NEWBORN CARE CHARTS

ROUTINE CARE AT BIRTH AND MANAGEMENT OF THE SICK AND SMALL NEWBORN IN HOSPITAL

Guidelines for the care of all newborns in District Hospitals, Health Centres and Midwife Obstetric Units in South Africa

health
Department:
Health
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MANAGEMENT OF NEWBORNS: ROUTINE CARE AT BIRTH

HELP BABY BREATHE AT BIRTH → **TRIAGE** → **SICK OR SMALL – CARE IN NEONATAL UNIT**

TRIAGE → **ROUTINE CARE WITH MOTHER**

MANAGEMENT OF SICK AND SMALL NEWBORNS

ASSESS AND CLASSIFY | **TREAT, OBSERVE AND CARE** | **COUNSEL** | **DISCHARGE** | **FOLLOW-UP**

Assess need for emergency care — **If present** → **EMERGENCY TREATMENT until stable**

Assess for respiratory distress

Assess for priority signs

Assess for injuries, abnormalities or local infections

Check risk factors and special treatment needs

Principles of newborn care
- Maintain normal body temperature
- Administer oxygen if needed
- Maintain normal glucose
- Manage feeds and fluids
- Infection prevention and control
- Transfer and referral

Treat specific conditions
- Apnoea and respiratory distress
- Preterm and low birth weight
- Assess feeding and weight gain in low birth weight babies
- Serious acute infection
- Neonatal encephalopathy
- Neonatal seizures
- Neonatal jaundice
- Congenital abnormalities
- Congenital Syphilis
- Congenital Tuberculosis
- HIV-affected mothers and babies
- Care of HIV infected babies

Counsel
- Baby's illness
- Feeding
- When to return

- Discharge
- Follow up
  - Day 3
  - 6 weeks

Follow up low birth weight and high risk babies
- 3 days after discharge
- 2 weekly until 2.5kg
- 4 months
- 9 months

TABLE OF CONTENTS

NEWBORN CARE CHARTS

MANAGEMENT OF THE SICK AND SMALL NEWBORN

ROUTINE CARE AT BIRTH

These charts provide guidelines on the routine care to be provided to ALL babies at birth.

Use these charts to manage babies from birth to the time of discharge home or transfer of a sick or small baby to the neonatal unit.

Use the Management of the Sick and Small Newborn charts to provide care in the neonatal unit of your hospital.

KEY TO COLOURS USED IN THE CHARTS ON ROUTINE CARE:

Urgent treatment required and admission to neonatal unit

Specific care and treatment now

Routine care, once complete baby can be discharged home

A. HELP BABY BREATHE AT BIRTH

PREPARE FOR BIRTH
- ☐ Identify a nurse or helper to assist with care
- ☐ Review the emergency plan
- ☐ Prepare the area for delivery
- ☐ Wash hands
- ☐ Prepare area for ventilation and check equipment

ROUTINE CARE FOR BABY WHO IS CRYING AND BREATHING WELL
- ☐ Dry the baby thoroughly at birth
- ☐ If there is meconium, clear the airway first
- ☐ ***ASK: Is the baby crying?***
- ☐ If the baby is crying keep warm and check breathing
- ☐ Clamp and cut umbilical cord in 1 – 3 minutes
- ☐ Keep warm, check breathing and initiate breastfeeding

GOLDEN MINUTE: CLEAR AIRWAY, STIMULATE
- ☐ ***Check breathing, if the baby is not breathing well***
- ☐ Clear airway and stimulate
- ☐ ***Check breathing, if the baby is breathing well***
- ☐ Keep warm and check breathing
- ☐ Clamp and cut the cord
- ☐ Keep skin to skin and initiate feeding

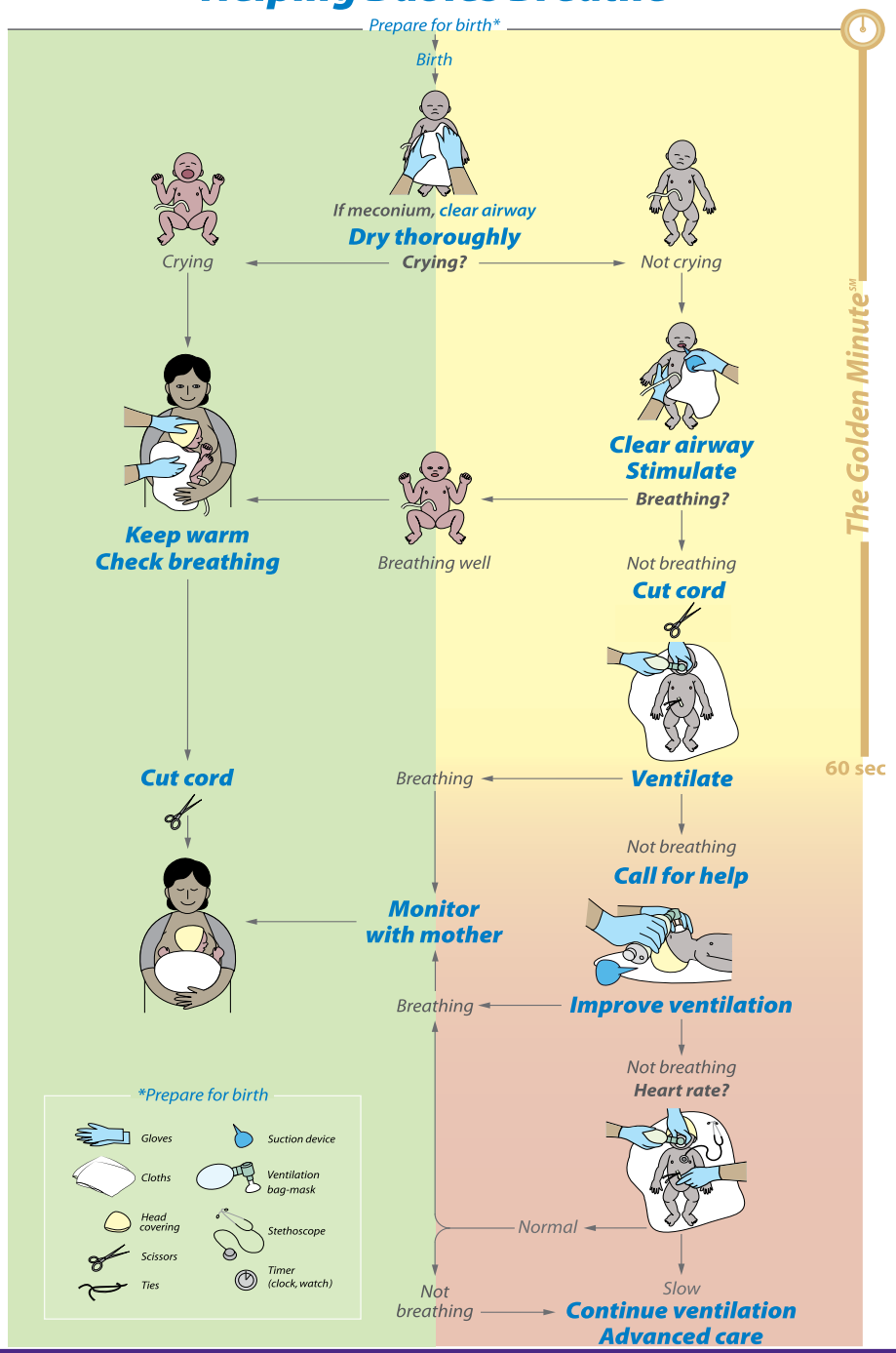
GOLDEN MINUTE: VENTILATE WITH BAG AND MASK
- ☐ ***If baby is still not breathing***
- ☐ Clamp and cut the cord
- ☐ Ventilate with bag and mask
- ☐ Give 40 breaths per minute; count bag, 2,3, bag 2,3...
- ☐ Continue to ventilate until the baby is breathing well

CONTINUE VENTILATION
- ☐ **Baby is still not breathing well**
- ☐ Call for help and improve ventilation
- ☐ ***Check the heart rate***
- ☐ If the heart rate is normal continue ventilation
- ☐ If the heart rate is slow baby requires advanced care
  - Improve ventilation
  - Start chest compression 1,2,3 Bag
  - Give Adrenaline 0,1mg/kg 1:10000 IV

Stop resuscitation if:
- ☐ *no heart beat or breathing at 10 minutes OR*
- ☐ *no breathing after 20 minutes OR*
- ☐ *only gasping after 30 minutes*

ACTION PLAN

Helping Babies Breathe



B. RAPIDLY ASSESS BABY IMMEDIATELY AFTER BIRTH

Do a rapid assessment of baby soon after birth, to establish if baby needs any immediate care or referral to neonatal unit. Provide routine care and commence breastfeeding.

ASK, LOOK, LISTEN, FEEL	SIGNS	CLASSIFY	CARE, TREAT AND COUNSEL
Is the Apgar at 5 minutes < 8 0 / 1 / 2 / 1 min / 5 min Crying? / No response / Grimace / Vigorous cry Breathing? / Absent / Slow or irregular / Good, crying Colour? / Blue or pale / Pink but blue feet / Pink all over HR> 100? / Absent / <100 / min / >100 / min Is baby active? / Limp / Slight flexion / Active, moves Did baby take more than 5 minutes to breathe on own? Observe the breathing. Is there? • Grunting, in-drawing, fast breathing or cyanosis Observe baby while lying on the back and then hold the baby and turn over. Observe for movement, tone and major abnormalities. Does the baby have? • Increased or decreased tone • Less than normal movement • Major abnormality on back, abdomen or head Weigh baby, is the weight? • >4,5kg • < 2kg Measure the head circumference. • Head circumference more than 39cm • Did the mother have diabetes in pregnancy?	• Took longer than 5 minutes to breathe • Apgar < 8 at 5 minutes • Grunting OR • Chest in-drawing OR • Fast breathing • Central cyanosis • Abnormal tone OR • Not moving well • Major abnormality • Head circ. > 39cm • Low birth weight < 2 kg	**POSSIBLE BIRTH ASPHYXIA** **and / or RESPIRATORY PROBLEM** **and / or SEVERE DISEASE** **and / or MAJOR BIRTH ABNORMALITY** **and / or LOW BIRTH WEIGHT < 2kg**	• Keep baby warm, in skin-to-skin or in a transport incubator • Check blood glucose, and treat if low (p. 12) • Start nasal prong oxygen at 1l/minute if grunting or chest in-drawing (p. 12) • Identify baby with mother • Administer Vitamin K 1mg IM • Administer Chloramphenicol eye prophylaxis into both eyes • Counsel about condition (p. 14) • If baby is breathing well, and not requiring oxygen and more than 1,8kg, breastfeed baby. • Refer to neonatal unit for further assessment and care (p. 23) see Charts on Care of sick and small newborns
	• Baby weighs more than 4,5 kg • Mother has diabetes	**INFANT OF DIABETIC MOTHER OR BIG BABY**	• Breastfeed or give EBM 3ml/kg every hour by cup for 6 hours • Check blood glucose every hour for 6 hours • If low glucose treat for low glucose (p. 12) • Administer Vitamin K 1mg IM • Administer Chloramphenicol eye prophylaxis into both eyes • Identify baby with mother and counsel
	• No abnormal signs or measurements	**BABY IS WELL**	• Keep skin-to-skin with mother • Identify baby with the mother • Start breastfeeding (p. 15) • Do not give any prelacteal feeds or other supplemental feeds • Administer Vitamin K 1mg IM • Administer Chloramphenicol eye prophylaxis into both eyes • Transfer with mother to postnatal ward after about one hour

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Assess the maternal HIV status of all babies

What is the mother's HIV status? • HIV Positive • HIV status not known • HIV negative • Repeat HIV test needed	• Mother is HIV positive OR HIV status is not known OR Mother is due for HIV retest OR Baby is abandoned	**HIV EXPOSED**	If Mom is HIV positive administer first dose of Nevirapine o Weight <2.0kg: refer to p. 77 o Weight 2 – 2.5kg: Birth to 6 weeks: 10mg(1ml) Nevirapine orally o Weight > 2.5kg: Birth to 6 weeks: 15mg(1.5ml) Nevirapine orally If the mother's HIV status is not known, or she is due for an HIV retest, test her as soon as possible, so the baby can benefit from ARV prophylaxis Care of HIV affected mothers and babies: p. 76-79

C. FULLY ASSESS BABY AFTER BIRTH IN POSTNATAL AREA / WARD

Assess the baby from top to toe in the first few hours after birth, when the baby is awake. Observe breast feeding. Classify and provide treatment and counselling.

ASK	LOOK, LISTEN FEEL	SIGNS	CLASSIFY	TREAT
Ask the mother if she has any concerns What was the mother's gestation at birth? Ask mother how feeding is going Assess baby while feeding – (p. 15)	**Priority signs** • Apnoea, central cyanosis • Fast breathing > 60 / min • Grunting OR chest in-drawing • Reduced movements/lethargy • Irregular jerky movements • Decreased or increased tone • Fontanelle full • Abdominal distension • Pallor or jaundice **Major abnormality** • Imperforate anus • Cleft lip of palate • Ambiguous genitalia • Nose not patent **Head and neck** • Abnormal shape or sutures • Boggy swelling of head • Neck swellings, webbing **Face, eyes, mouth and nose** • Unusual appearance • Abnormal shape, slant of eyes • No light reflex and does baby follow	• Any priority sign • Not able to feed	**SERIOUS ILLNESS**	• Keep warm, skin-to-skin or in transport incubator (p. 12) • Give nasal prong oxygen if respiratory distress (p. 12) • Counsel mother and transfer to neonatal unit
		• Cleft palate or lip • Imperforate anus • Nose not patent • Macrocephaly > 39cm • Ambiguous genitalia • Boggy swelling of the head	**MAJOR ABNORMALITY OR INJURY**	• Keep warm, skin-to-skin or in transport incubator (p. 12) • Give nasal prong oxygen if respiratory distress (p. 12) • Breastfeed except if imperforate anus • Counsel mother and transfer to neonatal unit
		• Microcephaly < 32cm • Club foot • Other abnormal signs	**BIRTH ABNORMALITY**	• Keep warm, skin-to-skin (p. 12) • Breastfeed on demand (8 – 12 times a day) • Assess feeding if not able to feed transfer to the neonatal unit • Call doctor to assess or transfer to neonatal unit (NNU)

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	Limbs, trunk • Abnormal position of limbs • Cries when limb touched, moved • Club foot • Abnormal fingers, toes and palms • Abnormal chest, back and abdomen • Undescended testis, hernia **Weigh, measure length and head circumference, take temperature** • Is temperature < 36°C or > 37,5°C • Is weight < 2kg, 2 – 2.5kg or > 4.5kg • If < 2.5 kg is gestation < 35 weeks • Head circumference < 32cm or > 39cm	• Birth weight 2 – 2.5kg or • Gestational age < 35 weeks	**LOW BIRTH WEIGHT 2 – 2.5KG**	• Keep skin-to-skin with the mother • Check blood glucose every 4 hours for 24 hours • Monitor 4 hourly RR, HR, colour and activity, intake and output • Encourage breastfeeding on demand (8 – 12 times a day) • If mom cannot breastfeed initiate breast expression within 3 hours of delivery and thereafter 2 to 3 hourly. • Assess breastfeeding, if not able to suckle refer to NNU • Check weight gain every day
		• Not moving a limb • Swelling of the head on one side (Cephal-haematoma) • Severe bruising	**BIRTH INJURY**	• Keep warm, skin-to-skin • Breast feed on demand (8 – 12 times a day) • Assist and assess breastfeeding at every feed, if not able to suckle refer to neonatal unit • Observe for development of jaundice or anaemia • If jaundice develops then refer to neonatal unit • If not moving a limb, check mothers syphilis serology and refer
		• No abnormal signs	**HEALTHY BABY**	• Room in with the mother and keep warm • Encourage breastfeeding on demand (8 – 12 times a day) • Assist and assess breastfeeding, if not able to suckle refer to NNU • 6 hourly Temp, HR, RR, colour, activity and intake and output • Apply Chlorhexidene to the cord every 6 hours • Wipe clean with a warm moist cloth, first face then head and body. Remove blood and meconium but NOT vernix.

D. ASSESS AND MANAGE RISK FACTORS OR SPECIAL TREATMENT NEEDS

ASK	SIGNS	SYMPTOMS, SIGNS	CLASSIFY	TREAT, COUNSEL, FOLLOW UP
• Mothers' RPR positive or unknown • What is the mothers HIV status o HIV positive • If on ARV treatment, how long has she been on ARV treatment • Not on ARV treatment o If HIV status unknown or tested > 12 weeks ago repeat HCT • Mother is on TB treatment? • Mother blood group O or Rh Negative? • Were the membranes ruptured for more than 18 hours? • Was the liquor offensive? • Was the mother feverish?	• Petechiae • Not moving limb • Hepato-splenomegaly	• Mother's RPR positive and she is o Untreated o Partially treated o Treatment completed < than 1 month ago • Mother's RPR is not known, and it is not possible to get the result now	**MOTHER HAS SYPHILIS**	• Give the baby Benzathine Penicillin 50 000 u/kg IM as a single dose (p. 73) • Check for signs of congenital syphilis (these should have been detected when looking for priority signs) and if present refer to neonatal unit for 10 days of treatment with Procaine IM or Penicillin G IV (see p. 73)
		• HIV exposed baby or • Abandoned baby	**HIV EXPOSED**	• Daily Nevirapine (NVP) orally for 6 wks - Birth weight NVP Dosage 2 - 2.5 kg Birth to 6 weeks: 10mg (1ml) > 2.5 kg Birth to 6 weeks: 15mg (1.5ml) • If the mother has received less than 4 weeks of ART treatment continue Nevirapine for 12 weeks • If the mother has resistance to NVP or EFV give the baby NVP and AZT p. 90 and do an HIV DNA PCR at birth • Follow up in 3 – 6 days and at 6 weeks • Conduct home visit in 1 – 2 weeks • If mother is on ART support her compliance • If mother not on ART, check her clinical stage and CD4 count and start her on ART for duration of breastfeeding (p. 76) • Abandoned babies see p. 77

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		• Mother has been on TB treatment for < 2 months OR • Mother is on TB treatment and not responding	**MATERNAL TB HIGH RISK**	• Screen the baby for congenital TB and treat baby with a full course of TB treatment for 6 months and give BCG on completion of treatment p. 74
		• Mother has had more than 2 months TB treatment and is responding well to treatment	**MATERNAL TB**	• Baby to get INH for 6 months and BCG on completion of treatment (p. 74)
		• Mom Blood group O • Mom Rh negative	**RISK OF JAUNDICE**	• Measure bilirubin at 6 hours of age • Commence phototherapy if bilirubin > 80mmol/l • Measure bilirubin 6 – 12hourly, refer to chart p. 67, and transfer if baby requires phototherapy
		• Membranes ruptured for more than 18 hours before delivery • Offensive liquor at birth	**RISK OF INFECTION**	• Do observations every 4 hours for 24 – 48 hours • If clinical signs of infection or <2.5kg refer to neonatal unit • If well at 48 hours discharge

E. PROVIDE ROUTINE TREATMENT TO THE WELL BABY

Keep baby warm	Nurse baby skin-to-skin • Place the baby skin-to-skin between the mothers breasts • Dress the baby with a cap, booties and nappy • Cover the baby • Secure the baby to the mother
Give oxygen if grunting or severe chest in-drawing	If a baby has grunting or severe chest in-drawing, start nasal prong oxygen and transfer to neonatal unit • Place the prongs just below the baby's nostrils. Use 1mm prongs for small babies and 2mm prongs for term babies • Secure the prongs with tape • Turn on the oxygen and flow at 1 L per minute • Humidification is not necessary 
Check glucose and treat low glucose	If a baby has a severe classification or is an infant of a diabetic mother, check the glucose and treat for hypoglycaemia **HYPOGLYCAEMIA** **If the blood glucose is 1.4 - 2.5 mmol / l (If > 1,4 mmol / l take to neonatal unit and treat for severe hypoglycaemia)** • Breastfeed or feed expressed breast milk (p. 17). If breastfeeding is not possible then give 10ml / kg appropriate replacement milk feed • Repeat the blood glucose in 15 minutes • If the blood glucose is normal, continue with breastfeeding or EBM and check the blood glucose 2- 3 hourly • If still low, or < 1,4 mmol/l refer to neonatal unit and treat for severe hypoglycaemia (p. 41)

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<table>
<tr><td rowspan="2">Infection prevention and control</td><td>Cord care
• Apply 4% Chlorhexidene or surgical spirits to the cord every 6 hours. Leave the cord exposed to dry</td><td>Room-in and breastfeed
• Baby to room-in with the mother, and breastfeed on demand
• Keep skin-to-skin</td></tr>
<tr><td>Hand washing
• Wash hands before and after touching the baby
• Mother to wash hands after going to the toilet and before breastfeeding</td><td>Bathing baby
• Wipe baby with a warm cloth within the first 6 hours and daily. Wipe the face and head, then the body and perineum. Clean perineum after changing nappy, then wash your hands
• Bath only if blood and meconium need to be removed, or baby is smelly</td></tr>
<tr><td>Give routine treatment at birth</td><td>Eye prophylaxis
• Administer Chloramphenicol eye ointment into both eyes after birth</td><td>Vitamin K
• Administer Vitamin K 1mg IM in the anterolateral aspect of the mid-thigh</td></tr>
<tr><td>Monitor</td><td colspan="2">• 6 hourly monitoring of feeding, intake and output, respiration, heart rate, activity and colour</td></tr>
<tr><td>Immunisations at birth</td><td colspan="2">• Give BCG on discharge
• If baby exposed to TB see p. 11
• If < 6 weeks also give OPV0 and refer to clinic when six weeks old for six weeks immunisation.
• If 6 weeks or older, give all six weeks immunisations and refer to clinic after four weeks to receive 10 weeks doses</td></tr>
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F. COUNSEL THE MOTHER: COUNSELLING SKILLS

Communication

- Be respectful and understanding
- Listen to the family's concerns and encourage them to ask questions and express their emotions
- Use simple and clear language
- Ensure that the family understands any instructions and give them written information
- If a baby needs to be transferred, explain the reason for the transfer and how the baby will be transferred
- If a baby has a poor prognosis, is not improving or has had a sudden deterioration, discuss this with the mother and explain the current management
- Respect the family's right to privacy and confidentiality
- Respect the family's cultural beliefs and customs, and accommodate the family's needs as much as possible
- Remember that health care providers may feel anger, guilt, sorrow, pain and frustration.
- Obtain informed consent before doing any procedures

Listening and learning skills

- Use helpful non-verbal behaviour.
- Ask open-ended questions.
- Use responses and gestures that show interest.
- Reflect back what the mother says.
- Avoid judging words.

