NEWBORN CARE CHARTS

MANAGEMENT OF SICK AND SMALL NEWBORNS IN HOSPITAL

Save the Children

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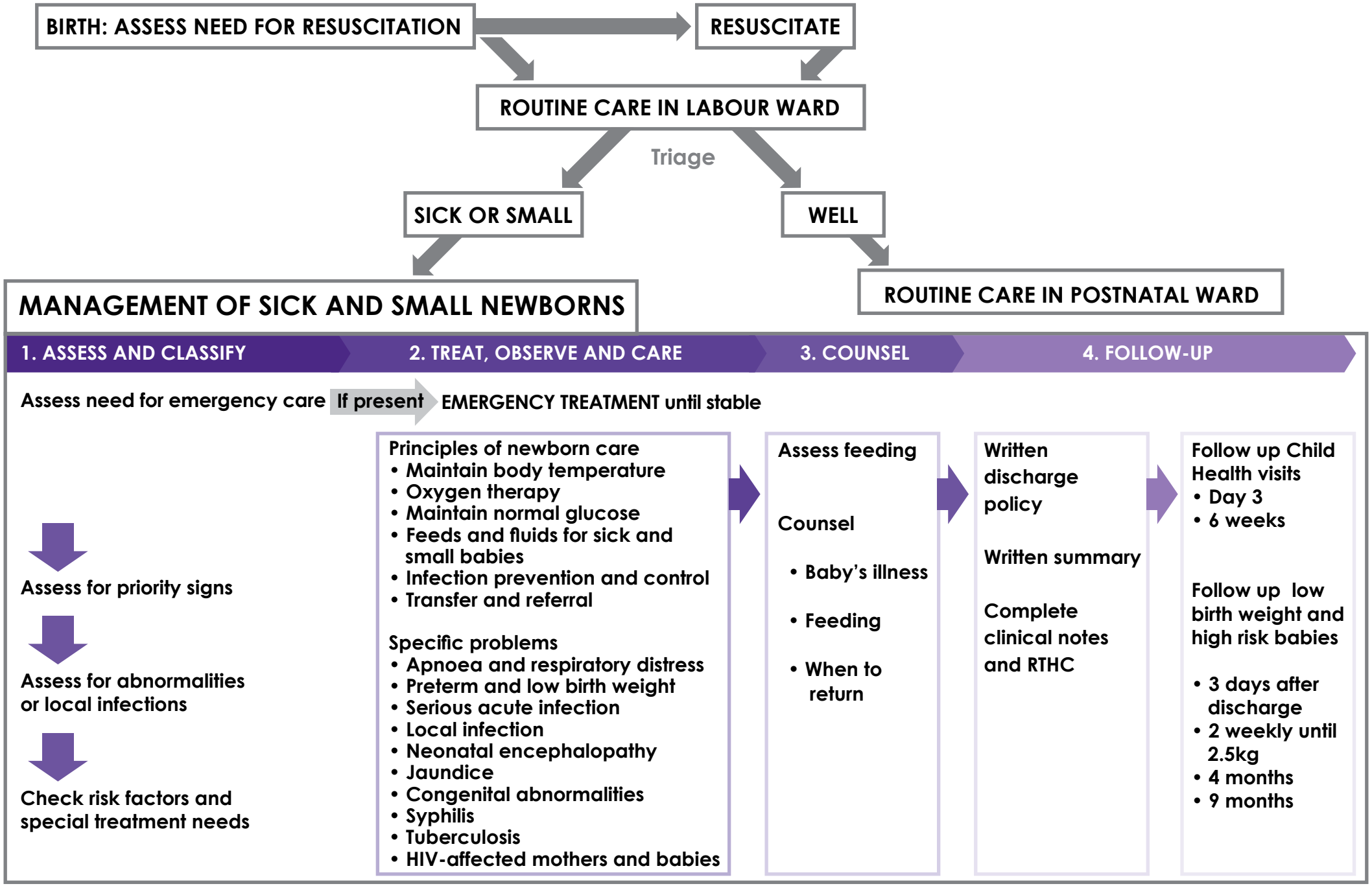
MANAGEMENT OF NEWBORNS



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1. ASSESS AND CLASSIFY

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- Apnoea
- Respiratory distress
- Low birth weight
- Temperature
- Colour and skin
- Tone, movement and fontanel
- Abdominal signs

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1.4 Assess risk factors and special treatment needs 10

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

SPECIALISED URGENT CARE
Provide care and refer as soon as possible

SPECIALISED NON-URGENT CARE
Provide care and referral

NON SPECIALISED CARE: INPATIENT
Care and treatment needed as soon as possible

Baby can be discharged home

1.1 ASSESS AND CLASSIFY: NEED FOR EMERGENCY CARE

Rapidly assess all newborns on arrival in the ward, casualty, or outpatients, for the need for emergency care.

ASK, CHECK, RECORD	LOOK, LISTEN, FEEL	SIGNS	CLASSIFY	ACT NOW
	Assess breathing • Is baby breathing? • Is baby gasping? • Count the respiratory rate • Is the baby's tongue blue? **Assess circulation** • Count the heart rate • Pallor • Extremely lethargic or unconscious	• Not breathing at all, or • Gasping, or • RR < 20, or • Heart rate < 100 • Tongue blue	**RESPIRATORY FAILURE**	• Resuscitate the baby using a bag and mask (p. **65**) • Give oxygen (p. **17 - 20**) • Call for help • Keep warm • Arrange nursery admission
		• HR > 180, or • Pallor, or • Extreme lethargy, or • Unconscious	**CIRCULATORY FAILURE**	• Give oxygen (p. **17 - 20**) • Call for help • Establish an IV line • Infuse normal saline 10ml / kg body weight over 1 hour • Then infuse neonatalyte or 10% glucose at recommended volume for weight and age (p. **22; 23**) • Keep warm (p. **12 - 16**) • Check Vitamin K administration
	Assess for hypoglycaemia • Check blood glucose with glucose test strip	• Glucose < 2.5 mmol / L	**HYPOGLYCAEMIA**	• Give 10% glucose IV as recommended volume for weight and age (p. **22; 23**) • Manage for hypoglycaemia (p. **21**)

1.2 ASSESS AND CLASSIFY: PRIORITY SIGNS

Check all babies for priority signs, before taking a detailed history. Examine the baby under a radiant heater. Classify 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 indrawing • 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**	• Stimulate or resuscitate, as required • Manage for apnoea (p. **28**)
		• Severe chest indrawing AND / OR • Grunting, AND / OR • RR > 80	**SEVERE RESPIRATORY DISTRESS**	• Start oxygen • If preterm and CPAP is available, commence CPAP (p. **20**) • Monitor the response to oxygen (p. **17**) • Mobile CXR (p. **28**) • Observe hourly • Start antibiotics (p. **29**) • Keep nil by mouth for 24 hours • Treat, care and observe (p. **28**,**29**)
		• RR 60-80 but NO cyanosis, grunting or chest indrawing	**MILD RESPIRATORY DISTRESS**	• Check oxygen saturation – if O2 saturation < 88% or cyanosis, manage as severe respiratory distress • Observe 3 hourly • Start antibiotics if at risk for sepsis • CXR if no improvement after 6 hrs
		• Central cyanosis but NO chest indrawing or grunting	**POSSIBLE HEART ABNORMALITY**	• Give oxygen (p. **17 - 20**) • Consult specialist for possible referral

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	• 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. **22 - 24**) • Check blood glucose (p. **21**) • See low birth weight chart (p. **30 - 34**)
		• Temp < 36.0°C	**HYPOTHERMIA**	• Re-warm (p. **12 - 16**) • Check blood glucose (p. **21**)
		• Temp < 32.0°C • Temp > 38°C • Not feeding • Decreased tone • Increased tone • Irregular jerky movements / convulsions • Reduced activity / lethargic • Full fontanelle • Abdominal distension • Vomiting bile • Jaundice in first 24 hours	**SEVERE DISEASE** (Classify if any one sign is present)	• Treat convulsions if present (p. **37**) • Commence IV infusion at maintenance rate (p. **22,23**) • Check glucose now and 3 hourly (p.**21**) • Re-warm if cold (p. **12 - 16**) • Keep warm (p. **12 - 16**) • Check for risk factors and determine the cause (p. **10**) • Treat the cause • Start antibiotics if sepsis is suspected (p. **35**) • Reassess 1-3 hourly
		• Jaundice after the first 24 hours	**JAUNDICE**	• Determine the bilirubin level and manage (p. **39 - 41**) • Determine the cause (p. **39**)
		• Birth weight 2 - 2.5 kg	**LBW (2-2.5 kg)**	• Keep skin-to-skin / KMC • Assess before discharge: KMC, warmth, feeding

1.3 ASSESS AND CLASSIFY: 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 any abnormality or is there anything that concerns you?" 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 **Eyes** • Pus draining from eye • Red or swollen eyelid **Abdomen and back** • Gastroschisis / omphalocoele • Spina bifida / myelomeningocoele • Imperforate anus **Skin** • Pustules / rash • Umbilicus red / pus **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**	• Open tissue on the head or back	**NEURAL TUBE DEFECT / SPINA BIFIDA**	• Cover the lesion with Opsite • Refer
		• Omphalocoele • Gastroschisis • Imperforate anus, not passed meconium in 24 hours	**MAJOR GASTROINTESTINAL ABNORMALITY**	• IV fluids (p. **22 - 23**) • Ensure warmth • Refer
		• Head circumference above the 97th centile	**HYDROCEPHALUS**	• Refer to tertiary centre for neuro-imaging and neurosurgery
		• Head circumference < 3rd centile	**MICROCEPHALY**	• Assess for other abnormalities • Determine the cause • Counsel the mother
		• Club foot	**CLUB FOOT**	• Assess other problems • Refer to orthopaedic service for early serial plasters
		• Cleft lip AND / OR palate	**CLEFT LIP AND / OR PALATE**	• Start feeding • Consult / refer

ASK, CHECK, RECORD	LOOK, LISTEN, FEEL	SIGNS	CLASSIFY	ACT NOW
		• Swollen head (bump on one or both sides) • Abnormal position of legs • Poor limb movement / pain • Extra digit • Unusual appearance • Other abnormalities	**BIRTH INJURY / ABNORMALITY**	• Counsel the parents • Handle gently • Determine the cause • Check for risk of syphilis
		• Pus draining from the eye • Umbilical redness • Skin pustules	**LOCAL BACTERIAL INFECTION**	• Treat skin, umbilical and eye infection (p. **36**) • If pus in the eyes give one dose IM Ceftriaxone (p. **36**)

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 antenatal care, pregnancy, labour, birth and resuscitation of the baby Pregnancy • Duration of pregnancy • Mother diabetic • Mother has had TB in last 6 months • Mother tested RPR positive or unknown • Mother tested HIV positive or unknown • Mother's blood group O or Rh Neg Labour and birth • Uterine infection or fever • Membranes ruptured for > 18 hours • Difficult labour • Complications after birth • Apgar score	• Mother has diabetes, OR • Baby > 4 kg • Low birth weight • Severe disease	**RISK OF HYPOGLYCAEMIA**	• Feed immediately • Hourly glucose for 6 -12 hours • Treat hypoglycaemia (p. **21**)
	• Mother blood group O, OR • Mother Rhesus Neg, OR • Birth injuries	**RISK OF JAUNDICE**	• Measure bilirubin at 6 hours • Commence phototherapy if bilirubin > 80 mmol / l (p. **39 - 41**)
	• Membranes rupture > 18 hours, OR • Maternal fever, OR • Offensive smell of liquor at birth	**RISK OF BACTERIAL INFECTION**	• Follow maternal chorioamnionitis protocol (p. **36**)
	• Apgar score < 7 at 5 minutes	**RISK OF NEONATAL ENCEPHALOPATHY**	• Observe for 12 hours • Evaluate and manage for neonatal encephalopathy (p. **37 - 38**)
	• Mother tested RPR positive, OR • Mother's RPR not known, OR • Mother partially treated	**RISK OF CONGENITAL SYPHILIS**	• Evaluate and manage according to congenital syphilis protocol (p. **45, 46**)
	• Mother tested HIV positive, OR • Unknown maternal HIV status, OR • Unknown feeding choice	**RISK OF HIV TRANSMISSION**	• Manage according to PMTCT protocol (p. **48**)
	• Mother started TB treatment within the past 6 months, OR • Mother coughing for > 3 weeks	**RISK OF TUBERCULOSIS**	• Manage according to TB protocol (p. **47**)

2. TREAT, OBSERVE AND CARE

2.1 Principles of Newborn Care

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2.1.1 MAINTAIN NORMAL BODY TEMPERATURE: PREVENT AND TREAT HYPOTHERMIA

PREVENT HYPOTHERMIA

Dry the baby well at birth

When the baby is warm:
- Keep the baby covered or clothed as much as possible
- Delay bathing until after the first 24 hours
- Provide skin to skin care if possible
- If skin to skin care is not possible, clothe the baby with booties and cap.
- Uncover only parts that need observation and treatment
- Change nappy when wet
- For incubator care see p. **15**

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 25 - 26°C (Check 4 x / day with a wall thermometer)
- Keep the room free of draughts
- Do not place the baby on or near cold objects (examination table, wall, window) even if the baby is in an incubator
- Ensure warmth during procedures
- Have curtains drawn in the nursery

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

Encourage skin-to-skin care
- Placing mother and baby skin-to-skin can be used to re-warm babies with hypothermia
- In addition to re-warming, skin-to-skin care improves feeding, reduces infections, and encourages bonding
- It is only used for stable babies, unless no other option is available
- Small babies should be cared for in Kangaroo Mother Care (p.**14**)

METHODS FOR WARMING THE SMALL OR SICK BABY AND MAINTAINING A THERMONEUTRAL ENVIRONMENT

Moderate hypothermia (32 - 36°C) but stable	• Measure blood glucose and feed • Measure temperature every hour, aiming for an increase of 0.5°C every hour • If baby is stable, introduce KMC (p.**14**)
Severe hypothermia (<32°C)	• Radiant warmer or incubator at 38°C • If using a servo-controlled incubator, set skin temperature at 36.5°C and ensure skin probe is fixed securely (p.**16**) • Measure 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 blood glucose, keep nil by 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 • Once the baby is warmed and stable, consider KMC (p.**14**)
Baby sick, or < 1 kg	• Radiant warmer or incubator at 38°C • If no incubator is available or transferring baby, then KMC is an acceptable alternative (p.**14**)

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KANGAROO MOTHER CARE

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

What is KMC?

