

Infant Feeding Policy of the Kangaroo Mother care Unit

1. Choice of feeds

Breast feeding

Breast milk from the infant's mother is usually the enteral feed of choice for premature infants. Premature infants can easily develop Necrotising Enterocolitis if they do not receive breast milk.

All infants in the neonatal unit should receive only breast milk for the first 2 weeks of life. If the mother is ill or unable to provide breast milk, the infant is placed on donor breast milk until the mother is able to provide her infant with breast milk. If a mother is HIV positive and her choice is to formula feed her infant, she is to give pasteurised breast milk until the baby is discharged from the hospital when she can change to formula feed. Incidence of infection and septicaemia has dramatically decreased since this policy was introduced.

2. Volume of feeds

- Newborn infants do not receive the total volume of feeds immediately. The volume is increased over 5 – 10 days depending on how ill or premature an infant is at birth.

Table 1 - Guideline of how feeds should be increased

Table 1: Amount of milk (or fluid) needed per Kg/day and age in days (Use birth weight)								
Birth weight	Feed every	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
500 – 1000g	2 hours	75 ml/kg	90ml/kg	110ml/kg	130ml/kg	150 ml/kg	170ml/kg	180ml/kg
1001-1500g	2 / 3 hours	70ml/kg	85ml/kg	110ml/kg	130ml/kg	150ml/kg	170ml/kg	180ml/kg
1501-2500g	3 hours	60ml/kg	80ml/kg	100ml/ kg	120ml/kg	140ml/kg	160ml/kg	180ml/kg
> 2500 g	3 hours	60ml/kg	90ml/kg	120ml/ kg	150ml/kg			

- Calculate feeds using birth weight until infant has regained birth weight.
- When infants are admitted in the KMC-unit most of them are already on full feeds. As infants gain weight, feeds are increased. Feeds should never be reduced when an infant lose weight.
- Preterm infants on full expressed breast milk should receive 180ml/kg per day (term infants 150 ml/kg/day). Feeds are administered 3 hourly but if an infant struggles to cope with the volume of a feed one can consider decreasing the volume by increasing the number of feeds.
 - 8 feeds every 3 hours or
 - 10 feeds - 2hourly during the day and 3hourly during the night.
- Volume of feeds should be adjusted if an infant is oxygen dependant or has a PDA. Reduce feeds to 150 – 160ml/kg/day

Breast milk and Caloric needs of Preterm infants

- VLBW infants need more calories/Kg/day than term infants in order to sustain catch-up growth. These infants often require 130 – 150 kcalories/kg/day. Breast milk however only contains about 70 kcal/100ml. An infant therefore may require volumes greater than 180ml/kg per day to satisfy the caloric requirements. Volumes larger than 180ml/kg/day may however cause complications especially in the very small premature infants in that they may develop fluid overload resulting in cardiac failure or the ductus arteriosus may become patent again.
- If infants do not gain weight satisfactorily most likely due to insufficient calories, the volume of feeds may be increased after discussion with the dietician and/ or consultant. If an increase in the volume is not an option then the dietician can be consulted to increase the caloric density of the feeds by adding special caloric dense food supplements. (Consult dieticians)

Breast milk Fortifiers

- VLBW infants require more micro- and macronutrients than term infants do. Breast milk may lack the correct concentration of these nutrients and for this reason breast milk fortifiers were developed to provide additional protein, minerals and vitamins. Fortification leads to improved growth and adequate bone mineralisation.
- Use of fortifiers recommended for infants <2kg or <36 weeks gestation. Fortify human milk when infants achieve an enteral intake of 100 ml/kg/d. (R.J Schandler, 1998) Most premature infants receiving breast milk should receive breast milk fortifiers.
- All premature infants receiving breast milk in the KMC unit should receive breast milk fortifiers.

