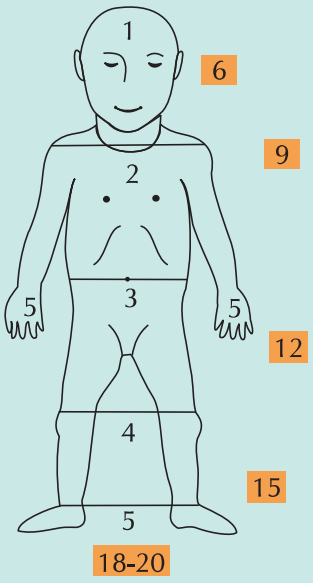
Chart 10

Assessment and management of jaundice in newborn babies

Clinical assessment of severity of jaundice in a newborn

In a newborn that has not been treated earlier, Kramer's criteria are used to clinically estimate severity of jaundice.

Figure 4: Kramer's criteria to clinically estimate severity of jaundice



Clinical: Visual perception: Kramer 1969

- **Jaundice limited to face:**
  Serum bilirubin of about 6 mg/dl
- **Jaundice extended to trunk:**
  Serum bilirubin of 9 mg/dl
- **Jaundice extended to abdomen:**
  Serum bilirubin of about 12 mg/dl
- **Jaundice extended to legs:**
  Serum bilirubin of about 15 mg/dl
- **Jaundice extended to feet and hands:**
  Serum bilirubin of about 18–20 mg/dl

Alert signs in a newborn with jaundice (any one sign of the following):

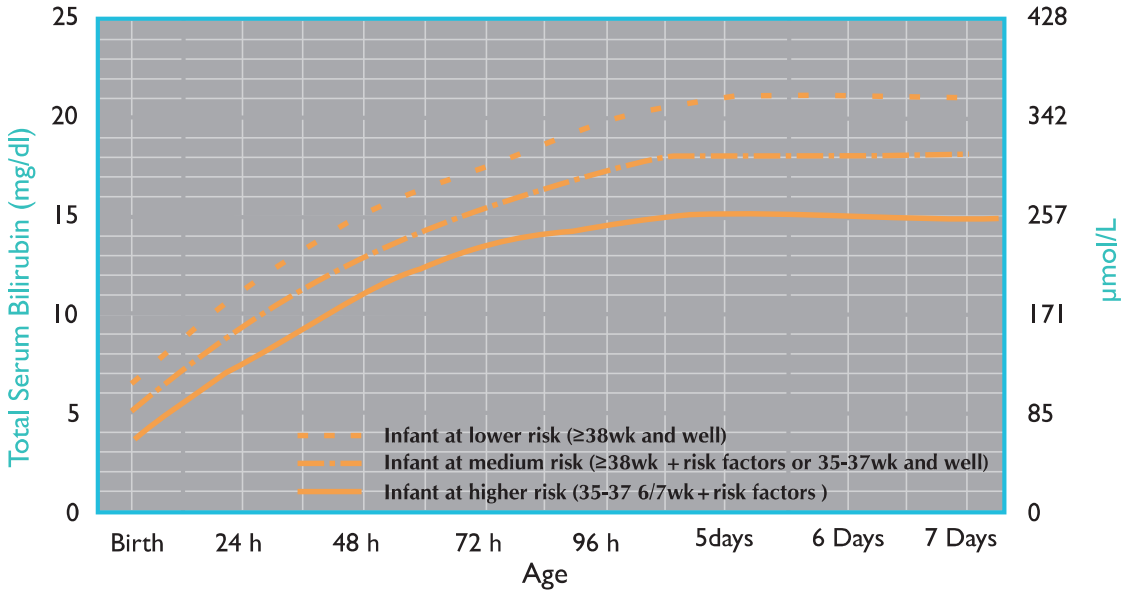
- Clinical jaundice in first 24 hrs of life
- Total Serum Bilirubin (TSB) increasing by >5mg/dl/day or 0.5 mg/dl/hour
- TSB >15 mg/dl
- Conjugated serum bilirubin >2 mg/dl
- Clinical jaundice persisting for >2 week in full term and >3 weeks in preterm neonates

Management of hyperbilirubinemia:

- Estimate total serum bilirubin in a baby with clinical jaundice at risk for hyperbilirubinemia
- Decide for phototherapy/exchange transfusion based on
  - Gestation
  - Postnatal age in hours
  - Presence or absence of risk factors

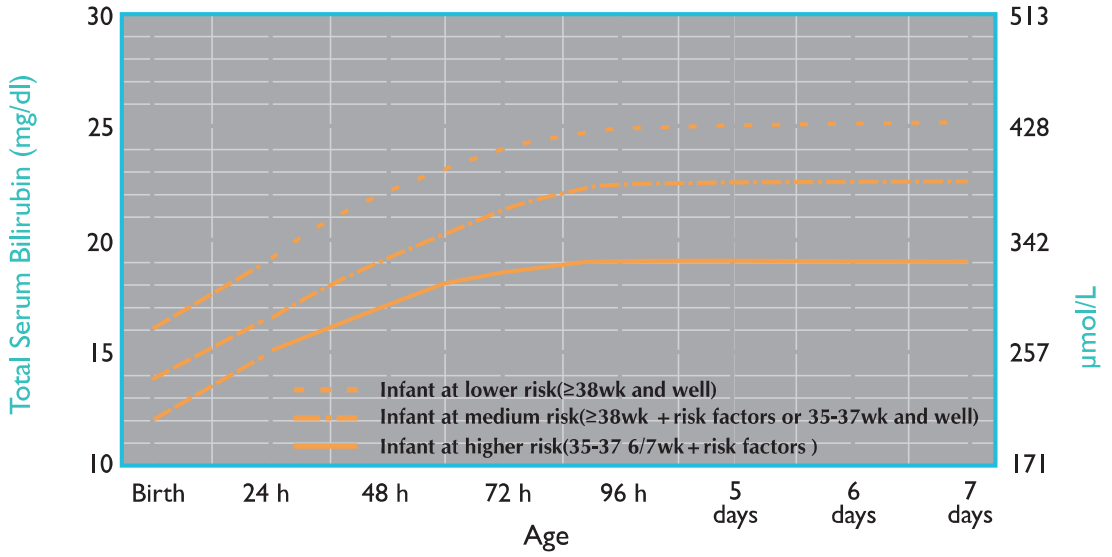
For newborns>35 weeks:	**Consult Normogram-I to identify requirement for phototherapy** **Consult Normogram to identify requirement for Exchange transfusion**

Figure 5: Normogram for initiating phototherapy (for newborns>35 weeks)



- Use total bilirubin. Do not subtract direct reacting or conjugated bilirubin.
- Risk factors = isoimmune hemolytic disease, G&PD deficiency, asphyxia, significant lethargy, temperature instability, sepsis, acidosis, or alburnin <3.0g/dl (if measured)
- For well infants 35-37 6/7 wk can adjust TSB levels for intervention around the medium risk line. It is an option to intervene at lower TSB levels for infants closer to 35 wks and at higher TSB levels for those closer to 37 6/7 wk.

Figure 6: Normogram for instituting exchange transfusion (newborns with gestation >35 weeks)



- The dashed lines for the first 24 hours indicate uncertainty due to a wide range of clinical circumstances and a range of responses to phototherapy.
- Immediate exchange transfusion is recommended if infant shows signs of acute bilirubin encephalopathy (hypertonia, arching, retrocollis, opisthotonos, fever, high pitched cry) or if TSB is ≥5mg/dL (85mol/L) above these lines.
- Risk factors- isoimmune hemolytic disease, G6PD deficiency, asphyxia, significant leathargy, temperature instability, sepsis, acidosis.
- Measure serum albumin and calculate B/A ratio(see legend)
- Use total bilirubin. Do not subtract direct reacting or conjugated bilirubin
- If infant is well and 35-37 6/7 wk (median risk) can individualize TSB levels for exchange based on actual gestational age.

For newborns ≤35 weeks of gestation

Consult Table given below for identifying requirement for phototherapy or exchange transfusion.