- KMC is a method of caring for small babies that has been shown to maintain warmth, improve feeding, reduce infections, and encourage bonding
- KMC can reduce mortality by up to half in babies weighing less than 2000g
- KMC has three main components including thermal care through continuous skin-to-skin contact usually with the mother, nutrition through exclusive breastfeeding, and support from health staff through early recognition and response to complications
- If continuous KMC cannot be practiced due to space or other constraints, intermittent KMC is also beneficial
- All stable small babies and their mothers will benefit from KMC

KMC monitoring

- 6 hourly heart rate, respiratory rate, temperature, activity, colour, intake and output
- Daily weight
- Daily KMC score (see p. **72**)

KMC nutrition

- 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 baby to breastfeed on demand, and feed at least every three hours
- Mothers who for medical reasons are using replacement feeds can still provide KMC and cup feed the baby

KMC position

- 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
- Explain and demonstrate until the mother is confident to try the kangaroo position

KMC support

- KMC ward should be warm and inviting
- The mother must keep her baby in KMC position at all times (except while she bathes)
- 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
- Health staff should be available to respond early and quickly to complications

OPEN WARMERS

A) RADIANT WARMER

- Uses radiant heat to warm the baby
- Mainly used in the resuscitation area
- Keep the radiant heater switched on in the resuscitation area, ready for use at all times
- Change the linen after each baby

B) SERVO-CONTROLLED OPEN 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 set to 36.5°C
- The baby needs to be undressed and exposed except for a nappy
- A heat shield will prevent heat loss through radiation
- An open incubator is useful for managing sick and small babies in ICU or high care

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CLOSED INCUBATORS

A) MANUAL

- Place the baby in a warm (37°C) clean incubator
- Determine the recommended incubator temperature for the baby, using 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 recommended temperature, then:

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

B) SERVO-CONTROLLED

- 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

NOTE: If the skin probe comes loose, the incubator will continue to warm up and the baby will become TOO HOT! (hyperthermic)

2.1.2 OXYGEN THERAPY

WHICH BABIES NEED OXYGEN?

- During resuscitation
- Severe hypothermia
- Baby with SEVERE RESPIRATORY DISTRESS:
  - RR > 80
  - severe chest in drawing or grunting
  - oxygen saturation less than 88%
  - central cyanosis (blue tongue and lips)

GUIDELINES FOR OXYGEN ADMINISTRATION
(see flow chart, next page)

- **Start head box oxygen** for all babies with **RESPIRATORY DISTRESS**
- Monitor the oxygen saturation with a PULSE OXIMETER continuously for 30 minutes after commencement on oxygen
- A preterm baby's oxygen saturation should be between 88% and 93%
- A term baby's oxygen saturation should be between 94% and 96%
- If the baby is pink and comfortable (less grunting / chest indrawing) and saturation > 88%, in < 60% oxygen on head box, change to nasal prongs
- If the baby is distressed or blue or the oxygen saturation is < 88% on > 60% oxygen, use CPAP if available, or transfer
- If the baby remains distressed or blue, or the oxygen saturation remains < 88% on optimum CPAP (as defined by experienced staff) then intubation and ventilation is needed

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, so mix the amount of oxygen and air to meet the baby's require ments. This can be done by:
- An air / oxygen blender that mixes pure oxygen with 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% - 80%
- Each venturi has a specified flow rate

Adjust the oxygen concentration to keep the saturation between 88 - 93% in a preterm baby and 94 - 96% in a term baby.

For Head box use

% Oxygen	80%	60%	40%	28%	24%	21%
Flow	12	10	8	6	4	4

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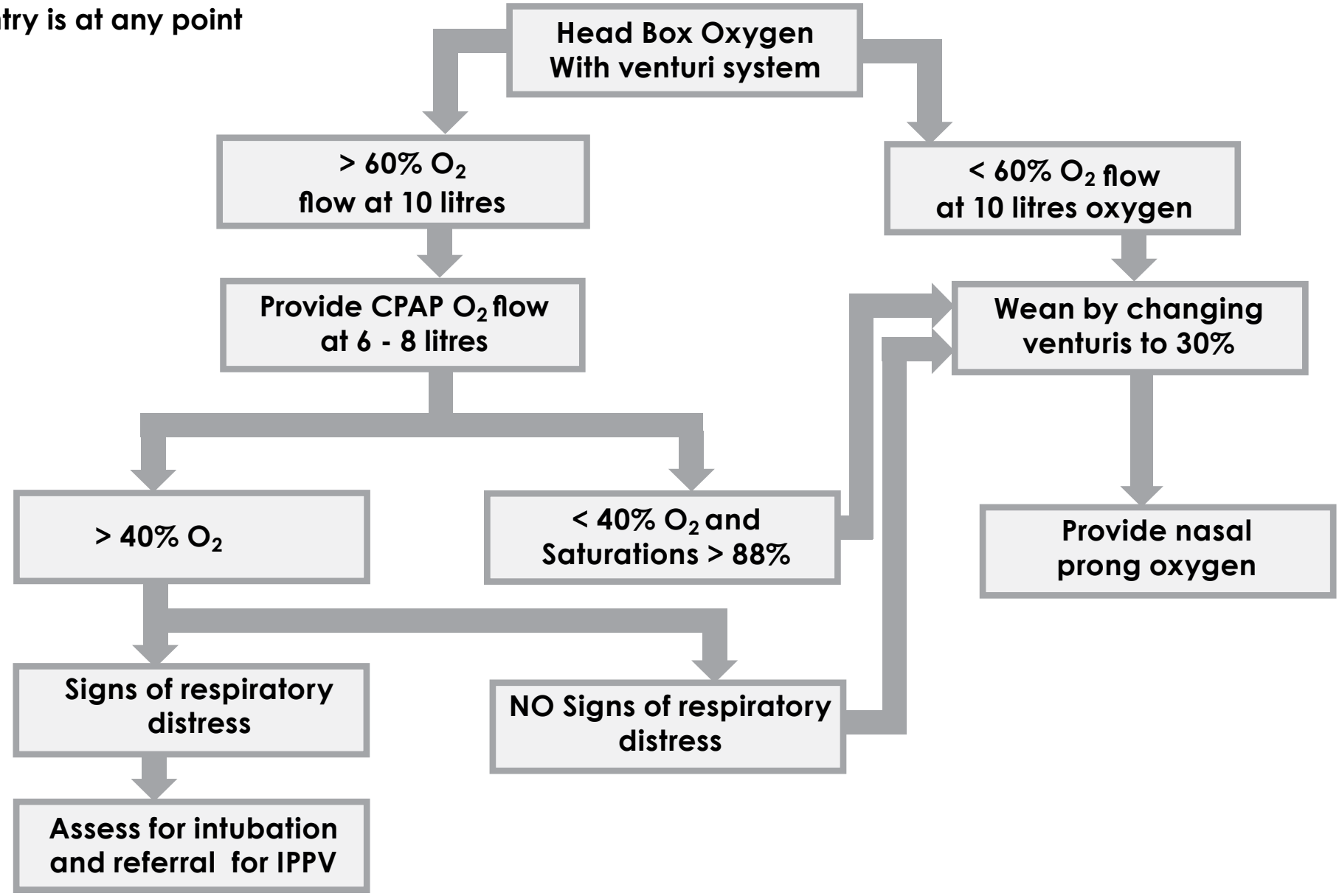
NB Entry is at any point



2.1.2 **OXYGEN THERAPY:** METHODS FOR PROVIDING OXYGEN TO BABIES WHO ARE BREATHING SPONTANEOUSLY

	Indication	Method	Flow and concentration	Observations	Advantages	Disadvantages
Headbox (HBO_2)	• For babies with severe respiratory distress • To stabilise babies to assess whether they will require CPAP • For babies not maintaining oxygen saturation on nasal prong or cannula	• Always ensure that the head stays within the head box • 4 - 12 L / min of oxygen is required (p. **17**) • Apply a face mask if you need to move the baby	• 5 L / min • Must use air / oxygen blender or venturi • Oxygen concentration 25% - 80%	• Observe and record the oxygen saturation and colour hourly • Observe and record oxygen concentration • **ALWAYS MONITOR THE OXYGEN SATURATION**	• High concentrations can be achieved • Does not obstruct the nasal passages • Humidification of oxygen not necessary	• Baby cannot be moved • Must feed by nasogastric tube • High flow of oxygen needed to reach the 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 • No nasogastric tube in situ - baby may have an orogastric tube	• 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	• 1 L per minute • Concentration ~30%	• Monitor the oxygen saturation 3 hourly	• Ensures constant concentration • Baby can be fed orally (cup or breast) • Ideal for babies with mild respiratory distress	• Not for babies with moderate or severe breathing difficulty • Prongs can easily get displaced
Nasal Cannula	• Mild respiratory distress, or coping on HBO_2 • No nasogastric tube in situ - baby may have an orogastric tube	• Insert a FG5 or FG8 nasogastric tube 2 – 3 cm into the nostril. • Secure with tape	• 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 OXYGEN THERAPY: METHODS FOR PROVIDING OXYGEN 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 of prematurity	• Apply special nasal prongs to the baby • Connect the CPAP machine • Start with a pressure of 5cm of H2O water • When weaning the baby, first turn down the oxygen percentage and then the cm pressure of water	• Oxygen and medical air mixed through a blender	• Observe and record the oxygen saturation continuously • **ALWAYS MONITOR THE OXYGEN SATURATION**	• 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

STARTING AND STOPPING CPAP

- Start on pressures of 5 cm H2O
- Utilise chest X-ray to assess lung expansion (7 - 8 posterior ribs visible above the diaphragm)
- Weaning:
  - o First reduce the oxygen if saturations are maintained
  - o Then reduce the pressure to see if the 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
- If the oxygen saturation is worsening, consider intubation and 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, lethargy, apnoea or hypothermia.

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 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 3 hourly

SEVERE HYPOGLYCAEMIA
If the blood glucose is < 1.4mmol / l
- Give a bolus of 10% glucose infusion (Neonatalyte) at 5 ml / kg. Then continue with the 10% glucose infusion at the recommended rate for age and weight (p. **22, 23**)
- Repeat blood glucose in 15 minutes
- IM glucagon: dose 0.2 mg / kg / dose to increase glucose rapidly

OR
- If still low, give 5mg hydrocortisone IV

AND discuss with paediatrician

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 does not have sepsis.

