on a constant PN volume.
- Weekly – nutritional intake, blood glucose, triglycerides (once PN not increasing), liver function.
- Lipid intake needs to be reduced irrespective of protein and carbohydrate intake, if triglyceride levels exceed 3.5 mmol/l – please indicate on the prescription sheet.
- Monthly – trace minerals (copper, zinc, selenium).

## Special Considerations for Enteral Nutrition

- Ensure gastric tube is correctly placed at all times (see Guideline for the Use of Oro-Nasogastric tubes)
- Never mix formula and breast milk in one bottle
- Always use colostrum first (whether fresh or frozen) if available
- Use fresh breast milk rather than frozen milk, but only after the stored milk from the first 2 - 3 weeks of life has been used in order of expressing
- Gastric aspirates equivalent to < 1 - 2 ml/kg/h (even if slightly bile stained) are acceptable to progress with feeding.
- If in babies  $\leq 1.5$  kg EBM is not available, use DEBM and if no DEBM available, insert a peripheral cannula and give Dextrose 10% until either EBM/DEBM is available or introduction of or transition to formula has been completed in line with the schedule outlined below.

### **Supplementing Enteral Nutrition**

- Start iron and vitamin supplementation in preterm infants (< 35 + 0 weeks or < 2 kg) when > 60 ml/kg/day enteral feeds tolerated irrespective of type of milk or combination with PN. Do not stop iron for blood transfusions.
- Change prescription timings of iron and vitamin supplementation to 10:00 (iron) and 14:00 (vitamins and folic acid) when in Nursery 3.
- Daily vitamin and iron intake:

Milk Type	Abidec/Dalivit	Folic Acid	Sytron
Unfortified Breastmilk	0.6 ml	50 microgram (preterm infants)	0.9 ml/kg
Breastmilk + Fortifier	0.3 ml	Nil	
Preterm Formula	0.3 ml	Nil	
Term Formula & Specialist Formula	0.6 ml	Nil	

- Minimum EBM volume (ideally higher for formula or fortified milk) requirements for oral supplements - split up doses, if necessary:

Additive	Dosage	Minimum EBM per feed per dose
Sytron	0.1 ml	1.2 ml
Folic Acid	50 microgram	1.1 ml
Abidec/Dalivit	0.3 ml	3.0 ml
Sodium Dihydrogen Phosphate	0.1 mmol	1.6 ml
Sodium Chloride	0.1 mmol	0.7 ml
Caffeine Citrate	1 mg	0.5 ml
Chloral Hydrate	1 mg	0.3 ml

### **Establishing Demand Breastfeeding/Bottle Feeding**

- Try to move to 3 hourly feeds by gravity once > 32 + 0 weeks' gestation and > 1.5 kg weight, if no medical concerns or on low-flow oxygen.
- For patients weaning off NGT/OGT feeds onto oral feeds refer to Establishing Breastfeeding Guideline
- When establishing breastfeeding top up feeds should be prepared as full feeds according to the Fortification Scheme below

### **Preparing for Discharge**

- Consider discharge at > 1.6 kg and > 34 + 0 weeks gestation, if no medical or social concerns
- Patients on SMA Gold Prem 1 should change over to Nutriprem 2 at 2 kg (current weight) or ideally one week before discharge or earlier when weight gain is excessive or oedema is present
- Patients should not be discharged on Fortifier. They should be weaned off ideally one week before discharge or earlier when weight gain is excessive or oedema is present.
- Change daily vitamin supplement to 0.3 ml and iron supplement to 1 ml p.o. per day before discharge. Stop folic acid.
- Babies born > 34 + 6 should be started on oral Vitamin D or Dalivit/Abidec supplements if fully breastfed or on exclusive EBM or less than 500 ml per day formula intake
- Involve Health Visitor or Neonatal Outreach Team, if feeding concerns present or enhanced care needed at discharge; refer to Community Paediatric Team, if medical problems including oxygen requirement present at discharge.