Guidelines for phototherapy and exchange transfusion (for newborns with gestation ≤ 35 weeks)

	Serum Bilirubin levels (mg/dl)	
Weight (Grams)	**Phototherapy, if TSB**	**Exchange transfusion, if TSB**
500–750	5–8	12–15
750–1000	6–10	>15
1000–1250	8–10	15–18
1250–1500	10–12	17–20
1500–2500	15–18	20–25

Precautions for phototherapy

- Baby should be naked
  - Eyes and genitals should be covered
- Newborn should be kept at a distance of not more than 45 centimeters below the light source
  - They can be kept as close to the phototherapy units as possible
- Frequent feeding every 2 hours and change of posture should be promoted
- Once under phototherapy, clinical assessment is not reliable. Serum bilirubin must be monitored

Choice of blood for exchange transfusion

ABO incompatibility: Use O cells of same Rh type as baby; ideal is to have O cells suspended in AB plasma

Rh iso-immunization: In emergency use O negative blood; ideal is O negative cells suspended in AB plasma. One may use baby's blood group but care must be taken to use Rh negative blood

Other conditions: Baby's blood group

Chart 11

Assessment and management of respiratory distress

Respiratory distress in a newborn is defined as Respiratory Rate >60/min and/or any of the following signs:

- Grunting
- Retractions
- Cyanosis

Assessment of severity of respiratory distress

Silverman Anderson Score and its Interpretation

Score	Upper Chest Retraction	Lower Chest Retraction	Xiphoid Retraction	Nasal Flaring	Grunt
0	Synchronised	None	None	None	None
1	Lag during inspiration	Just visible	Just visible	Minimal	Audible with stethoscope
2	See-saw	Marked	Marked	Marked	Audible with unaided ear

Interpretation

- Score 1–3 = Mild respiratory distress
- Score 4–6 = Moderate respiratory distress
- Score >6 = Impending respiratory failure

Monitoring of a newborn with respiratory distress

- Clinical assessment with respiratory distress charting
- Continuous pulse-oximetry is desirable. Change probe site regularly to avoid pressure sores
- Maintain saturations between 88–92% in preterm and 90–93% in term neonates
- Titrate oxygen flow as per SpO_2, reduce and omit oxygen, ensure adequate SpO_2 in room air

If the baby's breathing difficulty worsens or the baby has central cyanosis:

- Give oxygen at a high flow rate (5–10 L/min)
- In case of severe respiratory distress not improving even on high flow oxygen, organize transfer to a tertiary hospital for assisted ventilation and further diagnostic evaluation

Devices for oxygen delivery

Nasal Prong	O_2 Hood	Nasal Catheter/Cannulae
• Use appropriate size prongs • Appropriate sized prong fits into nostrils without blanching columella or alanasi • Flow rates:h 0.5 to 1 L/min for preterm and 1 to 3 L/min for term	• Choose appropriate sized hood • Use transparent hood • Flow rate > 5 L/min	• Use 6–8 Fr catheter • Measure distance of insertion from nostril to inner margin of eyebrow • Gently insert into nostril • Flow rate 0.5–1 L/min

Chart 12

Assessment of neonatal sepsis

Neonatal sepsis is one of the three major causes of neonatal mortality. Sepsis is largely preventable

Clinical manifestations of neonatal sepsis

Non-specific: Lethargy, refusal to suckle, poor cry, not arousable, comatose

Gastrointestinal: Abdominal distension, diarrhea, vomiting, poor weight gain

Cardiovascular: Hypothermia, poor perfusion, shock, bleeding and sclerema

Respiratory: Cyanosis, tachypnea, chest retractions, grunt, apnea/gasping

CNS: Fever, seizures, blank look, high pitched cry, excessive crying/irritability, neck retraction, bulging fontanel

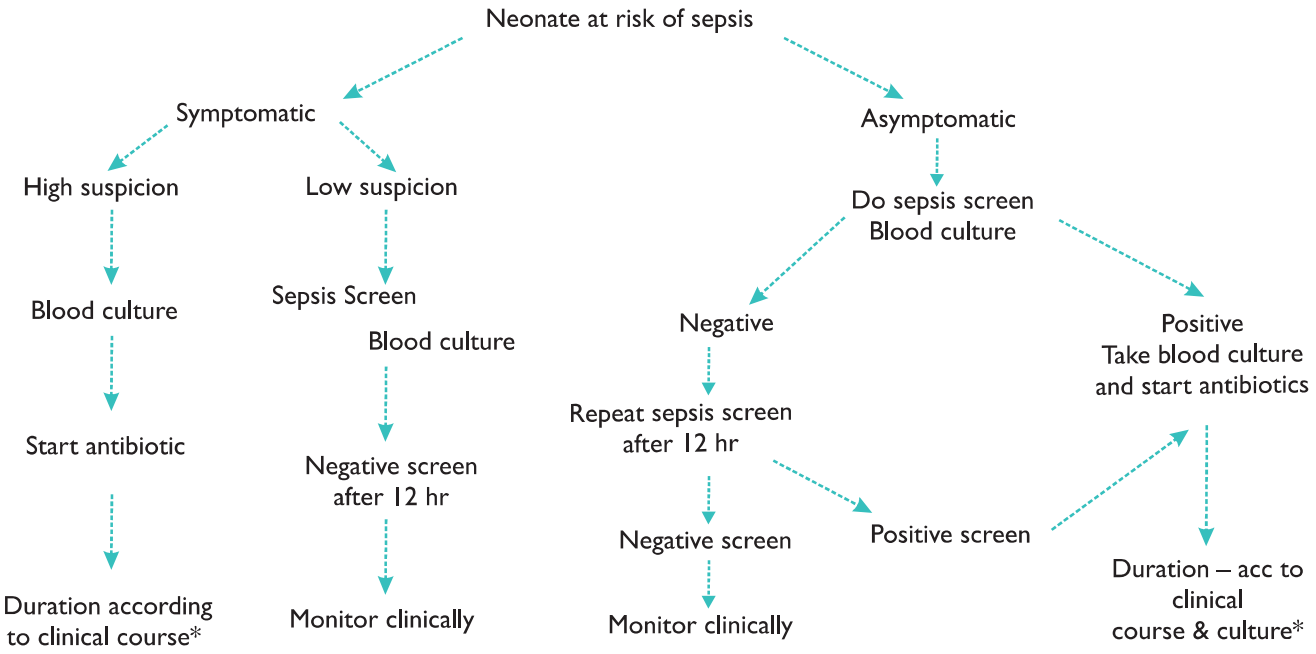
Laboratory diagnosis of a newborn with sepsis

Sepsis Screening: Any of two tests that come positive out of the following five tests strongly indicate presence of sepsis:

1. Leukopenia (TLC/Total leucocyte count<5000/cmm)
2. Neutropenia (ANC/Absolute neutrophil count<1800/cmm)
3. Immature neutrophil to total neutrophil (I/T) ratio (>0.2)
4. Micro ESR/Erythrocyte sedimentation rate (>15mm 1st hour)
5. Positive CRP/C-reactive protein

In clinically suspected cases of sepsis, send blood culture prior to starting antibiotics.

Figure 7: Approach to newborns at-risk of sepsis



Culture sterile – 7-10 days Culture Positive – 10-14 days

* Do lumbar puncture if meningitis suspected clinically; if positive then treat for 21 days

Antibiotic therapy for a newborn with sepsis

Choice of antibiotics

- Antibiotic therapy should cover the common causative bacteria, namely Escherichia coli, Staphylococcus aureus and Klebsiella pneunoniae
- A combination of Ampicillin and Gentamicin is recommended for treatment of sepsis and pneumonia
- In suspected or confirmed meningitis, add Cefotaxime with an aminoglycoside
- Following table provides the antibiotics and dosages of antibiotics for newborn sepsis

Antibiotic therapy of neonatal sepsis

I. Septicemia or Pneumonia

Antibiotic	Each dose	Frequency		Route	Duration
		<7 days age	>7 days age		
Inj Ampicillin or	50 mg/kg/dose	12 hourly	8 hourly	IV	7–10 days
Inj Cloxacillin	50 mg/kg/dose	12 hourly	8 hourly	IV	7–10 days
and					
Inj Gentamicin or	5 mg/kg/dose	24 hourly	24 hourly	IV	7–10 days
Inj Amikacin	15 mg/kg/dose	24 hourly	24 hourly	IV	7–10 days

II. Meningitis

Antibiotic	Each dose	Frequency		Route	Duration
		<7 days age	>7 days age		
Inj Ampicillin	100 mg/kg/dose	12 hourly	8 hourly	IV	3 weeks
and					
Inj Gentamicin	2.5 mg/kg/dose	12 hourly	8 hourly	IV	3 weeks
OR					
Inj Cefotaxime	50 mg/kg/dose	12 hourly	8 hourly	IV	3 weeks
and					
Inj Gentamicin	2.5 mg/kg/dose	12 hourly	8 hourly	IV	3 weeks

Supportive care of a newborn with sepsis

1. Provide warmth, ensure consistently normal temperature
2. Start intravenous line
3. If CFT > 3 seconds, infuse normal saline 10 ml/kg over 20–30 minutes, repeat the same 1–2 times, if perfusion continues to be poor
4. Infuse 10% dextrose 2 ml/kg stat
5. Inject Vitamin K 1 mg intramuscularly
6. Start oxygen by hood or mask, if cyanosed or grunting
7. Provide gentle physical stimulation, if apneic. Provide bag and mask ventilation with oxygen if breathing is inadequate
8. Avoid enteral feed if hemodynamically compromised, give maintenance IV fluids
9. Consider use of dopamine if perfusion is persistently poor
10. Consider exchange transfusion if there is sclerema