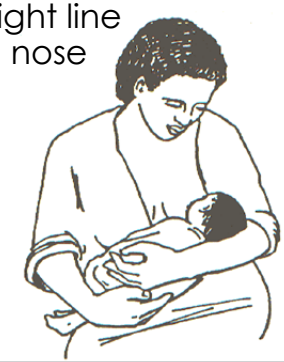
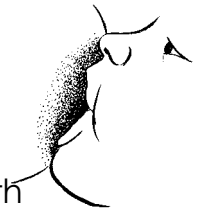
Confidence building skills

- Accept what the mother says, how she thinks and feels.
- Recognise and praise what the mother is doing right.
- Give practical help.
- Give relevant information according to the mother's needs and check her understanding.
- Use simple language.
- Make suggestions rather than giving commands
- Reach an agreement with the mother about the way forward

Suggested steps in counselling

Assess	Assess knowledge and practise
Advise	Give advice
Ask checking questions	Check her understanding by asking checking questions
Agree	Agree on a management plan
Assist	Give practical help and suggestions to achieve the plan
Arrange	Follow up sessions as required

G. ASSIST MOTHER WITH BREASTFEEDING

Assist mother with breastfeeding	**Help mother to position the baby for breastfeeding** • Seat the mother comfortably • Show the mother how to hold her baby • Baby's head and body must be in a straight line • Baby must face the mother's breast with nose opposite her nipple • Baby's body must be close to mother's body • Mother must support the baby's whole body (not just neck and shoulders) with her arm along baby's back 	**Show mom how to help the infant attach.** Mother should: • Hold baby's nose opposite nipple • Touch baby's lips to her nipple • Wait until baby's mouth is open wide • Move baby quickly onto her breast, aiming baby's lower lip well below the nipple • If attachment is not good, try again until baby attaches well • Mother may need to try different feeding positions till she finds one that is more comfortable
Assess attachment	**Signs of good attachment:** • Chin touching the breast • Mouth open wide • Lower lip turned outwards • Baby has areola and nipple in mouth • More areola visible above than below the mouth • Mother must feel comfortable • Jaw movement clearly seen  **Signs of poor attachment:** • Baby only has nipple in mouth • Chin not touching breast • Mouth points forwards and not open wide • Lower lip not turned outwards • Same amount of areola above and below baby's lips • Breast/nipple hurt during breastfeeding  **Assess suckling** • Sucking in of infant's cheeks. Clicking sounds heard while infant is suckling • Baby takes slow deep suckles with some pauses	**If poor attachment** • Help mother to position the baby • Help mother with attachment **If mother has pain in the breast or pain on feeding** • Check the mother's breasts (p. 18) **If not suckling effectively** • Check that attachment is good • Check that baby is well and does not have a priority sign, e.g. floppy, lethargic, not moving well

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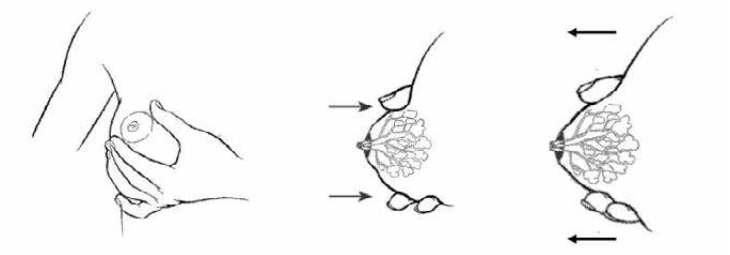
Support mother to breastfeed and provide help for any breastfeeding problems	**Advise about breast feeding** • Breastfeed baby on demand. Breastfeeds should not be timed • Most newborns breastfeed 8 - 12 times a day every 1 - 3 hours • Reassure the mother that the more the baby suckles the more milk she will make • Encourage mother to feed first on one breast without a time limit before offering the second breast. This ensures that baby gets the rich hind milk • Start each new feed on a different breast, then both breasts will make a similar amount of milk	**Breast feeding mothers** • Mother should drink extra fluids, at least 6 to 8 glasses of clean safe water • Mother should eat a variety of food. Refer to the Mother, Child Health and Nutrition booklet • Discourage the use of dummies or teats • Help mothers to recognise early hunger signs (feeding cues) e.g. sucking on hands or fingers, awake from sleep, making soft whimper sounds, restless, an increase eye movements • Discourage mix feeding

H. COUNSEL ON EXPRESSING BREAST MILK AND CUP FEEDING

EXPRESSING BREAST MILK

Assist mothers to express breast milk by hand

- Wash hands
- Make sure mom is sitting comfortably – a little forward
- Show her how to cup the breast just behind her areola
- Squeeze the breast gently, using thumb and the rest of fingers in a C shape. This shouldn't hurt (don't squeeze the nipple directly as you'll make it sore and unable to express)
- Hold a sterilised container below the breast to catch the milk as it flows
- Release the pressure then repeat, building up a rhythm. Try not to let her slide her fingers over the skin. At first, only drops will appear, but if she keeps going this will help build up her milk supply. With practice and a little time, milk may flow freely
- When no more drops come out, let her move her fingers around and try a different section of the breast
- When the flow slows down, swap to the other breast. Keep changing breasts until the milk drips very slowly or stops altogether
- If the milk doesn't flow, let her try moving her fingers slightly towards the nipple or further away, or give the breast a gentle massage



CUP FEEDING

How to feed a baby with a cup (ideal for expressed breast milk)

- Hold the baby sitting upright or semi-upright on your lap
- Hold the small cup of milk to the baby's mouth. Tip the cup so that the milk just reaches the baby's lips. The cup rests lightly on the baby's lower lip and the edge of the cup touches the outer part of the baby's upper lip. The baby will become alert
- Do not pour milk into the baby's mouth: A low birth weight baby starts to take milk with the tongue. A bigger / older baby sucks the milk, spilling some of it
- When finished the baby closes the mouth and will not take any more. If the baby has not had the required amount, wait and then offer the cup again, or offer more frequent feeds

I. ASSESS AND CLASSIFY FOR BREAST PROBLEMS IN THE MOTHER

If mom has a problem with her breast, use this chart to assess, classify and treat the problem.

ASK, CHECK, RECORD	SIGNS	CLASSIFY	TREAT AND ADVISE
Not enough milk? Pain or discomfort? • One or both breasts? • Pain in whole breast or localised? • Present between feeds? Lump in the breast? Does milk flow easily? Is there tightness around the nipple? Maternal fever? Nipples painful/ shiny/ flaky? Cracked/ bleeding/ oozing pus? Mother feeding from both breasts?	• Mom feels that she has not enough milk • Baby is not gaining weight and may cry	**NOT ENOUGH MILK**	• Reassure the mother that she can produce enough and give practical help • Give mom enough to drink and eat • Ensure she has rest and manage any stress • Let baby feed on demand 8 – 12 times a day, empty one breast before starting on the other side • Check and correct feeding positioning and attachment
	• Hot heavy breasts with no fever • Lumpy (disappears on feeding) • Milk flows easily	**FULL BREAST**	• Demand feed reduces full breasts in first few day • Express a little first to soften areola and help the baby to attach
	• Painful, red, shiny breast • Milk not flowing well • Nipple flat and tight	**BREAST ENGORGEMENT**	• Check feeding position and attachment • Encourage feeding on demand, suckling helps drain the breasts • Express a little first as it may help to get the baby to attach • Warm compresses on breasts, massage back and neck, warm shower may help milk to flow
	• Painful breast • Localized redness • No fever • Mother feels well	**BLOCKED DUCT**	• Check attachment, remove pressure of clothes • Give frequent feeds with gentle massage towards the nipple while feeding • Warm or cold compresses on breasts, massage back and neck, warm shower • Feed first using the affected beast

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	• Severe pain in part of or whole breast with fever for more than 1 day • Painful, hard, red, shiny breast or part of breast • Maternal fever • Breast oozing pus	**MASTITIS OR BREAST ABSCESS**	• Flucloxacillin 500 mg PO 6 hourly for 10 – 14 days OR • Erythromycin 500 mg PO 6 hourly for 10 – 14 days • Analgesia: Paracetamol 1 gm PO 6 hourly • Check and correct positioning and attachment • Feed baby on the unaffected side • Express milk from affected breast 8 - 12 times a day • Apply warm compresses or warm water to reduce the pain • Abscess requires surgical drainage: Refer to doctor
	• Painful nipple – no crack • Cracked nipple – no oozing or bleeding • Crack that is not healing	**PAINFUL NIPPLES**	• Prevention by correct positioning and attachment • Encourage breast feeding on demand • Express a little first to soften areola and help the baby to attach • Gently rub expressed breastmilk on the nipples for wound healing
	• Nipple may be red, shiny and flaky • Nipple painful, itchy, burning and stinging • Check baby's mouth for thrush	**BREAST THRUSH**	• Treat the baby with Nystatin 1ml (100 000u) orally and apply Nystatin cream to the mother's breasts after each feed
	• Nipple shape	**FLAT OR INVERTED NIPPLES**	• Continued breastfeeding will correct the nipple shape • If baby cannot suckle effectively, help mother express and cup feed

J. COUNSEL THE MOTHER WHO IS NOT BREASTFEEDING

ALMOST ALL MOTHERS CAN BREASTFEED HOWEVER A SMALL NUMBER MAY NOT BE able to breastfeed due to personal or health conditions. To safely formula feed the mother needs to meet certain conditions. If formula feeding is right for her educate and assist her to prepare and use formula feed safely.

COUNSEL THE MOTHER ABOUT BREASTFEEDING	**Does mom have a medical condition preventing her from breastfeeding** • She is on chemotherapy or radiotherapy • She has a chronic illness and is taking drugs that are harmful to the baby if she breastfeeds. Check that drugs cannot perhaps be changed • She is currently severely ill and cannot breastfeed, or express breast milk for the baby • Note: TB treatment and ARV treatment are not contraindications to breastfeeding a baby	**If there is no medical indication to not breastfeed, counsel the mother** • Explain that breastfeeding is the perfect food for baby, it contains many antibodies and substances that fight infection, mature the gut and body, and achieves optimal growth, development and health for the baby • The risk of not breast feeding is a much higher chance of the baby becoming ill with, or even dying from, diarrhoea, pneumonia and malnutrition • If she is HIV positive, and the mother was given ART treatment and prophylaxis to the baby the risk of HIV transmission is low
IF SHE STILL WANTS TO FORMULA FEED, COUNSEL FURTHER	• She must purchase the formula to use at home herself, and be prepared to do this for 12 months. See the table below for the amount needed per month (Affordable, Available, Sustainable) • Disclosure of her HIV status to relevant family will make it easier as she must give formula only and no breast milk (Acceptable) • Does the mother have access to safe clean water • Will she be able to prepare the formula safely	• She must safely prepare milk before EACH of the 6 – 8 feeds a day • She must clean and sterilise the equipment after each feed • Running water in the house and electricity and a kettle are advisable for safe preparation of 6 – 8 feeds a day (Sustainable, Safe) • She should use a cup to feed the baby as it is safer than a bottle (Safe) • Discourage mix feeding

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SAFE PREPARATION OF FORMULA

Age in months	Weight Kg	No. of feeds	400g tins per month
Birth	3	8 x 50 ml	2
2 weeks	3	8 x 50 ml	4
6 weeks	4	7 x 75 ml	7
10 weeks	5	6 x 125 ml	8
14 weeks	6.5	6 x 150 ml	8
4 months	7	6 x 175 ml	8
5 months or older	8	6 x 200 ml	8

HOW TO CUP FEED

- Hold the baby sitting upright or semi-upright on your lap
- Hold the small cup of milk to the baby's mouth.
- Tip the cup so that the milk just reaches the baby's lips.
- The cup rests lightly on the baby's lower lip and the edge of the cup touches the outer part of the baby's upper lip.
- Do not pour milk into the baby's mouth: A low birth weight baby starts to take milk with the tongue. A bigger / older baby sucks the milk, spilling some of it
- When finished the baby closes the mouth and will not take any more. If the baby has not had the required amount, wait and then offer the cup again, or offer more frequent feeds

Advise her how to prepare the formula milk

1. Formula milk must be prepared before EACH FEED
2. Wash your hands with soap and water
3. Boil water in a kettle or for 3 minutes in a pan and allow to cool
4. Read instructions on the tin very carefully to find out how many scoops of powder and water you need
5. Pour the amount of water needed in the cup, check that the water level is correct before adding the formula powder
6. Using the scoop supplied, add 1 scoop of formula powder to every 25ml of water (or manufacturer recommended amount) in the cup.
7. Stir with a clean spoon
8. Use the milk within and hour and discard any left over infant formula

Sterilise the utensils after each feed

- Wash the utensils, cup, knife and spoon in hot soapy water
- Sterilise the cup by boiling in water for 5 minutes or soaking in a sterilising liquid such as Milton, according to manufacturer's instruction

K. DAILY REVIEW AND DISCHARGE

ASK	ASSESS	SIGNS	CLASSIFY	ACT
Ask mother How is baby? How is baby feeding? Are the nappies wet? Has baby passed meconium? Is there any vomiting or drooling? Prophylactic treatment for HIV, syphilis and TB given?	**Assess breastfeeding** • Feeding 8 times or more • Well attached ◦ Chin touching the breast ◦ Mouth open wide ◦ Lower lip turned outwards ◦ More areola visible above than below the mouth • Is baby suckling well (that is, slow deep sucks sometimes pausing) **Check weight** • Check that baby is gaining weight or has not lost more than 10% of weight since birth **Examine baby** • Level of alertness • Tone • Breathing • Jaundice • Jaundice of the hands and feet • Skin • Eyes for infection • Umbilicus and umbilical cord	• Not able to feed • Drooling • Vomiting • Lethargic or floppy • Jaundice on Day 1 • Jaundice of the hands and feet	**POOR FEEDING OR SERIOUS ILLNESS**	• Refer URGENTLY to neonatal unit in hospital • Test for low blood sugar and treat or prevent low blood sugar (p. 12) • Keep warm
		• Jaundiced	**JAUNDICE**	• Check bilirubin • Review risk factors
		• Skin pustules or • Eye problem • Not passed meconium • Other problem	**LOCAL PROBLEM**	• Refer to neonatal unit or doctor for assesment • See p. 28
		• Weight loss excessive • Feeding problem • Not passed urine	**FEEDING PROBLEM**	• Assess attachment and assist with feeding • If mother has a breast problem, assess and treat (p. 18)
		• Feeding well • Weight gain or no excessive loss • Completed observation for infection for 48 hours • All prophylactic and preventative treatment administered • If risk of jaundice, bilirubin checked and below line of treatment	**BABY WELL**	• Prepare for discharge • Check Vitamin K and eye prophylaxis were given • Give BCG and OPV0 • Document information in the RTH booklet - Details of child and family - Neonatal information - Immunisation - PMTCT/HIV information Counsel mom on • Exclusive breastfeeding • Play and communication • Well child visits for comprehensive assessments • Growth monitoring and immunisation • HIV and TB prevention and care • Supplementation when required • Follow up at 3 – 6 days and 6 weeks

MANAGEMENT OF SICK AND SMALL NEWBORNS IN DISTRICT HOSPITALS

Use these charts as a guideline to care for Sick and Small newborns in district hosptials from birth to 28 days or discharge from hospital. They may also be used to care for babies in Community Health Centres or Midwife Obstetric Units. Local policies will then be required to decide when the mother and baby should be referred to hospital.

1. ASSESS AND CLASSIFY

Key to colours used in this chart booklet:

EMERGENCY CARE Immediate life-threatening situation: provide emergency care	**IMMEDIATE CARE** Potential life-threatening situation: provide immediate care
URGENT SPECIALISED CARE Provide care and refer as soon as possible	**NON-URGENT SPECIALISED CARE** Provide care and referral
Care and treatment needed as soon as possible	**Baby can be discharged home**

1.1 ASSESS AND CLASSIFY: ASSESS NEED FOR EMERGENCY CARE

Rapidly assess all newborns on arrival in the neonatal ward, casualty or outpatients for emergency or priority sign to assess the need for emergency care. Helping the baby to breathe at birth is part of routine care at birth (p. 5)

ASK, CHECK, RECORD	LOOK, LISTEN, FEEL	SIGNS	CLASSIFY	ACT NOW
Whilst assessing the baby, ask the mother or caregiver what is wrong with baby and check any letters or records? When was the baby born?	**Assess breathing** • Is baby breathing? • Is baby gasping? • Count the respiratory rate. Is it < 20 breaths / minute? • Is the baby's tongue blue? **Assess circulation** • Count the heart rate Is the heart rate > 180 or < 100? • Does baby have severe pallor? • Is the baby lethargic or unconscious? **Assess for hypoglycaemia in any small or sick baby** • Check blood glucose with glucose test strip	• Not breathing at all, or • Gasping, or • RR < 20, or • Heart rate < 100, or • Tongue blue	**RESPIRATORY FAILURE**	• Resuscitate the baby using a bag and mask • Give oxygen (p. 38 - 40) • Call for help • Keep warm • Manage in neonatal unit
		• HR > 180, or • Pallor, or • Lethargy, or • Unconscious	**CIRCULATORY FAILURE**	• Give oxygen (p. 38 - 40) • Call for help • Establish an IV line • Infuse normal saline 10ml / kg body weight over 1 hour • Infuse neonatalyte or dextrose 10% at recommended volume for weight and age. (p. 42 - 43) • Keep warm (p. 34 - 37) • Check blood glucose • Check Vitamin K administration
		• Glucose < 2,6 mmol / l	**HYPOGLYCAEMIA**	• If the blood glucose is < 1.4 mmol / l, or baby ill give 2ml / kg of 10% glucose IV • If the blood glucose is 1.4 – 2.5 and baby can feed, breastfeed or give EBM 10ml/kg PO immediately • For further care see (p. 41)

1.2 ASSESS AND CLASSIFY: PRIORITY SIGNS

Check all babies for priority signs and **ACT NOW** to manage priority problems.

