ADMISSION AND DISCHARGE IN NEONATAL NURSERY

Appropriate care of the newborn baby at delivery is very important. It is here that decisions about admission to the neonatal nursery are made.

Routine care of the newborn at delivery
Most babies require only simple supportive care at and after delivery
- Dry the baby with a clean towel
- Observe baby while drying (heart rate, breathing, colour, muscle tone, response)
- Give the baby to the mother as soon as possible, place on chest/abdomen
- Cover the baby to prevent heat loss
- Encourage initiation of breastfeeding within the first hour

Skin-to-skin contact and early breastfeeding are the best ways to keep a baby warm and prevent hypoglycaemia

Neonatal resuscitation
Anticipate the need for resuscitation in the baby of / with:
- a mother with a chronic illness
- a mother with a previous fetal or neonatal death
- a mother with pre-eclampsia
- a multiple pregnancy
- a preterm delivery
- abnormal presentations of the foetus
- a prolapsed cord
- prolonged labour or rupture of membranes
- meconium-stained liquor

For many babies the need for resuscitation cannot be anticipated before delivery. Therefore, be prepared for resuscitation at every delivery.

A. Admission of a baby to the nursery

NB: Ensure baby is fully resuscitated according to "Neonatal Resuscitation" guideline / Resuscitation poster in labour ward. Ensure baby is wiped down and stimulated prior to transfer.

Admission procedure
1) The baby must be correctly identified with the identification band attached to the baby’s arm or leg. ID band to include name, gender and date of birth.
2) A nurse must transfer the baby, together with the baby’s chart, correctly completed with all the necessary information and reason for admission.
3) Ensure full maternal history is given including administration of nevirapine and dexamethasone. Full details of birth and resuscitation are required.
4) During the transfer, the baby must be kept warm. Provide oxygen if necessary.
5) The nurse transferring the baby must hand over and give the full report to the nursery nurse.
6) The baby must be put on a warm resuscitation stand and both nurses must together check and confirm the baby’s details.
7) The baby’s condition must be assessed and oxygen must be given as required even before identifying the baby.
8) The first observations must be done:
   i.e. HGT 1 hour after birth, signs or respiratory distress (breathing, colour, oxygen saturation), pulse and temperature.
9) Notify the doctor and give a full report about the admitted baby.
10) Enter the baby’s details into the nursery admission book.
The following babies should be admitted into the neonatal unit:

1) Pregnancy complications
   - Babies with Rth negative mothers
   - Babies with diabetic mothers

2) Labour / birth complications
   - Birth asphyxia
   - Meconium stained liquor Grade 2 & 3
   - Caput Grade 2 & 3
   - Birth injuries
   - Assisted deliveries
   - Prolonged rupture of membranes
   - Babies born with offensive liquor

3) Small / big babies
   - Babies weighing < 2kg at birth
   - IUGR
   - Big babies weighing ≥ 4kg at birth

4) Sick babies
   - Breathing problems
   - Congenital abnormalities
   - Jaundice – on day 1 with rising TSB, or levels close to requiring an exchange tranfusion (see “Neonatal Jaundice” guideline)
   - Lethargic and/or hypothermic babies that do not respond to routine management
   - Persistent vomiting or abdominal distention
   - Persistent hypoglycaemia despite normothermia and supervised feeding
   - Haemorrhage e.g. subaponeurotic

5) Absent mothers
   - Babies whose mothers are too ill for rooming-in
   - Babies whose mothers have died
   - Abandoned babies
   - Babies whose mothers are on ‘pass out’
   - Babies born before arrival (BBAs), if they have any of the problems listed above

B. Discharge of a baby from the nursery

A baby may be discharged home once his/her condition is stable, i.e.:
   - not oxygen-dependent,
   - sucking from breast,
   - gaining weight, and
   - > 1.7kg

If the baby is in 24hr kangaroo mother care with a responsible mother, earlier discharge can be considered at ± 1.5-1.6kg (See “KMC” guideline)
Establishing Feeding

Babies need food to grow, and breast is best...

1. Babies who should NOT be fed
Do not start feeds on day 1 if the answer to any of the following is ‘YES’:

- Perinatal asphyxia
- Low Apgars
- No passage of meconium or other GIT problems
- Protein in urine
- Severe respiratory distress

These babies still need fluids, thus:

- Commence IV maintenance fluids (neonatolyte) at the appropriate rate (see “Feeding and Fluid Management” guideline)
- Keep on IV fluids only
- Gradually add feeds from Day 2 (refer to above guideline)
- Increase the feeds if there is no vomiting, apnoea or abdominal distension
- If the baby is unable to tolerate feeds at all, IV fluids can be continued alone for a maximum of 3 days. Thereafter, if still unable to feed, arrange for transfer.

2. Babies who should be fed – ALL the rest

Encourage exclusive breast feeding

Babies who are able to suckle and for whom breast feeding is not contra-indicated, should be put to the breast within 30 minutes of birth.

Some babies are unable to suckle, and these babies need to be fed expressed breast milk (EBM) via nasogastric tube or cup until they are able to suck fully from breast.

All babies need gut priming with breast milk.

a. Establishing feeding in babies ABLE to suck

Advantages of breast feeding

- Psychological (e.g. placid prems)
- Labour saving
- Non-allergenic
- Correct constituents, thus reduces obesity
- Involution of the uterus
- Digestibility
- Protection (reduces infectious diseases)
- Correct temperature
- Economical
- Mortality reduction e.g. cot deaths, gastro deaths
- Sterile

Setting the scene

- Education in hygiene – washing of hands before commencing feeds
- Provide privacy
- Encourage mother to relax completely, support back
- Make sure patient is comfortable
Position for feeding (depending on type of confinement)

- Mother lies on her side, baby next to her
- Mother sits upright in bed or on a chair with baby across her lap
- Mother sits with baby's head in hand and body tucked under her arm at her side
- During feeding the baby should be wrapped in a blanket with his hands and arms free, held in a semi-upright position with the head supported and the neck in a neutral position
- Ensure the mother is comfortable and her arm is supported

Putting baby to breast

Put baby to breast immediately after delivery if the mother’s condition permits.

Stay with the mother and assist until the baby has sucked well.

- Baby must be awake and alert. Unwrap baby and stimulate by rubbing the soles of the feet
- Encourage rooting by placing the nipple near the baby's cheek or mouth. This usually stimulates the baby to open its mouth, seek the nipple and to latch on
- Baby must be comfortable e.i.e. clean nappy
- The baby must open its mouth wide to ensure that as much as possible of areola and the nipple is taken into the mouth
- Tongue must be in the downward position
- Allow baby to suck the required amount of time on the breast, i.e. 5 – 10 mins on each side
- The baby must have been fed within 6 hours of birth
- Feed on demand - no less than every hour and no more than 6 hrs between feeds
- Burping can be achieved sitting baby up or gently holding over shoulder and rubbing baby’s back. Do not be too vigorous or pat as this may lead to regurgitation

Difficulties encountered in latching

- Congenital defects – e.g.cleft lip/palate
- Baby – drowsy or irritable, e.g. hypoglycaemia/ jaundice/hypothermia
- Ill baby – brain damage, e.g. HIE
- Mental defect – Down’s syndrome, poor sucking reflex
- Prematurity
- Respiratory distress
- Cardiac conditions, e.g. cyanosis particularly during effort such as sucking or crying

Removing baby from breast

- Advise mother never to pull baby off the breast as this may cause sore, cracked nipples
- The suction must be released before taking baby off breast, either:
  - depress chin, or
  - gently pinch cheeks, or
  - put a finger into the corner of the mouth and depress slightly

Choice of formula (N.B. Only if breast feeding is impossible)

- Premature infants < 1500g – PRENAN
- Term infants > 1500g – NAN
- PMTCT Program – PELARGON
- Any other specialized feeds to be discussed with dietician and consultant

Use cup and formula feeds if:

- The baby is abandoned
- The mother has died
- The mother has no milk (after 3 days) despite Maxalon, regular expressing and a good fluid intake on doctor’s orders
- The mother is on the PMTCT programme and has decided to formula feed (must be an informed decision based on her social and economic circumstances)
- The mother is returning to work / school and will not be able to breastfeed. She should however be encouraged to express her milk and cup feed
b. Establishing feeding in babies UNABLE to suck

Nasogastric feeding (see Technique section)
If baby is totally stable and not requiring IV antibiotics commence on full feeds as per daily fluid requirements.