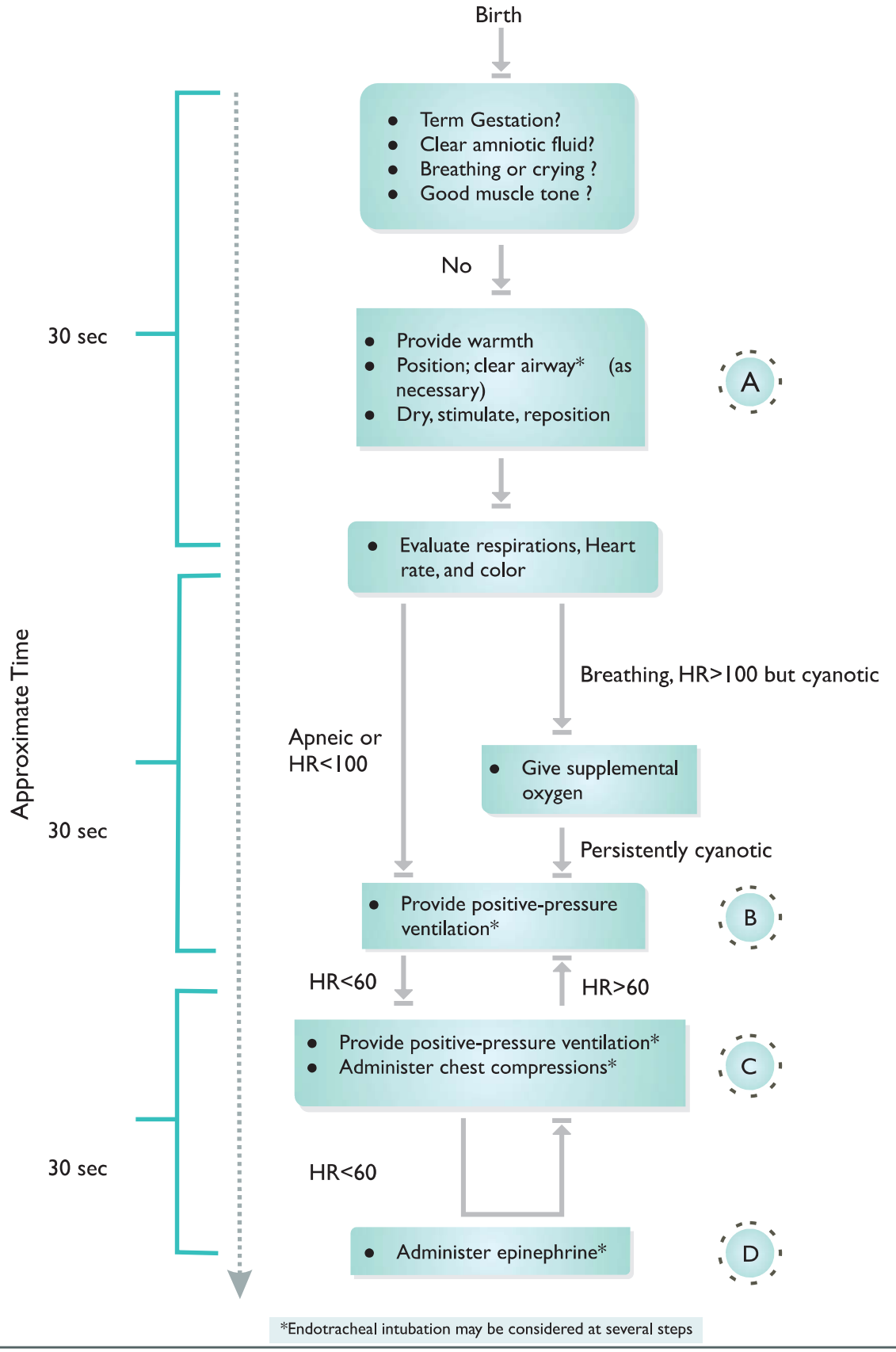
Chart 13

Administration of commonly used drugs

Drug	Dose	Route
Ampicillin	Age < 7 days: 50 mg/kg/dose, q 12 hour Age > 7 days: 50 mg/kg/dose, q 8 hour	IV
Gentamycin	**Sepsis/ pneumonia** 5 mg/kg/dose, q 24 hour **Meningitis** Age <7 days 2.5mg/kg/dose, q 12 hour Age >7 days 2.5 mg/kg/dose, q 8 hour	IV
Amikacin	<7 Days 15 mg/kg/dose, q 24 hour	IV
Cefotaxime	<7 days 50 mg/kg/dose, q 12 hour >7 days 50 mg/kg/dose, q 8 hour	IV
Chloramphenicol	12 mg/kg/dose q 12 hour	IV
Aminophylline	5 mg/kg loading, then 2 mg/kg/dose q 8-12 hour	IV
Vitamin K	1 mg	IM
Phenobarbitone	20 mg/kg loading over 10-15 minutes then 3-4 mg/kg q 24 hour	Loading IV Then IV, IM or oral
Phenytoin	15-20 mg/kg loading over 10-15 min then 5 mg/kg q 24hour	IV
Dopamine/Dobutamine	5-20 micro g/kg/minute	IV continuous

Chart 14

Resuscitation algorithm



*Endotracheal intubation may be considered at several steps

Chart 15

Management of the newborn with seizures

Identify and characterize the seizure

↓

Secure airway and optimize breathing, circulation and temperature

↓

Start Oxygen if seizures continue

↓

Secure IV access and take samples for baseline investigations including sugar, hematocrit, sepsis screen and calcium, magnesium, electrolytes where feasible

↓

If blood sugar <45 mg/dl, give 4–5 ml/kg 10% dextrose

↓

If seizures continue

↓

IV phenobarbitone 20 mg/kg over 20 min

If no control ↓

Repeat phenobarbitone 10 mg/kg till a total of 40 mg/kg

↓

If seizures continue

↓

Give phenytoin 20 mg/kg over 20 min

↓

After control of seizures, initiate maintenance doses

Chart 16

Administration of dopamine in a newborn with hemodynamic compromise

How to give dopamine

1 ml of commercially available dopamine contains 40 mg of dopamine. In a baby weighing 2.5 kg, if we want to start dopamine at a rate of 10ug/kg/min:

= 10 x 2.5 = 25 ug/min = 25 x 60 = 1500 ug / hr = 1500 x 24 = 36000 ug/day

= 36 mg of dopamine in 24 hrs

It means if we add 0.9 ml of dopamine in 24 ml of fluid and give @ rate of 1 ml/hour with syringe pump or one microdrops per min (which is virtually impossible) with the micro drip set, we will give dopamine @ 10 ug/kg/min

Increment

If we want to increase dopamine to15 ug/kg/min then give the same fluid @ 1.5 ml/hr

The above method is to give a separate infusion of dopamine; however, it could also be added to 24 hrs fluid as explained below:

For example, a 2.5 kg neonate in shock with a fluid requirement of 100 ml/kg/day, has received 2 fluid boluses of 10 ml/kg of normal saline, without any improvement

Total fluid needed for this baby in 24 hr= 100 x 2.5 = 250 ml/day

Fluid to be given every 8 hr = 85 ml. Let us learn how much dopamine to be added in 8 hr fluid, i.e. 85 ml to be given at a rate of 10 ug/kg/min

Amount of dopamine required in 1 min = 10 x 2.5 = 25 ug

Amount of dopamine required in 1 hr= 25 x 60 = 1500 ug

Amount of dopamine required in 8 hr = 1500 x 8 = 12000 ug = 12.0 mg

1 ml of available dopamine preparation = 40 mg of dopamine

To make 12 mg of dopamine, we need 0.3 ml. Add this volume to 85 ml of fluid and give over 8 hr at a rate of 10 ml/hr or at a rate of 10 micro drops/min with a burette set, which will deliver dopamine at a rate of 10 ug/kg/min

Chart 17

Checklist for assessment and management of a newborn requiring special care

A simple mnemonic is TABCFMFMCF

1. Temperature -Assess

- Hypothermia — Provide heat
- Cold Stress — Skin to skin contact, warmer
- Normal — Cover adequately
- Hyperthermia — Uncover

2. Airway

- Maintained
- Compromised — Open and maintain airway
  - Position
  - Suction

3. Breathing

- None or gasping — Positive-pressure ventilation with 100% oxygen
- Normal — No intervention
- Respiratory distress — Provide oxygen

4. Circulation-CFT

- Normal — No intervention
- >3 seconds — * Normal saline bolus
  * Check temperature
  * Check heart rate

5. Fluids

- If CFT >3 sec — IV RL/NS 10ml/kg
- If stressed baby — IV 10% Dextrose 2ml/kg
- If circulation not compromised — Normal requirement

(Refer to Chart 8)