3. Methods of administering feeds

a) Tube-feeding

- Tube-feeds are usually administered 2 or 3 hourly by boluses depending on the weight of the infant.
- In the KMC ward feeds are administered 3 hourly, thus 8 feeds are given to the infants. If an infant struggles to complete the volume of a feed one can consider decreasing the volume and increasing the number of feeds. The schedule that fits in the best with the ward routine is to change the 8 feeds to 10 feeds. Feeds are then administered 2hrly during the day and 3 hrly during the night. The infant will receive feeds 2hrly during the day from 6h00 to 18h00 and then 3hrly during the night from 18h00 to 06h00.
- The infants should be held in the KMC position when receiving tube-feeds. Inform the mothers that their premature infants do not have good gastric sphincters and may regurgitate or reflux their milk feeds if they are not kept in an upright position during or after feeding or if they do not rub out their winds.

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Transition from tube- to cup-feeding

- Suckling and swallowing actions are achieved at an early age when an infant receives KMC. It is recommended that cup-feeding should be given to infants as a step between tube- and breastfeeding. Cup-feeding is also advisable when a mother is unavailable to breastfeed her baby or if breastfeeding has not been completely established.
- Most of the infants transferred to the KMC unit are on tube-feeding. If weight gain is satisfactory on tube-feeding, cup/syringe- or spoon-feeding may be introduced. Many of the infants have to re-learn how to suck in order to make the transition from tube-feeding to cup- (oral) feeding and then to breastfeeding. Cup/syringe- or spoon-feeding is the method of choice if breastfeeding is to be established because it does not cause nipple confusion.
- In order to make this transition process as safe as possible oral feeds via a cup, spoon or syringe should slowly be introduced while the tube is in situ. The volume of the feeds given by cup will slowly be increased as the infant manages to cope with larger volumes of milk until 80% of the feed is given orally and only a small amount is given via the tube. The tube can then safely be removed and the infant will continue with cup-feeding while breastfeeding is established.
- The tube should not be removed until oral feeding is successfully established. The weight of a baby is no indication of whether the feeding tube should be removed or not.
- If infants have not learnt to suck and swallow properly and the tube is removed too early, the infant may lose weight because it does not receive the correct volumes of milk. If the infant loses weight after the tube has been removed and the mother admits that the infant struggles to finish the feeds each time, a feeding tube should be re-inserted.
- The mother may be anxious because her infant is not gaining weight and she may try to force the infant to swallow the full amount of feed. This may cause the infant to aspirate part of the feed and result in choking, asphyxia, apnoea and possible death. It is therefore important that the health care staff observe the mothers and infants during feeding times to prevent this from occurring.
- If oral feeding is difficult to establish consider consulting with the speech therapists to evaluate the baby's sucking action and to give the mother exercises to improve the suckling action.

b) Cup-feeding Indications

- Pre-term infants who cannot breastfeed directly, due to lack of strength and co-ordination.
- Babies whose mothers are unavailable, but wish to breastfeed.
- Babies with problems of latching on the breast, e.g. Cleft palate, inverted nipples.
- Mothers who pasteurise their breast milk.

Advantages of cup feeding

- Cup feeding prepares the baby for breastfeeding by exercising the back of the tongue. It encourages the baby to stretch the tongue forward over the gums. Tongue action is vital for successful breast feeding-ability. To extend the tongue is essential for efficient stripping of milk ducts. It also promotes good attachment at the breast. Cup feeding stimulates tongue and jaw movement necessary to establish breastfeeding and production of enzymes and saliva.
- Cup feeding promotes eye contact between mother and baby and it is more of a sensory experience than tube-feeding. It encourages a sense of smell in the infant.
- Cup feeding causes less stress than bottle-feeding. It allows breaks from feeding and therefore the infant breathes more easily (better oxygenation) during feeding. It takes little effort to cup-feed.
- Cup feeding is a simple, safe, easy and cheap method of feeding. Cups need not be sterilized they can be washed like other cups. There are less chances of contamination compared to bottles.

Practical Tips On Cup Feeding

- The cup should not be overly full.
- The cup is tilted so that the milk just touches the infant's lips. Observable tongue activity should follow in infants of 30-34 weeks gestation.
- Infants lap by protruding their tongue into the milk to obtain small boluses. The milk is often held in the mouth for some time before swallowing. As infants mature, sipping follows lapping.