ASK, CHECK, RECORD	LOOK, LISTEN, FEEL	SIGNS	CLASSIFY	ACT NOW
What is the baby's current problem? Is the baby having a problem with feeding? Has the baby had any convulsions or abnormal movements?	**Assess respiration** • Count the breaths in one minute • Listen for grunting • Look for severe chest in-drawing • Does baby have apnoea? (spontaneously stops breathing for more than 20 seconds) **Assess colour** • Central cyanosis (blue tongue)	• No breaths for > 20 seconds and needs stimulation	**APNOEA**	• Gentle physical stimulation or ventilate with bag and mask • Manage for apnoea (p. 50 - 51)
		• Severe chest in-drawing AND / OR • Grunting, AND / OR • RR > 80 breaths per minute	**SEVERE RESPIRATORY DISTRESS**	• Start oxygen (p. 38 - 40) • If preterm and nasal CPAP is available, commence nasal CPAP (p. 38 - 40) • Monitor the response to oxygen (p. 38-40) • Mobile CXR (p. 50) • Observe hourly • Start antibiotics (p. 51) • Keep nil per mouth for 24 hours • Treat, care and observe (p. 51)
		• RR 60-80 breaths per minute but **NO** cyanosis, grunting or chest indrawing	**MILD RESPIRATORY DISTRESS**	• Check oxygen saturation – if oxygen saturation <90% or cyanosis, manage as severe respiratory distress • Observe 3 hourly • Start antibiotics if at risk for infection (p. 51) • CXR if no improvement after 6 hrs
		• Central cyanosis and **no** chest in-drawing or grunting	**POSSIBLE HEART ABNORMALITY**	• Give oxygen (p. 38 - 40) • Consult specialist for further advice, referral and possible use of Prostoglandin E2 (p. 47)

continues below

ASK, CHECK, RECORD	LOOK, LISTEN, FEEL	SIGNS	CLASSIFY	ACT NOW
Baby's birth weight Baby's current weight Document findings in the newborn record	**Assess for low birth weight** **Assess temperature** Axillary temperature (Use thermometer which reads below 35°C) **Assess tone, movement and fontanelle** • Decreased tone (floppy) • Increased tone (stiff) • Irregular jerky movements • Reduced activity • Lethargic • Full fontanelle **Assess abdominal signs** • Abdominal distension • Vomiting bile or blood **Assess colour and skin** • Jaundice • Anaemia	• Birth weight < 1 kg • Birth weight 1 - 1.49 kg • Birth weight 1.5 -1.99 kg	**EXTREMELY LBW** **VERY LBW** **LBW (< 2 kg)**	• Ensure warmth • Commence fluids or feeds (p. 42 - 44) • Check blood glucose (p. 41) • See low birth weight chart (p. 52 - 61)
		• Temp < 36.0°C	**HYPOTHERMIA**	• Re-warm (p. 34 - 37) • Check blood glucose (p. 41)
		• Temp < 32.0°C or • Temp > 38°C or • Not feeding or • Decreased tone or • Increased tone or • Irregular jerky movement or • Reduced activity or • Lethargic or • Full fontanelle or • Boggy swelling of head extending down neck or • Anaemia or • Abdominal distension or • Vomiting bile or • Jaundice in the first 24 hour	**SEVERE DISEASE** (Classify if any one sign is present)	• Treat convulsions if present (p. 66) • Commence IV infusion at maintenance rate (p. 42 - 43) • Check blood glucose now and 3 hourly (p. 41) • Re-warm if cold (p. 34 - 37) • Keep warm (p. 34 - 37) • Check for risk factors and determine the cause (p. 31) • Treat the cause • Start antibiotics if sepsis is suspected (p. 62) • If abdomen distended, pass a naso / orogastric tube and leave on open drainage • Reassess 1-3 hourly
		• Jaundice after the first 24 hours	**JAUNDICE**	• Determine the bilirubin level and manage (p. 67 - 69) • Determine the cause (p. 67)
		• Birth weight 2 - 2.5 kg	**LBW (2-2.5 kg)**	• Place in KMC position with the mother in postnatal or KMC ward • Manage according to LBW guideline, 2.2.2 (p. 52 - 61)

1.3 ASSESS AND CLASSIFY: INJURIES, ABNORMALITIES AND LOCAL INFECTIONS

Assess all babies for any birth injuries or abnormalities that may be present.

ASK, CHECK, RECORD	LOOK, LISTEN, FEEL	SIGNS	CLASSIFY	ACT NOW
Ask the mother: "Have you noticed anything abnormal or of concern?" Has the baby passed meconium? Document findings in the newborn record. **This chart does not cover all abnormalities and local problems. Consult standard texts, or the local referring centre for advice on problems not covered here.**	**Assess the baby from head to toe:** **Head and face** • Head circumference • Swelling of scalp • Unusual appearance **Mouth and nose** • Cleft lip and / or palate • Nostrils patent **Eyes** • Pus draining from eye • Eyelid red or swollen **Abdomen and back** • Gastroschisis / omphalocoele • Spina bifida / myelomeningocoele • Imperforate anus • Ambiguous genitalia **Skin and Umbilicus** • Pustules / rash • Umbilicus red / pus continues below	• Open tissue on the head or back	**NEURAL TUBE DEFECT / SPINA BIFIDA**	• Cover the lesion with Opsite or cling film • See p. 70
		• Omphalocoele • Gastroschisis • Imperforate anus, not passed meconium in 24 hours	**MAJOR GASTROINTESTINAL ABNORMALITY**	• Commence IV fluids (p.42-43) • Keep nil per mouth • Cover the defect with sterile Opsite or cling film • See p. 70
		• Head circumference above the 97th centile on the fetal infant growth chart (p. 99)	**HYDROCEPHALUS**	• Refer to tertiary centre for neuro-imaging and neurosurgery (See p. 70)
		• Uncertain of the gender of the baby	**AMBIGUOUS GENITALIA**	• See p. 71 • Counsel the parents
		• Head circumference < 3rd centile on Head Circumference chart (p. 99)	**MICROCEPHALY**	• Assess for other abnormalities • See p. 71 • Counsel the parents
		• Club foot	**CLUB FOOT**	• If other abnormalities or abnormal tone refer to a paediatrician • Refer to orthopaedic service for early serial plasters • See p. 71

ASK, CHECK, RECORD	LOOK, LISTEN, FEEL	SIGNS	CLASSIFY	ACT NOW
	Limbs • Abnormal position • Poor limb movements (look at femur or clavicle) • Baby cries when leg, arm or shoulder is touched • Club foot • Extra finger or toe • Swollen limb / joint **Other**	• Cleft lip AND / OR palate	**CLEFT LIP AND / OR PALATE**	• If other problems refer to a paediatric service • Assist with feeding, breast feeding or EBM • Refer to a "cleft lip / palate service" • See p. 71
		• One major abnormality and two minor abnormalities OR • 3 other minor abnormalities	**OTHER MAJOR CONGENITAL ABNORMALITY**	• Baby may have a chromosomal problem, discuss investigation and management with paediatrician • See p. 72
		• One or two minor abnormalities	**MINOR ABNORMALITY**	• If the child has an extra digit on a narrow pedicle, it may be tied off • Dependent on the problem, refer for further management • See p. 72
		• Swelling confined to one skull bone	**CEPHALHAEMATOMA**	• Counsel the parents • Handle gently • Check for jaundice

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ASK, CHECK, RECORD	LOOK, LISTEN, FEEL	SIGNS	CLASSIFY	ACT NOW
		• Abnormal position of legs or arm • Poor limb movement • Pain on movement of the limb	**LIMB INJURY**	• X-ray to look for syphilis or a fracture • If there is a fracture or syphilis treat • If the arm is not moving and flaccid a brachial plexus palsy is likely, refer to physiotherapy, and if not improving to orthopaedic surgery
		• Blisters containing pus in the skin • Blisters rupture leaving reddish dry skin	**STAPH SKIN SEPSIS**	• If severe do a blood culture, gram stain and culture of pus • Wash with antiseptic soap 12 hrly • If a few small blisters give oral Flucloxacillin • If extensive or the baby is ill give CloxacillinIV for 7 – 10 days
		• Pussy discharge from the umbilicus • Redness and swelling of the skin around the umbilicus	**OMPHALITIS**	• Clean the base of the cord with surgical spirits or Chlorhexidene 3 – 4 times a day • Benzyl Penicillin and Gentamycin for 5 – 7 days
		• Pussy discharge • Red conjunctivae • Oedema of the eyelid	**SEVERE CONJUNCTIVITIS**	• Ceftriaxone IMI one dose only (p. 90) • PLUS • Erythromycin for 10 – 14 day • Irrigate eye with clean water 2 hrly • Chloramphenicol eye ointment 2 hrly
		• Mild eye discharge	**MILD CONJUNCTIVITIS**	• Clean with water and apply Chloramphenicol ointment 3 - 4 times per day • If no response, treat as severe

1.4 ASSESS AND CLASSIFY: RISK FACTORS AND SPECIAL TREATMENT NEEDS

Evaluate for maternal and perinatal conditions that may put the baby at risk of serious illness.

ASK, CHECK, RECORD	SIGNS	CLASSIFY	ACT NOW
Review and record the history of the mother's pregnancy, labour, birth and resuscitation of the baby Pregnancy • Duration of pregnancy • Mother diabetic • Mother has had TB in the last 6 months • Mother tested RPR positive or is unknown • Mother tested HIV positive or HIV status is unknown • Mother's blood group O or Rh Negative Labour and birth • Uterine infection or fever • Membranes ruptured for > 18 hours • Difficult labour • Complications after birth • Apgar score < 8 at 5 minutes	• Mother has diabetes, OR • Baby weighs > 4,5 kg, OR • Baby is low birth weight < 2,5kg or premature • Baby has SEVERE DISEASE	**RISK OF HYPOGLYCAEMIA**	• Feed immediately, or IV line • Hourly glucose for 6 -12 hours if mother diabetic otherwise 3 hourly for 24 hours • Treat hypoglycaemia (p. 41)
	• Mother blood group O OR • Mother Rhesus Negative OR • Baby has birth injuries • Baby is low birth weight	**RISK OF JAUNDICE**	• Measure bilirubin at 6 hours • Commence phototherapy if bilirubin > 80 mmol / l (p. 67 - 69)
	• Membranes ruptured >18 hours OR • Maternal fever OR • Offensive smell of liquor at birth	**RISK OF BACTERIAL INFECTION**	• If clinical signs of infection or VLBW • Treat with Benzyl penicillin and Gentamycin for 5 days unless CRP is normal at 2 days • If well observe for 48 hours and if still well, the baby can be discharged
	• Apgar score <8 at 5 minutes, OR • Baby did not breathe on own until 5 minutes	**RISK OF NEONATAL ENCEPHALOPATHY**	• Observe for at least 12 hours • Evaluate and manage for neonatal encephalopathy (p. 63 - 65)
	• Mother tested RPR positive, OR • Mother's RPR not known, OR • Mother partially treated	**RISK OF CONGENITAL SYPHILIS**	• Evaluate and manage according to the congenital syphilis protocol (p. 73)
	• Mother tested HIV positive, OR • Mother tested HIV negative and has not re-tested in the last 3 months, OR • Baby abandoned, OR • Unknown maternal HIV status	**RISK OF HIV TRANSMISSION**	• Manage according to the PMTCT protocol (p. 76 - 79)
	• Mother started TB treatment within the past 6 months, OR • Mother coughing for > 2 weeks	**RISK OF TUBERCULOSIS**	• Manage according to the TB protocol (p. 74 - 75)

2. TREAT, OBSERVE AND CARE

2.1 Principles of Newborn Care

2.1.1 MAINTAIN NORMAL BODY TEMPERATURE: PREVENT AND TREAT HYPOTHERMIA

The baby who is preterm and/or low birth weight needs additional warmth to maintain body temperature.

PREVENT HYPOTHERMIA

Dry the baby well at birth

Keep the baby warm:

- Provide 'skin-to-skin' care with the mother
- Babies in 'skin-to-skin' to have caps, booties and nappies only
- If baby not receiving 'skin-to-skin', keep the baby covered or clothed including booties and a cap
- Uncover only parts that need observation and treatment
- Change the nappy when it is wet
- Delay bathing until after 24 hours, preferably 'top and tail' to clean

Feed the baby early

- Encourage early breastfeeding
- Feed the baby and check the blood glucose if appropriate

Maintain a warm environment in the newborn unit

- Keep the room at 24 - 25°C
- Check the wall thermometer 4x/day to ensure the temperature is correct
- Keep the room free of draughts
- Do not place the baby or incubator on or near cold objects (examination table, wall, window)
- Ensure warmth during procedures
- Draw curtains at night or if it is cold outside

Observe body temperature

- Hourly if <1.2kg and serious infection
- 3 hourly in babies 1.2-1.5kg
- 6 hourly in babies >1.5kg and stable

TREAT HYPOTHERMIA

Temp <32°C Signs of severe disease	**SEVERE HYPOTHERMIA**	• Warm using a pre-warmed incubator at 38°C or radiant heater • Measure the temperature after 30 minutes and then hourly until normal • The temperature should increase by more than 0.5°C every hour • Treat for sepsis • Give IV fluids and monitor the blood glucose; keep nil per mouth until re-warmed • Give oxygen by nasal prongs until the baby's temperature is normal • Continually reassess for emergency signs. The baby is at risk for cardio-respiratory failure
Temp 32-36°C May have signs of severe disease	**HYPOTHERMIA**	• If the baby is stable, re-warm the baby using skin to skin contact with the mother • If the baby is not stable rewarm as for severe hypothermia • Measure the blood glucose and feed • Measure the baby's temperature every hour, aiming for an increase of 0.5°C every hour

2.1.1 MAINTAIN NORMAL BODY TEMPERATURE: METHODS

The baby who is preterm and/or low birth weight needs additional warmth to maintain body temperature. Term babies also need to be kept warm, and not exposed to cold.

Method	Indications	Method
Skin-to-Skin	• Baby immediately after birth • Baby < 2.5kg who are stable • To rewarm babies with hypothermia • To transport a baby in an ambulance if baby is reasonably stable	• Dress the baby with a cap, booties and nappy • Place the baby skin-to-skin on the mothers chest • Cover the baby • Secure the baby to the mother
Manual Radiant Warmer	• Mainly used in the resuscitation area, as the baby can get hypothermia or hyperthermia if not closely monitored	• Uses radiant heat to warm the baby • Keep the radiant heater switched on in the resuscitation area, ready for use at all times • Dry and cover the baby and ensure no draughts • Monitor the temperature to ensure no hypothermia or hyperthermia • Change the linen after each baby

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Method	Indications	Method

Servo-controlled Closed and Open incubators	• Babies with severe disease including severe hypothermia
	• Babies with very and extreme low birth weight
	• Babies who require
	  ○ CPAP / IPPV
	  ○ Head box oxygen
	  ○ Resuscitation
	  ○ Exchange transfusion
	• Closed servo-controlled incubators can be better for very small babies
	• Open servo-controlled incubators may be more convenient for babies requiring procedures
		Closed servo-control incubator
		• Switch the control to manual (AIR) and preheat to 37°C
		• Place the baby in the incubator and attach the temperature probe to the baby's skin (The left side of the abdomen is best)
		• Make sure that the cable from the baby's skin is correctly plugged into the incubator
		• Switch the incubator control from manual (AIR) to servo-controlled (SKIN)
		• Set the required skin temperature to 36.5°C on the control panel
		• The actual skin temperature will be displayed on the panel
		• After 30 minutes check that the baby's skin temperature is the same as the required temperature. If not then the skin probe is not correctly applied or the incubator is malfunctioning
		• Check the temperature of both baby and incubator every 1 - 3 hours
		
		Open servo-control incubator
		• Uses radiant heat to warm the baby
		• Set as for servo-controlled closed incubator The temperature probe is taped to the baby's skin and the skin temperature set to 36.5°C
		• The baby needs to be undressed and exposed except for a nappy, cap and booties
		• A heat shield or plastic covering will prevent heat loss through radiation
		
		NOTE: If the skin probe comes loose, the incubator may continue to warm up and the baby will become TOO HOT! (hyperthermic)

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Manual Incubators

- Where you do not have servo-control incubators OR
- The servo-control incubator is malfunctioning and you need to set it to manual mode

- Place the baby in a warm (37°C) clean incubator
- Determine the recommended incubator temperature for your baby. Use Table 1
- Set the incubator to this temperature
- Measure the incubator and baby's temperature after 30 minutes and adjust the incubator temperature if the baby's temperature is not normal (36.0 - 37.0°C)
- Monitor the incubator and baby's temperature 3 hourly as part of routine observations. Alter the incubator temperature whenever the baby's temperature is outside the normal range

TABLE 1: TEMPERATURE CHART FOR INCUBATORS

Birth weight	Days after delivery						
	0	5	10	15	20	25	30
1000g	35.5	35.0	35.0	34.5	34.0	33.5	33.0
1500g	35.0	34.0	33.5	33.5	33.0	32.5	32.5
2000g	34.0	33.0	32.5	32.0	32.0	32.0	32.0
2500g	33.5	32.5	32.0	31.0	31.0	31.0	31.0
3000g	33.0	32.0	31.0	30.0	30.0	30.0	30.0

If the baby remains cold despite the recommended temperature, then:

- the room is too cold, or the incubator is near a window
- the baby has an infection
- the incubator is malfunctioning

2.1.2 SAFE OXYGEN THERAPY

WHICH BABY NEEDS OXYGEN?

- Severe hypothermia
- Respiratory failure
- Circulatory failure
- Baby with SEVERE RESPIRATORY DISTRESS:
  - RR >80 breathes per minute
  - Severe chest in-drawing or grunting
  - Oxygen saturation less than 88%
  - Central cyanosis (blue tongue and lips)

CONCENTRATION OF OXYGEN

- The concentration of oxygen in room air is 21%, and the concentration of pure oxygen is 100%
- Too much or too little oxygen is bad for the baby. Keep oxygen saturation between 90 and 94%
- Try and give as little oxygen as possible to keep oxygen saturation between 90 and 94%. Do this by mixing oxygen with air as below.
- An air / oxygen blender that mixes pure oxygen with medical air to give the required concentration (between 21% and 100%)
- A venturi that mixes pure oxygen with room air – the venturi is a simple apparatus that uses a jet of oxygen to suck in a fixed amount of room air
  - Venturis are available that deliver oxygen concentrations from 24% to 80%. Each venturi has a specified flow rate

Adjust the oxygen concentration to keep the saturation between 90 - 94% in a preterm baby, or 92 - 94% in a term baby.

GUIDELINES FOR OXYGEN ADMINISTRATION

- **Start nasal prong oxygen at 1l/min for babies with RESPIRATORY DISTRESS**
- Monitor the oxygen saturation with a PULSE OXIMETER continuously for 30 minutes after starting the oxygen, and then at least hourly
- A preterm baby's oxygen saturation should be between 90% and 94% if receiving oxygen
- A term baby's oxygen saturation should be between 92 and 94% if receiving oxygen
- **If the baby is preterm and the saturation is low and the baby has severe respiratory distress, AND CPAP is available then start nasal CPAP**
- **If the baby is not preterm or is preterm but CPAP is not available, start headbox oxygen. Run 4 L / min of oxygen into a headbox, with all its openings closed.**
  - If the baby remains distressed, blue, or the oxygen saturation remains< 90% then increase the flow to 6 – 8 litres a minute
  - If the baby does not cope on this then the baby will need to be transferred for ventilation if available.
  - When the baby is pink and comfortable (less grunting / chest in-drawing) and the oxygen saturation is > 90%, in < 40% oxygen on head box, change to nasal prongs.
- When the baby is comfortable on nasal prongs and oxygen saturation is > 90% then remove nasal prongs, and monitor saturation in next 3 hours

For Head box use pure oxygen

% O_2	80%	70%	60%	50%	30%
Flow	101	81	61	41	21

2.1.2 SAFE OXYGEN THERAPY:
TO BABIES WHO ARE BREATHING SPONTANEOUSLY

	Indication	Method	Flow and concentration	Observations	Advantages	Disadvantages
Headbox (HBO_2) 	• For babies with severe respiratory distress needing oxygen • To stabilise babies to assess whether they will require CPAP • For babies not maintaining oxygen saturation on nasal prongs or cannula	• Always ensure that the head stays within the head box • Start with all the holes closed • 5 - 12 L / min of oxygen is required • Apply a face mask if you need to move the baby • Humidification is not necessary	• Start with 4 L / min oxygen and increase if needed • Use air / oxygen blender or venture if less oxygen is needed, don't decrease flow to < 4 L/Min • Oxygen concentration 25% - 80% can be achieved	• Observe and record the oxygen saturation and colour hourly • Observe and record oxygen concentration in head box	• High concentrations of up to 80% oxygen can be achieved if needed • Does not obstruct the nasal passages • Humidification of the oxygen is not necessary	• Baby cannot be moved • Must feed by nasogastric tube • High flow of oxygen needed to reach required concentration • Danger of oxygen poisoning (retinopathy, broncho-pulmonary dysplasia), especially in a preterm baby, if too much oxygen is given
Nasal prongs 	• Mild respiratory distress, or coping on HBO_2 40% or less • No nasogastric tube in situ - baby may have an orogastric tube	• Place prongs just below the baby's nostrils. Use 1mm prongs for small babies and 2mm prongs for term babies • Secure the prongs with tape • Humidification is not necessary	• 1 L per minute • O2 Concentration ~30%	• Monitor the oxygen saturation 3 hourly	• Ensures constant O2 concentration • Baby can be fed orally (cup or breast) • Ideal for babies with mild respiratory distress	• Not for babies with severe breathing difficulty • Prongs can get displaced
Nasal Cannula 	• Mild respiratory distress, or coping on HBO_2 40% or less • No nasogastric tube in situ - baby may have an orogastric tube	• Insert a FG5 or FG8 nasogastric tube 2 cm into the nostril. • Secure with tape • Humidification is not necessary if cannula is in the nose, and not the pharynx	• 0.5 L per minute	• Monitor the oxygen saturation 3 hourly	• Ensures constant concentration • Baby can be fed orally (cup or breast) • Ideal for babies with mild respiratory distress • Uses little oxygen	• Not for babies with a nasogastric tube in situ as this may obstruct both nostrils • If tube feeding is needed use an orogastric tube

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2.1.2 SAFE OXYGEN THERAPY: TO BABIES WHO ARE BREATHING SPONTANEOUSLY

	Indication	Method	Flow and concentration	Observations	Advantages	Disadvantages
Continuous Positive Airway Pressure (CPAP) 	• For preterm babies with severe respiratory distress, e.g. hyaline membrane disease, wet lung syndrome, pneumonia, atelectasis, pulmonary oedema • Apnoea due to prematurity • For term babies with severe respiratory distress who are breathing spontaneously	• Apply special nasal prongs to the baby • Connect the CPAP machine • Connect the humidification circuit • Start with a pressure of 5cm of water • When weaning the baby, first turn down the oxygen percentage and then the cm pressure of water	• Oxygen and medical air are mixed through a blender	• Observe and record the oxygen saturation continuously	• Delivers oxygen and provides a positive airway pressure to prevent collapse of airways • Decreases the work of breathing • Optimises surfactant production. • Reduces the incidence of apnoea.	• Babies must be breathing spontaneously • Cannot be fed initially • Later small feeds via an orogastric tube • Danger is gastric distension and vomiting • Risk of air leak syndromes • Reduction in cardiac output • Trauma to the nostrils and skin • Stomach distension • Inadvertent disconnection

GUIDE FOR CPAP

- Start on pressures of 5 cm water
- Utilise chest X-ray to assess lung expansion (7 - 8 posterior ribs visible above the diaphragm)
- Weaning:
  - o First reduce the oxygen if the saturations are maintained
  - o Then reduce the pressure to see if baby will cope on nasal prong oxygen
- Change to nasal prong oxygen
  - o If the oxygen requirement is < 40% and the oxygen saturations are maintained
  - o And when the pressure is at 2 cm water
  - o And there are no apnoeic episodes
- The baby requires referral and transfer for ventilation if CPAP is adequate and applied at 5cm pressure for 1 hour and:
  - o If the oxygen requirement is still > 40%, the respiratory rate is still > 60, or there are signs of severe respiratory distress
  - o There is repeated apnoea on CPAP

CPAP IS NOT ADVISABLE WITH THE FOLLOWING

- Upper airway abnormalities, e.g. choanal atresia, tracheo-oesophageal fistula, cleft palate
- Severe cardio-respiratory instability
- Unstable respiratory drive with severe apnoea and / or bradycardia
- Meconium aspiraton
- Abdominal distention
- If the oxygen saturation is worsening, consider intubation and referral for mechanical ventilation

2.1.3 MAINTAIN NORMAL GLUCOSE

CHECK THE BLOOD GLUCOSE OF THE FOLLOWING BABIES:

- Small and sick babies every 3 hours for the first 24 hours and until normal for 24 hours
- Babies of diabetic mothers: hourly for the first 6 hours
- Babies who are hypothermic
- Babies who have not been fed

PREVENT HYPOGLYCAEMIA:

- Put the baby to the breast immediately after birth
- If the baby is not sucking, pass a nasogastric tube and give a feed, or cup feed
- If milk feeds are contraindicated start intravenous fluids (Neonatalyte) immediately
- Keep the baby warm

CLINICAL SIGNS OF HYPOGLYCAEMIA

The baby may be asymptomatic or have the following priority signs:
irregular jerky movements, jittery, convulsion, lethargy, coma, apnoea, hypotonia.