6. Medications

- Pneumonia — IV antibiotics – Ampicillin, Gentamycin
- Apnea — IV Aminophyllin
- Meningitis — IV antibiotics
- Bleeding — Inj Vitamin K 1mg IM
- Convulsions (Refer to Chart 15) — Inj Phenobarbitone, Inj Phenytoin

7. Feeds

- Weight<1200 g — Gavage feeds
- Weight 1200-1800 g — Katori Spoon feeding
- Weight >1800 g — Breastfeeding

8. Monitoring

- Temperature
  - Touch method
  - Temperature record 2 hourly
- Respiration
  - Apneic
  - Gasping
  - Tachypneic – RR
  - Retractions +/–
  - Grunts +/–
- Color
  - Pink
  - Pink with peripheral cyanosis
  - Pale
  - Cyanosis
- Heart rate
  - Normal
  - Tachycardia
  - Bradycardia
- CFT
  - Normal
  - >3 seconds
- SpO2
  - 90-93
  - <90
  - >93
- *Danger signs
  - Bleeding – Inj Vit K 1 mg IM stat
  - Apnea – Tactile stimulation and PPV
  - Grunt – Oxygen
  - Severe retractions – Oxygen
  - Abdominal distension – NPO

*Refer immediately without delay

9. Communication

a) For referral	i) Inform parents/relatives about baby's referral
	ii) Inform need for referral
	iii) Communicate place of referral
	iv) Communicate with the higher centre if possible
	v) Send a written note about details of birth and care
	vi) Send a health worker with the family if possible
	vii) Mother to accompany as far as possible
b) For hospitalized neonate in SNCU	i) Inform neonate's status to family at least twice every day
	ii) Report on temperature, colour, perfusion and general activity
	iii) Report on progress in terms of resolution of respiratory distress, requirement of oxygen, Intravenous feeding, IV antibiotics and feeding
c) For home care	i) Exclusive breastfeeding
	ii) Maintain temperature – teach tactile assessment
	iii) Prevent infection – cord and eye care
	iv) Danger signs – early care seeking
	v) Maternal nutrition, rest supplements and spacing

10. Follow up

i) After 48 hr of discharge, then 2 weekly initially for 2–3 visits
ii) Check weight, mode of feeding, enquire problems during each visit
iii) Follow up every month thereafter
iv) Advise about immunization
v) Advise about complimentary feeding

Chart 18

Identifying intrauterine growth retardation in a newborn

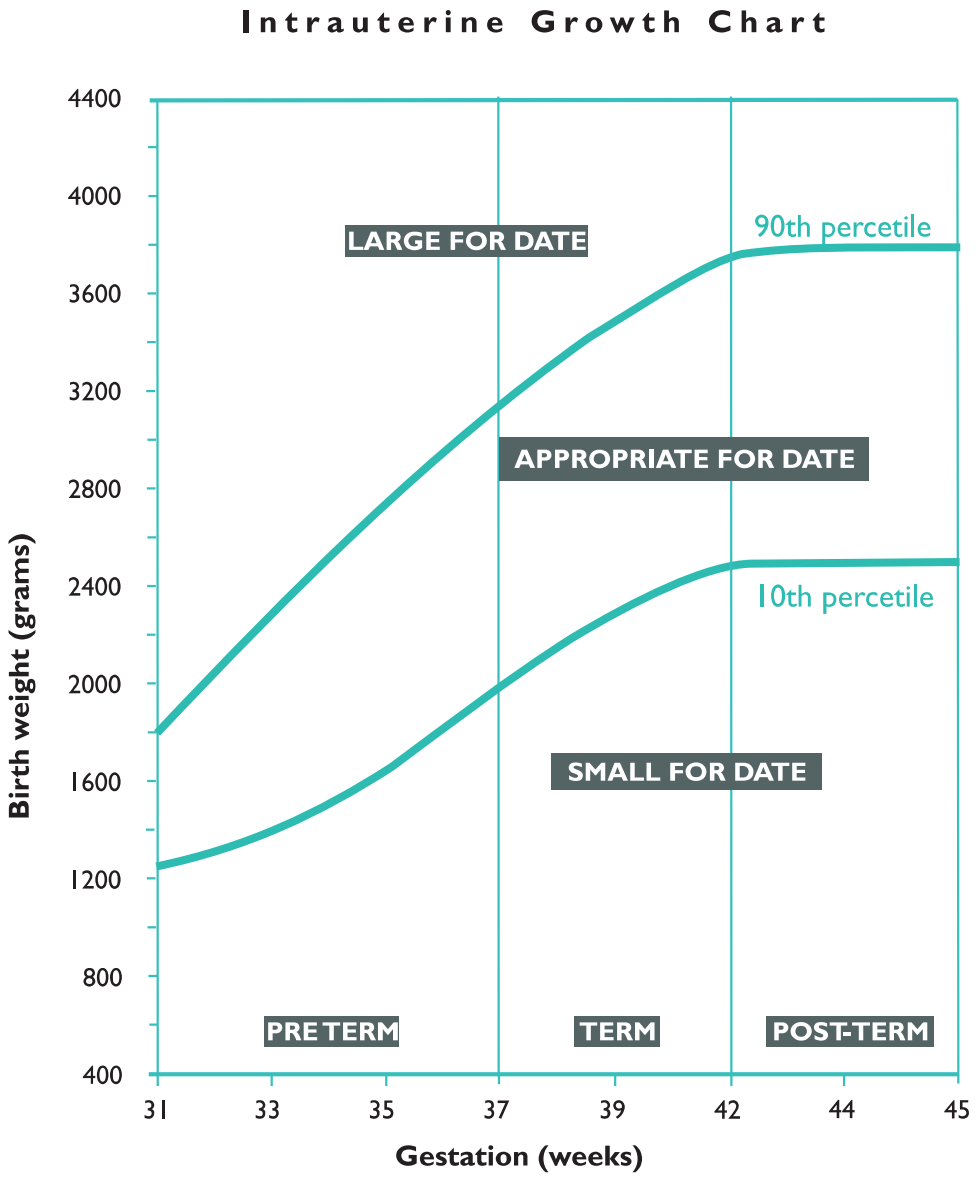
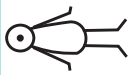
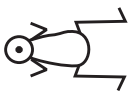
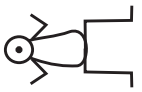
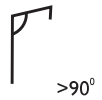
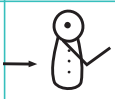


Chart 19

Assessing gestation of the newborn baby: Expanded new ballard score

Neuromuscular maturity

Score	-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							
Heal to ear							

Physical maturity

Skin	Sticky, friable, transparent	Gelatinous, red, translucent	Smooth, pink, visible veins	Superficial, peeling and / or, rash few veins	Cracking, pale areas, rare veins	Parchment, deep cracking, no vessels	Parchment, deep cracking, no vessels
Lanugo	None	Sparse	Abundant	Thinking	Bald areas	Mostly bald	
Plantar surface	Heel-toe 40-50 mm: -1 <40 mm:-2	>50 mm, no creases	Faint red marks	Anterior transverse cresse only	Creases anterior 2/3	Creases over entire sole	
Breast	Imperceptible	Barely perceptible	flat areola, no bud	Stippled areola, 1-2 mm bud	Raised areola, 3-4 mm bud	Full areola, 5-10 mm bud	
Eye/Ear	Lids fused loosely: -1 tightly: -2	Lids open, pinna flat stays folded	Slightly curved pinna soft, slow recoil	Well curved pinna, soft slow recoil	Formed and 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 rugee	Testes pendulous, deep rugee	
Genitals(female)	Clitoris prominent, labia flat	Clitoris prominent, small labia minora	Clitoris prominent, enlarging minora	Majora and minora equally prominent	Majora large, minora small	Majora cover citoris and minora	

Maturity Rating

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

Chart 20

Housekeeping protocols

Disinfection of equipment

1. Radiant warmers:
   - Daily: Canopy and mattress should be cleaned with a detergent solution and dried
   - Weekly: Thorough cleaning after dismantling weekly and every time after shifting of baby
2. Cots and mattresses:
   - Clean daily with 3% Phenol or 5% Lysol
   - Replace mattress whenever surface covering is broken
3. Suction apparatus:
   - Suction bottle should contain 3% Phenol or 5% Lysol
   - Suction bottle should be cleaned with detergent and changed daily
   - Change tube connected to bottle daily. Flush with water and dry. Soak for disinfection in 2% gluteraldehyde
   - Use disposable suction catheter
4. Oxygen hood:
   - Clean with detergent daily and after each use
5. Resuscitation bag and mask:

   Face mask:
   - Disinfect daily and sterilize weekly
   - Clean with detergent daily and after each use
   - Immerse in 2% gluteraldehyde
   - Rinse with clean water and dry with sterile linen (washed and sun dried)