BABY OF A DIABETIC MOTHER AND A LARGE FOR GESTATIONAL AGE BABY

Admit babies of mothers with diabetes OR babies weighing > 4 kg to the nursery for hourly blood glucose observation for the first 6 hours after birth
- Feed the baby immediately, or start IV Neonatalyte if the baby cannot be fed
- Check the blood glucose hourly
- If hypoglycaemia occurs, manage according to the hypoglycaemia protocol (p. **21**, above)
- Discharge the baby back to the mother after 6 hours if the glucose has been normal and the baby is well

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 by mouth for the first day
- Calculate the IV fluid and feed for each baby using Table 2 and Table 3 as guides (p. **22,23**)
- Gradually introduce expressed breast milk (EBM) from day 2 by nasogastric tube
  - Feed babies every 3 hours
  - Increase the feeds daily if there is no vomiting, apnoea or abdominal distension
- Progress to a cup / spoon as soon as the baby 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) may require 75ml / kg on day 1
- Extremely low birth weight babies(< 1kg) may require 100ml / kg on day 1 and 2 and may need to start oral feeds with ½ ml 2 hourly (p. **30**)

FOR BABIES > 1.5 KG AND THOSE THAT CAN TAKE ORAL FEEDS BUT CANNOT SUCK
- Feed 3 hourly according to suggested volumes in Table 4

FEEDING METHOD

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

Cup feed (p. 55)
- Babies who cannot breastfeed
- Cannot yet suckle but can swallow

Babies to be kept nil by 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 re-gained birth weight and then the weight on that day
- To calculate the drip rate: $\frac{\text{wt x volume / kg}}{24}$ = 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: $\frac{\text{wt x volume / kg}}{8}$ = ml / feed

Suggested feeds:
- EBM
- If no EBM or mother is HIV-positive and has decided not to breastfeed

  If < 1.5 kg – appropriate replacement for preterms

  If > 1.5 kg – appropriate replacement feeding (p. **56**)

TABLE 3: FLUIDS AND FEEDS FOR SICK AND VERY SMALL BABIES ON IV AND NASOGASTRIC OR CUP FEEDS

DAY 1	1		2		3		4		5+		7+	
Total fluid volume	60		75		100		125		150 (full feeds)		180 (max feed)	
	IVI	Oral	IVI	Oral	IVI	Oral	IVI	Oral	IVI	Oral	IVI	Oral
Total ml / kg IV	60	-	50	-	50	-	25	-	0	-	0	-
Total oral	-	0	-	25	-	50	-	100	-	150	-	180
< 1.2 kg	3	0	3	3	3	6	2	12	-	20	-	25
1.2 - < 1.5 kg	3	0	3	4	3	9	2	15	-	25	-	30
1.5 - < 1.75 kg	4	0	4	5	3	12	2	20	-	30	-	35
1.75 - < 2.5 kg	5	0	4	6	3	15	2	25	-	35	-	45
2.5 - < 3.5 kg	7	0	6	10	6	20	2	40	-	55	-	70
3.5 - < 4.5 kg	10	0	8	15	6	25	4	50	-	75	-	90

IV: ml / hour or drops / minute (60 drops / ml giving set) **Oral: ml / feed 3 hourly**

Use this as a guide to determine how much IVI 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

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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
1.5 - < 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

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 15 seconds, rinse under running water, air dry or use a clean disposable 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

Nursery procedures

- Encourage exclusive breastfeeding
- Each baby should remain in his / her own cot / incubator (only one baby per incubator)
- Ensure that each crib or incubator has it's own thermometer, stethoscope, alcohol hand lotion and swabs
- Avoid communal activities like bathing
- Perform all procedures in the cot / incubator
- Wear sterile gloves for contact with the mucous membranes or body fluids
- Always use a separate pair of gloves for each baby

Isolation and admission

- Isolation of infected babies is usually not needed if a policy of frequent hand washing is practiced. However babies with gastroenteritis should be nursed in a private room
- Outborn babies should be admitted in the nursery; they do not spread infection to the babies born in the hospital
- **Do not admit neonates to a paediatric ward**

Preventive care

- Administer prophylactic eye care after birth (chloramphenicol eye ointment)
- Apply alcohol (surgical spirits) to the umbilical stump every 6 hours
- Check the mother's RPR and if positive treat according to protocol (p.**45, 46**)
- Check the mother's HIV status and if positive treat according to protocol (p. **48**)
- Check the duration of rupture of membranes (> 18 hours) and treat according to protocol (p. **36**)
- Manage preterm infants born as the result of unexplained preterm labour according to the protocol (p. **31**)

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Cleaning equipment

- Wipe stethoscopes with alcohol swabs or D-germ (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 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 *Milton* or autoclave.

- Clean oxygen tubing, and respirator circuits with soap and water, soak in Hibiscrub (4% Chlorhexidine gluconate) for 30 minutes, rinse with clean water and then soak in 5ml Cydex (10% isopropyl alcohol) mixed with a bucket of water for another 30 minutes, then rinse with tap water. Using gloves, remove the tubing, drain water, hang on a IV stand and then blow dry with oxygen

Staff

- Avoid having too many people handling the baby
- Avoid overcrowding of the nursery and understaffing
- Staff should be patient allocated, not task allocated
- 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.
  - Short sleeves only

2.1.6 TRANSFER AND REFERRAL

The key to successful transport that will minimise 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 for which a baby should be referred is exhaustive, and the rule is:
IF IN DOUBT, DISCUSS WITH THE DOCTOR AT THE REFERRAL HOSPITAL

WHO SHOULD BE REFERRED?

- Birth weight 1000g-1500g who are unwell
- Respiratory distress with oxygen saturation > 40% on headbox oxygen
- Uncontrolled seizures
- Recurrent apnoea in > 1000g babies
- Hypoglycaemia not responding to treatment in 1 hour
- Jaundice: > 200 µmol / l on day 1
  400 µmol / l at any time
  > 300 µmol / l at any time, if weight < 2.5 kg
- 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
- 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, and small oxygen cylinder for transport, and a pulse oximeter.

TRANSFER OF BLUE BABY: CONGENITAL HEART DISEASE

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

2.2.1 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:

- Give an oral theophylline 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
- 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. **17 - 20**)
- Maintaining a thermo-neutral environment (p. **12 - 16**)
- Fluids (p. **22 - 24**)
- 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

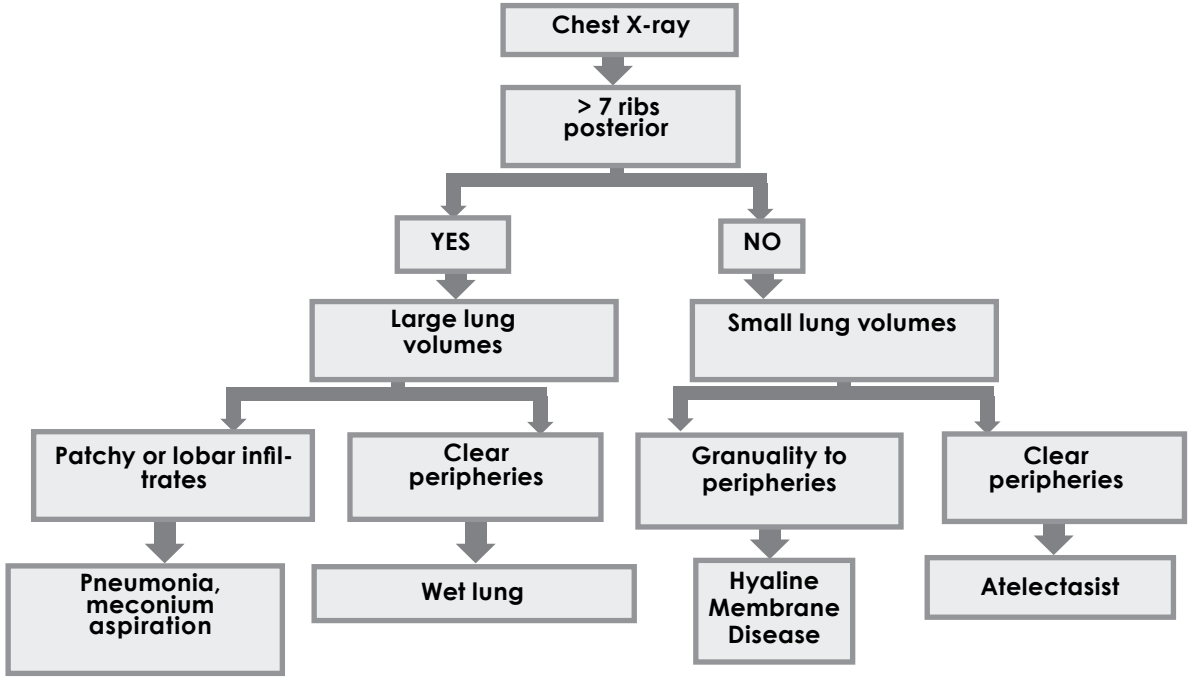

TABLE 5: SPECIFIC TREATMENT FOR RESPIRATORY DISTRESS

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. **17 - 20**) • Surfactant in first 12 hours under paediatric supervision • Penicillin and Gentamicin for 48 hours, then review CRP
• Born at or before term, often by C / S • Mild respiratory distress, resolves in 72 hrs • Overinflated chest clinically, CXR: hyperinflated lungs	**WET LUNG**	• Oxygen and supportive treatment • Penicillin and gentamicin for 48 hours, then review CRP
• Any gestational age • History of chorioamnionits • Develops respiratory distress after admission • CXR: areas of collapse and consolidatio	**PNEUMONIA**	• Oxygen and supportive treatment • Penicillin and gentamicin for 7–10 days • If the infection is hospital acquired or is not responding, consult paediatrician / referral hospital
• Term or post term • History of meconium stained liquor • CXR: hyperinflated, areas of consolidation	**MECONIUM ASPIRATION**	• Oxygen and supportive treatment • Penicillin and gentamicin for 48 hours, then review CRP
• If the baby has a murmur, or remains cyanosed with no or mild respiratory distress, suspect a cardiac problem	**CARDIAC**	• Refer to doctor 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 37 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	• Admit babies if they are not well
Warmth **(See p. 12 - 16)**	• Use a servo-controlled incubator if possible	• Standard incubator • Intermittent KMC when stable	• Incubator until stable • Once stable, do continuous KMC	• Continuous KMC
Investigations	• Ballard score	• Ballard score	• Ballard score	• Ballard score
Fluids and feeds **(See p. 22 - 24)**	• 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 • Then start 3 hourly nasogastric tube feeding	• 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 glucose for first 72 hours • Hourly oxygen saturation	• 3 hourly RR, HR, Temp, colour, activity • Intake and output • 3 hourly 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 • 3 hourly blood glucose for the first 24 hours • 1-3 hourly oxygen saturation for babies on oxygen	• 12 hourly RR, HR, Temperature, colour and activity • Intake and output

	All weights
Fluid / feed volume and method	• Follow fluid management guidelines on p. **22 - 24** for daily fluid volume increases • Progress to cup feeding • Progress to breastfeeding as soon as the baby can suckle
Apnoea prevention	• < 1.5 kg or < 35 weeks gestation: - Oral theophylline: Load with 5mg / kg then 2mg / kg / dose 12 hourly - Apnoea monitor for babies with a weight of < 1.5 kg • Stop when the baby weighs 1.8 kg or when baby is apnoea-free for 7 days
Oxygen therapy	• Babies with a respiratory rate > 80, severe chest indrawing, OR grunting, OR oxygen saturation less than 88%. • **Note: not all low birth weight babies will need oxygen**
Antibiotics	• Give antibiotics to the following groups of babies: - Babies from a potentially infected environment, e.g. born to mothers with prolonged rupture of membranes - Babies with obvious signs of infection - Babies < 37 weeks gestation where there is no obvious reason for the preterm labour - 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. **35** • Do a CRP after 48 hours and stop the antibiotics if the CRP is normal, and the baby is clinically normal
HIV exposed infants	See flow diagram on p. **48**
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

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	All weights
Measurement	• Measure the following and chart on the baby record: - Daily weight, assess the weight gain 2 times per week according to the chart on p. **52** - Weekly head circumference - Weekly haemoglobin
Discharge	• Discharge when the baby's weight is between 1.8–2 kg AND scores 20 on the KMC score sheet (p. **72**) • The baby to must continue with multivitamin and iron for 6 months. Write this on the Road to Health Chart (RTHC).
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 baby in 3-5 days • If the baby is gaining well, follow up every 2 weeks until the baby is 2.5 kg. Thereafter the baby can be followed up at the clinic • Babies with a birth weight < 1.5 kg or who have had a complicated course need a neuro-developmental evaluation at 4 and 9 months • Babies who are HIV exposed must have their HIV 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 RTHC

NEUROLOGICAL MATURITY

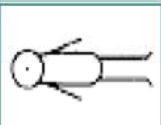
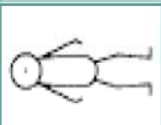
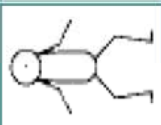
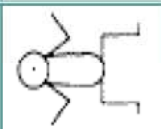
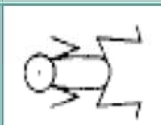
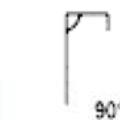
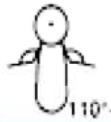
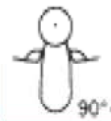
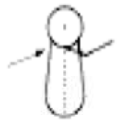
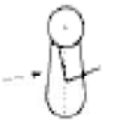
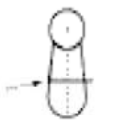
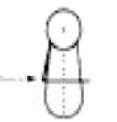
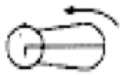
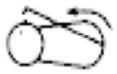
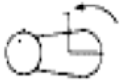
All 6 neurological features are assessed with the baby lying supine (the baby's back on the bed). The baby should be awake but not crying.