Correct positioning for cup feeding

- Infants need to be in an upright or semi-upright position during feeds.
- The head should be in a straight line with the rest of the body. It should not be tilted backwards or to the side otherwise the infant will be unable to swallow properly and aspiration may occur.

c) Spoon or syringe feeding

- A spoon or syringe may be used to administer the feed to the infants instead of a cup.
- A spoon is sometimes a good way to introduce this method of feeding because the mother is unable to offer too large a volume of feed to her infant and prevent the complication of aspiration.
- When using a syringe to feed the infant it is important to teach the mother to point the syringe towards the cheek and not towards the back of the throat. If the syringe is directed towards the back of the throat, the infant may suddenly receive a large bolus of milk resulting in aspiration.
- Only 2 ml syringes should be used when feeding the infants. Syringes with a larger volume are dangerous in that a too large bolus of feed could be delivered to the infant resulting in aspiration.

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Retroviral Exposed infants

- Exposed infants whose mothers are on ARV's and have viral loads <1000 may breastfeed. The baby should be on Nevirepine from birth.
- Exposed infants whose mothers did not receive any ARV's before delivery or where the viral loads are high are to receive their own mother's breast milk after it has been pasteurised by the Pretoria pasteurisation method for a week when the Nevirepine blood levels should be high enough that the mother can breastfeed safely. It is important that premature infants receive breast milk because it protects the infant against infections. The pasteurised breast milk also protects the infants against infections, because the anti-infective properties of the milk are not destroyed.
- The breast milk is pasteurised in the small kitchen next to the KMC unit's main entrance.
- In spite of the fact that the mothers were taught the Pretoria pasteurisation method in the High Care unit, they continue to need supervision with the pasteurisation process in the KMC unit. They also need support and training in feeding their infants with a cup or syringe.
- It is also important to go through the AFASS criteria with regards to the choice of feeding. A questionnaire is available to check whether it is appropriate for the mother to exclusively breastfeed or to give formula at home.
- When the infants are ready for discharge, the mothers can continue with the Pretoria pasteurisation method or they can decide to formula feed their infants. It is important that the mothers make a choice before discharge and that the health care staff advises the mother how to handle the preparation and storage of the feeds at home.
- Mothers who choose to formula feed their infants on discharge should receive a tutorial by the health care workers on how to mix the formula feeds, what type of bottle to buy and how to sterilise the bottles. (The dieticians will give guidance and support to the nursing staff on how to give the tutorials.)

d) Breast feeding

- In order to introduce the infant and mother as soon as possible to breastfeeding, all mothers are encouraged to allow their infants to suckle on their breasts (except mothers practising Pretoria pasteurisation) even while they are receiving tube feeds. Tube feeds and/ or cup feeds should be given until the infants are suckling well on the breast. A baby does not have to attain a certain weight before breastfeeding is started, the sooner the better.
- During these initial sessions on the breast, the infant may not obtain any milk, but this suckling is beneficial to both the mother and the infant. This suckling is called non-nutritive suckling. It reduces stress in the infant and reduces anxiety in the mother, which promotes the let down reflex and improves lactation.
- It is important that mothers in the KMC unit receive support from the health care workers to position the premature infants correctly on the breast. The infant's head, neck and body should be aligned in a straight line. If the neck is turned, the infant will have difficulty in swallowing the milk and will let go of the nipple. If mothers are having a difficult time in establishing breastfeeding, contact the dietician in order that she or the lactation team can assist the mother.
- If mothers complain that they do not have enough breast milk, it is the custom to prescribe Eglonyl (sulpiride) 100 mg 3x daily for 7 days or Solian (amisulpride) 100 mg bd x 7 days. Prescribe this for each mother who has milk supply problems. Another drug that also improves lactation is Maxolon (metoclopramide) 10 mg tds (Not as effective as sulpiride and has CNS side effects). If the mother has hypertension; give amisulpride that does not have an effect on bloodpressure. The mother can receive a milkshake drink from the dieticians which also help with her milk supply.