   Resuscitation bag:
   - Disinfect daily and sterilize weekly
   - Clean with detergent
   - Immerse in 2% gluteraldehyde
   - Rinse with clean water and dry with sterile linen
6. Laryngoscope:
   - Wipe blade with 70% isopropyl alcohol
7. IV equipment:
   - Disposable needles and infusion sets should be changed every 24 hours
9. Feeding utensils:
   - Clean with soap and water and boil in water for 10minutes
10. Thermometer:
    - Wipe with alcohol after use
    - Store in bottle containing dry cotton

Housekeeping routines

1. Floor and walls
   - Walls and sinks must be cleaned with 3% Phenol or 5% Lysol at least once a day
   - Wet mopping of the room should be done at least 3 times a day
   - Avoid sweeping and dry dusting
2. Disposal of waste and soiled linen
   - Waste disposable bins with covers should be available
   - The bins must be kept covered and emptied at regular intervals
   - Plastic bags should be used in the bins, and these bags should be sealed before they are removed
   - The waste bin should be cleaned and washed properly under running water every day
3. Cleaning of spills
   - Use 10 g of bleach in 1 lt of water. Cover the area with solution for at least 20 min and mop with newspaper or cloth
4. Needles and sharps
   - Discard in polar bleach in a needle-proof container
5. Others*
   - Cup, spoon and paladai should be boiled for at least 15 minutes before use
   - Use disposable feeding tubes

*All individual items like stethoscope, measuring tape, and probe tips should be cleaned with 70% isopropyl alcohol daily or whenever being used for another baby.

- Disinfection is killing of live microorganism, and this can be achieved by direct contact for 20 minutes with 2% gluteraldehyde
- Sterilization is killing of live microorganism along with spore. This can be done by direct contact for 4 hours with 2% gluteraldehyde
- Ensure that fumes of gluteraldehyde are aired out or rinsed completely with water from objects before using on infants otherwise these can be damaging to the baby
- 2% gluteraldehyde once prepared is active for 14 days

Chart 21

Breastfeeding

Breastfeeding is one of the cardinal principles of newborn care and breast milk is the optimum nutrition for both healthy and sick newborn babies

Ten steps to achieve successful breastfeeding

1. Have a written breastfeeding policy that is routinely communicated to all health care staff
2. Train all health care staff in skills necessary to implement this policy
3. Inform all pregnant women about benefits and management of breastfeeding
4. Help mothers initiate breastfeeding within 30 minutes of birth of baby
5. Show mothers how to breastfeed and how to maintain lactation even if they are separated from their infants
6. Give newborn infants no food or drink other than breast milk, unless medically indicated
7. Practice rooming-in; allow mothers and infants to remain together for entire 24 hours in a day
8. Encourage breastfeeding on demand
9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic

Breastfeeding technique

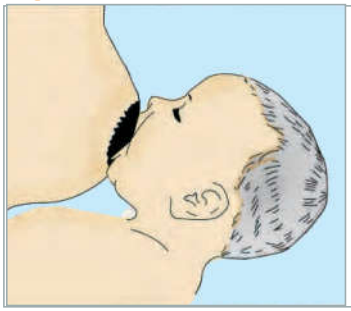
For mothers to produce enough milk, the baby must suckle often enough, and must also suckle in the correct manner. Correct positioning ensures effective suckling and prevents breast engorgement as well as sore nipples.

Figure 8: Correct positioning

Proper positioning involves:

- Baby's body is well supported
- The head, neck and body of the baby are in the same plane
- Entire body of the baby faces the mother
- Baby's abdomen touches mother's abdomen

Figure 9: Good attachment



Proper attachment involves:

- Baby's mouth is wide open
- Lower lip is turned outwards
- Baby's chin touches mother's breast
- Majority of areola is inside the baby's mouth

Annexures

Annexure 1.1: List of equipment

A) Newborn care corner

Item No	Item Description	Essential	Desirable	Quantity
1	Open care system: radiant warmer, fixed height, with trolley, drawers, O_2 bottles	E		1
2	Resuscitator, hand-operated, neonate, 500ml	E		1
3	Weighing scale, spring	E		1
4	Pump suction, foot operated	E		1
5	Thermometer, clinical, digital, 32°-34°C	E		1
6	Light for examination, mobile, 220-12	E		1
7	Syringe hub cutter	E		1

B) Newborn stabilization unit

Item No	Item Description	Essential	Desirable	Quantity
1	Open care system: radiant warmer, fixed height, with trolley, drawers, O_2 bottles	E		3
2	Phototherapy unit, single head, high intensity	E		1
3	Resuscitator, hand-operated, neonate, 500ml	E		2
4	Laryngoscope set, neonate	E		2
5	Electronic baby-weighing scale 10 kg <5g>	E		1
6	Suction pump, foot operated	E		1
7	Thermometer, clinical, digital, 32-34°C	E		4
8	Light for examination, mobile, 220-12	E		4
9	Syringe hub cutter	E		1

C) SNCU - Equipment for individual care

Item No	Item Description	Essential	Desirable	Quantity
1	Open care system: radiant warmer, fixed height, with trolley, drawers, O_2 bottles	E		12
2	Phototherapy unit, single head, high intensity	E		6
3	Resuscitator, hand-operated, neonate, 250ml	E		2
4	Resuscitator, hand-operated, neonate, 500ml	E		4
5	Laryngoscope set, neonate	E		6
6	Suction pump, portable, 220V, w/access	E		2
7	Suction pump, foot operated	E		2
8	Surgical instrument, suture/SET	E		2
9	Syringe pump, 10,20,50 ml, single phase	E		3
10	Oxygen hood, S and M, set of 3 each, including connecting tubes	E		6
11	Oxygen supply system	E		1
12	Oxygen concentrator	D		4
13	Thermometer, clinical, digital, 32-43°C	E		12

Item No	Item Description	Essential	Desirable	Quantity
14	Electronic baby-weighing scale, 10 kg <5g>	E		4
15	Pulse oxymeter, bedside, neonatal	E		6
16	Stethoscope, binaural, neonate	E		12
17	Sphygmomanometer, neonate, electronic	E		6
18	Light, examination, mobile, 220-12V	E		6
19	Syringe hub cutter	E		2
20	Measuring tape, vinyl-coated, 1.5m.	E		2
21	Kidney basin, stainless steel, 825ml	E		4
22	Dressing tray, stainless steel, 300x200x30mm	E		4
23	Infusion stand, double hook, on castors	E		1
24	Indicator, TST control spot/PAC-300		D	1
25	Irradiance meter for phototherapy units		D	2
26	Monitor, vital sign, NIBP, HR, SpO_2, ECG, RR, Temperature		D	1
27	ECG unit, 3 channel, portable/SET		D	2
28	Infantometer, plexi, 3½ft/105cm	E		1
29	X-Ray, mobile		D	1
30	Transport incubator, basic, with battery and O_2, w/o ventilator		D	1
31	Autoclave, steam, bench top, 20 l, electrical		D	1
32	Laundry washer dryer, combo, 5kg		D	

D) General equipment

Item No	Item Description	Essential	Desirable	Quantity
1	AC (1.5 Tonne)	E		1
2	Generator set 25-50 KVA	E		1
3	Refrigerator, hot zone, 110l	E		1
4	Voltage servo-stabiliser (three phase): 25-50 KVA	E		1
5	Room heater(oil)		D	4
6	Computer with printer		D	1
7	Spot lamps	E		2
8	Wall clock with seconds hand	E		2

E) Equipment for disinfection

Item No	Item Description	Essential	Desirable	Quantity
1	Sterilising drum, 165mm diameter		D	1
2	Electric steriliser		D	1
3	Washing machine with dryer	E		1
4	Gowns for staff and mothers	E		1
5	Washable slippers	E		4

F) Laboratory equipment

Item No	Item Description	Essential	Desirable	Quantity
1	Centrifuge, hematocrit, benchtop, up to 12000 rpm, including rotor	E		1
2	Microscope, binocular, with illuminator		D	1
3	Bilirubinometer, total bilirubin, capillary-based		D	1
4	Glucometer with Dextrostix	E		3