Babies should be fed via nasogastric tube until able to progress to cup and/or breast feeding.

Daily fluid requirements (see "Feeding and Fluid Management" guideline and "Cornerstones of Neonatal Care” poster)

<table>
<thead>
<tr>
<th>Day</th>
<th>Fluid (ml/kg/day)</th>
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<tbody>
<tr>
<td>1</td>
<td>60</td>
</tr>
<tr>
<td>2</td>
<td>90</td>
</tr>
<tr>
<td>3</td>
<td>120</td>
</tr>
<tr>
<td>4</td>
<td>150</td>
</tr>
</tbody>
</table>

- Extremely premature babies under radiant warmers may need double this in the first few days. Watch fluid balance closely
- Calculate fluids according to birth weight until baby passes this weight again
- Babies under phototherapy should be given an extra 30ml/kg/day
- Feeds may be increased by 20 - 30ml/kg/day as tolerated
- Premature babies must only be fed on their stomachs. This assists digestion, decreases reflux and helps prevent aspiration
- The nasogastric tube must be aspirated prior to each feed to check tube placement and gastric residuals. Any blood/bile stained aspirates should be reported to the doctor and feeds discontinued. If the residual is greater than 50% of the feed this should be returned and the feed decreased by the same amount
- Any signs of abdominal distention and/or vomiting should be investigated for sepsis, NEC or obstruction.
- Nasogastric tubes must be changed every 3 days to prevent infection and the risk of gastric perforation
- Any problems with feeds or nutrition should be discussed with the dietician/paediatrician at the referral hospital

Commencing breast / cup feeding following NGT feeds
This should be commenced at:
- 32 - 34 weeks gestation
- ± 1700 - 1800g

Do not attempt to breast feed prior to this as the baby’s suck/swallow is not co-ordinated and he/she may not tolerate orally, may aspirate, may tire and lose weight.

The baby should have:
- intact suck and gag reflexes
- be on full volume NGT feeds
- good periods of quiet sleep
- good sleep/wake cycles
- easy waking
- be able to maintain a quiet alert state

N.B. Ensure mother has sufficient milk – give Maxalon and Ensure if necessary

Tips for feeding transition (NGT to cup/breast)
- During feeding the baby should be wrapped in a blanket with hands and arms free, held in a semi-upright position with the head supported and the neck in a neutral position
- If baby makes no attempt at sucking continue full NGT feed
- Introduce one breast feed per day if baby sucks well. Increase by one feed each day replacing the equivalent NGT feed. So by day 8, baby should be on full breast feeds. If baby is sucking well and gaining weight, may introduce more rapidly

Tips for feeding transition (NGT to cup/breast)

N.B. This is not feeding, but simply preparing and colonising the bowel using EBM (expressed breast milk) in preparation for full feeds. It has been shown to greatly decrease the incidence of NEC in premature neonates.

Gut priming should be commenced on all premature babies on day 1 or as soon as clinically possible.

Regimen
- < 1000g - 0.5ml EBM 12hrly on day 1; 6hrly on day 2; 3hrly on day 3; then gradually increase
- 1000 – 1200g - 1ml EBM 6hrly
- 1200 – 1500g - 1ml EBM 3hrly
- > 1500g - commence feeding, as tolerated, e.g. 5-10ml EBM 3 hrly
3. Techniques

a. Nasogastric tube (NGT) feeding

Insertion of NGT

1) Purpose
- to facilitate feeding when the baby is unable to suck
- to enable accurate monitoring of the fluid intake and absorption of the feed
- to ensure weight gain
- to provide gastric drainage / decompression when indicated / NPO

2) Indications for insertion of NGT
- Infants who are too ill to suck and yet need to be fed
- To feed mechanically ventilated infants or infants nursed on CPAP
- Cases of distended abdomen
- Infants with poor sucking reflexes due to, e.g. asphyxia, low birth weight and babies with congenital abnormalities

3) Inserting a NGT

Preparation
- Explain the procedure and reasons for it to the mother
- Prepare the following items:
  - Size 5 NGT for infants weighing < 1000g
  - Size 6 NGT for infants weighing between 1500g-3500g
  - Size 8 NGT for infants weighing > 3500g
  - 2ml syringe to aspirate (5/10/20ml depending on the amount of feed)
  - Litmus paper
  - Granuflex (extra thin)
  - Strapping - tegaderm
  - Sticker with the date of insertion and due date for changing the tube
  - Stethoscope
  - Emergency equipment – suction and oxygen.  N.B. Ensure it is functional
  - Chlohexidine hand lotion
- Identify the baby – check name bands and name on the cot or incubator
- Change nappy if necessary. Ensure baby is wrapped securely
- Wash both hands under running water before removing the tube from the package

Procedure
- Measure tube length required by holding the tip of the tube against the baby’s nose and measuring the distance from the nose to the ear lobe, then down to the lower end of the sternum (xiphisternum).  Mark the tube at this point  (For orogastric tube start measurement from the mouth)
- Lubricate tube by wetting in baby’s mouth
- Flex the infant’s neck slightly and gently pass the tube through the nostril until you get to your measured point
- N.B. The nasal passages are fairly anterior so curve the tube down quite sharply.  If you cannot pass a tube down either nostril, choanal atresia must be excluded
- If the tube does not slide easily, re-lubricate using KY jelly or sterile water and try the other nostril
- Prepare the skin with skinprep and (extra thin) granufex before securing the tube by strapping it onto the side of the baby’s face. Use a 1cm wide strip of transparent dressing (eg tegaderm)
- Ensure that the nostril is patent

Check position of NGT
- Aspirate stomach contents with the syringe and place a drop on the strip of blue litmus paper (should turn blue litmus paper pink if the tube is in the stomach) OR
- Instill 2ml air rapidly down the tube and listen with a stethoscope.  You should hear a woosh as it enters the stomach
- If there is any doubt about the location of the tube, withdraw it and start again
- Attach the date sticker to the end of the tube

Feeding
- Change nappy prior to feeds
- Aspirate gastric contents and record volume before each feed.  If aspirate volume > 50% of feed volume return aspirated contents to stomach and subtract this volume from feed to be delivered
- Attach a sterile syringe containing required feed to the end of the tube
- Remove plunger and allow gravity to move feed, allowing for a feeding duration of 10-15 minutes
- Keep the baby in a prone position or right lateral to decrease the chance of regurgitation and aspiration
- Observe the infant closely for intolerance, gagging vomiting and other complications N.B. a staff member should always be present during tube feeding
- The syringe used must be changed 3 hourly together with the feed
If feeding intolerance is suspected, continuous feeds can be considered. Change the NGT tube every third day and record on the NGT feed chart (Form Paed/21). Do not reposition or change nappy following feeds as this can lead to vomiting.