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.

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		

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.

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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.

PHYSICAL MATURITY

PHYSICAL MATURITY SIGN	SCORE							RECORD SCORE HERE
	-1	0	1	2	3	4	5	
SKIN	sticky, friable, transparent	gelatinous, red, translucent	smooth pink, visible veins	superficial peeling &/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 40-50 mm: -1 <40 mm: -2	>50 mm no crease	faint red marks	anterior transverse crease only	creases ant. 2/3	creases over entire sole		
BREAST	imperceptable	barely perceptable	flat areola no bud	stippled areola 1-2 mm bud	raised areola 3-4 mm bud	full areola 5-10 mm bud		
EYE / EAR	lids fused loosely: -1 tightly: -2	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 & 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

2.2.3 SERIOUS ACUTE INFECTION

- If the baby has suspected sepsis, do the following investigations CXR, FBC, CRP, LP, 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. **45, 46** for treatment
- If convulsions are present, give a loading dose of phenobarbitone 20-40 mg / kg IMI. Consider maintenance phenobarbitone 5mg / kg / day in 2 divided doses orally.

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 ampicillin OR cefotaxime 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	• Cefotaxime and ampicillin • Gram positive organism treat for 14 days • Gram negative organism treat for 21 days
• 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 - Air in bowel wall - Perforation	• Cefotaxime and ampicillin • Gram positive organism treat for 14 days • Gram negative organism treat for 21 days
• History of unhygienic treatment of the cord • Inability to suck • Increased tone • Convulsions	TETANUS	• Refer all cases to a level 3 hospital urgently • NOTIFY ALL CASES	• Admit to high care / ICU • Tetanus human immunoglobulin IM 500 iu • Benzyl penicillin for 10 days • Diazepam IV 0.25–1 mg / kg 4–8 hourly titrated according to the response • Phenobarbitone IV or IM, 5 – 10 mg / kg / 24 hours (p. **71**)

2.2.4 LOCAL INFECTION

Signs	CLASSIFICATION	Investigations	First line treatment
• Mild conjunctivitis: - Mild eye discharge • Severe conjunctivitis: - Exudative (pussy) discharge - Red conjunctivae - Oedema of the eyelid	**CONJUNCTIVITIS**	• If no response to topical treatment, do Gram stain and culture of the exudates. • Caused by: - N. gonorrhoeae - C. trachomatis - S. aureus (common cause) - E. coli • Can be prevented by the instillation of chloramphenicol eye ointment immediately after birth	**If mild:** • Clean with water, and apply chloramphenicol ointment 3 – 4 times per day • If no response, then treat as severe **If severe:** • Ceftriaxone IM one dose only PLUS • Erythromycin for 10 – 14 days • Irrigate the eye with clean water 1 – 2 hourly until the discharge is better • Chloramphenicol eye ointment 1 – 2 hourly
• Blisters containing pus in the skin • Blisters rupture leaving reddish dry skin Usually caused by S. aureus	**STAPHYLOCOCCAL SKIN INFECTION**	• If severe, do: - Blood culture - Gram stain and culture of the pus	• Wash skin with antiseptic soap 2 times per day • Few small blisters give flucloxacillin orally • Extensive and the baby is ill give cloxacillin IV for 7 – 10 days
• Pussy discharge from cord • Redness and swelling of skin around umbilicus	**OMPHALITIS**	• If no response to IV treatment: - Blood culture - Gram stain and culture of pus swab	• Clean the base of the cord with spirits 3 – 4 times per day • Benzyl penicillin and Gentamicin for 5 – 7 days
Suspect when • PROM > 18 hours • Offensive smell at birth • Unexplained LBW baby Most of the colonised babies will be clinically well and only need observation for 24 hours. Some will develop signs of infection soon after birth.	**MATERNAL CHORIOAMNIONITIS**	• CRP at 48 hours	• If clinical signs of infection, or • If low birth weight: - treat with Benzyl penicillin and Gentamicin for 5 days, unless the CRP is normal • If not low birth weight and the baby is well, breastfeed and observe for 48 hours • Explain to the mother the signs of sepsis before discharge

2.2.5 NEONATAL ENCEPHALOPATHY

If a term baby is less than 3 days old, and cannot suck, and has a history of prolonged labour or an Apgar score < 7, treat for neonatal encephalopathy (NE)

Classify	Course	Management
Mild • 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 As above, plus: • Lethargy • Feeding difficulty • Occasional apnoea / convulsions	It resolves within one week,but long-term neurodevelopmental problems are possible	*Observations* 3 hourly RR, HR, Temperature, colour and activity Daily HIE score (p. **38**) *Temperature* • Do not overheat the baby • Cool the baby with a fan or ice pack to the head, to keep the axillary temperature around 34°C *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 60 ml / kg to 80 ml / kg to 100 ml / kg to 120 ml / kg • If the baby is unable to suck, give the feeds by nasogastric tube • When the baby is able to suck, start breastfeeding *Convulsions* • Give phenobarbitone 20 mg / kg slowly IV or IM • If the convulsions continue, give another dose of phenobarbitone 10 mg / kg IV slowly over 5 minutes, or IM • If they continue, load with phenytoin • If the convulsions are controlled, try to stop the phenobarbitone • If the baby is able to suck, allow breastfeeding. If the baby cannot breastfeed, feed via a gastric tube. **Encourage the mother to hold and cuddle her baby**
Severe • Floppy / unconscious • Unable to feed • Convulsions common • Severe apnoea common	The baby may or may not improve over several weeks. If these babies survive, permanent brain damage is common (cerebral palsy, mental handicap)	

Ongoing care for babies with asphyxia

- If the baby's condition does not improve after 3 days: Reassess for signs of serious infection or severe disease (p. **7, 35**)
- If the baby's condition does not improve after 1 week: If no sepsis, and no other hospital management is needed, discharge.
  The baby can be discharged on phenobarbitone if necessary. The mother will need advice on feeding.
- 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.

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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)

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 / 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															

< 10 mild HIE	11 - 14 moderate HIE	> 15 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 which remains high beyond 1 week is associated with a high risk of abnormal neurological development.

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

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) • Coombs' test, if possible	• Start phototherapy immediately • Check TSB 6 hourly
• Mother's blood group O or Rh negative	• Check TSB at 6 hours of age • Coombs' test, if TSB rising > 8.5 µmol / L / hr	• If TSB > 80 µmol / l, start phototherapy • If Coombs' test positive, give IV gammaglobulin 500mg over 1 hour
• Prolonged jaundice (> 14 days)	• Do conjugated and unconjugated bilirubin levels	• Consult paediatrician for further management
Common • Jaundice after day 1	• Do TSB if the baby looks yellow	• Start phototherapy if TSB above line on the graph (p.**41**)
• Preterm baby	• Daily TSB until day 5, or TSB is going down	• Start phototherapy if TSB above line on the graph (p.**41**) • Stop phototherapy if the TSB is below the phototherapy line on the graph (p.**41**) by at least 50 µmol / l

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PHOTOTHERAPY

Start phototherapy while waiting for the TSB result

- If the TSB is above the line on the graph (p.**41**), start phototherapy.
- Check the level for exchange transfusion on the second graph (p.**41**). 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 (p.**41**), 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
- 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 (p.**41**)

- 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.

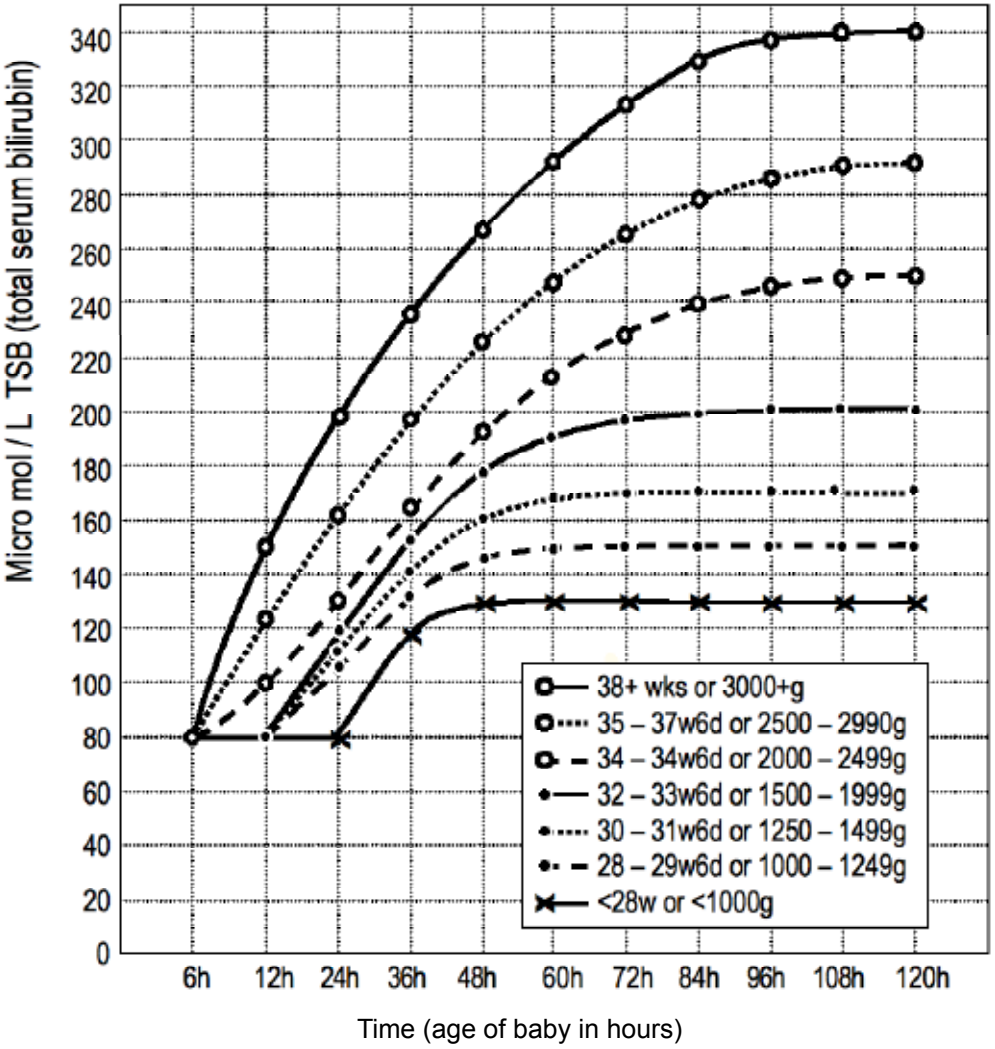
- Bilichecks can be used to screen for jaundice. However if the level is > 200 µmol / l, take blood for a TSB and start phototherapy.