TREAT HYPOGLYCAEMIA

HYPOGLYCAEMIA

If the blood glucose is 1.4 - 2.5mmol / l

- Breastfeed or feed expressed breast milk. Only if breastfeeding is not possible (mother very sick or HIV-positive and has chosen not to breastfeed) then give 10ml/kg appropriate replacement milk feed
- Repeat the blood glucose in 15 minutes
- If the blood sugar remains low, treat for severe hypoglycaemia
- If the blood glucose is normal, give normal milk feeds and check the blood glucose 2- 3 hourly

SEVERE HYPOGLYCAEMIA

If the blood glucose is < 1.4mmol / l

- Give a bolus of 10% dextrose infusion (Neonatalyte) at 2 ml/kg. Then continue with the 10% dextrose infusion at the recommended rate for age and weight (p. 42 - 43)
- Repeat the blood glucose in 15 minutes
- If still low increase infusion to 15% dextrose.(Add 20ml of 50% dextrose to 200ml Neonatolyte) OR
- Glucagon IM/, V/SC dose: 0.2mg/kg/dose

OR discuss with a paediatrician or neonatologist (if possible) whether to administer 5mg Hydrocortisone IV

If a baby has a persistent or recurrent hypoglycaemia check that the baby is in a thermo-neutral environment, is getting adequate feeds, and that he/she does not have sepsis.

BABY OF A DIABETIC MOTHER AND A LARGE FOR GESTATIONAL AGE BABY> 4.5kg

- Feed the baby immediately, or start IV Neonatalyte if the baby is nil per mouth
- Check the blood glucose hourly for 6 hours, stop when normal for 6 hours
- If hypoglycaemia occurs, manage as above

HYPERGLYCAEMIA

- Hyperglycaemia is common in small, sick and septic babies
- Check the hydration, and correct if dehydrated
- If on IV infusion, then change to 5% dextrose infusion
- If blood glucose remains > 14mmol /l consult a paediatrician or neonatologist
- NEVER give insulin, unless under the direction of a neonatologist

2.1.4 FEEDS AND FLUIDS FOR SICK AND SMALL BABIES

FOR BABIES < 1.5 KG OR SICK BABIES

- Commence on IV fluids and keep nil per mouth for the first day, unless the baby is well with a gestational age > 32 weeks and difficult to insert IV line. Calculate the IV fluid and feed for each baby using Table 2 OR Table 3 as guides (p. 42 - 43)
- Use birth weight to calculate feeds and fluids until baby has regained birth weight, then use the daily weight
- Gradually introduce expressed breast milk (EBM)by nasogastric tube from day 2
- Feed babies every 3 hours
- Increase the feeds daily if there is no vomiting, apnoea or abdominal distension
- Progress to cup/spoon feeding as soon as the baby can swallow and does not need head box oxygen
- Breastfeed the baby instead of giving EBM as soon as the baby can suckle
- Very low birth weight babies (1-1.5kg) require 75ml/kg on day 1
- Extremely low birth weight babies(<1kg) require 100ml/kg on days 1 and 2, and may need to start oral feeds with ½ ml 2 hourly (p. 52)

FOR BABIES >1.5 kg AND THOSE THAT CAN TAKE ORAL FEEDS BUT CANNOT SUCKLE

Feed 3 hourly according to suggested volumes in Table 2 and 4

FEEDING METHOD

Nasogastric / orogastric feeds

- Babies who cannot suckle - usually gestational age <34 weeks
- Babies who have respiratory distress and are in head box oxygen
- Babies on nasal prongs or cannula oxygen or CPAP, who need gastric feeds, should have an orogastric tube

Cup feed (p. 17)

- Babies who cannot breastfeed
- Cannot yet suckle but can swallow

BABIES TO BE KEPT NIL PER MOUTH:

- Birth weight < 1.5 kg on day 1
- Sick baby, until stable
- A baby with a distended abdomen and vomiting
- A baby with neonatal encephalopathy, until bowel sounds heard

TABLE 2: RECOMMENDED FLUIDS FOR SMALL OR SICK BABIES

	Total Fluids	Suggested IVI	Suggested oral
DAY 1	60 ml / kg	60 ml / kg	Nil
DAY 2	75 ml / kg	50 ml / kg	25 ml / kg
DAY 3	100 ml / kg	50 ml / kg	50 ml / kg
DAY 4	125 ml / kg	50 ml / kg	75 ml / kg
DAY 5 +	150 ml / kg	Nil	150 ml / kg
DAY 7 +	150 – 180 ml / kg	Nil	150 – 180 ml / kg

- **To calculate feeds, use birth weight until the baby has regained birth weight and then the weight on that day**
- To calculate the drip rate:

$$\frac{\text{weight} \times \text{volume / kg}}{24} = \text{ml / hour}$$

- Use a 60 drop/ml intravenous infusion administration set (ml/hour = drops/min)
- Always use a buretrol and an infusion controller or dial-a-flow when administering fluids to neonates
- Feeds and fluids must be calculated and prescribed EVERY DAY

Suggested IV fluid

- Neonatalyte / NEOLYTE (contains 10% dextrose)

Calculate 3 hourly feeding:

$$\frac{\text{weight} \times \text{volume / kg}}{8} = \text{ml / feed}$$

Suggested feeds:

- Expressed breastmilk (EBM)
- If no EBM use banked breast milk or appropriate formula
  - If <1.5 kg – appropriate replacement for pre-terms
  - If >1.5 kg – appropriate replacement

continues below

Use this as a guide to determine how much IV fluid and feeds to give sick and small babies. If a baby is not tolerating the amount of oral feeds, then decrease the oral feeds and increase the IV fluids – **ensure that the total fluid volume is correct for the baby's age and weight.**

TABLE 3: FLUIDS AND FEEDS FOR SICK AND VERY SMALL BABIES ON IV AND NASOGASTRIC OR CUP FEEDS																
DAY ⇨	1		2			3			4			5+			7+	
Total fluid volume ⇨	60 *75 – 100 if <1,5kg		75			100			125			150 (full feeds)			180 (max feed)	
	IVI*	Oral**	If Nil per mouth***	IVI	Oral	If Nil per mouth***	IVI	Oral	If Nil per mouth***	IVI	Oral	If Nil per mouth***	IVI	Oral	IVI	Oral
Total ml / kg IV and oral ⇨	60*	0	75	50	25		50	50		25	100		0	150	0	180
< 1.2 kg	3*	0	3	3	3	5	3	6	6	2	12	7		20		25
1.2 - < 1.5 kg	3*	0		3	4		3	9		2	15			25		30
1.5 - < 1.75 kg	4	0	5	4	5	7	3	12	8	2	20	10		30		35
1.75 - < 2.5 kg	5	0	6	4	6	8	3	15	10	2	25	12		35		45
2.5 - < 3.5 kg	7	0	9	6	10	12	6	20	15	2	40	18		55		70
3.5 - < 4.5 kg	10	0	12	8	15	16	6	25	20	4	50	25		75		90

***IV: ml / hour or drops / minute (60 drops / ml giving set)**
****Oral: ml / feed 3 hourly**
***Nil per mouth – these are estimates for babies that need to be nil per mouth, you may prefer to calculate the feeds yourself according to the birth weight, and gradually introduce oral feeds. No baby should be nil per mouth for more than 48 hours. If the baby cannot be fed then, consult a paediatrician at your referral hospital.

continues on next page

TABLE 4: AMOUNT (ml) OF 3 HOURLY CUP OR NASOGASTRIC FEEDS FOR BABIES ON ORAL FEEDS ONLY BUT WHO ARE NOT ABLE TO BREASTFEED						
DAY OF LIFE	**1**	**2**	**3**	**4**	**5**	**If not gaining**
Fluid volume / day	60 ml / kg	75 ml / kg	100 ml / kg	125 ml / kg	150 ml / kg	180 ml / kg
1.2 - < 1.5 kg	10	15	15	20	25	30
1.5 - < 1.75 kg	12	15	20	25	30	35
1.75 - < 2.5 kg	15	20	25	30	35	45
2.5 - < 3.5 kg	25	30	35	50	55	70
3.5 – < 4.5 kg	30	35	50	60	75	90

Give baby expressed breast milk as preference
Babies 1.2 – 1.5kg can receive EBM and no IV fluids if they are well, and do not have respiratory distress

2.1.5 INFECTION PREVENTION AND CONTROL

Infection is common in newborns because of their immature immune system. Failure to follow infection prevention routines will result in hospital acquired infections and deaths.

Hand washing

- To wash hands: wet hands thoroughly, apply Chlorhexidine containing soap or solution and wash for 60 seconds, rinse under running water and dry using a clean disposable hand towel
- Always wash your hands on entering the nursery and before and after touching a baby, or after handling soiled linen or instruments
- Instruct mothers and visitors to wash their hands before and after touching their babies while in the neonatal unit
- An alcohol based hand lotion may be used instead of hand washing before and after handling babies
- Each incubator or cot must have a bottle of alcohol containing hand lotion
- Each cubicle needs a basin with running water and Chlorhexidine containing solution or soap, and paper hand towels

Nursing

- Exclusively breast feed babies
- Nurse the baby in Kangaroo Mother Care whenever possible
- Each baby should remain in their own cot/incubator (only one baby per incubator)
- Each crib or incubator to have it's own thermometer, stethoscope, alcohol hand lotion and swabs
- Avoid having too many people handling the baby. Staff should be patient allocated, not task allocated
- Avoid overcrowding and understaffing in the neonatal unit
- Avoid communal activities like bathing
- Do any procedures in the cot/incubator
- Wear gloves for contact with the mucous membranes or body fluids
- Always use a separate pair of gloves for each baby
- Use alcohol hand lotion on the hands before and after handling the baby

Isolation and admission

- Isolation of infected babies is usually not needed if a policy of frequent hand washing is practiced. Babies with gastroenteritis should be nursed in a private room
- Out born babies should be admitted in the nursery; they do not necessarily spread infection to the babies born in the hospital
- Neonates should be admitted to a neonatal unit and not to a paediatric ward, unless there is a neonatal section with its own staff

Staff

- Exclude staff or visitors with a respiratory infection, fever blisters or open skin lesions from the unit until they have recovered
- Ensure that staff working in the nursery are up to date with all routine immunisations and encourage them to have annual influenza immunisation
- Clothing:
  - Protective clothing is not needed
  - Remove long sleeved clothing before entering
  - Remove white coats

continues on next page

Cleaning equipment

- Wipe stethoscopes with alcohol swabs or 0.5% Chlorhexidine and 70% alcohol between use
- Wash head boxes with soap and water between use
- Clean incubators with 0.5% Chlorhexidine between use and every week and allow to dry before using
- Remove and destroy sharps container when 2/3 full
- Clean spills of blood with 0.5% Chlorhexidine
- Clean containers used to express breast milk with soap and water, then soak in 2% Hypochlorite or autoclave.
- Clean oxygen tubing, and respirator circuits with soap and water then soak in 4% Chlorhexidine gluconate for 30 minutes, then rinse with clean water
- Soak in 5ml 10% isopropyl alcohol mixed with a bucket of water for another 30 minutes, then rinse with tap water.
- Using gloves, remove the tubing, drain the water, hang on a IV stand and then blow dry with oxygen

2.1.6 TRANSFER AND REFERRAL

The key to successful transport that will minimise the risk for the baby is accurate and detailed **communication** among the respective staff of the referring hospital, the transport team and the accepting hospital.
The list of conditions for which a baby should be referred is not exhaustive, the rule is: ***IF IN DOUBT, DISCUSS WITH THE DOCTOR AT THE REFERRAL HOSPITAL***

WHO SHOULD BE REFERRED?

- Babies with birth weight 1000g-1500g who are unwell
- Respiratory distress (requiring more than 40% headbox oxygen) with oxygen saturation <80% on headbox oxygen
- Uncontrolled seizures
- Recurrent apnoea in babies weighing >1000g
- Hypoglycaemia not responding to treatment in 1 hour
- Jaundice: >200 umol / l on day 1
  400 umol / l at any time
  >300 umol / l at any time, if weight <2,5kg
- Persistent vomiting
- Bile stained vomiting
- Surgical problems
  *NB**Dysmorphic babies who are otherwise well need to be seen by a paediatrician but this is not a reason for urgent transfer*

DUTY OF REFERRING CLINICIAN

- Inform the referring hospital of:
  - Progress of the baby
  - Condition of the baby on transfer
  - When the ambulance leaves your hospital
- Tear out the first page of the newborn record and write the referral letter on the back
- Nursing observations must be done while waiting for, and immediately before discharge
- Adequate medication must be available for transit
- The mother's details and contact numbers must be in the baby's records if she cannot accompany the baby

IMPORTANT THINGS TO CHECK BEFORE TRANSFER

- Name band of the baby
- Vital signs: temp, RR, PR, colour, activity - do regularly up until the time of transfer
- Blood glucose
- Secure airway
- Secure and reliable IV line
- Nasogastric tube in situ, if applicable
- Ensure that the transferring ambulance has a functioning warm transport incubator, resuscitation equipment, oxygen in the ambulance, a small oxygen cylinder for transport, and a pulse oximeter
- If no transport incubator it is better to transport the baby skin-to-skin with the mother.

TRANSFER OF BLUE BABY: CONGENITAL HEART DISEASE

- Resuscitate and stabilise
- Give Prostaglandin E2, **¼ tablet half hourly**. Crush the tablet, mix with 2-5ml of water and give it through a nasogastric tube
- Intubate if at all possible
- Treat shock before transfer
- Keep the baby nil per mouth

2. TREAT, OBSERVE AND CARE

2.2 Specific Problems

2.2.1 APNOEA AND RESPIRATORY DISTRESS

APNOEA

Stimulate the baby by rubbing his / her back for 10 seconds: if the baby does not begin to breathe immediately, resuscitate the baby using a bag and mask.

Preterm baby:

- Identify and treat the cause
- Load with oral caffeine 10 – 12,5 mg / kg PO once and then 2,5 - 5mg / kg daily OR oral Theophyline 5mg/kg loading dose followed by 2mg/kg 12 hourly
- Observe the baby for apnoea
- Once stabilised, KMC can be continued or started
- If there are intermittent apnoeic episodes, treat for sepsis
- If there is persistent apnoea, assess for CPAP and discuss for transfer

Term baby:

- Apnoea is unusual in term babies. Observe, investigate and refer if necessary
- Monitor for 24 hours using an apnoea monitor, or skin-to-skin care
- Investigate and treat for sepsis if there is a 2nd episode of apnoea
- If the baby is free from apnoea for 24 hours and the baby is feeding well and has no other reason for hospitalisation, then prepare to discharge the baby

RESPIRATORY DISTRESS

The main management of respiratory distress is:

- Oxygen therapy (p. 38 - 40)
- Maintaining a thermo-neutral environment (p. 34 - 37)
- Fluids (p. 42 - 44)
- Minimal handling

Investigations:

- Mobile CXR (If hyaline membrane disease is suspected it is best to wait until the baby is 4-6 hours old before doing the X-Ray)
- CRP 48 hours after birth
- Blood glucose

Approach to reading a CXR in a neonate

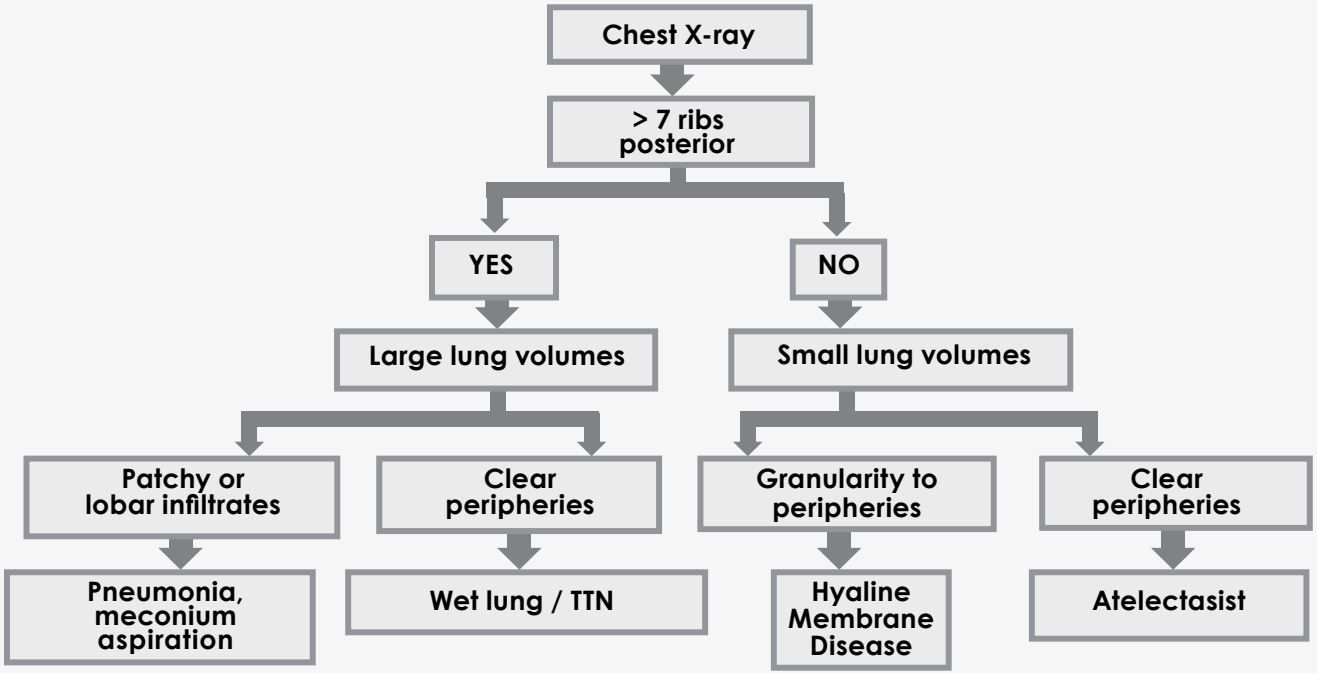


TABLE 5: SPECIFIC TREATMENT FOR RESPIRATORY DISTRESS		
Features	**Possible diagnosis**	**Specific treatment**
• Preterm; gestational age <37 weeks • CXR: small lung volumes, granular opacities in periphery	**HYALINE MEMBRANE DISEASE**	• Start CPAP if possible - otherwise use oxygen (p. 38 - 40) • Surfactant in the first 12 hours under paediatric supervision • Ampicillin and Gentamicin for 48 – 72 hours, then review CRP, if normal stop, if high continue for 10 days
• Born at or before term, often by Caesarean Section • Mild respiratory distress, resolves in 72 hrs • Over inflated chest clinically • CXR: hyperinflated lungs	**WET LUNG**	• Oxygen if needed • Supportive treatment • Ampicillin and Gentamicin for 48 hours, then review CRP, if normal stop, if high continue for 7 days
• Any gestational age • History of chorioamnionitis • Develops respiratory distress after birth • CXR: areas of collapse and consolidation	**PNEUMONIA**	• Oxygen and supportive treatment • Ampicillin and Gentamicin for 7–10 days • If the infection is hospital acquired or is not responding, consult a paediatrician / referral hospital
• Term or post term • History of meconium stained liquor • CXR: hyperinflated, areas of consolidation	**MECONIUM ASPIRATION**	• Oxygen and supportive treatment • Ampicillin and Gentamicin for 48 hours, then review CRP • May need referral for ventilation
• If the baby has a murmur, or remains cyanosed with no, or mild, respiratory distress, suspect a cardiac problem	**CARDIAC**	• Refer to additional page on congenital heart disease (p. 47) • Refer to paediatrician for further evaluation

CXR = Chest X-ray **CRP = C-reactive protein** **FBC = Full blood count** **LP = Lumbar puncture**

2.2.2 PRETERM AND LOW BIRTH WEIGHT

Admit babies with a birth weight of less than 2 kg, or with a gestational age less than 35 weeks for observation and management.