### Complications
- Vagal stimulation – leading to apnoea and bradycardia
- Trauma – mucosal damage
- Incorrect placement, e.g. into the lungs
- Infection
- Gagging and vomiting resulting in aspiration

### Stomach washout

**A stomach washout is performed on babies in order to cleanse the stomach of any irritants and consequently assist with establishment and toleration of feeds.**

**Indications**
- Meconium stained liquor III, i.e. thick meconium – in formula fed babies (as breast milk contains phagocytes which help remove meconium). Sodium bicarbonate helps neutralize any acid, in particular the corrosive effects of meconium.

**Equipment**
- Utility pack
- Nasogastric tube size 8 (blue)
- 10 ml syringe
- Blue litmus paper
- Stethoscope
- Suction machine – clean, connected and in good working order
- Oxygen – connected and working
- First baby pack
- Solution of 50 ml of 4% soda bicarbonate and 50 ml sterile water (warmed)

**Procedure**
- Wrap baby and place on right side
- Pass the lubricated nasogastric tube and secure it
- Inject 10 ml solution down tube. Check placement of NG tube. Gently turn baby from side to side to ensure fluid reaches all of stomach and then aspirate the same 10 ml out
- Observe colour, consistency, amount and odour of the aspirate
- Eject it into bowl. Continue until return is clear
- Observe baby closely throughout the procedure
- Record on progress notes and feeding chart – time washout was done and the result (Form Paed/21)
- Place the baby in the right lateral position to prevent aspiration
- Wait for 1 hour before feeding baby again
- **Put to breast**. Breast milk contains phagocytes that absorb the remainder of meconium
- If baby continues vomiting after two stomach washouts, refer to doctor

**Always keep the doctor informed**
MEDICATION ADMINISTRATION

Administering medication to babies requires careful checking and excellent technique.

Checking medication

N.B. Ensure two people check and sign for medication both at medicine counter in pharmacy and at the bedside.

It is essential that medication is properly checked, as follows:

- Name on form and ID band
- Dose (check in medication file if unsure)
- Frequency (when was the medication last given)
- Route
- Doctor’s signature and printed name and qualifications
- Expiry date
- Calculation and amount drawn up
- Correct re-constitution
- Allergies
- Ensure medicines are administered over the correct time period
- Compatibility of medications if infused together
- Rate of IV infusion e.g. bolus or 30 mins

Oral medication

Oral medication must be accurately drawn up in an appropriate syringe and administered by mouth or via the NG tube.

Intramuscular (IM) medication

Clean the chosen site with an antiseptic solution. Carefully check the dose of the drug to be given and draw the correct amount into the syringe. Expel the air from the syringe before injecting.

All IM medication must be administered into the lateral aspect of the baby’s thigh (see attached diagram).

Intravenous (IV) medication

Bolus via a short-line

- Clean bung / clave with chlohexidine.
- The medication should be infused slowly over 3 - 5 mins and the iv line should be flushed with 0.5 ml saline before and after each administration.

Infusion

- Most IV antibiotics are caustic to neonatal veins and should be infused slowly over 30 mins to 1 hour.
- A continuous infusion may also be considered.
- Ensure all medications are flushed through with the same volume of saline afterwards.
- Check compatibility of drugs, e.g. do not give penicillin with aminoglycosides (e.g. amikacin or gentamycin).
Blood transfusions in babies may be life-saving. However, great care must be taken to ensure that correct SMALL volumes are used otherwise they may become life-threatening.

Why give a blood transfusion?
Blood transfusions are given to raise haemoglobin levels when clinical signs of anaemia are present. It is imperative that they are administered using aseptic technique and are closely monitored in order to prevent sepsis and ensure early detection of anaphylactic shock.

Policy
A blood transfusion must be ordered by a doctor who must also take blood for cross-matching. The doctor must sign consent for a R/N to erect the first unit of blood.

4ml/kg blood increases the haemoglobin by 1gm% thus about 10ml/kg is usually ordered

Hospital policy must be adhered to when ordering, checking and receiving blood.

Requirements
1) Equipment for setting up an IV:
   - Vacolitre – neonatalyte
   - Buretrol
   - Write date on drip chamber
   - Administration set
   - T-piece and strapping
2) Unit of packed cells (O negative blood can be given to babies), at 10ml/kg
3) 50 ml syringe and extension set
4) Syringe driver
5) Fluid balance and observation charts
6) Gloves

Procedure
1) Peripheral line to be inserted by doctor (see IV guideline). Use a short-line separate from maintenance fluids if possible
2) Do baseline observations
3) Blood must be checked by 2 people as ordered by doctor
   - Check patients name, registration number, pack number, blood group and Rhesus, and expiry date
   - Details entered on orange card: date, time, signature, pack number, blood group and countersigned by checker
   - Ensure doctor has signed permission for R/N to erect blood
4) Draw up blood into 50 ml syringe (vary according to the amount of blood given)
5) Attach the extension line and flush blood through
6) Flush IV line with saline. Blood cannot be administered with glucose
7) Attach blood through a syringe driver and discontinue IV
8) Set according to the specified rate (usually over 4hrs)
1) Commence the blood transfusion
2) In Nursing Process, enter the date, time and baseline observations. Also record that information on Observation Chart. Record amount on Fluid Balance Chart in red (Form Paed/21)
3) Observe baby carefully:
   -i.e. temperature, pulse, BP, respiration, colour, oxygen and SATS
     - every 5 min for 15 minutes, then
     - every 30 minutes x 2, then
     - hourly
4) Administer lasix halfway through the transfusion, as ordered
5) Check blood glucose before, during and after the blood transfusion, particularly if maintenance fluid is discontinued (follow “Neonatal Hypoglycaemia” guideline)
6) On completion, flush with saline and reconnect IV running at the correct rate
7) Clean up and record in Nursing Process
Phototherapy is most often an effective and safe treatment for neonatal jaundice (see "Neonatal Jaundice" guideline).

**Preparations**
- Make sure the environment is warm enough
- Educate the mother about neonatal jaundice (NNJ) and phototherapy, and reassure her
- Obtain consent from the mother
- Undress the baby, removing blankets, clothing and nappy
- Ensure distance between baby and lights is ± 35cm
- Do not smear the baby's skin with vaseline
- Place a nappy under the baby
- Cover the baby’s eyes, then put him/her under the lights

**Ensure effectiveness of phototherapy**
- Remove the baby from the lights only for breast feeding (remove eye shields), and as briefly as possible
- Limit separation of the baby and the mother, if possible nursing baby with the mother
- Use biliblanket (if available) for double lights
- Turn lights off when taking “flash” or TSB
- Change the baby’s position 3 hourly
- Change lights after 1000 hours

**Prevent complications**

a. Prevent hypothermia and hyperthermia
- Check temperature 3 hourly, at the same time when the baby is fed
- Note signs of hypothermia and hyperthermia

b. Prevention of dehydration
- Check for dehydration, observing skin turgor, perfusion, fontanelles and activity
- Report any changes in the above.
- Encourage fluids - increase daily fluid requirement by 30 ml/kg/day
- Do not give clear fluids as a supplement, e.g. glucose water, rather feed the baby 3 hourly
- Breast feeding must be encouraged but if TSB levels are climbing get mother to express and feed via cup/NGT to ensure baby stays under lights as much as possible
- Weigh the baby daily
- Monitor blood glucose (HGT) 6 hourly
- Give neonatalyte if HGT is dropping

b. Prevent damage to the eyes
- Clean eyes with sterile saline 3 hourly
- Protect eyes with eye shields. Ensure that the shield does not obstruct the nose or mouth. It must fit securely over the eyes and head ensuring the eyes are effectively shielded