Annexure 1.2: List of dash board indicators

Sl No	Indicator	Numerator	Denominator
1	Inborn admission rate – Proportion of inborn babies admitted in the unit	Total number of inborn babies admitted	Total number of live births
2	Proportion of admissions which are in-born	Total number of inborn admissions	Total number of admissions
3	Proportion of admissions which are out-born	Total number of out-born admissions	Total number of admissions
4	Proportion of admissions by gender	Total number of males admitted	Total number of admissions
		Total number of females admitted	Total number of admissions
5	Proportion of low birth weight babies	Number with birth weight < 2500 g	Total number of admissions
6	Proportion of very low birth weight babies	Number with birth weight < 1500 g	Total number of admissions
7	Proportion of newborn deaths among inborn	Total number of inborn deaths	Total number of deaths
8	Proportion of newborn deaths among out-born	Total number of out-born deaths	Total number of deaths
9	Case fatality Rates • Respiratory distress syndrome (RDS) • Meconium aspiration syndrome (MAS) • Hypoxic-ischemic encephalophaty (HIE/ moderate/severebirth asphyxia(BA) • Sepsis/pneumonia/meningitis • Major congenital malformation • Prematurity	Number of newborn deaths due to RDS	Total number of deaths
		Number of newborn deaths due to MAS	Total number of deaths
		Number of newborn deaths due to HIE/BA	Total number of deaths
		Number of newborn deaths due to sepsis/ pneumonia/meningitis	Total number of deaths
		Number of newborn deaths due to congenital malformation	Total number of deaths
		Number of newborn deaths due to prematurity	Total number of deaths
10	Antibiotic use rate in inborn	Number of inborn who received antibiotics	Total inborn admissions
11	Antibiotic use rate in out born	Number of outborn who received antibiotics	Total outborn admissions
12	Average length of stay	Sum of days/hours of stay	Total number of newborns
13	Equipment breakdown rate[5] (Radiant warmer, phototherapy units, oxygen concentrator)	No. of days or hours of breakdown each month	Total days or hours in use

[5] *For example, if there are 12 radiant warmers, and 1 was not functional for 1 week in the past one month, then the breakdown rate for radiant warmer would be 7/ 360% (where 12 equipment X 30 days = 360 days)*

Annexure 1.3: Reporting format for newborn facility

(All new born care facilities should submit a Monthly /Quarterly report to the District. NBCCs will only fill in section A, while Section A, B and C will be filled in from all NBSUs and SNCUs. Compiled report from all newborn care facilities in the district should be forwarded to the State.)

State _____ District _____

Reporting period _____

Name and address of the health facility _____

Contact person _____

No. of beds _____ Date of operationalization _____

Type of unit: SNCU/NBSU/NBCC (Tick one or more options as applicable) (For example, the DH will have all three, while the FRU will have both NBSU and NBCC)

SECTION A

Section A to be filled from labor room & OT records (as applicable)

Sl No	Total Number	[N]		
1	Total deliveries			
2	Caesarean sections			
3	Live-births			
4	Still-births 4a. Fresh 4b. Macerated			
5	Term babies			
6	Birth weight of babies			
	> 2500gm			
	< 2500 gm			
	1500–2499 g			
	1000–1499 g			
	< 1000 g			
7	Preterm births (Gestation)			
	>37 weeks			
	<37 weeks			
8	No. of newborns who required resuscitation at birth			
9	Total no. of newborn deaths			
10	No. of referrals made (to higher facilities)[1]			
11	Human Resource	Sanctioned	In place	
	MO			
	SN			
12	Human Resource Trained (NSSK for NBCC, F-IMNCI for NBSU and FBNC for SNCU. Please tick applicable column)	NSSK	F-IMNCI	FBNC
	MO			
	SN			

[1] *In case of District hospital, the higher facility (like the NBSU or SNCU) may be in the same premises.*

SECTION B

Section B to be filled from the Special newborn care unit/Newborn Stabilization Unit records

S. No	Total Number	Inborn [I]	Outborn [O]
7	Admissions in the unit		
7a	Male		
7b	Female		
8	Birth weight /weight at admission* (Inborn – Record the birth weight/Outborn – Record birth weight if available; if it is not available, record and report weight at admission)		
8a	> 2500g		
8b	1500–2499 g		
8c	1000–1499 g		
8d	<1000 g		
9	Gestation		
9a	>37 weeks		
9b	34–37 weeks		
9c	<34 weeks		
10	Morbidity profile		
10a	Respiratory distress syndrome		
10b	Meconium aspiration syndrome		
10c	Other causes of respiratory distress		
10d	HIE/Moderate-severe birth asphyxia		
10e	Sepsis/Pneumonia/Meningitis		
10f	Major congenital malformation		
10g	Jaundice requiring phototherapy		
10h	Hypothermia		
10i	Hypoglycemia		
10j	Others		
11	Management (no. of babies who received)		
11a	Phototherapy		
11b	Antibiotics		
11c	Oxygen		
12	Step-down care		
12a	No. of babies managed in the unit from postnatal ward/step-down		
12b	No of babies managed in the step down from SNCU		
13	Outcome		
13a	Discharge		
13b	Referral		
13c	Left against medical advice (LAMA)		
13d	Died		
14	Duration of stay		
14a	<1 day		
14b	1–3 days		
14c	4–7 days		
14d	>7days		

S. No	Total Number	Inborn [I]	Outborn [O]
14e	Average duration of stay		
15	No. of non-functional equipment (Non-functional equipment = not working >7days/month)		
15a	Phototherapy unit		
15b	Radiant warmer		
15c	Oxygen concentrator		
15d	Suction machine		
15e	Generator/Invertor		

SECTION C

Section C to be filled from the Special newborn care unit/Stabilization Unit death records

S. No	Total Number of Deaths	Inborn [ID]	Outborn [OD
16	Mortality profile (Cause of death)		
16a	Respiratory distress syndrome		
16b	Meconium aspiration syndrome		
16c	HIE/Moderate-Severe birth asphyxia		
16d	Sepsis/Pneumonia/Meningitis		
16e	Major congenital malformation		
16f	Prematurity		
16g	Others		
16h	Cause not established		
17	Duration between the time of admission & death		
17a	<1 day		
17b	1–3 days		
17c	4–7 days		
17d	>7 days		
18	Age at death		
18a	<1 day		
18b	1–6 days		
18c	≥7 days		
19	Birth weight /weight at the time of death		
19a	>2500 g		
19b	1500–2499 g		
19c	1000–1499 g		
19d	<1000 g		
20	Gestation		
20a	Term		
20b	Preterm		
20c	Post term		

Signature of the in-charge: _____ Date: _____

Annexure 1.4: Checklist for facility assessment

The purpose of this assessment tool is to assess the current capacity and status of functioning of the health facility involved in providing delivery and newborn care services. This survey elicits information on the status of services, human resource, infrastructure, equipment and records. It is not intended to go into details of qualitative issues. This tool summarizes the existing resources available, helps to identify gaps and bottlenecks and support planning for newborn corner, stabilization unit or Special newborn care unit. It is recommended that the assessment be carried out by an expert from regional/state or national collaborative centre.

PROFORMA FOR FACILITY ASSESSMENT

Facility Code: (Refer List): _____ | | | | |

Date of Assessment: _____ | D | D | M | M | Y | Y | Y | Y |

SECTION 1: FACILITY IDENTIFICATION

101 Name of facility: _____

102 Type of facility: Tick as applicable

- ☐ District hospital
- ☐ Sub-district hospital
- ☐ First referral unit (FRU)
- ☐ Community Health Centre (CHC)
- ☐ 24 x 7 Primary Health Centre (PHC)
- ☐ Primary Health Centre
- ☐ Additional Primary Health Centre
- ☐ Any Other (Specify)

102 a Type of facility code | | |

103 Location of the facility: _____

SECTION 2: AVAILABILITY OF SERVICES

Tick or fill in as applicable

201 Is there 24-hour delivery and newborn care coverage? [Y|N]

If yes, ask to see a duty roster for night staffing; Tick accordingly:

- ☐ Yes,24-hour duty roster observed or staff present onsite
- ☐ Yes, 24-hour coverage but no duty roster observed & no staff present onsite

Critical services

202 Does this facility provide following delivery services?

☐ Yes (specify below by ticking), ☐ No >Go to 205

- ☐ Normal deliveries
- ☐ Assisted (Forceps delivery/Vacuum)
- ☐ Manual removal of placenta
- ☐ Administration of parental oxytocics/ antibiotics/ Inj. Magnesium sulphate/ management of PPH/other complications
- ☐ Caesarean sections

203 Does this facility have essential newborn care services?

☐ Yes (specify below by ticking) ☐ No >Go To 204

- ☐ Resuscitation
- ☐ Thermal care
- ☐ Breast feeding support services

204 Provision of referrals

- ☐ Yes
- ☐ No

Name of the referral facility _____

205 Does the facility provide 24-coverage for delivery &newborn care services?

- ☐ Yes, both delivery and newborn care services
- ☐ Only delivery services
- ☐ Only newborn care services
- ☐ None

206 Is the person skilled in conducting deliveries present at the facility or on call 24 hours a day, including weekends, to provide delivery care?