	< 1kg (ELBW)	1 – 1.5 kg (VLBW)	1.5 – 2 kg (LBW)	2 – 2.5 kg (LBW)
Admission criteria	• Admit all babies to high care	• Admit all babies to high care	• Admit babies for assessment in the neonatal unit • Transfer to KMC once intermittent KMC is successful and other problems are resolving	• Can stay with the mother in the postnatal ward, or move to KMC if they need more monitoring • Admit babies if they are not well
Warmth (See p. 34 - 37)	• Use a servo-controlled incubator if possible • Cover baby's body with plastic	• Standard manual incubator • Servo-controlled incubator if ill • Intermittent KMC when stable	• Incubator until stable • Once stable, do continuous KMC	• Continuous KMC
Investigations	• Ballard score done within 24 hours	• Ballard score done within 24 hours	• Ballard score done within 24 hours	• Ballard score done within 24 hours
Fluids and feeds (See p. 42 - 44)	• Day 1: Establish IV line and give only IV fluids • Day 2: Start ½ ml EBM feeds 2 hourly via nasogastric tube • Day 3: Give 2 hourly EBM via nasogastric tube	• Establish an IV line and give only IV fluids for the first 24 hours, unless the baby has no respiratory or other problems • Then start 3 hourly nasogastric tube feeding according to table 2 or 4	• If the baby is able to suckle, breastfeed 3 hourly • If the baby is unable to suckle, feed EBM via cup 3 hourly	• If the baby is able to suckle, breastfeed 3 hourly • If the baby is unable to suckle, feed EBM via cup 3 hourly
Observations	• Hourly respiratory and heart rates (RR, HR) • Intake and output • 3 hourly blood glucose for first 72 hours • Hourly oxygen saturation	• 3 hourly RR, HR, temperature, colour, activity • Intake and output • 3 hourly blood glucose for the first 24 hours • 1-3 hourly oxygen saturation for babies on oxygen	• 4 hourly RR, HR, temperature, colour and activity • Intake and output • 3 hourly blood glucose for the first 24 hours • 1-3 hourly oxygen saturation for babies on oxygen	• 6 hourly RR, HR, temperature, colour and activity • Intake and output

Fluid / feed volume and method	• Follow fluid management guidelines on p. 42- 44 for daily fluid volume increases • Progress to cup feeding • Progress to breastfeeding as soon as the baby can suckle

Apnoea prevention	• <1.5kg or <35 weeks gestation:
	  ○ Caffeine 10 – 20 mg / kg PO loading dose, and maintenance 5 – 10mg/kg/dose PO or if not available
	  ○ Oral Theophylline: Load with 5mg / kg then 2mg / kg / dose 12 hourly
	  ○ Apnoea monitor for babies with a weight of <1.5kg
	• Stop when the baby weighs 1.8kg or when baby is apnoea free for 7days

continues below

Oxygen therapy	• Babies with a respiratory rate >80, severe chest in-drawing, OR grunting, OR oxygen saturation less than 90%. • **Note: not all low birth weight babies will need oxygen**

Antibiotics	• Give antibiotics to the following groups of babies:
	  o Babies <1.5kg
	  o Babies from a potentially infected environment, e.g. born to mothers with prolonged rupture of membranes
	  o Babies with obvious signs of infection
	  o Babies <37 weeks gestation where there is no obvious reason for the preterm labour
	  o Babies with respiratory distress
	• Give IV Penicillin 100 000 u/kg/dose twice daily AND Gentamicin 5 mg/kg/day given daily for 5 days. For meningitis see p. 62
	• Do a CRP after 48 hours and stop antibiotics if the CRP is normal, and the baby is clinically normal

HIV exposed infants	See management for HIV in preterm babies on p. 76 - 79
Vitamins	0.6 ml of multivitamin drops (preparation must include 400iu Vitamin D) daily once the baby is on full feeds
Iron	0.6 ml ferrous lactate (ferrodrops) daily once the baby is on full feeds and there is no evidence of infection

Measurement	• Measure the following and chart on the baby record
	  o Daily weight. Assess the weight gain 2 x per week according to the chart on p. 60
	  o Weekly head circumference. If the head is growing too quickly then refer
	  o Weekly haemoglobin. If HB is dropping look for a cause (Haemolysis, haemorrhagic disease, infection, periventricular haemorrhage, immaturity), treat the cause and if Hb < 8g/dl transfuse the baby with 10ml/kg of packed red blood cells.

Discharge	• Discharge when the baby's weight is between 1.8–2kg **AND** scores 20 or more on the KMC score sheet (p. 59) • The baby must continue with multivitamin and iron for 6 months. Write this in the Road to Health Booklet • Give immunisations, see p. 84
Follow up	• Ensure that your hospital has a high risk follow up clinic to follow up babies until they are 9 months old • Babies with a birth weight <1.5kg and bigger babies with a complicated course must be followed up at a high risk clinic • After discharge from KMC, follow up the baby in 3-5 days • If the baby is gaining weight well, follow up every 2 weeks until the baby is 2.5kg.Thereafter the baby can be followed up at the clinic • Babies with a birth weight <1.5kg, or who have had sepsis or hypoxic ischaemic encephalopathy need a neuro-developmental evaluation at 4 and 9 months • Babies who are HIV exposed must have their follow up site identified and documented, and a specific date given for their 6 week HIV PCR test • All relevant health information **MUST** be documented in the Road to Health Booklet • If retinal eye examination services are available in your district refer infants for retinal assessments who were <1,5kg or <32 weeks gestation and those who had recurrent apnoea, and infants who received prolonged oxygen

2.2.2.1 PRETERM AND LOW BIRTH WEIGHT: BALLARD SCORE

NEUROLOGICAL MATURITY

All 6 neurological features are assessed with the baby lying supine (the baby's back on the bed). The baby should be awake but not crying.

POSTURE: Handle the baby and observe the position of the arms and legs. More mature babies (with a higher gestational age) have better flexion (tone) of their limbs.

SQUARE WINDOW: Gently press on the back of the baby's hand to push towards the forearm. Observe the degree of flexion. More mature babies have greater wrist flexion.

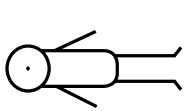
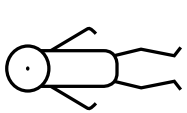
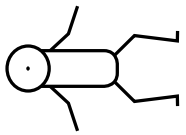
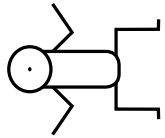
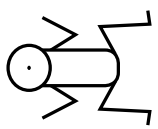
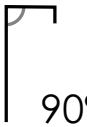
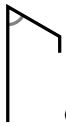
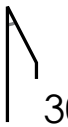
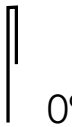
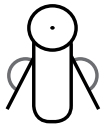
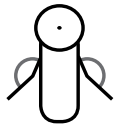
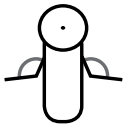
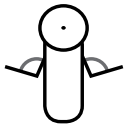
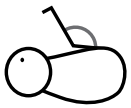
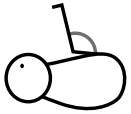
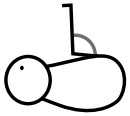
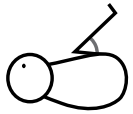
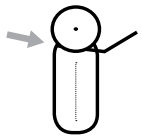
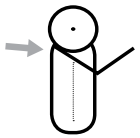
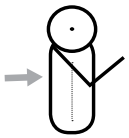
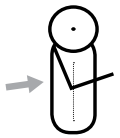
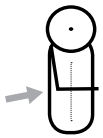
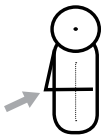
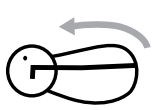
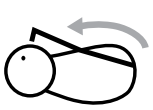
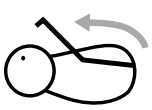
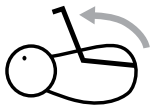
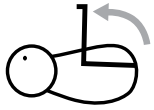
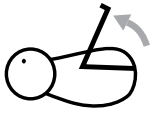
ARM RECOIL: Fully bend the arm at elbow so that the baby's hand reaches the shoulder, and keep it flexed for 5 seconds. Then fully extend the arm by pulling on the fingers. Release the hand as soon as the arm is fully extended and observe the degree of flexion at the elbow (recoil). Arm recoil is better in more mature babies.

POPLITEAL ANGLE: With your one hand hold the baby's knee against the abdomen. With the index finger of the other hand gently push behind the baby's ankle to bring the foot towards the face. Observe the angle formed behind the knee by the upper and lower legs (the popliteal angle).

SCARF SIGN: Take the baby's hand and gently pull the arm across the front of the chest and around the neck like a scarf. With your other hand gently press on the baby's elbow to help the arm around the neck. In more mature babies the arm cannot be easily pulled across the chest.

HEEL TO EAR: Hold the baby's toes and gently pull the foot towards the ear. Allow the knee to slide down at the side of the abdomen. Unlike the illustration, the baby's pelvis may lift off the bed. Observe how close the heel can be pulled towards the ear.

continues below

NEUROMUSCULAR MATURITY								
NEUROMUSCULAR MATURITY SIGN	SCORE							RECORD SCORE HERE
	-1	0	1	2	3	4	5	
POSTURE								
SQUARE WINDOW (WRIST)	 >90°	 90°	 60°	 45°	 30°	 0°		
ARM RECOIL		 180°	 140°-180°	 110°-140°	 90°-110°	 <90°		
POPLITEAL ANGLE	 180°	 160°	 140°	 120°	 100°	 90°	 <90°	
SCARF SIGN								
HEEL TO EAR								
							TOTAL NEUROMUSCULAR MATURITY SCORE	

continues on next page

PHYSICAL MATURITY

Six external features are examined. The baby has to be turned over to examine the amount of lanugo. If the baby is too sick to be turned over, then the amount of lanugo is not scored.

SKIN: Examine the skin over the front of the chest and abdomen, and also look at the limbs. More mature babies have thicker skin.

LANUGO: This is the fine, fluffy hair that is seen over the back of small babies. Except for very immature babies that have no lanugo, the amount of lanugo decreases with maturity.

PLANTAR CREASES: Use you thumbs to stretch the skin on the bottom of the baby's foot. Very fine wrinkles, that disappear with stretching, are not important. More mature babies have more creases.

BREAST: Both the appearance of the breast and the size of the breast bud are considered. Palpate for the breast bud by gently feeling under the nipple with your index finger and thumb. More mature babies have a bigger areola and breast bud.

EAR: Both the shape and thickness of the external ear are considered. With increasing maturity the edge of the ear curls in. In addition, the cartilage in the ear thickens with maturity so that the ear springs back into the normal position after it is folded against the baby's head.

GENITALIA: Male and female genitalia are scored differently. With maturity the testes descend in the male and the scrotum becomes wrinkled. In females the labia majora increase in size with maturity.

continues below

PHYSICAL MATURITY

PHYSICAL MATURITY SIGN	SCORE								RECORD SCORE HERE
	-2	-1	0	1	2	3	4	5	
SKIN		Sticky, friable, transparent	Gelatinous, red, translucent	Smooth pink, visible veins	Superficial peeling and/or rash, few veins	Cracking, pale areas, rare veins	Parchment, deep cracking, no vessels	Leathery, cracked, wrinkled	
LANUGO		None	Sparse	Abundant	Thinning	Bald areas	Mostly bald		
PLANTAR SURFACE	Heel-toe <40 mm	Heel-toe 40-50 mm	>50 mm no crease	Faint red marks	Anterior transverse crease only	Creases ant. 2/3	Creases over entire sole		
BREAST		Imperceptible	Barely perceptible	Flat areola no bud	Stippled areola 1-2 mm bud	Raised areola 3-4 mm bud	Full areola 5-10mm bud		
EYE / EAR	Lids fused tightly	Lids fused loosely	Lids open pinna flat stays folded	Sl. curved pinna; soft; slow recoil	Well-curved pinna; soft but ready recoil	Formed & firm instant recoil	Thick cartilage ear stiff		
GENITALS (MALE)		Scrotum flat, smooth	Scrotum empty, faint rugae	Testes in upper canal, rare rugae	Testes descending, few rugae	Testes down, good rugae	Testes pendulous, deep rugae		
GENITALS (FEMALE)		Clitoris prominent and labia flat	Prominent clitoris & small labia minora	Prominent clitoris & enlarging minora	Majora & minora equally prominent	Majora large, minora small	Majora cover clitoris & minora		
								TOTAL PHYSICAL MATURITY SCORE	

SCORING

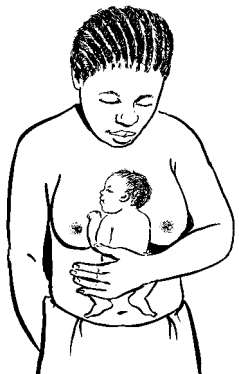
Add up the scores from the **physical** and **neurological** features and use the table below to estimate the gestational age.

SCORE	-10	-5	0	5	10	15	20	25	30	35	40	45	50
WEEKS	20	22	24	26	28	30	32	34	36	38	40	42	44

2.2.2.2 PRETERM AND LOW BIRTH WEIGHT: KANGAROO MOTHER CARE (KMC)

KMC is a means of providing the small baby with warmth and nutrition by continuous skin-to-skin contact on the mother's chest.

When to start KMC in a baby	• Intermittent skin-to-skin contact is commenced when the baby is in neonatal unit and stable enough to come out of the incubator for periods of time • Continuous KMC is commenced when the baby is stable enough to stay continuously with the mother in the KMC position. This is usually when the baby no longer has respiratory distress, apnoea or instability. • 1.5kg is a safe guide, but will vary according to the gestation, the condition of the baby, and how care is organised in your NNU
How to position the baby in KMC	• Dress the baby in a nappy and cap • Place the baby in an upright position against the mother's bare chest, between her breasts and inside her blouse • Cover both mother and baby with a blanket or jacket if the room is cold • You may use a special garment; or tuck the mother's blouse under the baby or into her waistband • The baby must be secure enough so that the mother can walk around without holding her baby
Feeding baby while in KMC	• Babies who are unable to suckle should be fed expressed breast milk via a nasogastric tube or cup. Babies may be kept in the KMC position while tube feeding. Allow them to try suckling during the tube feed • Babies will show that they are ready to suckle as their rooting and suckling reflexes develop • Once the baby is able to suckle, allow the baby to breast feed on demand, and feed at least every three hours • Mothers who for medical reasons are using formula can still provide KMC and cup feed the baby
Care and Monitoring in KMC	• While in KMC the baby will still require observation, and treatment. This can include nasal oxygen in a baby who has chronic lung disease, but best not in the acute period, except for periods of intermittent KMC. • Monitor 6 hourly heart rate, respiratory rate, temperature, activity and colour as well as intake and output • Daily weight, weekly head circumference, weekly haemoglobin, all plotted in neonatal record • Evaluate the mother and baby once a day by using the KMC score sheet
Care in the KMC ward	• The KMC ward should be warm and inviting • The mother must keep her baby in KMC position at all times (except while she does her ablutions) • Good hygiene is important, including hand washing after using the toilet and before feeding • Mothers can walk around the ward, and outside with their babies in the KMC position if the weather conditions are favourable • Occupy the mothers and encourage appropriate developmental stimulation • Allow the father and grandmother, and other appropriate people, to nurse the baby in the KMC position when they come to visit
KMC discharge	• A baby who is in the KMC ward can be discharged when the baby has reached 1.8kg, and has a KMC score of at least 20 • Don't discharge babies too early. It can be difficult to come back quickly if the baby has a problem • Follow usual procedures on p. 84-85, and be sure to bring the baby back within a few days to check that he / she is growing






KMC Daily Score Sheet **Based on the Intra-hospital KMC Training Programme in Bogota, Colombia**				Date of birth …….//……..//……. **Date ➡**														
Name:			**Breastfeeding:**	Date started 24 hour KMC …….//……..//……	**Day**	**Day**	**Day**	**Day**	**Day**	**Day**	**Day**	**Day**	**Day**	**Day**	**Day**	**Day**	**Day**	**Day**
Hospital No:			**Formula:**															
Evaluation	**Score**			**Weight ➡**														
	0	**1**	**2**	**Remarks**														
Socio-economic support	No help or support	Occasional help	Good support system															
Mother's milk production	Expresses 0 -10ml breast milk	Expresses 10 - 20 ml breast milk	Expresses 20 - 30 ml breast milk	Must score be-fore discharge. N/A for formula														
Positioning and attaching of baby on to breast	Always need assistance	Occasionally needs assistance	No assistance needed	Not applicable for formula feeding														
Baby's ability to suckle at the breast/ cup feed	Gets tired very quickly	Gets tired infrequently	Takes all feeding well															
Confidence in handling baby, e.g. feeding, bathing, changing	Always need assistance	Occasionally needs assistance	No assistance needed															
Baby's weight gain per day	0-10g	10-20g	20-30g	Must score 1 or 2 before discharge														
Confidence in administering vitamin and iron drops	No confidence	Some confidence	Fully confident															
Knowledge of KMC	No knowledge	Some knowledge	Knowledge-able															
Acceptance & application of KMC	Does not accept or apply KMC	Partly accepts & applies KMC method	Applies KMC without having to be told	Applies KMC without having to be told														
Confidence in caring for baby at home	Does not feel sure or able	Feels slightly unsure and unable	Feels confident															
TOTAL SCORE per day																		

2.2.2.4 ASSESS FEEDING AND WEIGHT GAIN IN LOW BIRTH WEIGHT BABIES

Use this chart once or twice a week until discharge to evaluate weight gain in low birth weight babies.

- Before discharging babies evaluate breastfeeding (p. 15 - 16) or replacement feeding (p. 20 - 21) in low birthweight babies.
- Use this chart to evaluate weight gain after discharge.