**Monitor carefully**

a. Monitor elimination
- Record passing of stools and note the consistency
- Observe for diarrhoea and increase fluids if necessary
- Ensure baby is passing good amounts of urine - at least one wet nappy per feed
- Monitor urine dipstix 6 hourly: must maintain SG ≤ 1010

b. Monitor for signs of kernicterus
- Note signs of hypotonia, lethargy, decreased sucking, abnormal Moro, irritability and opisthotonus
- Check TSB daily. Refer to secondary / tertiary hospital early if levels continue to rise and an exchange transfusion may be needed

If baby is discharged within first 3 days of life, ensure mother is informed about signs of jaundice. Encourage her to return early to clinic or hospital especially if baby becomes lethargic and won’t drink.

If possible, screen babies prior to discharge using a flash bilirubinometer
**Preparing for Transfer of a Neonate**

Ensuring the baby arrives safely

**Aim**

The aim of the care during transfer is to ensure that the infant is in the best possible clinical condition while he/she is being moved from one facility to another, e.g. clinic to the hospital, by providing the following:

- a warm environment
- an adequate supply of oxygen
- a source of energy
- careful observations

**Preparation for transfer**

- All infants must be stabilized before transfer (see "Transporting Neonates" guideline)
- **Follow the referral criteria for your institution and district**
- Discuss the transfer and condition of the infant with the staff at the receiving hospital
- Assess the condition of the baby and arrange for the appropriate mode of transport
- Critical notes, referral letter and baby’s clinic card must be sent with the infant
- Consent for surgery, if indicated, must be obtained and sent with the infant
- In the absence of trained ambulance personnel, nursing or medical staff should provide care for the infant while he/she is transferred
- A transport incubator, oxygen supply and an emergency box of essential resuscitation equipment should always be available for use in transferring newborn infants
- Whenever possible, the mother should be transferred with her baby

**Prevent hypothermia**

Keep baby warm using either skin-to-skin care method or the transport incubator. If mother is not available, wrap the baby in a silver swaddler (space blanket) or heavy gauge tin foil. **N.B. ensure baby is warm first!**

Maintain temperature between 36°-37°C. Do not over-warm. The baby’s skin temperature must be measured regularly.

**Prevent hypoglycaemia** (see "Neonatal Hypoglycaemia" guideline)

Some supply of energy must be provided during transfer, e.g. neonatalyte or 10% dextrose IV; or milk feeds, if stable. Monitor intake and output. (Form Paed/21)

**Prevent hypoxia**

Infants with respiratory distress and apnoea need oxygen and ventilation during transfer. Monitor pulse and oxygen saturation of all ill neonates. Aim for oxygen saturation of 88-93%. N.B. Saturation > 95% can lead to blindness.

**N.B. The referral letter**

| The referral letter is vitally important for the baby – so make it GOOD! |

Include accurate details of the following:

- History of labour and birth details, including Apgar score
- PMTCT programme (nevirapine administration) and feeding choice
- Maternal history
- Care given, including
  - fluids and nutrition, i.e. IV fluids / feeds
  - \(O_2\) requirements
  - last set of observations
  - resuscitation given
- Medications given, e.g. Konakion<sup>®</sup>, antibiotics
- Clinic card
- Current condition
**GESTATIONAL AGE SCORING**

Determine the gestational age score as soon as possible after birth, preferably within 12-24 hrs

**Why is gestational age important?**
It is important to know the gestational age of a baby, especially at the limits of viability, so that appropriate care plans can be made.

**Which babies should be scored?**
- low birth weight babies
- post-dates babies
- big babies
- babies with unknown EDD

**What is the Dubowitz / Ballard Score?**
The Ballard score looks at both the neuromuscular and the external/physical features of a baby, each according to six categories. A score is determined for each category, then added to give a final score (twelve categories). This is converted into a gestational age or maturity rate, using a table. (see "Dubowitz/Ballard Scoring for Gestational Age" guideline)

**What is the SPLEN Score?**
The SPLEN score is a convenient and quick method of calculating the gestational age. SPLEN is an acronym for:
- **Skin**
- **Plantar creases**
- **Labia / Scrotum**
- **Ear**
- **Nipples**

**Assessment procedure**
The baby is assessed in a warm environment. A paper and a pen are needed to record the scores. Examine each area using the score chart and calculate the score as indicated in the chart.

**Score**

<table>
<thead>
<tr>
<th>Signs of physical maturity</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td><strong>Skin</strong></td>
<td>Thin, smooth, pink, visible veins</td>
</tr>
<tr>
<td><strong>Plantar Creases</strong></td>
<td>Anterior transverse crease only</td>
</tr>
<tr>
<td><strong>Labia</strong></td>
<td>Clitoris &amp; labia minora prominent, Majora unformed</td>
</tr>
<tr>
<td><strong>Scrotum</strong></td>
<td>Small, smooth, no testes</td>
</tr>
<tr>
<td><strong>Ear</strong></td>
<td>Flat, soft cartilage, slow recoil</td>
</tr>
<tr>
<td><strong>Nipples</strong></td>
<td>Flat, no bud, No breast tissue</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>0</td>
</tr>
</tbody>
</table>

Add the score for each area and add to give a total score. Add this to 30 to give the gestational age of the baby.

The infant’s birth weight, head circumference and length are recorded in percentile chart, on the assessed gestational line. Then determine whether the infant is small, average or large for gestational age, according to percentile lines.

It is preferable to use the Dubowitz/Ballard score as it gives a more accurate gestational age.
**BASIC CARE OF THE BABY IN A NEONATAL UNIT**

**ALL babies require routine care after delivery.**

Some require additional specialised and sustained care in a neonatal unit.

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**A. Routine care for all newborn babies**

- Keep dry in a warm room away from drafts, well covered
- Keep the baby with the mother, rooming in
- Initiate breastfeeding within the first hour
- Let the baby breastfeed on demand if able to suck
- Give vitamin K (Konakion®) 1 ampoule (1 mg/0.5ml or 1 mg/ml) IM once (do NOT use 10 mg/ml ampoule)
- Keep umbilical cord clean and dry
- Apply antiseptic ointment or antibiotic eye drops/ointment to both eyes once
- Give oral polio, hepatitis B and BCG vaccines, according to EPI

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**B. General care for babies in a neonatal unit**

1. **Maintain temperature**
   - Prevent radiant, conductive, convective and evaporative heat losses.
   - Dry baby thoroughly after birth, and/or if wet
   - Cover head with cap or blanket
   - Swaddle / wrap baby tightly if in a cot
   - Place in incubator if not maintaining temperature
     - If baby < 1.8kg
     - Check for and manage hypoglycaemia (see “Neonatal Hypoglycaemia” guideline)
   - Kangaroo nurse wherever possible, if baby and mother’s condition permits (see “KMC” guideline)
   - Cover with plastic wrap in an incubator