**HIGH RISK < 1.2 KG**

<b>Admission</b>	<ul style="list-style-type: none"><li>• Insert central venous line (longline or UVC)</li><li>• Prescribe Start-Up PN at 60-90 ml/kg/day as required</li><li>• Start maternal EBM at 0.5-1 ml if available 2 hrly via Fr 5 NGT/OGT</li><li>• Receive consent for DEBM</li></ul>
<b>First 24-48h</b>	<ul style="list-style-type: none"><li>• Give Start-Up PN at 90-120 ml/kg/day as required</li><li>• Increase enteral feeds to 1-2 ml 2 hrly as tolerated</li><li>• Start DEBM at same volume if MEBM not available/insufficient</li></ul>
<b>Day 3 (&gt;48h)</b>	<ul style="list-style-type: none"><li>• Prescribe Concentrated PN at 120 ml/kg/day if tolerating at least 10-20 ml/kg/day enteral feeds, otherwise start Maintenance PN</li><li>• Do not increase enteral feeds if not opened bowels, prescribe glycerine spp.</li><li>• Increase enteral feeds 1 ml 24 hrly if opened bowels once daily</li><li>• Increase enteral feeds 1 ml 12 hrly if opened bowels &gt; 1 per day</li></ul>
<b>Day 4 and above</b>	<ul style="list-style-type: none"><li>• Prescribe combination feeding with Concentrated/Maintenance PN and enteral feeds aiming for max. 165 ml/kg/day total fluid intake (building up gradually)</li><li>• Adjust ratio of parenteral and enteral feeds according to total fluid intake and tolerated enteral volume and growth:<ul style="list-style-type: none"><li>○ At 130 ml/kg/day give at least 85 ml/kg/day Concentrated PN and no more than 45 ml/kg/day EBM OR 130 ml/kg/day Maintenance PN and no feeds/only trophic feeds (25 ml/kg/day)</li><li>○ At 150 ml/kg/day give at least 70 ml/kg/day Concentrated PN and no more than 80 ml/kg/day EBM OR 150 ml/kg/day Maintenance PN and no feeds/only trophic feeds (25 ml/kg/day)</li><li>○ At 165 ml/kg/day give at least 60 ml/kg/day Concentrated PN and no more than 105 ml/kg/day EBM OR at least 115 ml/kg/day Maintenance PN and no more than 50 ml/kg/day EBM</li></ul></li><li>• A lower proportion of donor breast milk might be required to achieve good growth in combination with PN without exceeding total fluid intake</li><li>• Do not fortify MEBM/DEBM whilst on combination feeding</li><li>• Give 2 hrly feeds via a Fr 5 OGT/NGT, avoid bigger size gastric tubes, if possible</li><li>• Consider bowel washout if bowels not opened after &gt; 5 days despite glycerine spp.</li><li>• Increase enteral feeds 1ml 24 hrly if opened bowels once daily and still meconium</li><li>• Increase enteral feeds 1ml 12 hrly if opened bowels &gt; 1 per day and still meconium</li><li>• Increase 1ml 8 hrly if opened bowels once daily and yellow stools</li><li>• Increase 1ml 6 hrly if opened bowels &gt; 1 per day and yellow stools</li></ul>
<b>Weaning PN</b>	<ul style="list-style-type: none"><li>• Do not wean PN until the patient has reached a weight of approx. 1.2 kg.</li><li>• Once a weight of approx. 1.2 kg reached continue increasing enteral feeds as long as tolerated until reaching full enteral feeds of max. 165 ml/kg/day.</li><li>• Follow guidance for WEANING TPN and ESTABLISHING GROWTH WITH ENTERAL NUTRITION in MODERATE RISK GROUP</li></ul>