- ☐ Yes present, schedule observed
- ☐ Yes present, schedule reported, not seen
- ☐ Yes, on call schedule observed
- ☐ Yes, on call, schedule reported, not seen
- ☐ No

207 Who attends the complicated delivery at the facility?

- ☐ Obstetrician ☐ Pediatrician
- ☐ Both ☐ Other Services

208 Does this facility provide antenatal care services?
- ☐ Yes
- ☐ No

209 Are postpartum care offered at the facility?
- ☐ Yes
- ☐ No

210 Does the facility offer immunization services?
- ☐ Yes
- ☐ No

211 Does the facility offer family planning services?
- ☐ Yes
- ☐ No

212 Does the facility offer safe abortion services?
- ☐ Yes
- ☐ No

213 Does the facility offer treatment of RTI/STI?
- ☐ Yes
- ☐ No

214 Does the facility have essential laboratory services?
- ☐ Yes
- ☐ No

215 Does the facility have blood transfusion services?
- ☐ Yes
- ☐ No

SECTION 3: HUMAN RESOURCES

301. Please specify the codes (a,b,c,d…) for training/s attended by the staff

	Sanctioned (nos.)	In-position (nos.)		Whether any of the staff listed received training in any of the following? *(Please put code and number of staff trained in each in the rows below)*	
		Regular	Contractual	a. SBA/ BEmOC b. IMNCI c. F-IMNCI d. FBNC e. NSSK f. MTP using MVA g. Blood banking/ storage	h. RTI/STI i. IUCD j. Minilap/Lap k. NSV l. EmOC m. LSAS n. Observership (FBNC)
Ob/Gyn					
Anaesthetist					
Paediatrician					
Surgeon					
Others					
Medical Officers					
Nurses					
ANMs					
Lab technicians					
Pharmacist					
Data manager					
Other support staff					

Instructions: *Please ask for the duration of each of the training attended/received. Indicate as trained, only if, they have undergone the training for the following durations.*

Type of training	Duration
1. SBA for ANMs/LHVs and Staff Nurses	2-3 Weeks
2. SBA/ BEmOC for Medical ficers	10 Days
3. IMNCI	8 Days
4. F-IMNCI	11 Days
5. NSSK	2 Days
6. Facility Based Newborn Care	4 Days
7. Observership	2 Weeks

SECTION 4: INFRASTRUCTURE, EQUIPMENT AND SUPPLY

401 How many inpatient beds does the facility have?
.....

402 How many beds are there in the maternity/postnatal ward? .....

403 Are there any beds dedicated to newborn care? If yes, how many? .....

404 Where is the delivery and neonatal equipment located?
- ☐ General consultation room
- ☐ Labor room
- ☐ OT
- ☐ Other (specify)

405 Does the facility have a functional ambulance or other vehicle on-site for referrals?
If yes, ask if the vehicle is functioning and if there is fuel available. Accept reported response.
- ☐ Yes, functioning with fuel
- ☐ Yes, not functioning or no fuel
- ☐ No

406 Does the facility have a mechanism or a system to make phone calls that is available all the time that client services are being offered? Eg. landline, mobile etc.
- ☐ Yes, onsite
- ☐ Yes, not onsite but within 5 minutes walk, pay phone or personal mobile
- ☐ No

407 Is there electricity supply? (Check to see if electricity can be turned on)
- ☐ Yes
- ☐ No supply
- ☐ Irregular electricity supply
- ☐ No electricity connection/supply

408 Is the lighting adequate in the labor room and newborn corner?
- ☐ Yes
- ☐ No

409 Does this facility have a back up or stand-by generator for electricity
If yes, ask if the generator is functioning and if there is fuel available. Accept reported response.
- ☐ Yes, functioning with fuel
- ☐ Yes, but not functioning or no fuel
- ☐ No

410 What is the main source of water for the facility at this time?
- ☐ Safe water source with sufficient amount for hand washing
- ☐ Safe water source with insufficient amount for hand washing
- ☐ Other water source (specify_____)
- ☐ No water source

411 Is the outlet for this water within 500 meters of the facility?
- ☐ Yes
- ☐ No

412 Is running water available today?
- ☐ Yes
- ☐ No

413 Does the facility have designated area for the following functions?
(Indicate in Table below)

Designated Area	Yes	No	No of rooms/ area
Labor Room			
OT			
Postnatal ward/rooming in			
Newborn corner			
Special care unit			
• Breastfeeding			
• Rooming in			
• Hand washing			
• Designated area for mixing I/V fluids			
• Designated area for boiling and autoclaving			
• Designated area for laundry			
• Clean utility area (for storing supplies for regular use)			
• Soiled utility room (for storing use and contaminated material)			
• Stores			
• Side lab			
Duty room for doctors			
Duty room for nurses			

414 **Equipment and supplies:** Note the availability and condition of the supplies and equipment for newborn care (The list is all encompassing for care at all levels. The purpose of listing here is not to judge the operationalization level but to have an inventory of all available equipment at the facility. Availability at the facility is important to note for planning and rationalization purposes)

S.No		Availability				Functionality		
		Number available	Not available	Not applicable	Don't know	Number functional	Not functional	Don't know
MONITORING EQUIPMENT								
1	Stethoscope with neonatal chest-piece							
2	Non-invasive BP monitors							
3	Heart Rate/ Apnea monitor							
4	Pulse oximeter							
5	Low reading clinical thermometers							
6	Room thermometers							
7	Electronic baby weighing scales							
8	Mechanical baby weighing scale							
EQUIPMENT FOR MANAGEMENT								
9	Radiant warmer							
10	Phototherapy unit							
11	Any other (specify)							
RESUSCITATION EQUIPMENT								
12	Self inflating bag							
13	Foot operated suction pump/ mucus trap							
OXYGENATION FACILITY								
14	Centralized							
15	Oxygen cylinders							
16	Concentrator							
17	Head boxes for delivery of oxygen							
EQUIPMENT FOR INVESTIGATION								
18	Micro-hematocrit (Hemoglobinometer)							
19	Dextrometer							
20	Multistix							
21	Microscope							
GENERAL EQUIPMENT								
22	Generator							
23	Invertors							
24	Washing machine							
25	Refrigerator							
26	Computer							
27	Wall clock with 'seconds' hand							
28	Surgical instruments							
29	Spot lamps							
30	Air conditioner							
31	Autoclave equipment							

SECTION 5: RECORDS

501	What source(s) of information were used to record the number of deliveries/births & deaths?	Delivery register	
		Ward register	
	Ask if these registers exist and which of them has the needed information.	OT register	
		Death register	
		Newborn register	
		Monthly Report/HIMS	
		Others	

502	Write duration for which data was examined	a. mo/yr:	b. mo/yr:	c. mo/yr:	d. mo/yr:	e. mo/yr:	f. mo/yr:	g. mo/yr:
1	Total No. of deliveries (include assisted deliveries and c-sections)	a.	b.	c.	d.	e.	f.	g.
2	No. of assisted deliveries	a.	b.	c.	d.	e.	f.	g.
3	Number of c-sections	a.	b.	c.	d.	e.	f.	g.
4	Number of live births	a.	b.	c.	d.	e.	f.	g.
5	Number of newborn deaths	a.	b.	c.	d.	e.	f.	g.
6	Number of fresh still births	a.	b.	c.	d.	e.	f.	g.

Annexure 2.1: Working definitions

Section A: General

1. Live birth

A live birth is complete expulsion or extraction from its mother of a product of conception, irrespective of duration of pregnancy, which after separation, breathes or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movements of voluntary muscles. This is irrespective of whether the umbilical cord has been cut or the placenta is attached. [Include all live births > 500 grams birth weight or 22 weeks of gestation or a crown heel length of 25 cm]

2. Still birth

Death of a fetus having birth weight > 500 g (or gestation 22 weeks or crown heel length 25 cm) or more

3. Birth weight

Birth weight is the first weight of a live or dead product of conception, taken after complete expulsion or extraction from its mother. This weight should be measured within 24 hours of birth, preferably within its first hour of life itself before significant postnatal weight loss has occurred

a. **Low birth weight (LBW):** Birth weight of less than 2500 grams
b. **Very low birth weight (VLBW):** Birth weight of less than 1500 grams
c. **Extremely low birth weight (ELBW):** Birth weight of less than 1000 grams

4. Gestational age (Best estimate)

The duration of gestation is measured from the first day of the last normal menstrual period Gestational age is expressed in completed days or completed weeks. Please provide the best estimate of gestation. It means that, in your judgment, based on history, ultrasound and baby examination date, the estimate as entered in the database is the most accurate

a. **Preterm:** Gestational age of less than 37 completed weeks (i.e. less than 259 days)
b. **Term:** Gestational age of 37 to less than 42 completed weeks (i.e. 259 to 293 days)
c. **Post term:** Gestational age of 42 completed weeks or more (i.e. 294 days or more)

5. Neonatal Period

It refers to the period of less than 28 days after birth

a. **Early neonatal period** refers to the period before 7 days of age
b. **Late neonatal period** refers to the period from completion of 7 days upto 28 days of life