2. **Observations**
   - Hourly observations until temperature is stable 36° - 37°C. Thereafter, 3 hourly. If temperature falls out of normal range, take action and repeat hourly until stable. (see “Neonatal Hypothermia” guideline)
   - Observe heart rate and respiratory rate. NB: report if H/R >180 or < 120/min
   - Observe for any signs of respiratory distress, i.e. apnoea; grunting; nasal flaring; recession; central cyanosis; tachypnoea; tachy/bradycardia
   - Observe colour for: jaundice, cyanosis or pallor
   - Check IV infusion rate, volume administered and drip site hourly (see "IV Lines" protocol)
   - Check urine dipstix daily – SG and for blood, protein, glucose or bilirubin
     - SG should be ≤ 1010. In order to catch baby’s urine – place a swab in the nappy and use a syringe to draw up urine from this

3. **Maintain airway**
   - If signs of respiratory distress are present, check air entry with a stethoscope and suction oro- and nasopharynx if necessary. (see “Respiratory Distress” guideline)
   - Use a 6FG in most cases or an 8FG if very thick secretions are present or in a large term baby
   - Never allow suction pressure over 30 KPA
   - Suction gently and do not go too deep as this can cause a vagal response leading to apnoea and bradycardia
   - Use a new suction catheter each time you suction
   - All babies on oxygen require regular suctioning at least 6 - 12 hourly
4. Weighing a baby

Careful monitoring of a baby’s weight is one of the cornerstones of quality care and is essential for good management.

Why weigh babies?
Babies lose 10% of their body weight within the first 3 days of life. After the first three days, a term baby should put on between 150 - 200g per week. It is important to weigh babies regularly to ensure they have gained weight sufficiently after birth, to determine fluid requirements and accurately calculate medication, if needed.

When to weigh babies
- daily, while in the nursery
- if in the ward with mother, can be done 3 times / week

How to weigh babies
The nurse should be shown how to use the nursery scale as all scales are different:
- collect all relevant equipment
- before weighing each baby, chlorhexidine tincture should be used to wipe the scale to prevent cross-infection
- all baby's clothes should be removed, i.e. nappy and nightie
- baby should be weighed and the weight charted on baby’s notes, i.e. Nursing Process, neonatal chart (Form Paed/06) and Road to Health Chart

Monitoring growth
- monitor growth according to percentile chart – it should follow the 50th percentile
- if mom is worried, advise her that a baby loses weight after birth but gains within a week
- loss of 10% of birth weight within the first three days is acceptable

Ensure mother is given a Road to Health Chart on discharge and is referred to the nearest well baby clinic for ongoing monitoring.

5. Bathing an infant
This does not have to be done daily. It is dependent on the baby’s condition and can be done 2-3 / week. Preferably bath at night as this is similar to home routines.

Do not bath a baby on admission as this cools him/her and can lead to hypothermia and metabolic acidosis. Also, do not bath a baby if his/her condition is not stable.

1) First baby bath
The first baby bath and examination gives the nurse the opportunity to clean the baby, educate the parents (when present), prevent infection and thoroughly examine the baby for any congenital abnormalities, respiratory distress, or any other problems.

a. Requirements
- Jug with hot water to top up ½ way through if necessary
- Bath towel
- Receiving blankets x 2
- Baby jacket
- Disposable napkin
- Suction machine clean and working
- Spray bottle chlorhexidine tincture
- First baby bath pack, including:
  - Konakion®, syringe and needle
  - Terramycin®
  - mild, non-allergenic baby soap  NB: If offensive liquor was present, use hibiscrub
  - thermometer
  - vaseline and spatula
  - fine-toothed comb
- Container for soiled linen
- Container for soiled napkins and swabs
- Basinette

b. Preparation
- Close all windows to avoid draughts
Test suction and oxygen equipment
Wash your hands
Open pack (First baby bath pack)
Fill basin with warm water
Put on latex gloves
Rinse comb under tap and place on tray
Test water with inner aspect of forearm. Should be warm but not hot (30°C on a thermometer)
Keep baby firmly wrapped in blanket and napkin, ensuring that head is covered

Procedure

To wash the face:
- gently wipe with swabs dipped in the bowl of water, using one swab for each eye
- clean half the face at a time, starting from the forehead
- clean under chin and behind the ear
- clean second half of the face in the same way
- DO NOT WASH INSIDE THE EARS

To wash the hair:
- place rinsed comb in bowl of water
- fold down the blanket into the nape of the neck and expose the head
- hold the baby firmly over the bath, supporting baby's body with the left forearm
- hold the head in the left hand with the thumb and forefingers covering the ears
- wet the hair, soap gently and lather, using fine tooth comb to methodically comb through baby’s hair, rinsing the comb after each stroke in the bowl of water
- rinse hair in bath
- dry thoroughly with the towel

To wash the body:
- unfold the blanket and remove the napkin
- wet hands and work up lather
- soap the baby from neck and wrists (not hands) down the body, legs and feet. Turn the baby on its side, soap the back and buttocks and lastly the genitals
- lift the baby carefully and lower into the bath, support baby’s body with the left forearm, hold baby's upper arm in hand and rinse off all the soap. Now rinse the baby’s hands
- lift the baby out of the bath and wrap baby in the towel, cuddle for a while, then pat dry
- do not rub the baby
- pay particular attention to the folds in the neck, axilla, groin and buttocks
- NB: it is not necessary to remove all the vernix as it helps to insulate the baby

To dress the baby:
- remove baby from the wet towel and place on the receiving blanket and napkin
- put jacket on and place baby on back
- expose the umbilical cord, hold the clamp and check if secure. Clean carefully with chlorhexidine swabs. Prevent tincture from spilling onto skin. Dry surrounding skin
- apply liberal amount of vaseline to buttocks, put napkin on and fold below cord
- apply Terramycin® to eyes.
- give Konakion® 1mg as per standing order (if not already given)
- brush hair, wrap baby up warmly in receiving blanket, ensuring that head is covered
- place in clean crib on hot pad, if necessary
- check axillary temperature

At the first baby bath, the baby is examined for birth injuries and congenital abnormalities. This should be done thoroughly before, during and after the bath.
Record findings accurately on: A) Nursing Process, and B) Neonatal Chart (Form Paed/06)

2) Incubator bath
a. Requirements
- Bath pack (receiver and gullipot with swabs)
- Sterile cotton wool swabs
- Mild, non-scented baby soap / water
- Hibitane hand spray

b. Procedure
- Wash hands
- Open pack and fill gullipot with warm tap water
- Clean eyes with swabs soaked in water (if eyes are sticky use normal saline) NB: a swab is used once only for each eye and part of face, then discard
- Wipe face with wet swab from forehead, around the eyes, to the nose, around the mouth and under the chin
- Using swabs and hibiscrub in water, clean arm from axilla down, chest, abdomen, legs, from groin down
- Turn the baby and clean the back and genitalia NB: dry the area that has been cleaned before moving to the next area
- Change linen and place infant on a clean napkin
- Spray hands and clean cord with hibitane swab
- Clean incubator as explained in the “Incubator Care” protocol
- Clean and restock solutions container

Each baby should have his/her own container (ice cream containers work well) with:
1) Sterile saline ampoules
2) Sterile swabs
3) Aqueous cream (for dry skin)
4) Vaseline (for lips and bottom)
5) 1 syringe (2ml) for nasogastric aspirates
6) 1 syringe (2 ml) for urine testing
7) Soda bicarbonate 1% spray (for cleaning bottom)
8) Hand lotion
9) Chlorhexidine

6. Cord care

**Keeping the cord clean and dry is important to prevent infection, facilitate separation of the cord and promote comfort for the baby**

a. Equipment
- Pack of swabs
- Chlorhexidine hand spray
- Disposable napkins
- Cord spirit e.g. chlorhexidine 5% in 70% alcohol
- Packet to dispose of dirty of swabs

b. Preparation
- Introduce yourself to the mother and explain the procedure
- Identify the baby with the mother by asking the mother’s name and checking the baby’s armband
- Check the napkin and change it if wet or soiled
- Wash hands and spray with hibitane hand spray
- Lay out the swab
- Spray the swabs with hibitane spray

c. Cleaning the cord
- Use each swab once and discard
- First: clean around the base
- Second: clean below the cord clamp
- Lastly: clean the clamp

d. Observe the cord and surrounding area for:
- bleeding
- pus
- signs of inflammation
- redness around the cord
- offensive smell
- is cord clamp tight?
- is ligature well secured?