ASK, CHECK, RECORD	LOOK, LISTEN, FEEL	SIGNS	CLASSIFY	ACT NOW
• Weigh daily and record weight • Plot daily weight on the graph • Calculate weekly weight gain Assess weight gain ◦ If the baby is < than 10 days Has the baby lost more than expected body weight? OR Has the baby regained birth weight at 10 days? OR Is the baby gaining sufficient weight?	**%Weight loss** $\frac{\text{Birth weight} - \text{Current weight}}{\text{Birth weight}} \times 100$ **Weight gain / kg / day** $\frac{\text{Current weight (g)} - \text{Previous wt (g)}}{\text{Previous weight in kg x no. days}}$	• More than10% weight lost in first week • Weight gain insufficient	**INADEQUATE WEIGHT GAIN**	• Determine the cause of inadequate weight gain
		• Adequate weight gain or • Less than 10% weight loss in first week	**ADEQUATE WEIGHT GAIN**	• Continue feeding • When able to suckle, start breastfeeding

Expected weight loss

- Babies may lose 10% of their birth weight in the first week

Expected weight gain

- Initial loss regained in 7 - 10 days
- Thereafter **minimum** weight gain should be:

Preterm = 10g / kg / day Term = 20g / kg / day

If INADEQUATE WEIGHT GAIN, determine the cause and classify for cause

ASK, CHECK, RECORD	LOOK, LISTEN, FEEL	SIGNS	CLASSIFY	ACT NOW
Assess feeding • What feed volume is being given? (ml / kg / day) • How is the baby fed? (Cup / breast / nasogastric tube) • Is this appropriate for the baby's development or condition? **Assess thermo-neutral environment** • Is the baby maintaining a normal temp? • Is a small baby in an incubator adequately dressed? (woollen cap, booties, plastic wrap) • If in KMC, is this continuous? • Does the baby have an infection?	**Assess for priority signs** • Lethargy • Less than normal movements	• Baby seems unwell, lethargic, less than normal movement	**SERIOUS ILLNESS**	• Investigate and treat for sepsis or specific infections • Check for PDA, and other rare causes
		• Inadequate feed volume for weight and age	**INSUFFICIENT FEEDS**	• Correct the feed volume • Increase feeds by 20 ml / kg / day until 180 ml / kg / day of feeds (p. 42 - 44)
		• Baby < 1.8 kg is not getting continuous KMC • Baby < 1.5 kg is not adequately heated	**INADEQUATE TEMPERATURE CONTROL**	• Correct the thermo-neutral environment (p. 34 - 37)
		• Preterm baby < 1.5 kg is suckling from breast • Baby < 1.5 kg is cup fed	**INCORRECT FEEDING METHOD**	• Correct feeding (p. 42 - 44)
		• No problems identified	**CAUSE UNCLEAR**	• Consider PDA or other causes

2.2.3 SERIOUS ACUTE INFECTION

- If you think the baby may be septic, do a septic screen, CXR, FBC, CRP, LP and Blood Culture
- Decide on the site of infection and commence treatment. Use the table below to assist with diagnosis, investigation and first line treatment
- If the baby has signs of sepsis, but the site of infection is not yet clear, treat for septicaemia
- The baby may also have congenital syphilis, refer to p. 73 for treatment
- If convulsions are present, give a loading dose of Phenobarbitone 20-40 mg/kg IM / IV slowly. Consider maintenance Phenobarbitone 4mg/kg/day

Signs	CLASSIFICATION	Investigations	First line treatment
• Lethargy • Poor feeding • Abdominal distension • Pallor • Jaundice • Purpura • Recurrent apnoea • Hypothermia • Oedema	**SEPTICAEMIA**	• Blood culture • Lumbar puncture • CXR • FBC • CRP	• Start CefotaximeIV for 10 days PLUS • Gentamicin for 7–10 days • Nurse in high care • Supportive care
• Apnoea • Convulsions • Bulging fontanelle • Lumbar puncture – pus cells	**MENINGITIS**	• Lumbar puncture • Blood culture • Repeat LP after 48 – 72 hours to ensure response to therapy	• CefotaximeIV for 21 days AND • Ampicillin IV for 14 days • Reconsider choice of antibiotics when the results of CSF and blood cultures become available or if baby does not improve within 72 – 96 hours

• Term baby with prenatal hypoxia, or preterm baby
• Signs of septicaemia or shock
• Abdominal distension
• Bile stained vomiting
• Blood in the stool
	NECROTISING ENTEROCOLITIS	• Abdominal X-ray
		  • Distended static loops of bowel
		  • Thickened bowel wall
		  • Air in bowel wall
		  • Perforation
			• CefotaximeIV and Ampicillin IV
			• Gram positive organism treat for 14 days
			• Gram negative organism treat for 21 days

• History of unhygienic treatment of the cord • Difficulty with sucking and swallowing • Increased tone • Opisthotonus, spasms and sudden jerks following stimulation • Laryngeal spasm	**TETANUS**	• Gram stain of stump may reveal Gram positive bacilli • LP to rule out meningitis • NOTIFY ALL CASES	• Refer all cases to a level 3 hospital • Admit to high care/ICU • Human anti tetanus immunoglobulin IM 500 iu • Metronidazole IV for 14days • Tetanus toxoid IM, 0,5ml into deltoid muscle If not ventilated • Phenobarbitone, oral 4mg/kg once daily • Chlorpromazine, oral, 1mg/kg/dose 8 hourly via NG tube • Nasogastric feeds • Supportive care

2.2.4 NEONATAL ENCEPHALOPATHY

If a term baby is less than 3 days old, and cannot suckle, and has a history of prolonged labour or an Apgar score < 8 treat for neonatal encephalopathy (NE). Classify the severity of NE – score the baby using the scoring chart on the page below.

Classify	Course	Management
Mild (HIE score <11) • Jittery, hyper-alert • Increased muscle tone • Poor feeding • Normal or fast breathing	Features usually last for 24 - 48 hours and then resolve spontaneously	• If the baby is not receiving oxygen, allow breastfeeding • If the baby is receiving oxygen or cannot be breastfed, give expressed breastmilk via a nasogastric tube • Provide ongoing care (see below)
Moderate (HIE score 11 – 14) As above, plus: • Lethargy • Feeding difficulty • Occasional apnoea/ convulsions	It resolves within one week, but longterm neuro-develop-mental problems are possible	**Observations** 3 hourly RR, HR, temperature, colour and activity, daily HIE score (p. 65) **Temperature** • Do not over heat the baby. Keep the baby's temperature +/- 36°C • *Note: Cooling is done for babies with mild and moderate HIE at some tertiary and regional hospitals, but it is not yet considered safe for district hospitals. If started it must commence within 6 hours of birth* **Fluids** • Establish an IV line and give only IV fluids for the first 12-24 hours – do not feed orally • Restrict the fluid intake to 60 ml/ kg body weight for the first 3 days • Monitor the urine output: If the baby passes urine <6 times per day or produces no urine, do not increase the fluid volume on the next day • When the amount of urine begins to increase, increase the volume of fluid intake gradually, regardless of the baby's age – i.e. progress from 60ml/kg to 80ml/kg to 100ml/kg to 120ml/kg • If the baby is unable to suckle, give the feeds by nasogastric tube • When the baby is able to suckle, start breast feeding **Convulsions** • Give Phenobarbitone 20mg / kg slowly IV or IM • If convulsions continue, give another dose of Phenobarbitone 10 mg / kg IV slowly over 5 minutes, or IM • Maintenance Phenobarbitone oral 4mg/kg/day begin 12 – 24 hours after loading dose • If the seizures continue, load with Phenytoin or Lidocaine • If convulsions are controlled, try to stop Phenobarbitone • If the baby is able to suck, allow breast feeding. If the baby cannot breast-feed, feed via a gastric tube **Encourage the mother to hold and cuddle her baby**
Severe (HIE score 15 or more) • As above, plus: • Floppy / unconscious • Unable to feed • Convulsions common • Severe apnoea common	The baby may or may not improve over several weeks If the babies survive, permanent brain damage may occur (cerebral palsy or mental impairment)	

continues on next page

(continued from the previous page)

2.2.4 NEONATAL ENCEPHALOPATHY (HYPOXIA / ISCHAEMIA OF THE NEWBORN)

Ongoing care for babies with HYPOXIA / ISCHAEMIA

- If the baby's condition does not improve after 3 days: Reassess for signs of serious infection or severe disease (p. 27 and 62)
- If the baby's condition does not improve after 1 week: Keep baby in hospital until feeding well
- Discuss the baby's prognosis with the mother and/or family
- Follow up in 1 week. The baby must come sooner if he / she is not feeding well, or has convulsions, or is sick

HYPOXIC ISCHAEMIC ENCEPHALOPATHY (HIE) SCORING SYSTEM

- The HIE scoring system is a simple clinical tool which helps to predict the infant's long term outcome.
- This chart is easy to use. It consists of a clinical assessment of 9 signs, which need to be assessed daily, and a score recorded.
- Infants with a maximum score of 10 or less, will almost certainly be neurologically normal. Those with a maximum score of 15 or more, and who are not sucking by day 7, will probably not be neurologically normal. (Ref 3)

continues below

Score					Day	1	2	3	4	5	6	7	8	9	10
Sign	**0**	**1**	**2**	**3**	**Date**										
Tone	normal	hyper	hypo	flaccid											
Conscious level	normal	hyper alert, stare	lethargic	comatose											
Fits	none	infrequent < 3 / day	frequent 3 or more / day												
Posture	normal	fisting, cycling	strong distal flexion	decerebrate											
Moro	normal	partial	absent												
Grasp	normal	poor	absent												
Suck	normal	poor	absent												
Respiration	normal	hyperventilation	brief apnoea	IPPV (apnoea)											
Fontanelle	normal	full - not tense	tense												
Total score per day															

< 11 mild HIE	11 - 14 moderate HIE	> 14 severe HIE

The score usually increases for the first few days after birth and then returns to normal by 1 week in mildly affected babies. A high score is generally associated with a high mortality, while a score that remains high beyond 1 week is associated with a high risk of abnormal neurological development.

2.2.5 NEONATAL SEIZURES

Neonatal seizures are usually secondary to an underlying brain injury or malformation or due to a biochemical disorder.
Seizures do not stop when the limbs are flexed, whereas jitteriness does.
Status epilepticus: continuous seizures lasting 30 minutes or recurrent seizures.

CHECK	LOOK	INVESITIGATE	TREAT
Neonatal seizures occurs with the following conditions, check if they are known to be present • Hypoxic ischaemic encephalopathy • Intracranial haemorrhage • Meningitis • Hypoglycaemia • Hypocalcaemia • Hypomagnesaemia • Hypo- or hypernatraemia • Drug withdrawal • Inborn errors of metabolism	• Absence • Subtle signs: eye deviation, eyelid fluttering, bucco-lingual movement or pedalling of arms and legs • Focal: tonic or clonic • Generalised: multifocal rhythmic jerking, generalised posturing or myoclonic	Measure serum Glucose If cause is not known • Measure serum magnesium, calcium and sodium • Do a lumbar puncture if sepsis is suspected If no cause can be found contact a paediatrician or neonatologist for further investigations and management	Treat electrolyte and glucose abnormalities and sepsis • Hypocalcaemia – < 1.8mmol/l give Calcium gluconate 10%, IV, 100 – 200 mg / kg / dose over 10 minutes under ECG control • Hypomagnesemia – Magnesium < 0.6mmol/l give Magnesium sulphate 50%, IV, 0.25 ml/kg over 3 minutes as a single dose • Hypoglcyaemia – p. 41 • Pyridoxine deficiency – Pyridoxine IV/IM 20mg /kg For recurrent seizures or seizures lasting > 3 minutes • Phenobarbitone 20 mg/kg IV infused over 10 min • If seizures persist give another dose of Phenobarbitone 10mg/kg/ IV up to 40mg/kg and give maintenance 4mg/kg/day starting 12 – 24 hours after the loading dose • Seizures refractory to Phenobarbitone should be admitted to high care or referred to ICU for administration of Lidocaine. Continuous monitoring of ECG, HR and BP are required if Lidocaine is used • Lidocaine IV loading dose 2mg/kg over 10 minutes • Follow with continuous infusion of 6mg/kg/hour for 6 hours, then 4mg/kg /hour for 12 hours then 2mg/kg/ hour for 12 hours. In preterm babies start with 3mg/kg/hour and taper down

MAINTENANCE TREATMENT

- This is considered for neonates with underlying brain damage.Continue until neonate is seizure free for 2 weeks, then slowly taper to stop
- If seizures recur then continue with maintenance therapy

2.2.6 NEONATAL JAUNDICE

Physiological jaundice is common. It usually starts on day 3, and seldom lasts beyond day 10. Treatment is not usually needed as the bilirubin is seldom above 275 µmol/L or by 85µmol/L/24 hours.

Risk for jaundice	Investigations	Treatment
Uncommon but potentially severe • Jaundice on day 1	• Do a total serum bilirubin (TSB) level • Check the mother's blood groups (ABO and Rhesus) • Do a Coombs test	• Start phototherapy immediately • Check the TSB 6 hourly
• Mother's blood group O or Rh negative	• Check the TSB at 6 hours of age • Do a Coombs test, if the TSB is rising >8,5 µmol/l/hr	• If the TSB is >80 umol / l, start phototherapy • If the Coomb's test positive, give IV gamma-globulin 500mg over 1 hour
• Prolonged jaundice (> 14 days)	• Do conjugated and unconjugated bilirubin levels	• Consult a paediatrician for further management
Common • Jaundice after day 1	• Do a TSB	• Start phototherapy if TSB above the line on the chart
• Preterm baby	• Do a daily TSB until day 5, or until theTSB is going down	• Start phototherapy if TSB above the line on the chart

continues on next page

PHOTOTHERAPY

Start phototherapy while waiting for the TSB result

- If the TSB is above the line on the graph, start phototherapy
- Check the level for exchange transfusion on the second graph. This varies depending on the baby's weight, age and illness
- Repeat the TSB every 12 – 24 hours, depending on the severity of the jaundice
- Ensure that the baby is getting an adequate fluid intake.
- Encourage breastfeeding, as it enhances the excretion of bilirubin
- Stop phototherapy when the TSB is 50 µmol / l lower than the line on graph , and repeat the TSB the next day

Notes on phototherapy

- The distance between the mattress and the light should be about 40 cm
- The light bulbs must be changed every 1000 hours OR have their emittance regularly checked with an irradiance meter.
- The baby should be naked
- Cover the baby's eyes when under phototherapy (remove the cover for feeding)
- Turn the baby over every hour
- Do not cover the incubator, or cot, or phototherapy lights with blankets or sheets

EXCHANGE TRANSFUSION

- Exchange transfusion is needed if the TSB is above the line on the exchange transfusion graph

- A baby should be referred for exchange transfusion:
  - If the TSB level is close to, or is above, the exchange transfusion level
  - If the TSB is rising at more than 17 µmol / l / hour

- Exchange transfusions should be discussed with, and if at all possible, done at the level 3 hospitals

- In a newborn with jaundice, always determine the degree of jaundice by measuring the TSB and plotting this on a graph

- The result of the TSB needs to be available within 1 hour from the laboratory

- Bilichecks can be used to screen for jaundice. However if the level is >200 umol / l, take blood for a TSB and start phototherapy

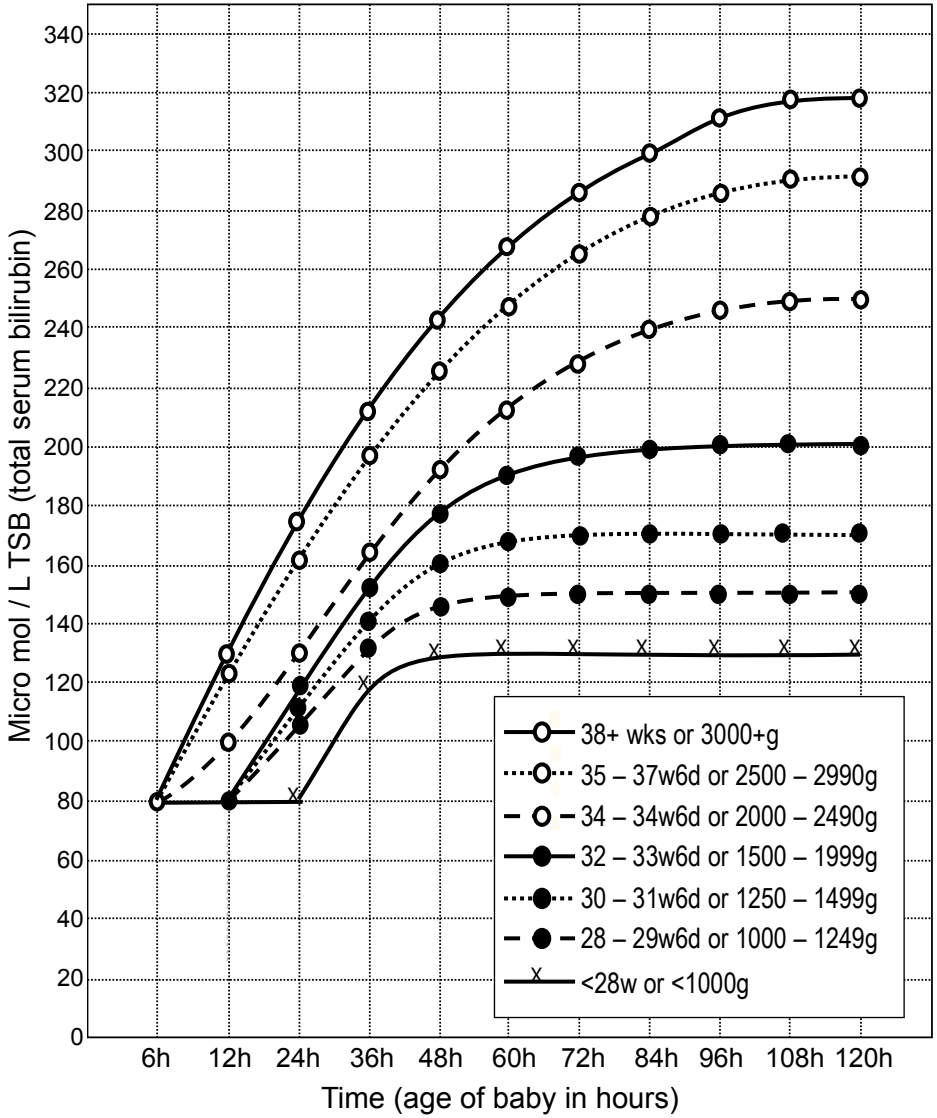
continues below

PHOTOTHERAPY

GUIDELINES FOR ALL WEIGHTS AND GESTATIONS

In presence of sepsis, haemolysis, acidosis, or asphyxia, use one line lower (gestation below) or levels 20µmol lower if < 1000g

If gestational age is accurate, use gestational age (weeks) rather than body weight



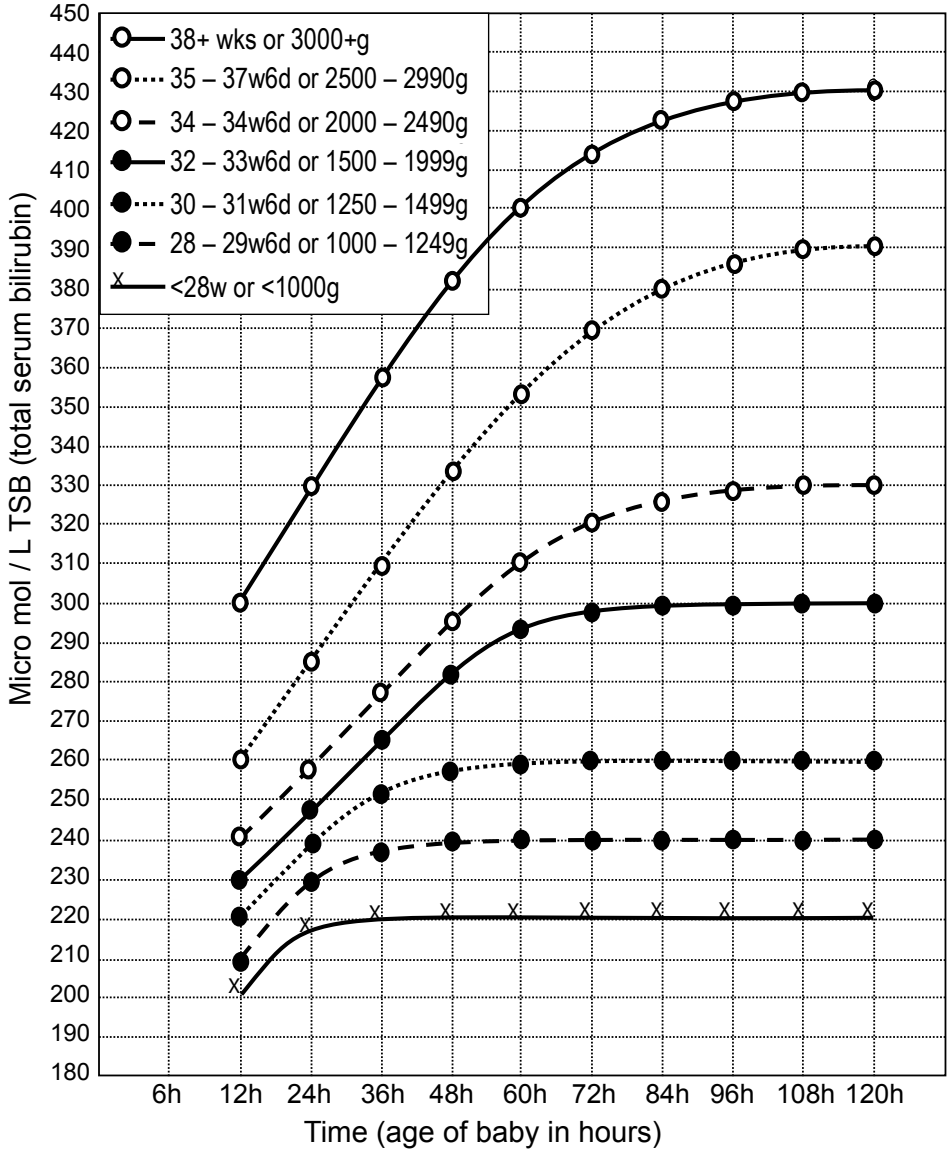
Reference 2

EXCHANGE TRANSFUSION

GUIDELINES FOR ALL WEIGHTS AND GESTATIONS

In presence of sepsis, haemolysis, acidosis, or asphyxia, use one line lower (gestation below) or levels 20µmol lower if < 1000g

If gestational age is accurate, use gestational age (weeks) rather than body weight



2.2.7 CONGENITAL ABNORMALITIES

Counsel the parents, confirm the diagnosis and provide information to the parents about the condition, treatment options and the need for referral.