6. Inborn: A baby born in your center

7. Outborn: A baby not born in your center

Section B: Neonatal details

1. **Respiratory Distress - Presence of any one of the following criteria:**
   - Respiratory rate = > 60/minute
   - Subcostal/intercostal recessions
   - Expiratory grunt/groaning

Note: The baby should be evaluated in between the feeds and in a quiet state. Respiratory rate should be recorded for at least 1 minute

2. **Hyaline Membrane Disease/RDS**

   A. Presence of the following criteria
   - Pre-term neonate
   - Respiratory distress having onset within 6 hours of birth

   B. Supportive evidence (Desirable)
   - Skiagram of chest showing poor expansion with air bronchogram/ reticulogranular pattern/ ground glass opacity

3. **Meconium Aspiration Syndrome**

   A. Presence of the following:
   - Respiratory distress within one hour of birth in a term baby with Meconium staining of liquor, staining of nails, umbilical cord or skin

   B. Supportive evidence (Desirable)
   - Radiological evidence of aspiration pneumonitis (atelectasis and or hyperinflation)

4. **Transient tachypnea /delayed adaptation**

Respiratory distress in a term or borderline term or preterm neonate starting within 6 hours after birth, often requiring supplemental oxygen, but recovering spontaneously within 3-4 days and showing characteristic x-ray changes (linear streaking at hila and interlobar fluid)

5. **Birth asphyxia: Presence of any one of the following**
   - Delayed cry
   - Need for assisted ventilation at birth or
   - Apgar < 3 at 1 minutes
   - Apgar < 5 at 5 minutes

6. **Moderate – severe perinatal asphyxia/Hypoxic ischemic encephalopathy**

   Baby with birth asphyxia has encephalopathy if one or more of the following are present:
   - Altered sensorium
   - Inability to feed
   - Convulsions

7. **Pneumonia**

In a neonate with respiratory distress, pneumonia is diagnosed if positive blood culture or any one of the following is present:

- Existing or predisposing factors: maternal fever, foul smelling liquor, prolonged rupture of membranes
- Clinical picture of septicemia (poor feeding, lethargy, poor reflexes, hypo or hyperthermia, abdominal distension)
- X-ray picture suggestive of pneumonia
- Positive septic screen

8. Sepsis (Systemic infection)

In a newborn having clinical picture suggestive of septicemia (poor feeding, lethargy, poor reflexes, hypo or hyperthermia, abdominal distension etc.) and the presence of any one of the following criteria is enough for assigning probable diagnosis of infection:

- Existence of predisposing factors: maternal fever or foul smelling liquor or prolonged rupture of membranes (> 24 hours) or gastric polymorphs (> 5 per high power field)
- Positive septic screen (two of the four parameters (TLC (< 5000/mm, band to total polymorph ratio of > 0.2, absolute neutrophil count less than 1800 / cmm, Creactive protein (CRP) > 1mg/dl and micro ESR > 10 mm 1st hour)
- Radiological evidences of pneumonia
- Positive blood culture

9. Meningitis

In a baby with sepsis, if there is any one of the following:

- Altered sensorium
- Convulsions
- Bulging fontanelle
- Cerebrospinal fluid (CSF) culture is positive, or CSF microscopy and biochemistry are suggestive

10. Hyper-bilirubinemia

Jaundice requiring phototherapy as per charts

11. Hypothermia

Skin temperature < 35.5°C

12. Hypoglycemia

Whole blood glucose of less than 45 mg/dl

13. Major congenital malformation

A malformation that is life threatening or requires surgical correction

Section C: Causes of neonatal deaths

Important Note:
You should first assign the cause(s) of death and you must choose from the causes of death mentioned below. You may assign more than one cause of death at this stage. You will then be assigning the single most important cause of death. Here you should choose only one cause. This is the primary or underlying cause of death, which is defined as disease or injury, which initiated the train of morbid events leading directly to death. You will exercise your judgment to assign this cause keeping in mind this definition change as above

1. **Respiratory distress syndrome:** Death in a neonate attributable to respiratory distress syndrome
2. **Meconium aspiration syndrome:** Death in a neonate attributable to meconium aspiration
3. **Perinatal asphyxia:** Death of a neonate in the setting of and with features of perinatal hypoxia and / or birth asphyxia followed by manifestations of or hypoxic ischemic injury of brain (hypoxic ischemic encephalopathy) or other organs
4. **Septicemia:** Death in a neonate attributable to septicemia or meningitis
5. **Pneumonia:** Death in a neonate attributable to pneumonia
6. **Meningitis:** Death in a neonate attributable to meningitis
7. **Congenital malformations:** Death due to lethal congenital malformation
8. **Prematurity:** Prematurity as a cause of death is assigned to infants having birth weight of less than 1000g or < 28 weeks of gestation with no asphyxia, sepsis, RDS or major malformations
9. **Others:** Mention the cause not classified by above such as
   a. **Birth trauma:** Death due to birth trauma
   b. **Tetanus neonatorum:** Death due to tetanus neonatorum
10. **Not established:** Cause of death not established

Annexure 2.2: Newborn Case Record Sheet for the facility

Newborn Case Record Sheet

01. Name of baby
02. Admission No.
03. Date of admission ☐☐ ☐☐ ☐☐☐☐ [dd/mm/yyyy]
04. Mother's Name _____
05. Father's Name _____
06. Address

07. Date of birth ☐☐ ☐☐ ☐☐☐☐ [dd/mm/yyyy]
08. Time of Birth ☐☐ hr ☐☐ min
09. Age of baby ☐☐ days
10. Sex [M] [F]

HISTORY

A. Maternal history – present pregnancy

11. Age ☐☐ Gravida ☐☐ Para ☐☐ Abortion ☐☐
12. LMP ☐☐ ☐☐ ☐☐☐☐ EDD ☐☐ ☐☐ ☐☐☐☐
13. ANC Check up [Y] [N]
    a. Number of ANC visits ☐☐
14. Tetanus Toxoid [Y] [N]
15. History of
    a. PIH [Y] [N]
    b. Diabetes [Y] [N]
    c. APH [Y] [N]
    d. Maternal Fever [Y] [N]
16. Any other significant history

B. Intra-partum history

17. Place of delivery [Home] [Other hospital] [This Hospital]
18. Delivery attended by [Doctor] [Nurse or ANM] [Dai] [Any other]
19. Mode of Delivery [Caesarean] [Normal Vaginal] [Forceps/vacuum]
    a. Indication for Caesarean, if applicable [_____]
20. PROM > 24 hr [Y] [N]
21. Amniotic Fluid [Clear] [Meconium] [Foul Smelling] [Don't Know]
22. Apgar 1 min ☐☐ [Not Known] 5min ☐☐ [Not Known]
23. Baby cried at birth [Y] [N]
24. Resuscitation [Y] [N] If Yes, details
    a. Bag and mask [Y] [N]
    b. Oxygen [Y] [N]
    c. Others (specify) [_____]
25. Gestation at birth in completed weeks (best estimate) ☐☐ weeks
26. Preterm/ Term/ Post term
27. Weight at birth ☐☐☐☐ grams

C. Presenting complaints

28. Presenting complaints

    _____

    _____

29. Feeding History Breast fed [Y] [N] Fed 8 times/day [Y] [N]
    Any other fluids [Y] [N] If yes, how [bottle] [cup/spoon]
30. Immunization BCG [Y] [N] OPV [Y] [N] HepB [Y] [N]

EXAMINATION

31. Apnea [Y] [N] Respiratory rate _____/min Fast breathing [Y] [N]
    Cyanosis [Y] [N] Chestindrawing [Y] [N] Grunting [Y] [N]
32. Temperature _____° C
33. Circulation: Extremities cool [Y] [N] CFT > 3 secs [Y] [N] HR _____beats/min
34. General condition [Alert] [Lethargic] [Comatose]
35. Convulsions [Y] [N]
36. Skin pinch > 2 seconds [Y] [N]

37. Jaundice [Y] [N] If yes, extent: [Face] [Chest] [Abdomen] [Legs] [Palms/soles]

38. Bulging anterior fontanelle [Y] [N]

39. Bleeding [Y] [N] If yes, specify site [Skin] [Mouth] [Rectal] [Umbilicus]

40. Umbilicus [Red] [Discharge]

41. Skin pustules [No] [< 10] [> 10] [Abscess]

42. Major congenital malformations [Y] [N] If Yes specify _____

43. Neonatal reflexes _____

Anthropometry

44. Weight ☐☐☐☐ grams

45. Head Circumference ☐☐ cm

46. Gestation assessment ☐☐ weeks [Term] [Preterm]

Feeding assessment

47. Sucking [Good] [Poor] [No sucking]

48. Attachment [Well attached] [Poorly attached] [Not attached]

Systemic examination:

_____

_____

_____

_____

Provisional diagnosis:

_____

_____

_____

_____

Plan of investigations:

_____

_____

_____

_____

Treatment:

_____

_____

_____

_____

_____

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