Record your findings and report any abnormalities to the doctor.

The mother must be taught to do this with every nappy change. Give mother chlorhexidine / surgical spirits and swabs on discharge.
If she observes any of the above problems with the cord she must take the baby to the clinic.

**NB: Do not use anything else e.g. mercurochrome to clean the cord**
7. Eye care

Eye care is important to prevent and control infection

a. Indications
- routinely after the delivery
- if the baby suffers from conjunctivitis

b. Equipment
- Sterile cotton wool swabs
- Sterile saline ampoules
- Chloramphenicol eye ointment / eye drops / Terramycin®
- Sterile gloves

c. Procedure
- Wrap and put the baby in the dorsal position (on back)
- Clean hands
- Moisten swabs with saline
- Wipe the eye from inside out until it is clean, cleaning one eye at a time
- Use the cotton wool swab once and discard after use
- Instill eye ointment / drops into each eye after birth and prn if there is a discharge

NB: If a discharge is present, clean with saline first and then take a pus swab before instilling ointment.

Severely swollen and discharging eyes are serious and must be seen by a doctor, as there may be a gonococcal infection which may require systemic antibiotics

8. Transfer to a cot
A baby can be transferred to a cot when:
- the baby's condition is stable
- temperature is being maintained
- weighs ≥ 1.4kg

NB: Ensure baby is well wrapped with head covered.

If baby does not maintain temperature of 36°-37°C, check for hypoglycaemia (HGT < 2.5mmol/l). Manage accordingly and put baby back in incubator.
Developmental Care
Caring for a baby by ensuring a gentle environment

Due to the nature of the NICU environment (increased light and sound, painful invasive procedures, multiple care givers, lack of consistency, disruption of sleep/wake cycles, and other abnormal stimuli), the infant is deprived of his/her normal ante/postnatal developmental environment. Over time this overload of stressors can affect a baby’s ongoing growth and development and can lead to emotional and behavioural problems.

All infants (particularly premature infants) should receive individualised care that observes and supports their natural cues/behaviour, diminishes invasive and painful stimuli as much as possible, encourages gestationally correct development and maintains and encourages parent/infant bonding

1) Sight
The premature eye has a decreased tolerance for light. The iris has a decreased ability to adjust to changes in light and frequently admits more light, which causes pain.
- Decrease ambient light – turn off overhead lights by 13h00
- Use individual lighting where possible
- Cover eyes when under phototherapy
- Cover all closed incubators with a blue blanket to decrease light penetration. Ensure baby is nursed on a monitor if not clearly visible
- Shield critically ill / ventilated babies with a blanket where possible
- Allow babies to focus on mother’s face but do not stimulate two senses at once e.g. sight and hearing
- Normal diurnal patterns should be maintained with decreased light and activity at night

2) Hearing
- Decrease ambient noise
  - Keep radio and voice levels low
  - Eliminate alarms as quickly as possible
  - Do not hold conversations at the bedside
  - Do not bang the incubators
  - Empty water from humidified tubing promptly
- Protect baby’s ears in the presence of loud noises

3) Positioning and Growth
- Ensure baby receives 120 Kcal/kg/day
- Monitor weight gain which should be ± 1% increase per day
- Maintain flexion of spine and limbs, as in utero. Use appropriate positioning devices e.g. nesting
- Ensure shoulders are curved inwards and not abducted, particularly when nursed prone, which assists in preventing the development of an abnormal posture (use of a small fabric roll placed vertically between the shoulders when lying prone is helpful)
- Ensure baby is flexed along the midline, contained and nursed in the prone or lateral position, as this ensures natural muscle and tendon formation. Avoid “squashed frog” positioning
- Use rolled blankets as “cocoon”/nest - this must be big enough to contain baby horizontally with the feet flexed against it (to prevent drop foot). Use blanket tucked over “cocoon” to cover baby
- Allow hands access to face, as this is a primitive reflex
- Use shoulder roll to ensure patent airway and curved shoulders when nursed supine
- Nurse prems predominantly prone as this aids in absorption of feeds; ↓ aspiration; ↓ apnoea and promoting rest and sleep

4) Pain
- Pain transmission along nerve pathways is both exaggerated and prolonged, therefore keep all sensory stimulation to a minimum
- Provide pain relief, e.g. non-nutritive sucking, containment / skin-to-skin holding for minor procedures. For invasive procedures (e.g. PICCS or lumbar punctures) use sucrose or appropriate analgesia, e.g. morphine prior to the procedure
- Ensure adequate sedation and analgesia, e.g. Dormicum® and morphine, prior to intubation
5) Rest and sleep
- Research has suggested that sleep may affect our immune systems, enabling us to stay well. Infants need ± 16 hrs of sleep a day. If this is not achieved, irritability and behavioral problems may occur.
- All premis under 1.2kg must have minimal handling, i.e. 6 - 8hrly.
- Group all interventions to coincide with awake periods. Do not wake baby if at all possible, e.g. to change a nappy.
- All babies and mothers to sleep between 13h00-14h00, i.e. no interventions except emergencies.
- Try to differentiate between night and day with regard to amount of interventions, degree of sound and light etc.

6) Handling
- Observe and teach mother to identify her baby’s behaviour and signals, and show her how to respond appropriately.
- There are three typical types of behavior:
  - Stress or withdrawal, which indicate the infant’s need for a change or cessation from stimulation. Behaviours include colour changes, changes in vital signs, vomiting, hiccupping, passing flatus, sneezing, yawning, hypotonia, frantic flailing movements, finger splaying, hyper-extension of extremities, sleepiness, glassy, staring eyes, irritability or a look of panic.
  - Approach, which indicates that a baby is ready for interaction. Behaviours include regular respiration, stable heart rate, pink colour, quiet states (absence of startles, twitches and tremors), awake or alert states, smooth movements of arms or legs and a relaxed appearance.
  - Self-regulatory, whereby the infant calms him/herself and maintains a quiet state. Behaviours include hand-to-mouth and hand-to-face movement, sucking, grasping, hand clasping, holding onto objects, looking away, tucking arms, legs and trunk into a flexed position and bracing.
- Only handle baby when awake. Encourage mother to massage and interact with baby at these times. Discontinue handling when baby becomes distressed.
- Avoid stroking prems - they respond better to stationary containment with one hand on their head and the other on their body.

7) Consistency
- The NICU environment constantly changes which is stressful to the developing infant and his/her family. It is important to try and establish consistent routines and, particularly prior to discharge, to establish routines as close as possible to those at home. This allows the infant to develop a sense of security.
- Consistency of caregivers should be maintained as much as possible, as the nurse learns to understand and interpret the baby’s individual behavior and develop a trust and rapport with the parents.