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



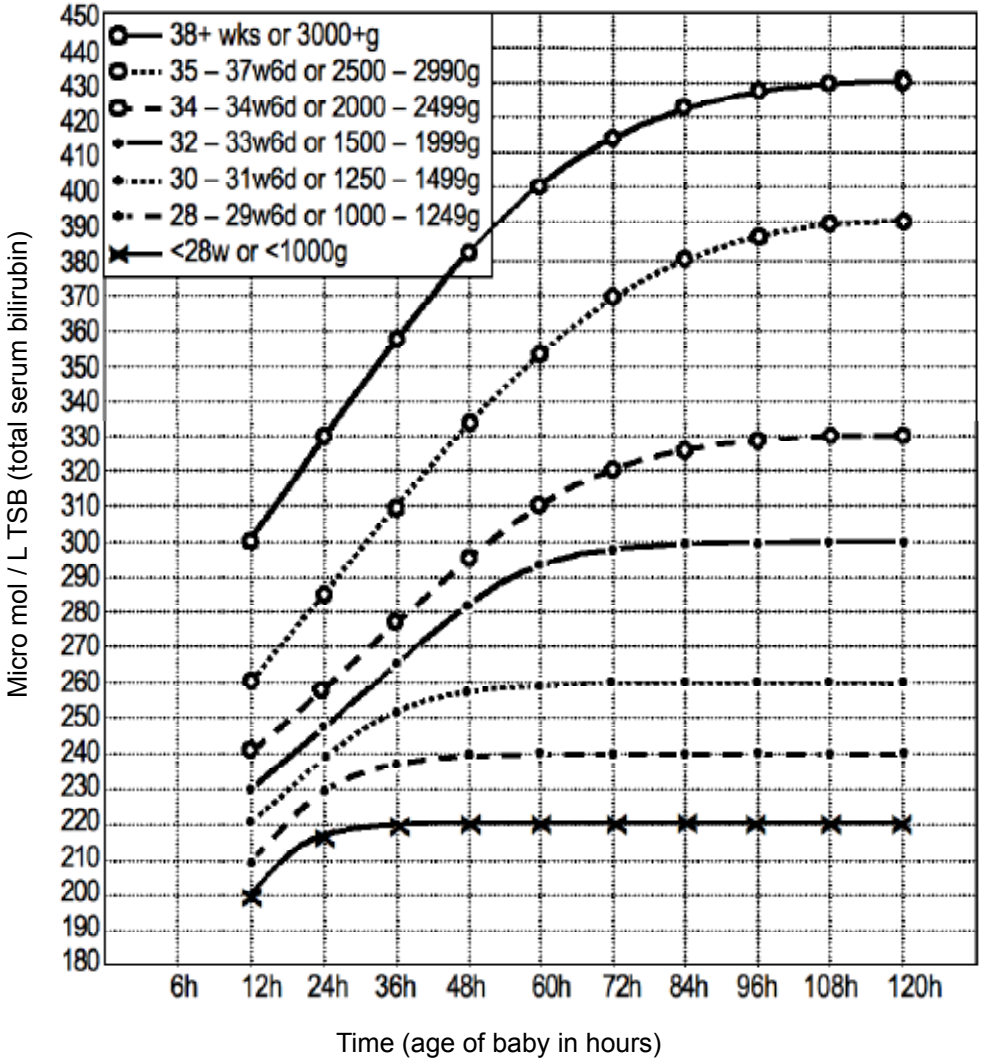
Reference 2

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 gauze soaked in saline to prevent damage, leakage and infection. • 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) • Counsel the mother • Refer and follow up at a special clinic that will monitor development, provide therapy and bladder and bowel care • The mother must be advised to plan her next pregnancy and to take folic acid before she becomes pregnant. Give her a letter to take to the clinic when she is planning her next pregnancy
• 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.**22**) • Cover the defect with sterile gauze soaked in saline and ensure that the gauze is moist at all times • Ensure warmth • Refer to a tertiary paediatric surgical centre

FEATURES	CLASSIFICATION	MANAGEMENT
• 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.
• 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 infections, a structural abnormality of the brain or could 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 Talipes Equinovarus. 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 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 assessment • Counsel the mother • Assist with feeding; breastfeeding is possible • Refer early to a cleft lip clinic / maxillofacial clinic at a tertiary dental hospital; they will initially make a plate to aid feeding and then repair the lip at around 3 months and the palate at around 9 months

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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 nerve palsy is likely. Allow 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, or for Quantitative Fluorescent (QF) PCR for Aneuploidy, if there are features of Trisomy 13, 18 or 21
• 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. • Consult neonatal textbooks, discuss with a paediatrician or genetic nurse

2.2.8 SYPHILIS

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

At risk	Observe	Treatment	
Mother's RPR • +ve, titre > 1:4 • Untreated • Treated < 1 month before delivery • Unknown	• Hepato-splenomegaly • Petechiae • Pallor • Low birth weight • Jaundice • Respiratory distress • Blisters on hands and feet • Osteitis • Large, pale placenta • Sometimes no symptoms or signs	If signs of 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
		If asymptomatic baby *AND* • If the mother is RPR positive, and • fully treated at least one month before delivery	• No treatment
		If asymptomatic baby *AND* • If the mother is RPR positive and NOT treated, OR • treated < 1 month before delivery	• Benzathine Penicillin 50 000 units / kg IM - one dose only
		If asymptomatic baby *AND* • Unknown maternal RPR	• Benzathine Penicillin 50 000 units / kg IM - one dose only

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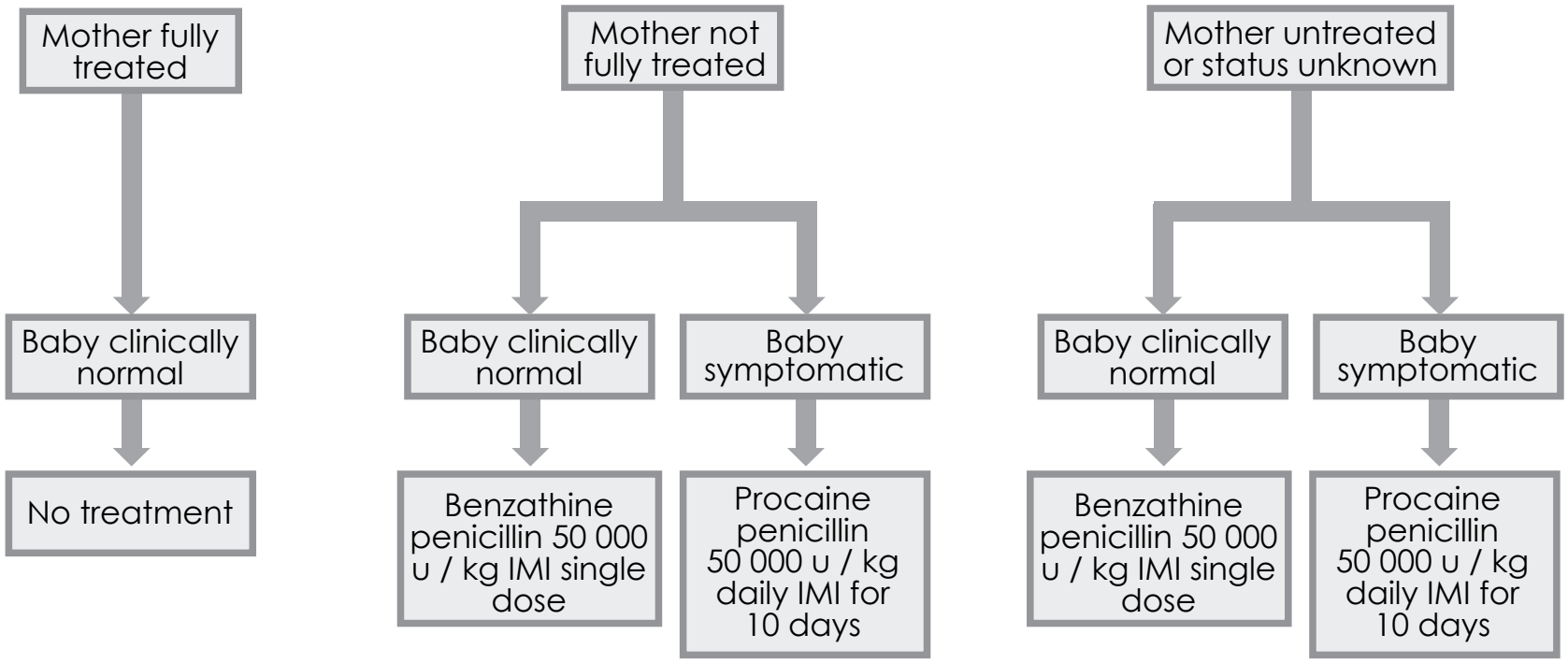
Ensure that the mother's RPR is known and, if positive, that she and partner are fully treated.

Management of the baby of a mother who has positive or unknown syphilis serology



Mother not fully treated: Mother treated less than 1 month before delivery, and / or she has not completed a full course of treatment
Baby symptomatic: Baby shows clinical evidence of syphilis

2.2.9 TUBERCULOSIS

All mothers should have been offered VCT during antenatal care and this should be repeated 6 weeks later if it was negative.

At risk	Treatment
• If the mother has been on tuberculosis treatment for less than 2 months **Or, if the mother has been on treatment for more than 2 months and if:** • Sputum positive mother, OR • Mother with primary infection, OR • HIV-positive mother	• The baby should receive three drug treatment for 6 months (Table 7) • Give BCG on completion of treatment
• If the mother has had more than 2 months treatment	• Baby should get INH for 6 months (IPT). See drug doses (Table 6) • Give BCG on completion of treatment

TABLE 6: Dosing for Isoniazid Preventive Therapy (IPT) in infants

Body Weight (kg)	Daily Isoniazid (INH) (100mg tablet)
2 – 3.4	1 / 4
3.5 – 6.9	1 / 2
7 – 9.9	1
10 – 14.9	1+1 / 4

TABLE 7: Dosing for full drug treatment in infants of TB untreated mothers

Body Weight (kg)	RHZ dissolvable tablets (60 / 30 / 150mg)	RH dissolvable tablets (60 / 30mg)
2 – 2.9	0.5	0.5
3 –5.9	1	1
6 – 8.9	1.5	1.5
9 – 11.9	2	2
12 – 14.9	2.5	2.5

2.2.10 HIV AFFECTED MOTHERS AND BABIES

All mothers should be counselled and tested for HIV at the first antenatal visit. If the mother is HIV negative, a repeat test is offered 6 weeks later.

Determine the mother's HIV status

Ask the mother:

- if she knows her HIV status
- *If she is HIV positive,* what treatment she has received and when it commenced
- If she is HIV positive and not on HAART
  - Determine her CD4 count and WHO stage
- *If she is HIV negative,* when last she had an HIV test
- If she has not been tested, counsel her on HIV testing

Follow up mother

- If she is on HAART, continue HAART especially if breastfeeding, refer back to ARV site, and counsel on adherence
- If she is not on HAART, ensure she completes the treatment for PMTCT, and ensure she has a recent CD4 count and WHO stage done. If her CD4 count is < 350mm^3, refer her for HAART
- If HIV negative, counsel on safe sex, and use of a condom, especially while breastfeeding

Treat the baby

- Give all HIV exposed babies post-exposure prophylaxis with ARV therapy according to the current national PMTCT guideline
- Check the treatment required and the duration of treatment
- Ensure that the baby has an adequate supply of treatment and document this on the Road To Health Chart
- Counsel on adherence
- Post-exposure prophylaxis may extend through the duration of breastfeeding if the mother is not on HAART

The national PMTCT guideline may change from time to time and you need to be aware of the latest guidelines

Test the baby

- If the baby is well, ensure s/he has an appointment for an HIV DNA PCR test at 6 weeks of age
- If the baby has features of HIV infection (serious acute infection, severe local infection, oral thrush, poor growth, inadequate weight gain) before 6 weeks then do an HIV DNA PCR test before 6 weeks
  - If PCR test is positive, counsel mother and prepare to start ARV treatment according to latest national protocol (consult a paediatrician on treatment for neonates)
  - If PCR test is negative, repeat HIV DNA PCR test at 6 weeks

Infant feeding and HIV

- Determine how the mother has decided to feed her baby
- If she is not sure how to feed her baby, counsel her on safe feeding, and help her choose the option that is best for her
- Support the mother's feeding choice, either exclusive breastfeeding or exclusive replacement feeding
- If she chooses replacement feeding, ensure that she knows how to prepare and store feeds (p.**56**)
- If she is breastfeeding, assess breastfeeding before discharge and ensure baby is well attached and positioned during feeding (p.**55**)
- If she is breastfeeding, determine if mother or baby require HAART according to the national protocol.

Follow up baby

- Follow up at 4-6 weeks
  - Do a HIV DNA PCR test on baby
  - Commence co-trimoxazole prophylaxis
  - Infant feeding support and routine child health
- Follow up 2 weeks later for PCR test result
  - If PCR test is positive
    - Refer immediately to paediatric ARV site
    - Continue co-trimoxazole prophylaxis and breast feeding
  - If PCR test is negative
    - Offer infant feeding support
    - If breastfeeding, ensure mom or baby is on ARV treatment according to national protocol
    - If breastfeeding, repeat PCR test 6 weeks after cessation of breastfeeding

3. ASSESS FEEDING AND COUNSEL

3.1. Assess feeding in the breastfed baby 50

3.2. Assess feeding in the baby receiving replacement milk 51

3.3. Assess feeding and weight gain in low birth weight babies 52

3.4. Counselling principles 54

3.5. Counsel on feeding 55

3.6. Counsel on replacement feeding 56

3.7. When to return 58

3.1 ASSESS FEEDING IN BREASTFED BABY

Assess feeding in a baby who does not need emergency, urgent or immediate care. In these children wait until the baby is ready to feed until you assess feeding. Assess feeding on all babies before discharge and on follow up visits.

- Use this chart to assess feeding on all babies who are breastfeeding.
- Use the alternate feeding chart to assess the feeding if the mother has decided on replacement feeding (p. **51**)
- Use the charts on p. **52, 53** to evaluate weight gain in low birth weight babies.