**MODERATE RISK  $\geq 1.2 - \leq 1.5$  KG**

<b>Admission</b>	<ul style="list-style-type: none"> <li>• Insert central venous line (preferably longline), do not give PN peripherally</li> <li>• Prescribe Start-Up PN at 60-90 ml/kg/day as required</li> <li>• Start maternal EBM at 1-2 ml if available 2 hrly via Fr 5 NGT/OGT</li> <li>• Receive consent for DEBM</li> </ul>
<b>First 24-48h</b>	<ul style="list-style-type: none"> <li>• Give Start-Up PN at 90-120 ml/kg/day as required</li> <li>• Increase enteral feeds to 2 ml 2 hrly as tolerated</li> <li>• Start DEBM at same volume if maternal EBM not available/insufficient</li> </ul>
<b>Day 3 (&gt;48h)</b>	<ul style="list-style-type: none"> <li>• Prescribe Concentrated PN at 120 ml/kg/day if tolerating at least 10-20 ml/kg/day enteral feeds, otherwise start Maintenance PN</li> <li>• Do not increase enteral feeds if not opened bowels, prescribe glycerine spp.</li> <li>• Increase enteral feeds 1ml 24 hrly if opened bowels once daily</li> <li>• Increase enteral feeds 1ml 12 hrly if opened bowels &gt;1 per day</li> </ul>
<b>Day 4 and above</b>	<ul style="list-style-type: none"> <li>• Prescribe combination feeding with Concentrated/Maintenance PN and enteral feeds aiming for max. 165 ml/kg/day total fluid intake (building up gradually)</li> <li>• If enteral feeds tolerated, continue increasing enteral feeds as long as tolerated until reaching full enteral feeds of max. 165 ml/kg/day</li> <li>• If enteral feeds not tolerated, adjust ratio of parenteral and enteral feeds according to total fluid intake and tolerated enteral volume and growth: <ul style="list-style-type: none"> <li>○ At 130 ml/kg/day give at least 85 ml/kg/day Concentrated PN and no more than 45 ml/kg/day EBM OR 130 ml/kg/day Maintenance PN and no feeds/only trophic feeds (25 ml/kg/day)</li> <li>○ At 150 ml/kg/day give at least 70 ml/kg/day Concentrated PN and no more than 80 ml/kg/day EBM OR 150 ml/kg/day Maintenance PN and no feeds/only trophic feeds (25 ml/kg/day)</li> <li>○ At 165 ml/kg/day give at least 60 ml/kg/day Concentrated PN and no more than 105 ml/kg/day EBM OR at least 115 ml/kg/day Maintenance PN and no more than 50 ml/kg/day EBM</li> </ul> </li> <li>• A lower proportion of donor breast milk might be required to achieve good growth in combination with PN without exceeding total fluid intake</li> <li>• Do not fortify MEBM/DEBM whilst on combination feeding</li> <li>• Give feeds via a Fr 5 OGT/NGT, avoid bigger size gastric tubes, if possible</li> <li>• Consider bowel washout if bowels not opened after &gt; 5 days despite glycerine spp.</li> <li>• Increase enteral feeds 1ml 24 hrly if opened bowels once daily and still meconium</li> <li>• Increase enteral feeds 1ml 12 hrly if opened bowels &gt; 1 per day and still meconium</li> <li>• Increase 1ml 8hrly if opened bowels once daily and yellow stools</li> <li>• Increase 1ml 6hrly if opened bowels &gt; 1 per day and yellow stools</li> </ul>
<b>Weaning PN</b>	<ul style="list-style-type: none"> <li>• Once enteral feeds of 120 ml/kg/day tolerated, remove central line and stop PN.</li> </ul>
<b>Establishing growth with enteral nutrition</b>	<ul style="list-style-type: none"> <li>• If not tolerating full feeds suggesting reflux, ensure a Fr 5 OGT/NGT is inserted and in good position, consider prone/lateral positioning, ensure 30° mattress tilt, hold the syringe with its flange at the height of the junction between the lid and the door of a closed incubator or at the upper margin of the plastic sides of an open incubator or cot. This equates to a distance of approximately 12 cm above the baby's head and 10 – 20 min feed.</li> <li>• Consider pump feeding if still not tolerating full feeds. Start at 30 minutes and increase in 30 minute increments to a max. of 1 h 30 minutes; wean 10 minutes every day as soon as feeding tolerance established until tolerating 30 minutes.</li> <li>• Continue with full feeds for approx. 1 week and review tolerance and growth.</li> <li>• If not enough MEBM available and on DEBM, then, once 120 ml/kg/day tolerated, introduce one formula feed of SMA GP 1 at same volume according to the Scheme below until all DEBM feeds are replaced completely</li> <li>• If not enough MEBM available and on combination with formula but not growing, fortify MEBM with SMA fortifier according to Scheme below before increasing the number of formula feeds</li> <li>• If enough MEBM available but not growing, then fortify MEBM with SMA fortifier according to Scheme below before introducing formula</li> </ul>