FEATURES	CLASSIFICATION	MANAGEMENT
• A meningocoele is an open lesion over the spine, only covered by membranes. • A myelomeningocoele is an open lesion over the spine with nerve tissue in the sac. There is lower limb paralysis with bladder and bowel affected. Many children have an associated hydrocephalus.	**NEURAL TUBE DEFECT/ SPINA BIFIDA**	• Cover the lesion with sterile *Opsite* or cling film to prevent damage, leakage and infection. Do not cover with gauze. • Babies who do not have any neurological deficit at birth should be urgently referred to a tertiary neurosurgical service for immediate closure. • Refer all babies electively to the neurosurgical service for repair, except when there is anencephaly or another major congenital abnormality • Monitor the head circumference of babies daily while in hospital and weekly thereafter. Refer early and urgently if hydrocephalus develops. (80% of children will develop hydrocephalus either before or after closure of the lesion) • Refer and follow up at a special clinic that will monitor development, provide rehabilitation and bladder and bowel care. • Counsel the mother.The mother must be advised to plan her next pregnancy and to take folic acid **before** she becomes pregnant
• An omphalocoele is a defect in the abdominal wall where the abdominal contents are covered with peritoneum • A gastroschisis is a defect in the abdominal wall where the viscera have no covering • Imperforate anus	**MAJOR GASTROINTESTINAL ABNORMALITY**	• Keep the baby nil per mouth • Commence IV fluids (p. 42 - 43) • Pass a nasogastric tube and leave it on open drainage • Cover the defect with a plastic bag and not gauze • Ensure that the baby is kept warm • Refer to a tertiary paediatric surgical centre
• A head circumference above the 97th centile is called macrocephaly. Hydrocephalus is a cause of macrocephaly	**HYDROCEPHALUS**	• If the head is >97th centile then refer immediately to a tertiary centre for neuro-imaging. Surgery for hydrocephalus is an emergency and should not be delayed for weeks.

continues below

FEATURES	CLASSIFICATION	MANAGEMENT
• Difficult to decide on the gender of the baby by looking at the genitalia	**AMBIGUOUS GENITALIA**	• Advise the parents that the gender of the baby is not clear • Check the Na, K and Urea immediately for hypoaldosteronism • Refer the baby as soon as possible to a paediatrician for investigation and gender assignment
• A head circumference < 3rd centile	**MICROCEPHALY**	• Compare the weight and head circumference centiles • Assess for other abnormalities • Determine the cause.It may be due to a congenital infection, a structural abnormality of the brain or be part of a genetic syndrome. Refer to a paediatrician
• Extreme plantar flexion (bending of the foot downwards) at the ankle, and medial (inward) angulation of the forefoot. This is called TalipesEquinovarus. This may be due to an in-utero position, developmental abnormality of the bone or cartilage, neuromuscular problem, or a spinal cord problem	**CLUB FOOT**	• Assess for other problems of the bone, spine or CNS • If there is any neuromuscular problem or other abnormality refer the baby to the tertiary paediatric service • Refer the baby immediately to the orthopaedic service, who can commence gentle manipulation, serial splinting and plaster of Paris • If these measures do not work surgical correction must be planned at 10 weeks. Delay in management of the clubfoot will lead to permanent disability
• A gap occurs in the lip, gum margin and / or palate due to failure or incomplete closure of the skin, bone and or muscles. The cleft may be unilateral, bilateral, midline, complete or incomplete. It may be associated with a genetic cause, environmental factor or teratogen, but in most cases is multifactorial	**CLEFT LIP AND / OR PALATE**	• Conduct a thorough examination to exclude other problems or syndromes. If these are found or suspected, refer to the tertiary unit for further assessment • Counsel the mother • Assist with feeding; breastfeeding is possible • Refer early to a cleft lip clinic / maxillofacial clinic at a tertiary hospital. They may make a plate to aid feeding and then repair the lip at around 3 months and the palate at around 9 months

continues on next page

FEATURES	CLASSIFICATION	MANAGEMENT
• Abnormal position of legs • Poor limb movement • Pain on movement of the limb	**LIMB INJURY**	• Counsel the parents • Handle gently • Do an X-ray of the affected limb • Check for a fracture or syphilis on X-ray • If a fracture is present, immobilise the limb and treat with advise from orthopaedic doctors • If an arm is not moving, and flaccid, and no fracture is present, a brachial plexus palsy is likely. Encourage gentle movements and refer to physiotherapy. If not improving, refer to orthopaedic surgery
• One major abnormality and 2 minor abnormalities OR • 3 minor abnormalities	**MAJOR CONGENITAL ABNORMALITY**	• These babies are likely to have a chromosomal problem • Refer to a paediatrician, or experienced genetic sister • Discuss with a paediatrician and consider taking blood for chromosome analysis. (Heparinised specimen) • If there are features of Trisomy 13, 18 or 21 take blood for QF PCR for aneuploidy. (Purple top (FBC) tube)
• One or 2 minor abnormalities	**MINOR ABNORMALITY**	• If a child has an extra digit without any bony attachment and a narrow pedicle, it can be tied off • Discuss with a paediatrician

2.2.8 CONGENITAL SYPHILIS

Congenital syphilis is a chronic intrauterine infection caused by the spirochaete, Treponemapallidum. If the mother was untreated during pregnancy, the baby has a 50% chance of becoming infected.

CHECK	LOOK, LISTEN, FEEL	SIGNS	CLASSIFY	TREATMENT
Mother's RPR • +ve, titre > 1:4 • Untreated • Treated < 1 month before delivery • Unknown	• Hepato-splenomegaly • Petechiae • Pallor • Low birth weight • Respiratory distress • Blisters on hands and feet • Osteitis • Large, pale placenta	• **Mother RPR positive** **AND** • **Any of the clinical signs listed**	**CONGENITAL SYPHILIS**	• NOTIFY • Admit to neonatal unit • Procaine Penicillin 50 000 units / kg IM daily for 10 – 14 days, OR • Penicillin G 150 000 units / kg IV 12 hourly for 10 – 14 days
		• **Mother RPR positive** **AND** • **Mother treated < 1 month before delivery** **AND** • **Baby is well**	**INCOMPLETELY TREATED FOR SYPHILIS EXPOSURE**	• Administer Benzathine Penicillin 50 000 units / kg IM - one dose only to baby • Ensure mother completes treatment
		• **Mothers RPR status is not known** **AND** • **Baby is well**	**UNKNOWN MATERNAL RPR, PROPHYLAXIS REQUIRED**	• Administer Benzathine Penicillin 50 000 units / kg IM - one dose only to baby • Ensure mother has a RPR test and reclassify
		• **Mother RPR positive** **AND** • **Fully treated at least one month before delivery** **AND** • **Baby is well**	**COMPLETED TREATMENT FOR SYPHILIS EXPOSURE**	• No treatment required

2.2.9 CONGENITAL TUBERCULOSIS

Assess all infants who have had exposure to TB, for clinical and laboratory evidence of Tuberculosis, and provide treatment or prophylaxis.

Exposure to TB	Clinical Signs	Investigate	Signs	Classification	Provide anti-tuberculosis Treatment
Tuberculosis exposure in mother or close family contact • Mother has tuberculosis and on TB treatment for < 2 months • Mother has tuberculosis on TB treatment for > 2 months but has not shown good clinical response • Mother on TB treatment > 2 months and is responding to treatment, sputum negative	Does the baby have? • Poor feeding and poor weight gain • Abdominal distention or hepato-splenomegally • Prolonged jaundice • Pneumonia not responding to treatment	Gastric washings • TB culture • GeneXpert Chest X Ray • Miliary pattern • Lymph nodes • Cavitations Abdominal sonar • Large lymph nodes Placental biopsy • TB culture (in saline) • Histology (in formalin)	TB meningitis	**TB MENINGITIS**	6 months treatment of all 4 drugs below • INH – 15 – 20mg/kg/day • Rifampicin 15 – 20 mg/kg/day • Pyrazinamide 35mg/kg/day • Ethionamide 15 – 20 mg/kg/day Check ALT and watch for jaundice. Give BCG on completion of treatment Prednisone 2 – 4mg/kg/day x 4 weeks then taper over 2 weeks.
			Miliary Tuberculosis Cavitating TB Extrapulmonary TB	**DISSEMINATED TUBERCULOSIS**	Treat with • INH10 – 15mg/kg/day X 6 months • Rifampicin 15 – 20 mg/kg/day x 6 months • Pyrazinamide 30 – 40 mg/kg/day x 2 months • Ethionamide 15 – 20 mg/kg/day x 2 months If HIV infected • Fast-track for ARV treatment • Add Pyridoxine 12,5mg daily for 6 months Give BCG on completion of treatment If HIV positive give BCG if asymptomatic

continues below

Positive TB test or CXR

CONGENITAL TB

- Give BCG on completion of TB treatment

Mother has TB and < 2 months of treatment or is not responding to TB treatment

HIGH TB EXPOSURE RISK

	Intensive Phase for 2 months		Continuation phase for 4 months
Body Weight (kg)	RH Tablets (60/60)	PZA 500mg	RH Tablets (60/60)
< 2 kg	See individual drugs above	See individual drugs above	See individual drugs above
2 – 2.9	½ tablet		½ tablet
3 – 3.9	¾ tablet	¼ tablet	¾ tablet
4 – 5.9	1 tablet	¼ tablet	1 tablet

- Mother >2 months of TB treatment and is smear negative AND
- Baby asymptomatic

LOW RISK TB PROPHYLAXIS

- Give BCG on completion of treatment, if HIV uninfected. If HIV infected give BCG if asymptomatic.
- Give INH for 6 months at 10mg/kg /day

Body Weight (kg)	Daily Isoniazid (INH) (100mg tablet) 10mg /kg daily
< 2 kg	10 mg/kg daily
2 – 3.4	¼ tablet
3.5 – 4.9	½ tablet
5 – 7,4kg	¾ tablet

2.2.10 HIV AFFECTED MOTHERS AND BABIES

This guideline is based on the SA 2014 National PMTCT guideline. Ensure you are using the latest PMTCT guidelines as these guidelines may have changed.

STEP	ASSESS AND CLASSIFY	CARE
Step 1. **Identify the Mother's HIV status and provide care to her** • What is the mothers HIV status? • If the mother is HIV positive, is she on ART? • If not on ART should she commence ART?	• Mother HIV positive • CD4 count < 350 and on ART	Continue with lifelong ART, provide support, ensure treatment and follow up arrangements
	• Mother HIV positive • CD4 count > 350	Continue with or start ART for the duration of breastfeeding then review WHO clinical stage and CD4 count
	• Mother HIV positive, • CD4 not known	Initiate on ART according to the PMTCT protocol. Take blood for CD4 count and creatinine and follow up in 1 week
	• Mother HIV negative	If HIV test done > 12 weeks ago, repeat
	• Mother's HIV status unknown	Counsel and test for HIV
	• Mother's HIV status unknown and very ill, unavailable or has died	Perform a rapid HIV test on the baby, to determine HIV exposure of baby and start on Nevirapine until HIV status determined. See care of baby in step 2

continues below

Step 2.

Provide ARV prophylaxis for HIV exposed baby

- HIV exposed Baby > 2 kg

Birth weight	NVP Dosage
2 - 2.5 kg	Birth to 6 weeks: 10mg (1ml)
> 2.5 kg	Birth to 6 weeks: 15mg (1.5ml)

Daily NVP for 6 weeks. If the mother has received less than 4 weeks of ART treatment continue Nevirapine for 12 weeks.

- Baby < 2 kg

- Single dose Nevirapine (NVP) 2mg/kg (0.2 ml/kg) **within** 1 hour of birth
- Give orally or flush NGT with 1 ml normal saline after dose
- Only give 1 dose in 24 hours. If baby vomits first dose repeat once
- Give NVP daily for at least 6 weeks according to age and weight
- **Take blood for ALT and TSB on day 7**
  If blood results raised consult a Neonatologist

Nevirapine Prophylaxis: Birth weight < 1800 gm		
Age	Daily dose (mg)	Daily dose (ml)
Day 0 -14	2 mg/kg	0.2 ml/kg
Day 15 – 42	4 mg/kg	0.4 ml/kg
Nevirapine Prophylaxis: Birth weight 1800 – 1999 gm		
Day 0 – 14	5 mg	0.5 ml
Day 15 – 42	10 mg	1 ml

Baby ill and cannot take oral

Consult a Paediatrician about using IV AZT

HIV status of mother not known or baby abandoned

- Daily Nevirapine until HIV exposure is known. See step 1
- If HIV exposed continue Nevirapine for 12 weeks

continues on next page

STEP	ASSESS AND CLASSIFY	CARE
Step 3. **Safely feed HIV exposed baby**	Baby < 1.8 kg	• EBM according to guidelines on feeds and fluids for low birth weight babies • EBM can be pasteurized if facilities available • Ensure NVP prophylaxis for baby according to weight and age of the baby and ART for the mother
	Exclusively breastfeeding	• Support exclusive breastfeeding • Assess breast feeding (p. 15 - 16) and provide support if necessary
	Mother has decided on formula feeding and can safely prepare and provide it	• Confirm that this is the best choice for her and provide her with assistance (p. 20 - 21)
Step 4. **Determine HIV status of HIV exposed baby**	Baby < 2 kg or ill. (This includes LBW, failure to thrive, prematurity, anaemia, thrombocytopaenia, pneumonia, hepatosplenomegaly, extensive oral candidasis, lymphadenopathy or any opportunistic infections)	• Do a HIV DNA PCR test on baby at birth or on admission • If HIV DNA positive, initiate ART now and do a second PCR test to confirm (p. 80 - 81) • If HIV DNA negative, repeat the test at 6 weeks
	Baby is well	• Do a HIV PCR test at 6 weeks
Step 5. **Positive HIV DNA PCR test**	HIV DNA PCR test positive	• Prepare for commencement of lifelong ART treatment and repeat PCR to confirm HIV status (p. 80 - 81)

continues below

<table>
<tr>
<td rowspan="2">Step 6.
Continue NVP prophylaxis for longer than 6 weeks</td>
<td>Mother is not on ART and breastfeeding</td>
<td>Give the baby daily NVP. Continue NVP until 1 week after cessation of breast feeding
<table>
<tr><th>Age or weight</th><th>Nevirapine</th></tr>
<tr><td>Birth – 6 weeks 2.0 - 2.5 kg</td><td>10mg/day (1ml)</td></tr>
<tr><td>≥ 2.5 kg</td><td>15mg/day (1.5 ml)</td></tr>
<tr><td>> 6 weeks – 6 months</td><td>20mg/day (2 ml)</td></tr>
<tr><td>> 6 months – 9 months</td><td>30mg/day (3 ml)</td></tr>
<tr><td>> 9 months until breastfeeding stops</td><td>40mg/day (4 ml)</td></tr>
</table>
Check HIV DNA PCR test 6 weeks after breastfeeding is discontinued.</td>
</tr>
<tr>
<td>Mother initiated ART after 36 weeks gestation OR Mother tested positive in labour, or post delivery AND mother is breastfeeding</td>
<td>Baby to get 12 weeks of NVP</td>
</tr>
<tr>
<td>Step7. If mother has resistance to NVP or EFV</td>
<td>Mother has resistance to NVP or EFV</td>
<td>Give NVP and AZT for 6 weeks (p. 90)
Do a HIV DNA PCR test soon after birth</td>
</tr>
<tr>
<td>Step 8.
Provide Cotrimoxazole prophylaxis from 6 weeks</td>
<td>HIV exposed baby from 6 weeks</td>
<td>Provide Cotrimoxazole prophylaxis until breastfeeding is discontinued, and it is confirmed the baby is HIV uninfected, or baby is stable on ARV treatment
Cotrimoxazole Dose 2.5ml daily PO or 0.5ml/kg/day PO if < 2.5kg</td>
</tr>
</table>

2.2.11. CARE OF HIV INFECTED BABIES

Provide on-going care to the HIV infected baby, ARV initiation should commence while still in hospital, and in consultation with a neonatologist.

STEPS, ASK	CHECK, LAB	TREAT, OBSERVE, CARE	COUNSEL AND FOLLOW UP
1. Confirm the Positive HIV status	• Confirm that the HIV DNA PCR test is positive by doing a second PCR test • Take blood for Viral Load, CD4 count, U&E and Hb or FBC	• Follow steps below to prepare for ART initiation	• Start counselling on adherence
2. WHO Clinical Staging Take a comprehensive history	• Do a full clinical examination. • Check for underlying opportunistic infections	• Treat any underlying opportunistic infections	
3. Provide Cotrimoxazole prophylaxis from 6 weeks	• If baby is 6 weeks of age or more, is baby on cotrimoxazole?	• Prescribe Cotrimoxazole dose 0.5ml/kg/dose PO if more than 6 weeks of age	
4. Screen for congenital T.B.	• Does mother have signs of TB or is she on TB treatment?	• Refer to Chart 2.2.9 (p. 74 - 75) for the management of TB	
5. Check readiness to start ART	• Check the results of VL, CD4, FBC, U&E	• If Hb is low, determine the cause and treat. If Hb< 8g/dl transfuse with 10ml/kg of packed cells.	• Adherence counselling (p. 14)

continues below

6. Initiate ART	• Baby is ready to be initiated on ART, commence treatment	• Continue prophylaxis and then add additional drugs in discussion with a paediatrician or neonatologist familiar with ART in neonates • These drugs may be a combination of AZT or Kaletra or Lamivudine. See the drugs dosage table for doses and precautions	• If in hospital observe for side effects • If discharged follow up in a week
7. Monitoring	• Kaletra - Reduced metabolism by the liver and reduced kidney function can lead to cardiac and renal toxicity, CNS depression and lactic acidosis, especially in pre-term infants either due to Lopinovar or ethanol, polypropylene glycol in the solution • Check renal function and osmolality every week • Check for clinical signs of CNS depression, hypotonia, seizures and complete AV block	• Discuss treatment and any side effects with a Neonatalogist or Paediatrician	• Follow up weekly for the first 4 week if baby is ready to be discharged

3. DISCHARGE AND FOLLOW-UP

3.1 DISCHARGE

When to discharge	• Low birth weight baby: When baby is at least 1,8kg and KMC score is more than 18 • Baby with serious infections: Completed course of treatment and feeding well • Baby with encephalopathy and seizures: Completed treatment, seizures controlled and feeding well • Other babies: Once treatment is completed, baby is feeding well, mom is able to provide home care	

Give Immunisations before discharge	• Give BCG and OPV0 on discharge if less than 6 weeks of age.
	• If more than 6 weeks and baby has not received OPV0 and BCG yet
	  ○ Give BCG, OPV0, DaPT-Hib-IPV1, HepB1, PCV1, and RV1 – then give OPV1 in 4 weeks with 10 week immunisations.
	• If 6 weeks and has received BCG and OPV0
	  ○ Give BCG, OPV1, DaPT-Hib-IPV1, HepB1, PCV1, and RV1
	• BCG may be delayed due to maternal TB (p. 10 - 11 and p. 74 - 75)	

Document information in the road to health booklet	• Document information on the road to health booklet on the following pages • Page 2: well child visit summary at 3 days, 6 weeks and 10 weeks if applicable • Page 4: Details of child and family • Page 5: Neonatal information • Page 6: Immunisation • Page 7: PMTCT/HIV information	
Counsel	• Counsel on exclusive breastfeeding: Refer to page 10 in the road to health card, health promotion messages in babies up to 6 months • Counsel on any special care the child may require e.g. for HIV or other condition	
Counsel on when to return immediately	• Feeding poorly • Convulsions • Fever • Cough with fast breathing • Bleeding, diarrhoea	• Pus draining from the eyes, skin pustules • Cord stump red or draining pus • Yellow hands and feet

continues below

Counsel on when to return for follow up

• All babies	• PHC Clinic	3 – 6 days of age then 6 weeks and normal routine
• HIV exposed babies	• PHC Clinic OR • PMTCT follow up clinic	3 – 6 days after discharge, 6 weeks of age and monthly for first year
• Babies who weighed < 2 kg at birth	• Neonatal follow-up	• 3 days after discharge then weekly until 2.5 kg
HIGH RISK: Babies who had the following problems • *Birth weight < 1.5 kg* • Meningitis or sepsis • Moderate or severe neonatal encephalopathy • Severe hypoglycaemia • *Required CPAP or IPPV* • Major congenital abnormalities • Necrotising enterocolitis • Severe jaundice	• High risk follow-up clinic	• 3 days after discharge • Weekly until 2.5 kg • 4 months • 9 months OR as required by the condition of the baby

3.2 NEONATAL FOLLOW UP

VISIT	ASSESS	TREAT, COUNSEL, FOLLOW UP
3 days after discharge	• Assess and classify weight gain (p. 60 - 61) • Assess and classify for priority signs	Counsel on feeding **Low birth weight** Gaining well: follow up in 2 weeks Not gaining: follow up in 3 days Losing weight: readmit Multivitamin drops 0.6 ml / day Ferrous lactate 0.6 ml / day
Low birth weight visits until 2500g	• Assess and classify weight gain (p. 60) • Assess and classify for priority signs • Measure and record head circumference	Multivitamin drops 0.6 ml daily for 6 months Ferrous lactate 0.6 ml daily for 6 months Counsel on feeding If well at 2500g, for routine PHC clinic follow up • Birth weight less than 1500g, and / or • Serious illness (see p. 85) • Follow up at 18 weeks corrected age and 9 months for developmental screen
6 weeks of age HIV exposed	• Assess growth and feeding • Do PCR • Give Immunisations • Initiate co-trimoxazole syrup • Discontinue NVP syrup unless extended course indicated (p. 79)	• Counsel on feeding • Get PCR result in 2 weeks. If PCR positive initiate on ART and confirm HIV status with a repeat PCR (p. 80 - 81) • PCR negative: routine follow up at clinic and repeat PCR if baby shows signs of HIV • PCR negative, and breast feeding, repeat PCR 6 weeks after stopping breast feeding • HIV antibody test at 18 months
18 weeks corrected age	• Assess growth and feeding • Measure and record head circumference • Assess development (p. 87)	• According to problems identified • If delayed motor development, start physiotherapy
9 months	• Assess growth and feeding • Measure and record head circumference • Assess development (p. 87) • Give immunisations	• According to problems identified • If delayed motor development, start physiotherapy • If delayed speech development, assess hearing
Retinal Assessment - when check	• Specialised assessment by ophthalmologist	• Specialised assessment by ophthalmologist