ASK, CHECK, RECORD	LOOK, LISTEN, FEEL	SIGNS	CLASSIFY	ACT NOW
Assess breastfeeding How is breastfeeding going? How many times in 24 hours do you breastfeed? Does your baby get any other food or drink? Has the baby fed in the last hour? **Assess weight gain**	**Assess for possible feeding problem** • Is baby able to attach? o Not at all o Poor attachment o Good attachment • To check attachment look for: o Chin touching breast o Mouth wide open o Lower lip turned outward o More areola visible above than below the mouth • Check positioning • Is the baby sucking well? o Not at all o Not sucking well o Sucking well • Clear a blocked nose if it interferes with breastfeeding • Look for thrush and mouth ulcers **Assess all babies for growth** • Has the baby gained weight according to expectations?	• Not able to feed. OR • No attachment at all, OR • Not sucking at all	**NOT ABLE TO FEED**	• Treat for serious acute infection or severe disease • If the baby < 3 days old and no risk factors for sepsis, treat for encephalopathy
		• Not well attached to the breast, OR • Not suckling effectively, OR • Feeding < 8 times in 24 hours, OR • Baby receiving other foods or fluids, e.g. formula milk or water as well as breast milk	**FEEDING PROBLEM**	• Teach the correct positioning • Assess the mother for breast problems • Counsel the mother to breastfeed on demand and at least 8 times in 24 hours • Counsel the mother to exclusively breastfeed
		• Poor weight gain	**POOR GROWTH**	• Encourage exclusive breastfeeding on demand • Exclude sepsis
		• Good weight gain	**GROWING WELL**	• Encourage the mother to continue exclusive breastfeeding

3.2 ASSESS FEEDING IN THE BABY RECEIVING REPLACEMENT MILK

Use this chart to assess feeding if the mother has decided on replacement feeding

ASK, CHECK RECORD	LOOK, LISTEN, FEEL	SIGNS	CLASSIFY	ACT NOW
Assess replacement feeding How is feeding going? What milk are you giving? How many times during the day and night do you feed the baby? How are you preparing the milk? Let the mother demonstrate or explain how a feed is prepared. Are you giving any breast milk at all? How is the milk being given? Cup? Bottle? How are the bottle / utensils washed and cleaned? **Assess weight gain**	**Assess for a possible feeding problem** • Look for thrush / mouth ulcers • Clear a blocked nose if it interferes with feeding **Assess all babies for growth** • Has the baby gained weight according to expectations?	• Not able to suck / feed	**NOT ABLE TO FEED**	• Treat for serious acute infection or severe disease • If the baby < 3 days old and no risk factors for sepsis, treat for asphyxia
		• Milk incorrectly or unhygienically prepared or • Giving inappropriate replacement milk or other foods / fluids or • Giving insufficient amounts of milk or • Mixing breast milk and replacement milk or • Thrush	**FEEDING PROBLEM**	• Counsel the mother appropriately (p. **56, 57**)
		• Poor weight gain	**POOR GROWTH**	• Check the feeding volumes • Check that the feed is being correctly prepared • Check if the mother is doing KMC (p.**14**) and assess feeding and weight gain in LBW babies (p. **52, 53**)
		• Good weight gain	**GROWING WELL**	• Encourage the mother to continue feeding

3.3 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. **55**) or replacement feeding (p. **56, 57**) in low birth weight 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 less than 10 days old, 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?	*Calculation % Weight Loss:* $\frac{\text{Birth weight}}{10}$ = 10% birthweight	• 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 = 10 g / kg / day,
  Term = 20 g / kg / day

If **INADEQUATE WEIGHT GAIN**, determine 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 temperature? Is a small baby in an incubator adequately dressed? (woollen cap, booties, plastic wrap) If in KMC, is this continuous?	**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, other rare causes
		• Inadequate feed volume for weight and age	**INSUFFICIENT FEEDS**	• Correct feed volume • Increase feeds by 20 ml / kg / day until 180 ml / kg / day of feeds (p. **22, 23**)
		• Baby < 1.8 kg is not getting continuous KMC • Baby < 1.5 kg is not adequately heated	**INADEQUATE TEMPERATURE CONTROL**	• Correct thermoneutral environment (p. **14 - 16**)
		• Preterm baby < 1.5 kg is suckling from breast • Baby < 1.5 kg is cup fed	**INCORRECT FEEDING METHOD**	• Correct feeding (p. **22, 23**)
		• No problems identified	**NO OBVIOUS CAUSE FOUND**	• Consider rarer causes • Consult a paediatrician at the referral hospital for advice

3.4 COUNSELLING PRINCIPLES

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.

3.5 FEEDING METHODS: CORRECT POSITIONING AND ATTACHMENT AND CUP FEEDING

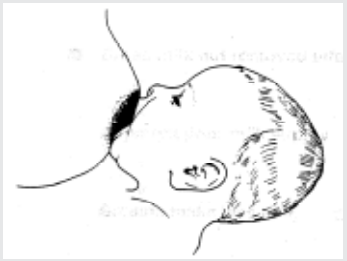
Teach the Correct Positioning and Attachment for Breastfeeding
Seat the mother comfortably

Show the mother how to hold her infant:
- with the infant's head and body straight
- facing her breast, with the infant's nose opposite her nipple
- with the infant's body close to her body
- supporting the infant's whole body, not just the neck and shoulders.

Show her how to help the infant attach.
- she should touch her infant's lips with her nipple.
- wait until her infant's mouth is opening wide.
- move her infant quickly onto her breast, aiming the infant's lower lip well below the nipple.

Look for signs of good attachment and effective suckling. If the attachment or suckling is not good, try again.
A baby suckles by pushing the nipple against his palate with his tongue.

Good attachment
Signs of good attachment:
- More areola above baby's mouth
- Mouth wide open
- Lower lip turned outwards
- Chin touching breast
- Slow, deep sucks and swallowing sounds



Poor attachment
Signs of poor attachment:
- Baby sucking on the nipple, not the areola
- Rapid shallow sucks
- Smacking or clicking sounds
- Cheeks drawn in
- Chin not touching breast

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

3.6 REPLACEMENT FEEDING

Safe preparation of formula milk

1. Wash your hands with soap and water before preparing a feed.

2. Boil the water. If you are boiling the water in a pan, it must boil for three minutes. Put the pot's lid on while the water cools down.

The water must still be hot when you mix the feed to kill germs that might be in the powder.

3. Carefully pour the amount of water that will be needed in the marked cup. Check if the water level is correct before adding the powder.

4. Only use the scoop that was supplied with the formula. Fill the scoop loosely with powder and level it off with a sterilised knife or the scraper that was supplied with the formula.

Make sure you add 1 scoop of powder for every 25 ml of water.

Mix in a cup and stir with a spoon.
Cool the feed to body temperature by leaving it to cool or placing it in a container of cool water.

Pour the mixed formula into a cup to feed the baby.

Only make enough formula for one feed at a time.

5. Feed the baby using a cup.

6. Wash the utensils.

- Exclusive breastfeeding is the preferred method of feeding, unless AFASS criteria are met
- If replacement feeding is Accessible, Feasible, Affordable, Sustainable and Safe (AFASS), then use replacement feed exclusively (i.e. no breast milk at all)

- Food and fluids other than milk are not necessary
- Prepare the correct strength and amount just before use. (correct numbers of scoops of powder for the volume of water)
- Use the milk within an hour and discard any that is left over (a fridge can store formula for 24 hours)
- Cup feeding is safer than bottle feeding
- Clean the cup and utensils with soap and water
- If using a bottle, also boil it for 5 minutes or sterilise it after each use

Table 9: Amount of replacement feed to be given 6 to 8 times per day						
Age in months	Weight in kilos	Approx. amount of replacement feed in 24 hours	Previously boiled water per feed	Number of scoops per feed	Approx. number of feeds	Number of tins of formula
Birth	3	400 ml	50	2	8 x 50 ml	2
2 weeks	3	400 ml	50	2	8 x 50 ml	4
6 weeks	4	600 ml	75	3	7 x 75 ml	6
10 weeks	5	750 ml	125	5	6 x 125 ml	8
14 weeks	6.5	900 ml	150	6	6 x 150 ml	8
4 months	7	1050 ml	175	7	6 x 175 ml	8
5 months	8	1200 ml	200	8	6 x 200 ml	8

NB: 1 scoop of milk powder is used in 25 ml boiled water.

3.7 WHEN TO RETURN

When to return immediately	Where	When	What For
• Breastfeeding poorly or drinking poorly • Convulsions • Fever • Bleeding • Diarrhoea	**Return to the hospital**	**Immediately**	Assessment, treatment and care
• Pus draining from the eyes • Skin pustules • Cord stump red or draining pus • Yellow skin or eyes (jaundice)	**Return to the PHC clinic**	**Immediately**	Assessment, treatment and care

When to return for follow up			
• All babies	• PHC Clinic	• 3 days of age • 6 weeks and normal routine	• Weight gain • Jaundice assessment • Feeding assessment • Immunisation
• HIV exposed babies	• PHC Clinic, OR • PMTCT follow up clinic	• 6 weeks and monthly for first year	• PCR • Cotrimoxazole • Routine care • Immunisation
• Babies who weighed < 2 kg at birth	• Neonatal follow-up	• 3 days after discharge then weekly until 2.5 kg • 6 weeks	• Weight gain • Feeding assessment • Immunisation
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	• Weight gain • Feeding assessment • Developmental assess-ment

4. FOLLOW-UP

4.1. Neonatal follow up **60**

4.2. Development chart (0-12 months) **61**

4.1 NEONATAL FOLLOW UP

Visit	Assess	Treat, Counsel, Follow up
3 days after discharge	• Assess and classify weight gain (p. **52, 53**) • 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. **52, 53**) • 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. **58**) • Follow up at 18 weeks corrected age and 9 months for developmental screen
6 weeks HIV exposed	• Assess growth and feeding • Do PCR	• Counsel on feeding • Get PCR result in 2 weeks. If +ve, do a CD4 count and follow up at the paediatric HIV clinic • PCR –ve: routine follow up at clinic • PCR –ve, and breastfeeding, repeat PCR 6 weeks before stopping and 6 weeks after stopping breastfeeding. • Repeat HIV antibody test at 18 months
18 weeks corrected age	• Assess growth and feeding • Measure and record head circumference • Assess development (p. **61**)	• According to problems identified • If delayed motor development, start physiotherapy
9 months	• Assess growth and feeding • Measure and record head circumference • Assess development (p. **61**)	• According to problems identified • If delayed motor development, start physiotherapy • If delayed speech development, assess hearing

4.2 DEVELOPMENT CHART (0 – 12 MONTHS)

Months	Gross-motor	Fine-motor-adaptive	Communication	Personal-social
12	Walks alone (10 steps) Walks with one hand held	Retains 3 cubes Simple formboard (one circle in) Replaces pegman	Jabbers with expression Where's daddy - looks at father	Holds a spoon
11	Stands at furniture - lifts one foot at a time Cruises around furniture Creeps like a bear	Holds car and explores with index finger Thumb index finger opposition	Imitates one or two words 2-3 words with meaning (in-clude mama, dada)	Finger feeds
10	Sitting, can recover toy behind him	Throws objects Clicks two cubes together	One word with meaning Shakes head for no Object permanence, find cube under cover	Deliberate casting Pushes arm into sleeve Pulls off hat
9	Crawls Pulls up to stand	Removes pegman from car Exploratory mouthing	Says mama, dada Babbles tunefully Waves bye bye	Stranger anxiety Holds and eats a biscuit
8	Sits alone for 1 minute Prone - pivots in a circle using arm	Retains one cube in each hand Grasps ring by the string	Combines syllables e.g. ba-ba, ma-ma	Plays peek-a-boo
7	Sits alone for 1 minute	Retains 1 cube in hand at a time	Shouts for attention Responds when called	Drinks from a cup
6	Prone - extended arm support rolls from supine to prone	Shakes, waves and bangs ob-jects Grasps ring, mouth and transfer	Makes m sound Object permanence - looks after dropped object	Smiles, pats mirror image Chews solids
5	Rolls from prone to supine	Grasps ring Crumples paper	Combines sounds e.g. ag-hoo	Holds cup
4	Pulls to sit - no headlag	4 part sequence, reach, grasp, retrieve, mouth	Giggles and laughs Initiates vocalisation	Friendly towards strangers
3	Prone - elbow support Supine - symmetrical lie	Follows through 180 Fingers one hand with other when lying quietly	Coos, chuckles and squeals	Obvious pleasure at being handled
2	supported sitting - head vertical	Follows past the midline Hand to mouth as voluntary act	Vowel sounds	Enjoys a bath Smiles at mother
1	Lifts head when prone	Follows to midline	Cries when hungry Throaty sounds Startles to sound	Sucks well Watches mother when feeding