**LOW RISK > 1.5 KG**

<b>Admission</b>	<ul style="list-style-type: none"> <li>• Insert peripheral venous access</li> <li>• Prescribe iv Glucose 10%</li> <li>• Start maternal EBM at 2-3 ml if available 2 hrly via Fr 5 or 6 NGT/OGT</li> <li>• Babies <math>\geq</math> 35 weeks gestation at birth can be tried on 3 hrly feeds and higher starting volumes from birth, e.g. starting at 20-30 ml/kg/day, increasing by 20-30 ml/kg/day</li> </ul>
<b>First 24-48h</b>	<ul style="list-style-type: none"> <li>• Give iv additives (Na and K) as required</li> <li>• Increase enteral feeds to 2-3 ml 2 hrly as tolerated or higher (see above)</li> <li>• Start Nutriprem 2 if <math>&gt;</math> 1.5 kg or term formula if <math>\geq</math> 2 kg birth weight at same volume if MEBM not available/insufficient</li> </ul>
<b>Day 3 (&gt;48h)</b>	<ul style="list-style-type: none"> <li>• Do not increase enteral feeds if not opened bowels, prescribe regular glycerine spp.</li> <li>• Increase enteral feeds 1ml 12 hrly if opened bowels once daily</li> <li>• Increase enteral feeds 1ml 8 hrly if opened bowels <math>&gt;</math>1 per day</li> </ul>
<b>Day 4 and above</b>	<ul style="list-style-type: none"> <li>• Consider starting Concentrated/Maintenance TPN if not tolerating <math>&gt;</math> 50% feeds after <math>&gt;</math> 5 days</li> <li>• Do not fortify any breast milk until tolerating at least 150 ml/kg/day</li> <li>• Consider bowel washout if bowels not opened after <math>&gt;</math> 5 days despite regular glycerine spp.</li> <li>• Increase enteral feeds 1ml 12 hrly if opened bowels once daily and still meconium</li> <li>• Increase enteral feeds 1ml 8 hrly if opened bowels <math>&gt;</math> 1 per day and still meconium</li> <li>• Increase 1ml 6 hrly if opened bowels once daily and yellow stools</li> <li>• Increase 1ml 4 hrly if opened bowels <math>&gt;</math> 1 per day and yellow stools</li> </ul>
<b>Weaning PN</b>	<ul style="list-style-type: none"> <li>• Continue increasing feeds until reaching full enteral feeds of max. 165 ml/kg/day</li> </ul>
<b>Establishing growth with enteral nutrition</b>	<ul style="list-style-type: none"> <li>• If not tolerating full feeds, ensure a Fr 5 OGT/NGT is inserted and in good position, consider prone/lateral positioning, ensure 30° mattress tilt, hold the syringe with its flange at the height of the junction between the lid and the door of a closed incubator or at the upper margin of the plastic sides of an open incubator or cot. This equates to a distance of approximately 12 cm above the baby's head and 10 – 20 min feed.</li> <li>• Consider pump feeding if still not tolerating full feeds. Start at 30 minutes and increase in 30 minute increments to a max of 1h 30 minutes; wean 10 minutes every day as soon as feeding tolerance established until tolerating 30 minutes</li> <li>• Consider changing to 3 hrly feeds once tolerating 2 hrly feeds for approx. 1 week</li> <li>• Continue with full feeds for approx. 1 week and review tolerance and growth</li> <li>• If not enough MEBM available, then introduce one formula feed of Nutriprem 2 at same volume according to the Scheme below to complement MEBM feeds from birth and do not give DEBM</li> <li>• If on combination of MEBM and formula but not growing, then fortify MEBM with SMA fortifier according to Scheme below</li> <li>• If enough MEBM available but not growing, then fortify MEBM with SMA fortifier according to Scheme below</li> <li>• If enough MEBM available and fully fortified with SMA fortifier at Stage 2 but not growing, then introduce one formula feed of Nutriprem 2 at same volume according to the Scheme below to complement fortified MEBM feeds</li> </ul>

### INFUSION RATE CHART (NORMAL VOLUME PN)

TPN Volume	ml/day	100	95	90	85	80	75	70	65	60	55	50	45	40	35	30	25	20	15	10	5
PN	ml/h	3.6	3.4	3.3	3.1	2.9	2.7	2.5	2.4	2.2	2.0	1.8	1.6	1.5	1.3	1.1	0.9	0.7	0.5	0.4	0.2
Lipid	ml/h	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.0
Change of Bag	h	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
TPN Volume	ml/day	200	195	190	185	180	175	170	165	160	155	150	145	140	135	130	125	120	115	110	105
PN	ml/h	7.3	7.1	6.9	6.7	6.5	6.3	6.2	6.0	5.8	5.6	5.4	5.3	5.1	4.9	4.7	4.5	4.4	4.2	4.0	3.8
Lipid	ml/h	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.6	0.6	0.6
Change of Bag	h	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
TPN Volume	ml/day	300	295	290	285	280	275	270	265	260	255	250	245	240	235	230	225	220	215	210	205
PN	ml/h	10.9	10.7	10.5	10.3	10.2	10.0	9.8	9.6	9.4	9.2	9.1	8.9	8.7	8.5	8.3	8.2	8.0	7.8	7.6	7.4
Lipid	ml/h	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.1	1.1
Change of Bag	h	46	47	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
TPN Volume	ml/day	400	395	390	385	380	375	370	365	360	355	350	345	340	335	330	325	320	315	310	305
PN	ml/h	14.5	14.3	14.1	14.0	13.8	13.6	13.4	13.2	13.1	12.9	12.7	12.5	12.3	12.1	12.0	11.8	11.6	11.4	11.2	11.1
Lipid	ml/h	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.7	1.7	1.7	1.7
Change of Bag	h	34	35	35	36	36	37	37	38	38	39	39	40	41	41	42	42	43	44	44	45
TPN Volume	ml/day	500	495	490	485	480	475	470	465	460	455	450	445	440	435	430	425	420	415	410	405
PN	ml/h	18.1	17.9	17.8	17.6	17.4	17.2	17.0	16.9	16.7	16.5	16.3	16.1	16.0	15.8	15.6	15.4	15.2	15.0	14.9	14.7
Lipid	ml/h	2.7	2.7	2.7	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2
Change of Bag	h	28	28	28	28	29	29	29	30	30	30	31	31	31	32	32	32	33	33	34	34