3.3 DEVELOPMENT CHART (0–18 MONTHS)

Months	Gross-motor	Fine-motor-adaptive	Communication	Personal-social
18	Walks well, arms down Pulls a toy Throws a ball Climbs on a chair	Completes simple form board with reversal (trial and error)* 3 - 4 cube tower	2 word utterances. 6-20 words Points to one body part Points to one picture	Indicates wet / dirty nappy Pulls up pants Handles spoon and cup well
15	Walks alone – uneven steps, arms out for balance	2 cube tower Simple form board - replaces both circles*	Jabbers with expression Uses 5 words (other than mama, dada)	Pulls off socks Holds and drinks from a cup Attempts to feed with a spoon - spills most
12	Bear walks, walks around furniture lifting one foot and stepping sideways, may walk alone	Pincer grasp, releases object on request Simple form board (one circle in)*	Knows own name 2 – 3 words with meaning	Finger feeds Pushes arm into sleeve
10	Pulls to stand, walks with assistance	Picks up small object between finger and thumb Clicks two cubes together	Shakes head for no Waves bye bye	Plays peek-a-boo with mother
9	Sits without support Crawls on hands and knees Pulls up to stand	Immediately reaches out and holds a cube in each hand Exploratory mouthing	Vocalizes deliberately Babbles	Stranger anxiety Holds cup
6	Pulls to sit: braces shoulders and pulls to sit Prone: Lifts head and chest up, supports on extended arm Rolls from supine to prone	Reaches for and grasps toy Transfers toy from one hand to the other	Initiates conversation	Takes everything to the mouth Pats mirror image
3	Pulls to sit: little or no head lag Prone: supports on forearms, lifts head, buttocks flat Rolls from prone to supine	Follows through 180° Holds rattle when placed in hand	Coos, chuckles and squeals	Excited when sees mother Obvious pleasure at being handled
6 weeks	Pull to sit: some head control Prone: head to side, buttocks moderately high Moro reflex	Stares Follows horizontally to 90°	Startle response	Smiles at mother
New-born	Ventral suspension: head drops, hips flexed, limbs hang Moro reflex, palmar & plantar grasp reflexes	Hands fisted Closes eyes to sudden bright light	Stills to sound Startles to sudden loud noises	Alternates between drowsiness and alert wakefulness

* omit if you do not have form boards

4. DRUG DOSAGES, CHARTS, RECORDING FORMS AND REFERENCES

4.1 DRUG DOSAGES

- Determine appropriate drugs and dosages for baby's weight or surface area, gestational or chronological age
- Tell the mother the reason for giving the drug to the baby
- Give intra-muscular antibiotics in the antero-lateral thigh – use a new syringe and needle for each antibiotic

DRUG	DOSE	AGE / WT	FREQUENCY AND COMMENT
Abacavir	2mg/kg dose PO 8mg/kg/dose PO	< 30 days > 30 days	12 hrly 12 hrly
Adrenaline	0.01-0.03mg/kg(equates to 0.1-0.3ml/kg of 1: 10 000 adrenaline) IV		Give as a rapid bolus followed by 0.9% Sodium Chloride flush. Mix 1 ml of 1:1000 adrenaline with 9ml of Saline to get 1:10000
Amikacin	15mg /kg/dose IV or IM	< 7days if < 32 weeks if > 32 weeks > 7days	 36 hourly 24 hourly 24 hourly
Amoxicillin Augmentin	25 - 50 mg / kg / dose PO	< 7days 7 - 21 days:	12 hourly 8 hourly
Ampicillin	50 mg / kg / dose IV **100 mg / kg / dose IV for meningitis**	<7 days: 7 - 21 days >21 days	12 hourly 8 hourly 6 hourly
AZT (Azidothymidine)	> 2kg: 12mg / dose PO <2kg: 4 mg / kg / dose PO 1.5 mg / kg / dose IV	> 2kg < 2kg	12 hourly; dose is **not per kg** 12 hourly; dose is per kg 12 hourly, give over 1 hour
Caffeine	Load 10 mg/ kg PO once Maintenance: 2,5 - 5 mg/kg/dose PO		Once then maintenance dose 12 hours later Daily
Cefotaxime	50 mg / kg / dose slowly IV or IM	< 7 days 7 - 21 days >21 days	12 hourly 8 hourly 6 hourly
Ceftriaxone	Sepsis: 50 mg / kg / dose **Meningitis: 80 mg / kg / dose IV** Gonococcalopthlamia 50 mg / kg / dose IM		24 hourly 24 hourly 1 dose for Gonococcalopthalmia Don't use with IV infusions that contain Calcium such as Neonatolyte, if IV infusion is required rather use Cefotaxime

Cloxacillin	25 – 50 mg / kg / dose IV or PO 100 mg/kg/dose for osteitis or intra-cranial infection	< 7 days 7 - 28 days > 28 days	12 hourly 8 hourly 6 hourly
Erythromycin	12.5 mg / kg / dose PO		6 hourly Give for 14 days for Chlamydia or Pertussis
Ferrous lactate	(25 mg / ml) 0.2ml / PO	From 2 weeks of age	Daily
Flucloxacillin	25mg/kg		6 hourly
Gentamycin	5mg / kg / dose IV / IM	>32 weeks < 32 weeks	24 hourly 36 hourly
Glucagon	0.2mg / kg / dose IM / IV / SC		Single dose Give before referring patient.
INH	10 mg / kg / dose PO daily		Give for 6 months if mother has been on TB treatment for more than 2 months
Combination TB treatment	RH (60,60)		Give 6 months of treatment if the mother has had <2 months treatment or is HIV positive Give RH for 6 months, and PZA for 2 months
Lamivudine (3TC)	2 mg / kg / dose PO 4 mg / kg / dose PO	< 7 days > 7 days	12 hourly 12 hourly
Lopinavir / Ritonavir (Kaletra)	300/75mg/m2 /PO or 16mg/4mg/kg/PO	Not before 42 weeks gestational age	12 hourly Closely monitor renal function, and for signs of CNS depression, seizures, hypotonia, and complete AV block in the first month
Metronidazole	Load 15mg/kg/IV/PO dose slowly 7.5 mg / kg / dose IV /PO		Once only 12 hourly
Naloxone	1mg/kg IV		Give IV if baby is still not breathing after bag and mask ventilation, and mom received narcotics in labour

continues on next page

DRUG	DOSE	AGE / WT	FREQUENCY AND COMMENT
Nevirapine (Syrup 10mg/ml)	As post exposure prophylaxis 2mg/kg/ dose PO 4mg/kg/dose PO 10mg(1ml) / dose PO 15mg (1.5ml) / dose PO 20mg (2ml) / dose PO 30mg (3ml) /dose PO 40mg (4ml) / dose PO	 < 2kg day 0 -14 <2kg day 15- 42 2 – 2.5 kg >2.5kg >6 wks – 6mo > 6 mo – 9 mo >9 mo	 After birth and daily Daily for 6 weeks Daily for 6 weeks Daily for 6 weeks Daily while breastfed if mom not on ART or for 12 weeks if she started ART after 36 weeks gestation or after delivery Daily while breastfed if mom not on ART Daily while breastfed if mom not on ART
Nystatin	1ml (100 000u) PO		6 hourly Continue until no thrush for 3 days
Paracetamol	Load 24mg/kg 12 mg/kg/dose maintenance	 Term Preterm	 6 hourly 8 hourly
Penicillin G (Benzyl penicillin)	Sepsis / Syphilis 50 000 u / kg / dose IV Meningitis 100 000 u / kg / dose IV	Term Preterm < 7 days > 7 days	6 hourly 12 hourly 8 hourly *Duration of treatment* Syphilis: 10 days Sepsis / Pneumonia: 14 days Meningitis: 21 days
Penicillin Benzathine	50 000 u / kg / dose IM		1 dose for babies born to mothers with syphilis who are untreated or partially treated
Procaine Penicillin	50 000 u / kg / dose IM 24 hourly		For symptomatic congenital syphilis: 10 days NEVER GIVE IV

Phenobarbitone	Load: 20 mg / kg / IV over 10 minutes Maintenance: 4 mg / kg / dose orally / IV / IM / rectally		IV stat over 10 minutes 24 hourly
Phenytoin	Load: 20 mg / kg / IV over 30 minutes Maintenance: 4 - 8 mg / kg / dose		Orally / IV / rectally 24 hourly
Theophyline (oral)	Load: 6 mg / kg orally Maintenance 2.5 mg / kg / dose		Give in pre-term infants (< 35 weeks gestational age to prevent apnoea) 12 hourly
Vitamin D2	400 iu / kg / day PO		Daily For pre-term infants
Vitamin K	1 mg IM if < 1000g give 0.3 mg IM		At birth or as a single dose to prevent haemorrhagic disease of the newborn Prophylaxis with oral Vitamin K is not recommended

4.2 RECORDING FORM

Infant's Name:_____ **Birth Time:**_____

Hospital Number:_____ **Birth Date:** _____

Gender:	**Birth Weight:** kg	HC: cm	Gest Age Score: weeks	**Resuscitation:(Circle)** None Bag and Mask Advanced		
Apgar Score	0	1	2	**1 min**	**5 min**	**Details of resuscitation:**
Heart rate	Absent	< 100 / min	> 100 / min			
Respiration	Absent	Slow or irregular	Good, crying			
Muscle Tone	Limp	Slight flexion	Active, moves			
Response to stimulation	No response	Grimace	Vigorous cry			
Colour	Blue or pale	Body pink, limbs blue	Pink all over			
			Total			

Mode of delivery ☐ NVD ☐ C/S ☐ Vac ☐ Forceps	**Routine care:**	**Treatment given:**	**Date done :**
Problems with delivery:	Eye care:		
Placenta: wt:	Vitamin K 1mg imi:		
Risk factors to baby:			

PREGNANCY:		**Care required:**	**Care received:**	**Date done:**
RPR positive	☐ No ☐ Yes	Examine, Benzathine Pen if mother incompletely treated		
RPR unknown	☐ No ☐ Yes	Examine, Benzathine Penicillin to baby if no result		
Blood group O or Rh neg	☐ No ☐ Yes	Check the TSB at 6 hours		
HIV positive	☐ No ☐ Yes	Nevirapine for 6 weeks, then reassess based on care mother is receiving and feeding		
HIV unknown	☐ No ☐ Yes	Arrange HIV testing for mother, if positive as above		
TB status	☐ No ☐ Yes	If mom has TB provide prophylaxis or treatment to baby		
Maternal diabetes	☐ No ☐ Yes	Refer to nursery for hourly blood sugars for the first 6 hours		

continues below

LABOUR:				
MSL	☐ No ☐ Yes	Assess baby for respiratory distress		
Foetal distress	☐ No ☐ Yes	Assess baby for Neonatal Encephalopathy		
PROBLEMS DURING NEWBORN PERIOD:			**Preventive care:**	
1			Polio:	
2			BCG:	
3			RTH Booklet filled in:	
FEEDING:			**Follow up plans:**	
Did mother breastfeed baby within 1 hour of birth ☐ No ☐ Yes			In first week: Date:	Place:
Has mother been counselled on the benefits of brestfeeding ☐ No ☐ Yes			At 6 weeks: Date:	Place:
			For PCR: Date:	Place:
Feeding on discharge?			Discharge weight:	Discharge date:
Identification:				
At Birth	Date:	Midwife (print)	Mother (print)	Witness:
Postnatal Ward	Date:	Brought by:	Received by:	Mother:
At Discharge	Date:	Midwife (print)	Mother (print):	Witness:

continues on next page

INITIAL ASSESSMENT: SICK AND SMALL NEWBORNS IN HOSPITAL

Date: _____ Time _____ Name: _____

Date of birth:_____Weight:_____kg

ASK: How old is the baby? _____ Where was the baby born? _____

What is the baby's current problem? _____

Is the baby having a problem with feeding? _____

Has the baby had any convulsions or abnormal movements? _____

ASSESS		NEEDS ACTION?	CLASSIFY	ACTION
ASSESS NEED FOR EMERGENCY CARE			Respiratory failure yes ☐ no ☐	
Breathing well	Y	N		
Gasping	N	Y		
Respiratory rate < 20 / minute	N	Y		
Pale or cold	N	Y	Circulatory failure yes ☐ no ☐	
Heart rate > 180 or < 100 / minute	N	Y		
Baby extremely lethargic	N	Y		
Glucose test strip .....m / mol / l	Norm	Low	Hypoglycaemia yes ☐ no ☐	
ASSESS FOR PRIORITY SIGNS: APNOEA AND RESPIRATORY DISTRESS			**Classify for apnoea and respiratory distress**	
Central cyanosis	N	Y		
Fast breathing (respiratory rate ..... / min)	N	Y		
Severe chest indrawing	N	Y		
Grunting	N	Y		
Apnoea	N	Y		

continues below

ASSESS		NEEDS ACTION?	CLASSIFY	ACTION
ASSESS FOR OTHER PRIORITY SIGNS			**Classify for priority signs**	
Temperature: < 36°C	N	Y		
Birth weight: < 2500g	N	Y		
> 4000g	N	Y		
Increased tone	N	Y		
Decreased tone	N	Y		
Irregular jerky movements	N	Y		
Reduced activity	N	Y		
Lethargic or unconcious	N	Y		
Bulging fontanelle	N	Y		
Abdominal distension	N	Y		
Bile stained vomiting	N	Y		
Jaundice	N	Y		

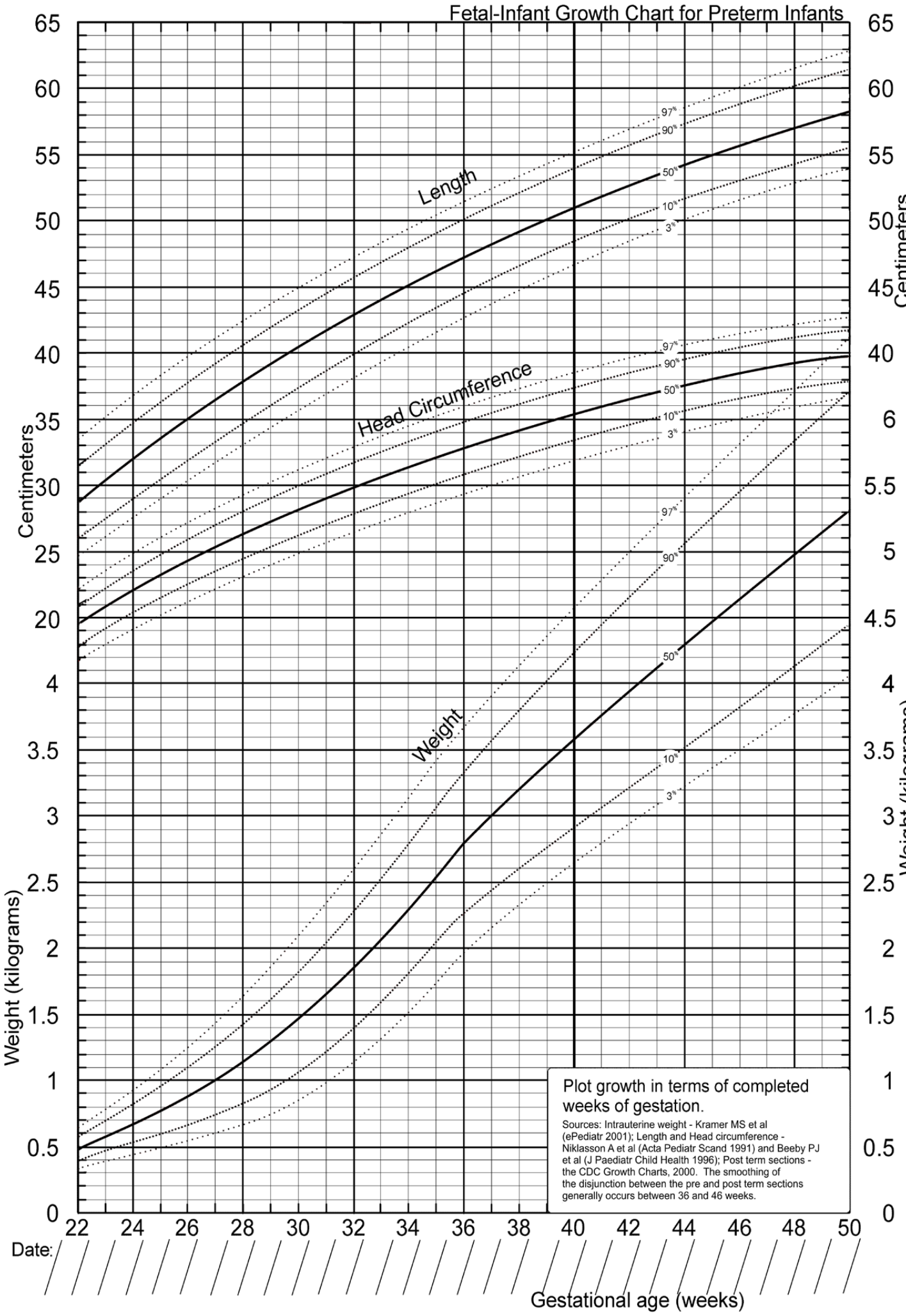
ASSESS FOR BIRTH INJURIES, MALFORMATIONS, LOCAL INFECTIONS			**Classify for all problems**	
Abnormal position of limb	N	Y		
Asymmetric movements	N	Y		
Cries when limb touched	N	Y		
Swollen limb or joint	N	Y		
Head circumference: < 3rd centile	N	Y		
> 97th centile	N	Y		
Normal	Y	N		
Swelling of scalp	N	Y		
Unusual appearance	N	Y		
Cleft lip / palate	N	Y		
Neural tube defect	N	Y		
Gastroschisis / omphalocoele	N	Y		
Ambiguous genitalia	N	Y		
Imperforate anus	N	Y		
Club foot	N	Y		
Extra digit	N	Y		
Eyes: Pus draining	N	Y		
Red or swollen eyelids	N	Y		
Skin pustules / rash	N	Y		
Umbilicus red / pussy discharge	N	Y		
Other:	N	Y		

continues on next page

ASSESS	NEEDS ACTION?	CLASSIFY	ACTION

ASSESS RISK FACTORS AND SPECIAL TREATMENT NEEDS			Classify for risk factors	
Mother has diabetes	N	Y		
Baby weighs > 4000g	N	Y		
Mother's blood group: O	N	Y		
Rhesus negative	N	Y		
Unknown	N	Y		
Rupture of membranes > 18 hours	N	Y		
Maternal fever	N	Y		
Offensive liquor	N	Y		
Apgar score < 8 at 5 minutes	N	Y		
Mother's RPR: Positive	N	Y		
Partially treated	N	Y		
Unknown	N	Y		
Mother's HIV staus: Positive	N	Y		
Unknown	N	Y		
Mother has TB, or has been on TB treatment in the last 6 months	N	Y		

4.3 GROWTH AND HEAD CIRCUMFERENCE CHART



4.4 LIST OF ABBREVIATIONS

APH	Antepartum haemorrhage
AIDS	Acquired immunodeficiency syndrome
AFIS	Amniotic fluid infection syndrome
AGA	Appropriate for gestational age
ANC	Antenatal care
ARV	Anti-retroviral
AZT	Zidovudine
CA	Chorio – amnionitis
CHD	Congenital heart disease
CNS	Central nervous system
CPAP	Constant positive airway pressure
CRP	C-reactive protein
CXR	Chest X-ray
EBM	Expressed breastmilk
EBF	Exclusive breast feeding
FBC	Full blood count
GA	Gestational age
GPH	Gestational proteinuric hypertension
HIE	Hypoxic-ischaemic encephalopathy
HIV	Human immune deficiency virus
HMD	Hyaline membrane disease
HR	Heart rate
ICU	Intensive care unit
IDM	Infant of diabetic mother
IM	Intramuscular injection
IPPV	Intermittent positive pressure ventilation
IV	Intravenous injection
IVF	Intravenous fluids
IVH	Intra-ventricular haemorrhage
K	Potassium
KMC	Kangaroo mother care
LBW	Low birth weight
LP	Lumbar puncture
Na	Sodium
NEC	Necrotizing enterocolitis
NG	Naso-gastric
NMR	Neonatal mortality rate
NND	Neonatal death
NNU	Neonatal Unit
NICU	Neonatal Intensive Care Unit
NTD	Neural tube defect
NVP	Nevirapine
PCR	Polymerase chain reaction test
PDA	Patient ductusarteriosus
PMTCT	Prevention of mother to child transmission
PROM	Prolonged rupture of membranes
RDS	Respiratory distress
RPR	Rapid plasma reagin (syphilis)
ROM	Rupture of membranes
RR	Respiratory rate
RTHC	Road to health card
TPN	Total parental nutrition
TSB	Total serum bilirubin
TSR	Time to sustained respiration
VCCT	Voluntary confidential counselling and testing
VCT	Voluntary counselling and testing

4.5 KEY REFERENCES AND CONTRIBUTORS

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