8) Kangaroo mother care
This involves the baby being nursed on his/her parent’s chest with skin-to-skin contact (only a nappy and a cap). The head should be covered with a cap and a blanket tightly tied round, holding baby to parent. (see “KMC” guideline) The more frequently and longer this is done the better. Research has shown that this: ↓ infection rates; ↑ bonding; ↑ SATS; ↓ apnoea; ↓ aspiration; promotes homeostasis; ↑ growth rate and ↓ length of hospital stay.

- Kangaroo mother care (KMC) should be given to all stable babies for as much of the day as possible.
- Mothers may walk around with babies if no interventions are required.
- Babies in special care should be KMC’d for the majority of the day.
- If babies are on IV or O₂ KMC can be given at the bedside.
- Ventilated infants can be given KMC with supervision, depending on their condition.
- If KMC is not possible at other times it should at least be given between 14h00-16h00.
1) **Hand washing**
   - Full scrub up for ALL STAFF at the beginning of shift
   - Wash hands in-between babies and use chlorohexidine hand lotion
   - Mothers and visitors to wash hands on entering the wards

2) **High & Low dusting**
   - High dusting to be done weekly
   - Counter tops to be dusted daily
   - Floors to be mopped daily and PRN if necessary
   - Windows cleaned monthly

3) **Milk Kitchen (where applicable)**
   - Ideally all milk feeds should be mixed in a central milk kitchen in the hospital with its own dedicated staff
   - The milk kitchen should be thoroughly cleaned daily, including the microwave
   - Feeding utensils to be washed after use and then sent to CSSD to be re-sterilised
   - Fridge to be thoroughly cleaned weekly
   - All milk feeds are to be mixed according to aseptic technique

4) **Staff**
   - No watches or jewellery to be worn
   - Only wedding bands permitted
   - No wearing of long sleeves, sleeves to be rolled up
   - Staff should cut their nails
   - All staff members who have upper respiratory infections should be treated immediately and they must wear masks when in the nursery

5) **Equipment**
   - Daily cleaning of incubators with hibiscrub and water
   - Daily cleaning of saturation monitors, syringe pumps, probes etc. which are being used on a baby
   - Scale must be cleaned with chlorhexidine tincture in-between weighing babies
   - When the baby is transferred from the incubator to cot or if baby dies, the incubator must be thoroughly cleaned with hibiscrub and all equipment used on the baby must be cleaned (see “Incubator Care” protocol)
   - Suction bottles, oxygen bottles and tubing must be changed daily
   - Head boxes and resuscitation crib to be checked and cleaned daily
   - Used equipment to be sent to CSSD - disposable items should be discarded and not re-sterilized
   - Nasal prongs to be discarded after use
   - Ambubags and masks to be cleaned with hibiscrub after use
   - **Weekly Cleaning**
     - Medicine and emergency trolleys must be checked daily and cleaned weekly
     - Stethoscope earpieces must be cleaned after use and be soaked weekly
     - High dusting to be done weekly
     - Walls, windows, doors and skirting boards to be cleaned monthly
   - **Miscellaneous**
     - 10 ml saline ampoule used for cleaning eyes must be discarded after use once opened
     - Nasogastric tube aspirate and urine syringes must be changed daily and dated
     - Phototherapy eye shields must be used once and discarded after use or if soiled
     - Probe covers must be cleaned with hibiscrub, dried and re-used

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**INFECTION CONTROL**

N.B. Please refer to the Provincial and Institutional Infection Control Policy to ensure that the policy is implemented effectively
6) The Baby
   - Clean all newborns’ eyes with saline and apply Terramycin® as per standing order
   - A first baby bath should not be done until baby’s condition, especially temperature, is stable
   - Cord must be cleaned with chlohexidine
   - A gastric aspirate should be taken within an hour after birth - for all premature or sick babies to rule out chorioamnionitis
   - All used vials must be discarded immediately

   a. Medications
      - Rubber bung to be cleaned with chlohexidine tincture and allowed to dry prior to drawing up (use of needle free devices is advisable)
      - Aseptic technique must be used when drawing blood specimens
      - Multidose vials should not be used if possible - if used, they must be discarded after each medication round

   b. Intravenous lines (see “IV Lines” protocol)
      - Prepare surface with chlohexidine tincture prior to running through
      - Aseptic technique must be used when erecting IV lines
      - IV lines to be changed every 72 hours
      - Ensure IV lines are dated
      - Needle free system to be used on all IV lines, for bag and vial access
      - Clear fluid filters should be used on all IV lines

   c. Nasogastric tubes to be changed every 3 days
      - Surgically clean procedure to be used
      - See Insertion of nasogastric tube procedure in “Establishing Feeding” protocol
      - Ensure the nasogastric tube is dated and changed every 3 days

   d. Dummies to be changed daily

   e. Linen / clothes
      - Linen should be changed daily and PRN if necessary (when linen available)
      - Nursery clothes should be changed daily and clothes washed by a private laundry

   f. Feeding
      - Baby to be fed with a sterile syringe at each feed
      - Continuous feed syringes are to be changed 4 hourly and the extension sets are to be changed daily
      - Ensure mothers are taught cleanliness with regard to expressing breast milk. A new sterile bottle, expressing pump and tubing to be used each time the mothers express

   g. Visitors
      - Limited to two per baby, and only parents and grand parents
      - Ensure there is no movement of non-nursing personnel and relatives through the unit

7) Waste Material
   - Ensure separate bins are used for the various waste materials, e.g. ‘sharps’ bins

8) Special Care Cribs
   - Keep cribs to be placed 1 metre apart
Skin care is important for protecting the sensitive, fragile skin of the newborn from infection, and it also provides an opportunity for the caregiver to examine the baby and to educate the mother.

**Top and tail**
1) Clean eyes with sterile water twice a day
2) Clean mouth with water and apply vaseline PRN
3) Clean umbilicus with hibitane 70% in alcohol, with every nappy change

**Prevention of the dry skin**
1) Stable babies - massage with aqueous cream or unscented baby oil daily
2) Depending on the condition of the baby and the mother, teach the mother how to massage the baby in order to promote bonding
3) Apply aqueous cream on pressure areas and dry skin

**Prevention of pressure sores**
1) Turn baby 3 hourly
2) Use a soft blanket or a sheepskin if available
3) Gently massage the skin to improve perfusion
4) Change pulse oxymeter probe site 2-4 hrly to prevent pressure sores
5) Ensure that the probe cover is not too tightly wrapped: check perfusion carefully and use a soft sponge holder (e.g. Paul’s tubing holder)

**Prevention of excoriation of the perineum**
1) Change nappies regularly
2) Clean with Soda Bic 1% solution
3) Apply a barrier ointment with every nappy change e.g. vaseline
4) Apply zinc and castor oil if excoriation occurs
5) Apply antifungal cream (Nystatin®) if thrush occurs

**Bathing**
1) This is not a priority and is dependent on baby’s condition
2) Do not bath immediately on admission, if hypothermic or condition is unstable
3) A stable baby can be bathed in his/her bassinette but this only needs to be done 2-3 times per week unless baby becomes soiled with stool/vomit
4) Ensured baby is well dried and the head is covered after a bath

**Strapping**
1) Use skin prep wipes or TBCo prior to attaching any tape or adhesive to the baby’s skin
2) Use extra thin granuflex under strapping (particularly for prem babies)
3) Use micropore for all strapping except endotracheal tube and umbilical line strapping
4) Use zinc oxide strapping for endotracheal tubes and umbilical lines
**INCUBATOR CARE**

The purpose of good incubator care is to prevent infection and enhance proper functioning of the incubator.