### INFUSION RATE CHART (CONCENTRATED VOLUME PN)

TPN Volume	ml/day	71	67	64	60	57	53	50	46	43	39	36	32	28	25	21	18	14	11	7	4
PN Concentrate	ml/h	2.4	2.3	2.2	2.1	1.9	1.8	1.7	1.6	1.5	1.3	1.2	1.1	1.0	0.8	0.7	0.6	0.5	0.4	0.2	0.1
Lipid	ml/h	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.0
Change of Bag	h	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
TPN Volume	ml/day	142	138	135	131	128	124	121	117	114	110	107	103	99	96	92	89	85	82	78	75
PN Concentrate	ml/h	4.8	4.7	4.6	4.5	4.4	4.2	4.1	4.0	3.9	3.7	3.6	3.5	3.4	3.3	3.1	3.0	2.9	2.8	2.7	2.5
Lipid	ml/h	1.1	1.1	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.6	0.6	0.6
Change of Bag	h	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
TPN Volume	ml/day	213	209	206	202	199	195	192	188	185	181	178	174	170	167	163	160	156	153	149	146
PN Concentrate	ml/h	7.3	7.1	7.0	6.9	6.8	6.6	6.5	6.4	6.3	6.2	6.0	5.9	5.8	5.7	5.6	5.4	5.3	5.2	5.1	5.0
Lipid	ml/h	1.6	1.6	1.6	1.5	1.5	1.5	1.5	1.4	1.4	1.4	1.4	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.1	1.1
Change of Bag	h	45	46	47	47	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
TPN Volume	ml/day	284	280	277	273	270	266	263	259	256	252	249	245	241	238	234	231	227	224	220	217
PN Concentrate	ml/h	9.7	9.5	9.4	9.3	9.2	9.1	8.9	8.8	8.7	8.6	8.5	8.3	8.2	8.1	8.0	7.9	7.7	7.6	7.5	7.4
Lipid	ml/h	2.2	2.1	2.1	2.1	2.1	2.0	2.0	2.0	2.0	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.7	1.7	1.7	1.7
Change of Bag	h	34	34	34	35	35	36	37	37	37	38	38	39	40	40	41	41	42	43	44	44
TPN Volume	ml/day	355	351	348	344	341	337	334	330	327	323	320	316	312	309	305	302	298	295	291	288
PN Concentrate	ml/h	12.1	12.0	11.8	11.7	11.6	11.5	11.4	11.2	11.1	11.0	10.9	10.8	10.6	10.5	10.4	10.3	10.2	10.0	9.9	9.8
Lipid	ml/h	2.7	2.7	2.7	2.6	2.6	2.6	2.5	2.5	2.5	2.5	2.4	2.4	2.4	2.4	2.3	2.3	2.3	2.2	2.2	2.2
Change of Bag	h	27	27	27	28	28	28	28	29	29	30	30	30	31	31	31	32	32	33	33	33



## SCHEME FOR MEBM FORTIFICATION

**Do not fortify DEBM and do not fortify MEBM in any baby < 1.2kg or if volume is < 15ml per feed**

### Stage 1 fortification (2 hourly feeding)

1. Dissolve 1 fortifier sachet into the volume of 2 cold MEBM feeds (ensure a minimum total volume of 30ml) and mix thoroughly
2. There is no maximum volume of milk that can be used
3. Split the volume into 2 individual feeds, warm one feed (as per guideline) and administer. Label the second feed and store this in the refrigerator to give for the next feed. The two fortified feeds should be given consecutively
4. If growth is not improving, increase by 2 fortified feeds per day following the table below
5. Continue until all feeds are fortified and then review growth for at least 1 week. If growth still not adequate move to stage 2 fortification