Fortification of Breastmilk with FM 85 powder

- Mothers who breastfeed their infants will receive FM 85 powder to fortify their breast milk. Fortification is necessary because breast milk does not always provide enough protein and minerals necessary for satisfactory growth in premature born infants.
- The dieticians provide the FM 85 powder and fortification is started as soon as infants are receiving 100ml/kg oral feeds. Some infants will already be on fortification when they are transferred down to the KMC unit, other infants will be placed on it by the dietician working in ward 4.
- The FM 85 powder is placed in a plastic container with a lid and every day each infant will receive a new container of powder. All FM 85 and spoon containers will be clearly labelled. The nurses must please check that mothers collect the containers.
- The small (1 gram) spoon is used to measure out the FM 85 powder. One scoop should be added to 25ml expressed breast milk. These spoons and containers should be washed once a day and placed in the Milton for 30-60 minutes. The clean spoons should be replaced in the clean container. Explain to the mothers that the spoons should be dry when they scoop up the powder.
- Upon discharge the small spoons should be returned and handed to the dietician for reuse. It is difficult to obtain these small spoons and it is important that the mother does not take it home with her. The mothers receive a tin of FM 85 on discharge and each tin is provided with its own spoon.

e) Bottle feeding

- All mothers are encouraged to breastfeed their infants. No bottle-feeding is allowed, all formula should be given by cup. Even if a mother intends to bottle feed her infant when she goes home, bottle-feeding is not allowed in the unit. Cup-feeding is the preferred method of feeding the premature infants in the ward if breastfeeding is not possible.
- Sucking from a bottle has several disadvantages for premature infants. It is more tiring than suckling from the breast and infants on bottle feeds have more episodes of apnoea, hypoxia and aspirate more easily.

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- Mothers who choose to formula feed their infants on discharge should receive a tutorial by the health care workers on how to mix the formula feeds. Each mother will receive a cup on discharge and they will be encouraged to use this to feed the baby and not to use bottles as it is easier to clean the cups with soap and water than cleaning the bottles and teats.

Advantages and Reasons for breastfeeding

- Breast milk is well tolerated especially by extreme premature infants and it promotes earlier achievement of enteral feeding.
- Breast milk provides immunological and anti-microbial components resulting in fewer infections, a decrease in the severity of nosocomial infections and almost no occurrence of necrotizing enterocolitis. Skin-to skin care enhances antibody production that protect against specific infections.
- Growth factors and hormones in breast milk improve brain and neurological development of the infant.
- Enzymes in breast milk increase bioavailability of macronutrients and there is also greater bioavailability of trace elements. The enzyme lipase improves fat absorption.
- Hormones in the breast milk improve gastric emptying and this leads to improved tolerance of feeds.
- Low iron concentration in breast milk prevents bacterial overgrowth and fewer infections occur.

Breast milk proteins

The proteins in breast milk have an important immune function.

- WHEY protein**

60-70% of breast milk consists of whey protein, which contains immunoglobulins that protect against infection, immunostimulants that protect against allergy and immunosuppressants that dampen inflammation.

- CASEIN protein**

8% of breast milk protein consists of casein. Casein breaks down into protective factors & factors which directly regulate the baby's gut. These factors include phosphopeptides that assist in the absorption of calcium and zinc and lactoferrin that acts as a growth factor and bacteriostatic agent as well as assists in the absorption of iron.

- Breast milk nitrogen - NON-PROTEIN NITROGEN**

Non-protein-nitrogen repair and improve the growth of the gut. It also has protective functions

Breast milk is a DYNAMIC Food

The composition of breast milk varies immensely.

- It varies during the course of suckling and from one suckling to another.
- It varies from one day to another and during the whole course of lactation
- It varies between every mother and child pair.
- The types of immunoglobulins produced are specific to the particular bacteria and viruses, which the mother is meeting in her environment. So if the mother and infant form a pair, the mother's immunoglobulins will protect her infant from bacterial and viral organisms in their combined environment.