5. ROUTINE CARE FOR ALL NEWBORNS, CHARTS, RECORDING FORMS AND REFERENCES

5.1 Routine care in labour ward 63

5.2 Resuscitation 65

5.3 Routine care in postnatal ward 67

5.4 Drug doses 69

5.5 KMC chart 72

5.6 Recording form 73

5.7 Growth and Head Circumference chart 74

5.8 Daily Weight, Feeding and Treatment Chart 75

5.9 List of abbreviations 76

5.10 References 77

ASK, CHECK, RECORD	LOOK, LISTEN, FEEL	TREAT, OBSERVE, CARE
Immediately after birth • Check if the baby needs resuscitation? • Check and record the Apgar score	**Is the baby breathing?** **Is the heart rate > 100?** **Is the baby centrally pink?**	• Dry the baby with a warm towel • If NO to any question, resuscitate immediately p. **65, 66** • If there are excess secretions, turn the infant onto the side. Avoid suctioning • Clamp the cord after the first few cries. • Replace the forceps with a disposable clamp or sterile cord tie 3 - 4 cm from the abdomen • Admit to the neonatal unit if the baby required resuscitation or if the Apgar score at 5 min is 7 or less • If in theatre, and the baby is normal, place the baby in a warm incubator in the theatre (no blankets or clothes), and then take the baby to the postnatal ward with the mother.
Check risk factors • Membranes ruptured for more than 18 hours • Mother diabetic	• Smelly liquor or baby	• Admit to the neonatal unit for observation
• Mother HIV positive		• Check the feeding choice

Apgar Score	0	1	2
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 re-sponse	Grimace	Vigorous cry
Colour	Blue or pale	Body pink, limbs blue	Pink all over

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ASK, CHECK, RECORD	LOOK, LISTEN, FEEL	TREAT, OBSERVE, CARE
Check baby from head to toe and over • Check the weight • Check the head circumference	• Central cyanosis • Grunting • Fast breathing • Chest indrawing • Floppy • Less than normal movements • Major congenital abnormality	Admit to the neonatal unit if • Weight > 4 kg • Weight < 2 kg • Head circumference < 3rd centile or > 97th centile • Any of the signs are positive
Check Vitamin K and Eye prophylaxis		• Administer **1mg of Vitamin K** IM in the anterolateral aspect of the mid thigh • Administer **chloramphenicol** eye ointment into both eyes
Initiate bonding and feeding		• Place the baby on the mother's chest • Initiate breastfeeding
Identify and record, and transfer	• Formally identify the baby with the mother • Place a label with the mothers name and folder number, infant's sex, time and date of birth on the infants wrist and ankle	• Transfer to the postnatal ward with the mother unless there is a reason for the baby to be admitted to the neonatal unit

5.2 RESUSCITATION OF THE NEWBORN

Questions to ask at birth
1) Is the baby breathing adequately?
2) Is the baby's heart rate above 100 beats per minute?
3) Is the baby centrally pink?

If "YES" to all 3 the baby does not need resuscitation.

ASSESS THE BREATHING, COLOUR AND HEART RATE every 30 seconds during the resuscitation. If the baby is improving then the intervention can be stopped. If the baby is not responding or getting worse then further intervention is needed. Almost all babies who do not breathe at birth will only require bag and mask resuscitation.

ANTICIPATE: *Always* be ready to resuscitate every baby who is born.

A. AIRWAY
- Suction the mouth and pharynx at the delivery of the head
- Warm, position, clear airway, dry and stimulate
- **ASSESS BREATHING, COLOUR AND HEART RATE**
- If blue but breathing, and HR > 100, administer oxygen

B. BREATHE
If blue, HR < 100, or apnoeic:
- Ventilate with bag and mask: Squeeze bag firmly at a rate of 40 – 60 breaths (Counting "bag, 2, 3" will achieve the correct rate.)
- Most babies will be successfully resuscitated by bag and mask only.
- Repeat ventilations for 30 seconds
- **ASSESS BREATHING, COLOUR AND HEART RATE**

C. CHEST COMPRESSIONS
If heart rate < 60 per minute:
- Begin chest compressions using the hand encircling technique if two people are available. Otherwise, use the two finger technique. Give the compressions at the lower third of the baby's sternum and compress to 1/3 the depth of the baby's chest.
- Give 3 compressions followed by one breath in a 2 second cycle. (Counting 1, 2, 3, bag will achieve the correct rate)
- Repeat compressions for 30 seconds then reassess
- **ASSESS BREATHING, COLOUR AND HEART RATE**
- If HR is still < 60 intubate and give drugs

D. DRUGS
- Give adrenaline (0.01 mg / kg (IV / via endotracheal tube) every 3-5 minutes as required)
- Administer naloxone 0.1 mg / kg (IM / Subcutaneously / via endotracheal tube) only if mother received pethidine or morphine within 4 hours of delivery

Refer to Reference 7.

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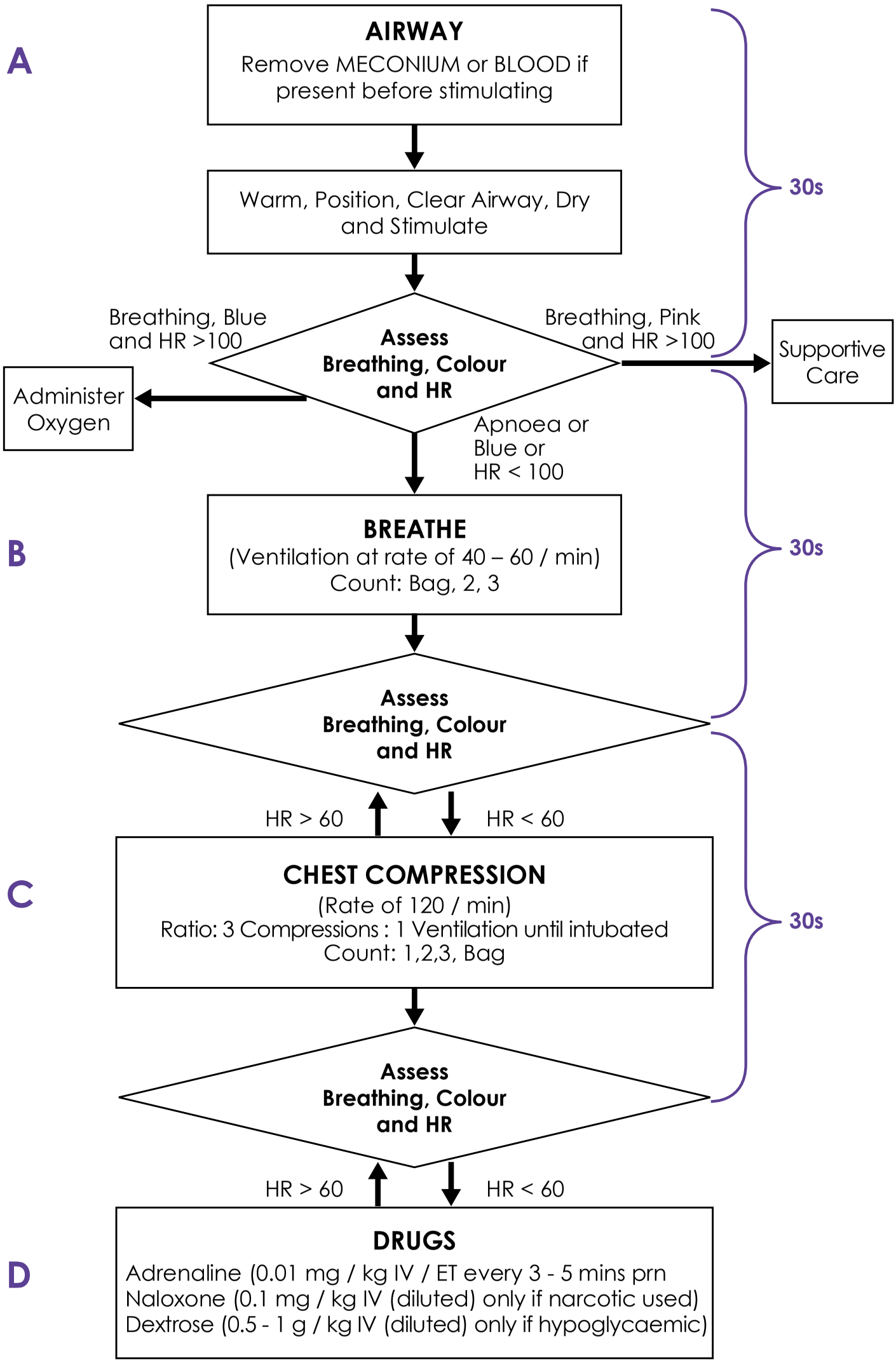

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5.3 ROUTINE CARE:
POSTNATAL WARD IN HOSPITAL OR CLINIC

ASK, CHECK, RECORD	LOOK, LISTEN, FEEL	TREAT, OBSERVE, CARE
Identify and care in ward • Referring nurse, receiving nurse and mother identify the baby every time that the baby moves to another area in the hospital	• Keep the baby with the mother at all times • Weigh normal babies daily if still in hospital. Record the weight at discharge	• Allow demand feeding • Chart the intake and output • Observe 12 hourly temperature, respiratory rate, heart rate, colour and activity • Apply surgical spirits to the cord every 6 hours • Do not bath the baby. Instead, wipe the baby's face, neck and ears, bottom and genitals and dry ("top and tail"). Remove blood and meconium but NOT vernix
Mother is **RPR positive**	• Examine baby for signs of congenital syphilis	• Treat the mother and baby. Refer to p. **45, 46**
Mother's **RPR status is unknown**	• Take blood for RPR from the mother	• Treat the mother and baby. Refer to p. **45, 46** • Do not discharge until the result is back or the baby has received prophylaxis
Mother has had **TB in the last 6 months**	• Examine babies for signs of respiratory distress	• Treat according to the protocol on p. **47**
Mother is **HIV positive**		• Manage according to the protocol on p. **48** and ensure that the HIV exposure, the ARV treatment prescribed, and the feeding choice are documented on the RTHC.
Mother's **HIV status is unknown**	• Counsel and test for HIV	• According to the protocol on p. **48**
Mother's **blood group is O or Rh Neg**	• Check TSB or bilicheck or at 6 hours	• Start or refer for phototherapy if the TSB is greater than 80 µmol / l

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ASK, CHECK, RECORD	LOOK, LISTEN, FEEL	TREAT, OBSERVE, CARE
Mother's **blood group is unknown**	• Check the mother's blood group • Check the baby's bilirubin at 6 hours of age	• If the mother's blood group is Rh negative or O, check the TSB of baby and manage according to the bilirubin graph on p. **41**
Check: Abnormalities or illness • Does the mother have any concerns? • Has the baby passed meconium yet?	• Examine the baby in the presence of the mother. • Use the examination chart in the maternity record	• Document the findings in the examination page of the infant record.
Check: Jaundice daily	• Look for jaundice or assess with a bilicheck	• Treat according to the graph on p. **41**
Check: Feeding	• Assess breastfeeding or replacement feeding if an HIV positive mother has chosen replacement feeding	• If the baby is not feeding well, check positioning and attachment according to the chart on p. **55** • Counsel the mother on replacement feeding if relevant (p. **56**)
Check: Routine preventive care		• Give polio drops and BCG within 5 days of birth and BEFORE discharge. • Give Vitamin K and eye prophylaxis if not given at birth, e.g. BBA
Check: Discharge and plan follow up • Check that all the risk factors are managed, and that all preventive treatment is given	• Check that the baby is feeding well and is active and well	• Record all the information on the RTHC • Give the mother an appointment to go to the clinic at 3 days of age and 6 weeks

5.4 DRUG DOSAGES

- Determine appropriate drugs and dosages for baby's weight
- 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	Frequency and Comment
Amoxicillin Augmentin	50 mg / kg / dose orally	< 7days: 12 hourly 7-21 days: 8 hourly
Ampicillin	50 mg / kg / dose IV **100 mg / kg / dose for meningitis**	< 7 days: 12 hourly 7-21 days: 8 hourly
AZT*	Term: 4mg / dose orally 1.5 mg / kg / dose IV Preterm: 2 mg / kg / dose orally 1.5 mg / kg / dose IV	Term: 12 hourly 6 hourly Preterm: 12 hourly 12 hourly, give over 1 hour
Cefotaxime	50 mg / kg / dose slowly IV or IM	< 7 days: 12 hourly 7-21 days: 8 hourly
Ceftriaxone	Sepsis: 50 mg / kg / dose **Meningitis: 80 mg / kg / dose** Gonococcal Opthlamia 50 mg / kg / dose	24 hourly 1 dose for Gonococcal opthalmia
Cloxacillin	25 – 50 mg / kg / dose	< 7 days: 12 hourly 7-28 days: 8 hourly
Cotrimoxazole	2.5ml (40/200mg/5ml)	Daily From 6 weeks prophylaxis against PCP
Erythromycin	12.5 mg / kg / dose	4 times daily Give for 14 days for Chlamydia
Ferrous lactate	(25 mg / ml) 0.6 ml	Daily from when baby is sucking well to 6 months
Furosemide	1 mg / kg / 24 hours	Orally 24 hourly
Gentamycin	5 mg / kg / dose	24 hourly