Stage 1 (2 hourly feeding)	Always mix 1 fortifier sachet into an MEBM volume equivalent to 2 full feeds	
Step of fortification	Total fortified feeds per day	Regime
Step 1	2	Give 2 consecutive fortified feeds followed by 10 unfortified feeds
Step 2	4	Give 2 consecutive fortified feeds followed by 4 unfortified feeds
Step 3	6	Give 2 consecutive fortified feeds followed by 2 unfortified feeds
Step 4	8	Give 2 consecutive fortified feeds followed by 1 unfortified feed
Step 5	10	Give 2 unfortified feeds 12 hours apart
Step 6	12	Fortify all feeds
Observe growth for at least 1 week before changing to stage 2		

### Stage 2 fortification (2 hourly feeding)

1. Dissolve 2 fortifier sachets into the volume of 3 cold MEBM feeds (ensure a minimum total volume of 50ml) and mix thoroughly
2. There is no maximum volume of milk that can be used
3. Split the volume into 3 individual feeds, warm one feed (as per guideline) and administer. Label the second and third feed and store these in the refrigerator and give for the next two feeds. All fortified milk must be used within 6 hours

Stage 2 (2 hourly feeding)	Always mix 2 fortifier sachets into an MEBM volume equivalent to 3 full feeds	
Give 12 fortified feeds per day		



### Fortification for 3 hourly feeding

1. Fortification steps will depend on whether babies are already receiving fully fortified feeds 2 hourly and changing to 3 hourly feeds or whether babies are already receiving 3 hourly feeds and not receiving fortified feeds
  - a. Babies already receiving fully fortified feeds but changing from 2 to 3 hourly feeds: Dissolve 1 fortifier sachet into the volume of 1 cold MEBM feed (ensure a minimum total volume of 25ml) and mix thoroughly. There is no need for a gradual change.
  - b. Babies not already receiving fortified feeds: Dissolve 1 fortifier sachet into the volume of 1 cold MEBM feed (ensure a minimum total volume of 25ml) and mix thoroughly. Increase the number of fortified feeds as per table below
2. There is no maximum volume of milk that can be used
3. You can stop at any stage if growth improves or continue until all feeds are fortified

<b>3 hourly feeding and not already receiving fortified feeds</b>		<b>Always mix 1 fortifier sachet into the volume of 1 cold MEBM feed (ensure a minimum volume of 25ml)</b>
<b>Step of fortification</b>	<b>Total fortified feeds per day</b>	<b>Regime</b>
Step 1	1	Give 1 fortified feed followed by 7 unfortified feeds
Step 2	2	Give 1 fortified feed followed by 3 unfortified feeds
Step 3	4	Give 1 fortified feed followed by 1 unfortified feed
Step 4	6	Give 3 fortified feed followed by 1 unfortified feeds
Step 5	7	Give 7 fortified feed followed by 1 unfortified feeds
Step 6	8	Fortify all feeds

## SCHEME FOR INTRODUCTION OF FORMULA FEEDING

### 2 hourly feeding schedule

Step of formula	Total formula feeds per day	Regime
Step 1	1	Give 1 formula feed followed by 11 human milk feeds
Step 2	2	Give 1 formula feed followed by 5 human milk feeds
Step 3	3	Give 1 formula feed followed by 3 human milk feeds
Step 4	4	Give 1 formula feed followed by 2 human milk feeds
Step 5	6	Give 1 formula feed followed by 1 human milk feed
Review growth for at least 1 week before progressing, unless there is not enough MEBM available or DEBM fed		
Step 6	8	Give 2 formula feeds followed by 1 human milk feed
Step 7	9	Give 3 formula feeds followed by 1 human milk feed
Step 8	10	Give 5 formula feeds followed by 1 human milk feed
Step 9	12	Give all formula feeds

### 3 hourly feeding schedule

Day of formula	Total formula feeds per day	Regime
Step 1	1	Give 1 formula feed followed by 7 human milk feeds
Step 2	2	Give 1 formula feed followed by 3 human milk feeds
Step 3	4	Give 1 formula feed followed by 1 human milk feed
Step 4	6	Give 3 formula feeds followed by 1 human milk feed
Step 5	7	Give 7 formula feeds followed by 1 human milk feed
Step 6	8	Give all formula feeds