**Daily checks**
1) Check whether the incubator is in good working order and record on the daily check form.
2) Check humidity reservoir, if available, and ensure that it is empty (i.e. with no water) to prevent accumulation of microorganisms.
3) Check and adjust the incubator temperature according to the weight and age of the baby that is nursed in it, although the usual range is 32 - 36°C (see "Neonatal Hypothermia" guideline).
4) Incubator should be thoroughly cleaned and dried inside and out with hibiscrub and water daily. Mothers can be encouraged to assist with this.
5) Incubator cuffs should be changed daily and sent for sterilising (CSSD).

**Terminal disinfection**
1) Disconnect the incubator from the electrical power point and dismantle the machine completely. Lift the top of the incubator and remove the mattress, tray, base plate and rubber seal and clean thoroughly.
2) Remove all foreign objects from the incubator.
3) Clean the inside and outside with soapy water and cloth, drying each part quickly and thoroughly with a paper towel.
4) Incubator cuffs should be changed daily and sent for sterilising.

**Maintenance of the incubator**
1) The incubator must be inspected and overhauled by a qualified technician twice a year according to the maintenance programme of the institution.
2) Check if incubator filter requires changing and change every three months. Ensure date of next change is clearly visible.
3) Ensure that incubator is switched on and set to 36°C even when not in use.
**INTRAVENOUS (IV) LINES**

Intravenous therapy is useful for maintaining fluid balance when oral fluids are contra-indicated, maintaining electrolyte balance, providing glucose and for the administration of IV medications.

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**Due to the risks of complications and infection, intravenous therapy should only be erected when indicated and be performed by suitably qualified staff using aseptic techniques.**

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**When is an IV line needed?**

1) In the premature infant who is unable to tolerate nasogastric feeds
2) In the post-operative infant, to rest the bowel to allow for healing
3) In conditions where oral feeds are not tolerated and long term antibiotics must be given, e.g. NEC
4) In certain congenital abnormalities
5) To replace fluid and to maintain electrolyte balance
6) In conditions causing severe vomiting, e.g. cerebral injury
7) For maintenance of blood sugar levels

**How are fluid requirements calculated?**

These are calculated according to the mass and the age of the infant (see "Feeding and Fluid Management" guideline)

<table>
<thead>
<tr>
<th>Day</th>
<th>mL/kg/day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>60</td>
</tr>
<tr>
<td>Day 2 &amp; 3</td>
<td>90</td>
</tr>
<tr>
<td>Day 4 &amp; 5</td>
<td>120</td>
</tr>
<tr>
<td>Day 6 &amp; 7</td>
<td>150</td>
</tr>
</tbody>
</table>

**What fluids are generally used?**

- Neonatlyte
- Total parenteral nutrition, calculated by the paediatrician and prepared by the pharmacy, in consultation with the dietician

**What equipment is required?**

- Infusion pump and syringe pump
- 200 ml vacolitre
- Giving set
- 3-way tap / clave
- Extension set
- Filter
- Extras: swabs, gloves, strapping, Opsite®, chlorhexidine tincture

**Preparation for IV line insertion**

1) Clean hands
2) Clean counter surface with chlorhexidine tincture
3) Run correct fluid through tubing and expel air bubbles
4) Clean insertion site with chlorhexidine tincture

**Procedure**

1) The doctor or nurse inserts cannula in vein and checks for backflow
2) Assist with connection of intravenous line and ensure it is running
3) Assist with strapping of cannula – remember one must be able to change lines down to cannula
4) Place intravenous tubing through infusion pump and ensure correct rate of flow
5) Site to be inspected hourly for inflammation and infiltration
6) IV tubing needs to be changed every 72 hours
7) Write date on the line and record clearly into nursing process
8) Calculate and record infused volume hourly
9) Attend to any pump alarms promptly
10) Changing lines or fluids must be checked and counter signed on the fluid balance chart (Form Paed/21) by two nurses
Umbilical venous lines provide fast and secure IV access particularly when long term venous access is required.

N.B. Umbilical venous lines should be erected by a doctor or experienced nurse, on the doctor’s orders.

Advantages of an umbilical venous catheter
- Hypertonic and hyperosmolar fluids can be given with less risk of phlebitis
- The line cannot become infiltrated
- Provides secure IV access for 7-10 days even if baby is hypothermic, hypoglycaemic or shocked
- Useful for an exchange transfusion

Disadvantages and complications
- Sepsis
- Perforation
- Haemorrhage and/or thrombosis
- Hepatic complications if catheter placed incorrectly

Important guidelines
- Insert within first 24 hours of life
- Aseptic procedure with full scrub and gowns must be used
- Remove catheter within 7-10 days, as ordered

Equipment
- umbilical catheterisation / exchange transfusion pack, with hibitane 0.5% in 70% alcohol
- surgical blade
- radio-opaque umbilical catheter size 5
- gloves
- 2.5 ml syringe for flushing
- strapping
- packet or bin for waste

Procedure (see diagram below)
1) Open umbilical catheterisation / exchange transfusion pack onto clean trolley
2) Measure shoulder-umbilical length and check correct catheter placement as per graph alongside
3) Position baby under a radiant warmer and maintain infant’s oxygen supply, observing infant’s reaction and general condition
4) The doctor/nurse scrubs up, using gown and mask, cleans the cord and drapes the infant
5) A ligature is placed around the base of the cord to prevent haemorrhage N.B. Do not tie on skin
6) The cord is cut 1-2 cm from the base with a sterile scalpel. The umbilical vein (larger gaping vessel) and umbilical arteries (two thicker walled vessels apart from the vein) are identified. The cord stump may be stabilised using sterile mosquito forceps.
7) The catheter may be held with sterile forceps and advanced into the vein (it should pass easily) for 4–6 cm
8) Check that catheter is not kinked and that blood draws back easily - if there is a block, pull gently on the cord, pull back the catheter partly and re-insert
9) Once blood flows back in the catheter, the assistant connects the infusion, flushes the back flow of blood and then sets the infusion pump at the correct speed (may take FBC and blood culture)

10) Secure with goal-post strapping (ensure granuflex applied first to protect skin)

11) The ligature is loosened and may be removed when there is no longer a danger of bleeding from the cord

**N.B. It must have been removed by 24 hrs**

12) An x-ray should then be taken to establish the correct placement of the catheter. The venous catheter should be 1cm above the diaphragm. **N.B. It must not lie in or below the liver**

13) The line may need to be withdrawn if perfusion to the toes/feet is impaired

14) Make a note on crib to state position of line (and any changes) and ensure ALL the details are recorded in nursing process

15) If line is withdrawn slightly following an x-ray, record this on a sticker on the X-ray, in the nursing process and on the incubator note

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A. Preparation of the umbilical cord

B. Inserting the catheter into the umbilical vein. This is the larger, thin walled structure towards the head. Note the 2 umbilical arteries, which are thick-walled and towards the legs of the baby.

C. Fixation of the inserted catheter which prevents kinking

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**Care of umbilical venous line**

- While the catheter is in situ the site must be cleaned regularly with hibitane and sterile swabs
- **N.B. Any signs of redness must be reported promptly**
- Check strapping daily to ensure catheter is firmly secured
- Change strapping if loose or soiled
- Ensure nappy does not cover site