Function of Anti-infective Factors in Human Breast Milk	
Factor	Active against (in vitro)
<i>L. bifidus</i> growth factor	<i>Enterobacteriaceae</i> , enteric pathogens
Secretory Ig A	<i>E. Coli</i> (+ enterotoxin); <i>C. diptheriae</i> ; <i>C. tetani</i> ; <i>Salmonella</i> ; <i>Shigella</i> ; <i>S. pneumoniae</i>
Lactoferrin	<i>E.coli</i> ; <i>C. albicans</i>
Lactoperoxidase	<i>Streptococcus</i> , <i>Pseudomonas</i> , <i>E. coli</i>
Lysozyme	<i>E. coli</i> , <i>Salmonella</i>
Lipid (unsat. fatty acid)	<i>S. aureus</i> ; Herpes simplex, Influenza
Milk cells	Phagocytosis: <i>E.coli</i> , <i>C. albicans</i>

Variations in Breast milk over the first 5 days of life

- There are striking differences in the milk content during the first few days of life after birth.
- At birth the milk contains huge amounts of whey, which contain all the protective elements already discussed. This forms part of colostrum. Colostrum is absolutely essential for the protection of the newborn infant, especially the LBW premature infant. By day 3 the concentration of whey has fallen to a stable level, which is much lower.
- Casein breaks down in peptide hormones, which govern the function of the gut. Because the gut is empty at birth casein only appears in the milk on the 2nd day when the baby is starting to take bigger volumes of food. The composition of human milk changes constantly according to the needs and circumstances of the infant.

Breast milk versus formula (cow's) milk

- Cow's milk or formula milk is static. It does not change with time, it does not respond to the baby's needs and it does not contain any protective immunological factors.
- Only 2% of cow's milk is non-protein nitrogen versus the 25% of human milk.
- Cow's milk contains very little whey and no protective factors to speak of.
- Cow's milk consists of 90% casein as opposed to 8% in human milk. The casein is different in nature to that found in human milk. When digested, cow's milk casein breaks down to peptide hormones, which are called caso-toxins and these have a toxic effect on the immature human gut causing constipation, distension and other problems.

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Standards and Procedures: Handling of Milk in ward 4

Management of the milk in the Refrigerator

1. The temperature of the fridge should stay in the range of 2-8°C. Twice a day the fridge's temperature should be recorded onto a temperature register secured to the fridge's door. Each month the temperature chart will be replaced with a new chart. The old chart must be placed in the Milk Handler's file. Only breast milk and formula milk and FM 85 may be stored in the milk refrigerator.
2. There are red plastic rectangular containers. Each patient in ward 4 will be issued with one of these containers on admission. Each mother is allocated to lie in a bed that is numbered from 1-20. The red containers are also numbered from 1-20. The mother will use the container with the same number as the bed that she is lying in.
3. The mothers will be provided with small round plastic cups with lids which will be used to store expressed breast milk.
4. After the mother has fed her infant the required amount of breast milk, she can store any excess milk in the plastic cup. The cup should be covered with the provided lid and labelled with the date and time of expression. The milk should be placed in the red rectangular container in the refrigerator and used for feeding within the next 24 hours. The mothers must place the fresh milk in the back of the container and move the older milk to the front to be used first. If the mother produces large volumes of breast milk, more than her infant would drink within 24 hours, disposable cups can be supplied in which she can store her breast milk in the freezer for later use.
5. Mothers who have to pasteurise their breast milk using the Pretoria pasteurisation method should pasteurise the milk shortly before giving it to their infants. Milk that have been pasteurised can be stored in the refrigerator or it can be frozen. Mother's breast milk that was frozen should be placed in the rectangular container for thawing (defrosting) in the fridge and used for feeding within 24 hours after opening the container.
6. Be sure that the refrigerator doors are closed tightly at all times. Do not open the doors more often than necessary and close them as soon as possible. Do not over pack the shelves so that the air can move throughout the unit.
7. Keep the refrigerator clean. Wipe up spills immediately, wash surfaces throughout with hot soapy water and rinse. Clean all external surfaces often with a soft cloth and mild liquid dishwashing soap. The grill in front of the condenser should be kept free of dust and lint to permit air to flow freely to the condenser.
8. Check the milk stored in the fridge on a daily basis and throw out any milk that has expired.