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Drug	Dose	Frequency and Comment
Glucagon	0.2 mg / kg / dose	Single dose IM Give before referring patient.
INH	10 mg / kg / dose daily	Give for 6 months if mother has been on TB treatment for less than 2 months, then administer BCG
Combination TB treatment	RHZ (60,30,150) 3 – 4 kg ½ tab daily	Give 6 months of treatment if the mother has had < 2 months treatment or is HIV positive Give RHZ for 2 months followed by RH for 4 months
Lamivudine (3TC)*	2 mg / kg / dose	12 hourly in combination with AZT for MTCT
Lopinovir/Ritonavir*	10 – 12 mg / kg / dose	12 hourly
Metronidazole	7.5 mg / kg / dose IV	12 hourly
Nevirapine*	> 2 kg: 6 mg (0.6 ml) / dose orally < 2 kg: 2 mg (0.2 ml) / kg / dose orally	Daily
Nystatin	1ml (100 000 u) orally	6 hourly
Penicillin G (Benzyl penicillin)	Sepsis / Pneumonia, and Syphilis 50 000 u / kg / dose IV Meningitis 100 000 u / kg / dose IV	12 hourly for first week 8 hourly thereafter 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

Drug	Dose	Frequency and Comment
Phenobarbitone	For convulsions Load: 20 mg / kg / IV over 10 minutes then 5 – 10 mg / kg / dose (Maximum cumulative dose 40 mg / kg) HIE: 40 mg / kg within the first hour of life may improve outcome	Maintenance: 3-5 mg / kg / dose orally / IV / IM / rectally 24 hourly
Phenytoin	Load: 20 mg / kg / IV over 30 minutes Maintenance: 4-8 mg / kg / dose	Orally / IV / rectally 24 hourly
Prostoglandin E2	¼ tablet half hourly	Crush the tablet, mix with 2 – 5ml of water and give it through a nasogastric tube
Stavudine (d4T)*	< 14 days 0.5mg / kg / dose > 14 days 1mg / kg / dose	Orally 12 hourly Orally 12 hourly
Sucrose	Preterm: 0.2 - 0.5ml 24% sucrose solution Term: 5 ml 24% sucrose solution	Give by dropper 2 minutes before painful procedure. (Avoid the use of paracetamol in infants)
Theophyline (oral)	Load: 5 mg / kg orally Maintenance: 2 mg / kg / dose 12hrly	Give in pre-term infants (< 35 weeks gestational age to prevent apnoea) 12 hourly
Vitamin D2	400 – 800 iu orally	Daily in preterm infants up until 1.5 kg
Vitamin K	1 mg IM	Prophylaxis at birth
Multivitamin	Daily requirements Vitamin A 1500 – 3000 u / day Vitamin C 25 – 50 mg / day Vitamin D 400 u / day 0.3 – 06 ml multivitamin preparation	Daily until 6 months

* Consult current PMTCT guidelines when prescribing post-exposure prophylactic ARV treatment for neonates. Consult paediatric ART guidelines and a neonatologist when prescribing ARV treatment for neonates.

5.5 KMC Score Sheet

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 1**	**Day 2**	**Day 3**	**Day 4**	**Day 5**	**Day 6**	**Day 7**
Hospital No:		**Formula:**		Weight _____							
Evaluation	**Score**										
	0	**1**	**2**	**Remark**							
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 before 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 tires 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											

5.6 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?_____

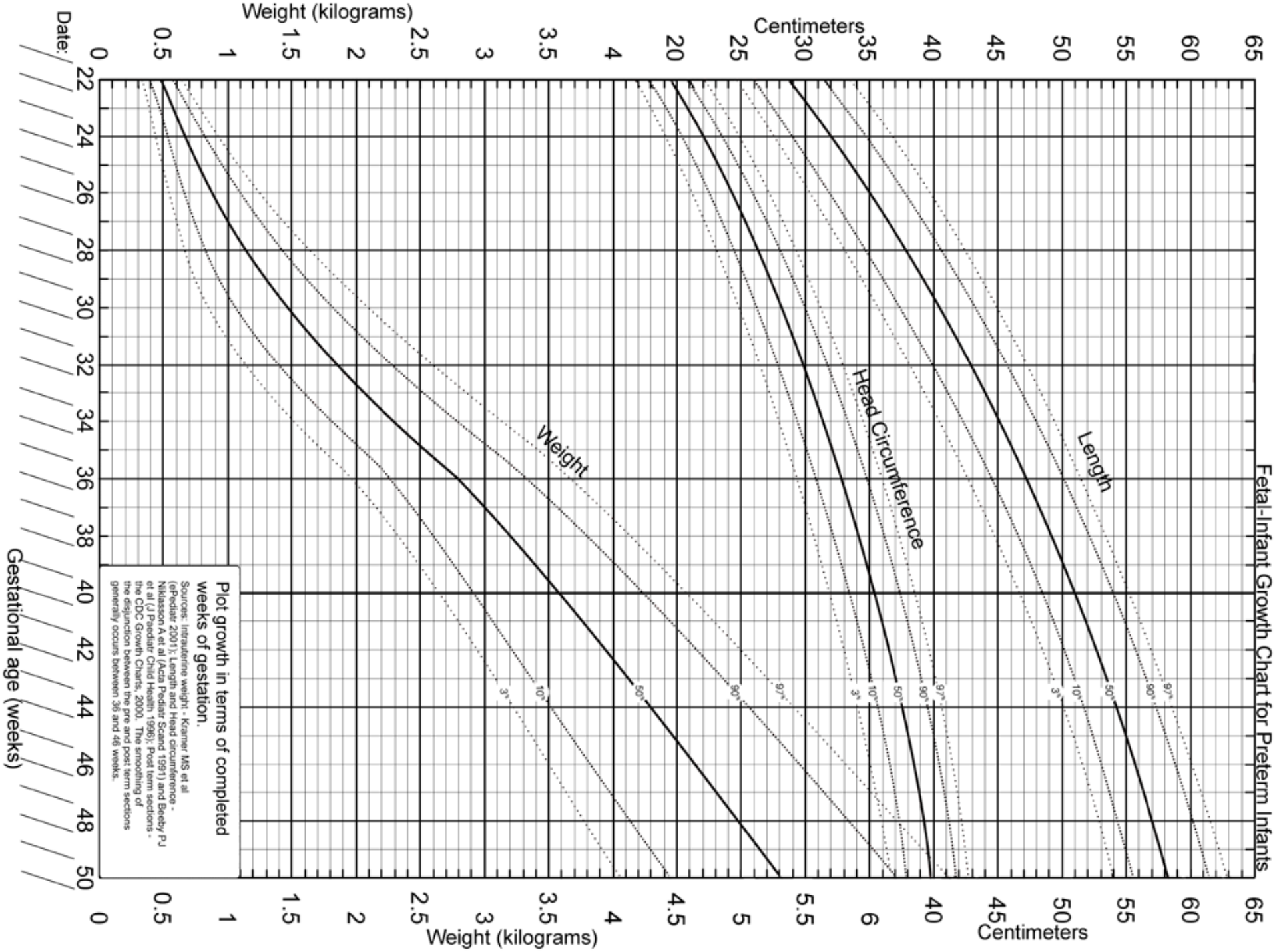
What is the baby's current problem? _____

Is the baby having a problem with feeding? _____

Has the baby had any convulsions or abnormal movements? _____

ASSESS	CLASSIFY	ACTION
ASSESS NEED FOR EMERGENCY CARE Breathing well? Y N Gasping? Y N Respiratory Rate < 20 Y N Pale or cold? Y N Heart Rate > 180 or < 100 Y N Is baby extremely lethargic? Y N Glucose test strip < 2.5 mmol / l Y N	**Respiratory failure** Yes ☐ No ☐ **Circulatory failure** Yes ☐ No ☐ **Hypoglycaemia** Yes ☐ No ☐	
ASSESS FOR PRIORITY SIGNS: **APNOEA AND RESPIRATORY DISTRESS** Central cyanosis Y N Apnoea Y N Fast breathing Y N Respiratory Rate _____ Severe chest indrawing Y N Grunting Y N	**Classify for apnoea and respiratory distress**	
ASSESS FOR OTHER PRIORITY SIGNS: Temperature_____ Birth Weight _____ Jaundice Y N Increased tone Y N Decreased tone / floppy Y N Irregular jerky movements Y N Reduced activity Y N Lethargic or Unconscious Y N Bulging fontanel Y N Abdominal distension Y N Bile stained vomiting Y N	**Classify for priority signs**	
ASSESS FOR BIRTH INJURIES, MALFORMATIONS, LOCAL INFECTIONS Head circumference _____ < 3rd centile Y N > 97th centile Y N Normal Y N Swelling of scalp Y N Unusual appearance Y N Cleft lip / Cleft palate Y N **Eyes:** Pus draining Y N Red or swollen eyelid / Subconjunctival haemorrhage Y N Neural tube defect Y N Gastroschisis / omphalocoele Y N Imperforate anus Y N Pustules / rash Y N Umbilicus red / pus Y N Abnormal position Y N Asymmetric movements Y N Cries when limb touched Y N Club foot Y N Extra digit Y N Swollen limb or joint Y N Other_____	**Classify for all problems**	
ASSESS RISK FACTORS AND SPECIAL TREATMENT NEEDS Mother has diabetes Y N Baby > 4 kg Y N Mother's blood group: Rh Neg Y N Gp O Y N Unknown Y N Rupture of membranes > 18 hours Y N Maternal fever Y N Offensive liquor Y N Apgar < 7 at 5 minutes Y N Mother's RPR: ☐ Positive ☐ Partially treated ☐ Unknown Mother HIV status: ☐ Positive ☐ Negative ☐ Unknown Mother has TB, or has been on TB treatment within the last 6 months Y N	**Classify for all risk factors**	

5.7 GROWTH AND HEAD CIRCUMFERENCE CHART



5.8 WEIGHT, FEEDING AND TREATMENT SUMMARY CHART

Month

Days	Feeds	ivi dpm	ml/kg	Date	Oxygen	CPAP/IPPV	Antibiotics	Phototherapy	KMC or HIE score	HC	Hb	4500g / 2500g	4250g / 2250g	4000g / 2000g	3750g / 1750g	3500g / 1500g	3125g / 1250g	3000g / 1000g	2750g / 750g	2500g / 500g
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5.9 LIST OF ABBREVIATIONS

APH	Antepartum haemorrhage
AIDS	Acquired immunodeficiency syndrome
AGA	Appropriate for gestational age
ANC	Antenatal care
ARV	Anti-retroviral
AZT	Azidothymidine (antiretroviral drug)
BBA	Born before arrival
BD	Twice daily
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 breastfeeding
FBC	Full blood count
GA	Gestational age
GPH	Gestational proteinuric hypertension
HIE	Hypoxic-ischaemic encephalopathy
HIV	Human immuno 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
KMC	Kangaroo mother care
LBW	Low birth weight
LP	Lumbar puncture
NEC	Necrotising enterocolitis
NG	Naso-gastric
NMR	Neonatal mortality rate
NND	Neonatal death
NTD	Neural tube defect
NVP	Nevirapine
PCR	Polymerase chain reaction test
PDA	Patient ductus arteriosus
PMTCT	Prevention of mother to child transmission
PROM	Prolonged rupture of membranes
RDS	Respiratory distress syndrome
RPR	Rapid plasma reagin (syphilis)
ROM	Rupture of membranes
RR	Respiratory rate
RTHC	Road to health chart
TSB	Total serum bilirubin
TSR	Time to sustained respiration
TTN	Transient tachypnea of the newborn
VCT	Voluntary counselling and testing

5.10 KEY REFERENCES

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Each year in South Africa, 20,000 newborns die, most from preventable causes. Most births and most newborn deaths occur in hospitals. Improving the quality and timeliness of care is a critical step to save these lives. Since 2003 the Limpopo Initiative for Newborn Care (LINC) has advanced the quality of care of newborns in district and regional hospitals in the Limpopo province. LINC is a joint venture between the Department of Paediatrics and Child Health in Polokwane and the provincial Maternal, Child and Women's Health directorate.

These Newborn Care Charts for Management of Sick and Small Newborns in Hospital are designed to be used by doctors and nurses at the district and regional hospital level and provide a ready reference for assessment, classification, and treatment of sick and small newborns as well as an overview of routine care that should be provided to all newborns.





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