Handling of Pasteurised Donor Milk

Kalafong hospital pasteurises its own donor breast milk and occasionally receives pasteurised donor milk from the South African Breast milk Reserve (SABR). This milk is used to feed premature infants where the mother is unable to provide breast milk. It is well known that breast milk protects premature infants from developing necrotising enterocolitis (NEC). Using formula milk increases the risk that an infant may develop this condition. NEC has a high mortality and morbidity rate. The neonatal unit does not have a freezer to store the milk. The milk is stored in the pasteuriser room in ward 4.

1. The donor breast milk is stored in 250 ml plastic bottles with heat sealed aluminium foil caps. After the milk has been pasteurised it is immediately frozen. Details of the milk must be entered into the Delivery and Issuing Register which is kept in a plastic pocket attached to the door of the freezer.
2. Frozen breast milk can be stored for a maximum of 3 months in the freezer. Any stock older than 3 months should not be used and should be removed from the freezer. Discard the expired milk by pouring it down the drain as soon as it has thawed (defrosted) and place the empty bottles in a dustbin.
3. After issuing the milk the bottles need to be placed in the fridge for thawing (defrosting). Thawing takes time (\pm 2hours) and therefore it is important that milk is issued in advance in order that infants can receive feeds on time.
4. Each patient in the neonatal unit and ward 4 is issued with a special plastic rectangular container in which the mother's breast milk, the donor breast milk or formula milk is stored. As soon as the milk bottle is opened a white sticker should be placed on the bottle with the patient's name, date and time of opening. Only the amount of milk necessary for each feed is decanted into a clean cup and the bottle placed back in the rectangular container.
5. Any milk that remains in the bottle 24 hours after opening of the bottle must be discarded.
6. The milk handlers are in charge of the above actions. They see to it that the mothers receive the correct amount of donor breastmilk.

Maintenance and upkeep of the Freezer

1. The pasteurising room with the chest freezers should be kept locked and the patients should not have free access to it. A key is kept by the sister in charge of ward 4, by the dietician in charge of ward 4, by Dr Van Rooyen, consultant of ward 4, by Martha Rabothata and the other two milk handlers..
2. The milk should be stored in an orderly manner. One basket will be allocated for storage of non-pasteurised breast milk from mothers in ward 4 and the neonatal unit. Pasteurised donor breast milk will be stored in the other basket.
3. Twice a day the freezer's temperature should be recorded onto a temperature register secured to the freezer's door. Each month the temperature chart will be replaced with a new chart. The old chart must be placed in the Milk Handler's file.
4. The freezer compartment should maintain a temperature at or below -18°C. The freezer temperature should never be more than -15°C. Avoid overcrowding your freezer compartment shelves. Cold air must be able to circulate freely throughout the freezer compartment to keep food properly frozen.
5. Clean all external surfaces often, also freezer shelves. Mop up any spills as soon as they happen. Clean the external surfaces with a soft cloth and mild liquid dishwashing soap. The grill in front of the condenser should be kept free of dust and lint to permit air to flow freely to the condenser.
6. *What is the safest method to thaw (defrost) frozen foods?*
Frozen foods must be thawed carefully to prevent contamination and spoilage. The safest method of thawing frozen food is to place them in the refrigerator. Never thaw frozen foods at room temperature. Thaw times vary by weight. Foods weighing 350 grams or less will thaw in 4 hours.

Cleaning of the plastic cups and lids

1. Wash the cups and lids with soap and water to make sure that any fatty residue has been removed.
2. After washing and rinsing the cups and lids, place them in the jug next to the bed. They need to stay in the Milton for 30 – 60 minutes. Thereafter the cups and lids can be removed and immediately used. No rinsing is required.
3. Every day the jug of Milton is freshly prepared by the staff in ward 4 by placing 1600ml water in the jug and adding 20 ml of sodium hypochlorite to the jug. In the pink kitchen a bucket of 8 litres water and 100ml of Milton is prepared every day for the glass jars that is used for Pretoria Pasteurisation.