Ministry of Health and Family Welfare
Government of India

Facility Based Newborn Care Operational Guide

2011

Guidelines for Planning and Implementation

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Acknowledgements

The Facility Based Newborn Care Operational Guide has been produced using wide consultation, and represents the hard work of a large number of individuals. We sincerely acknowledge the contributions from an expert group comprising leading professionals, programme managers and government officers. The expert group was set up by the Government of India involving staff from medical colleges, professional bodies – the National Neonatology Forum (NNF) and Indian Academy of Pediatrics (IAP) –UNICEF, WHO, USAID and NIPI for developing these guidelines.

The expert group submitted its report on Unified Standard Protocols for Special Newborn Care Units, Newborn Stabilization Units and Newborn Care Corners under the chairmanship of Dr Ashok Dutta from Kalawati Saran Children's Hospital. Ms Anuradha Gupta and Dr Ajay Khera from the Ministry of Health and Family Welfare reviewed the draft and coordinated the finalization of this document.

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Foreword

K. Chandramouli
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Reproductive and Child Health (II) Programme of the Ministry of Health and Family Welfare, Government of India, aims to reduce Infant Mortality Rate (IMR) and Under-Five Mortality Rate (U5MR) to 30 and 38 per thousand live births respectively in accordance with the Millennium Development Goals (MDG).

Though IMR has declined from 146 in 1951 to 50 per thousand live births (SRS 2009), reduction in Neonatal Mortality Rate (NMR) is almost static and has reduced from 37 (SRS 2005) to 34 per thousand live births (SRS 2009). Furthermore, NMR contributes to about two-thirds of infant deaths and nearly half of all under - 5 deaths. There is an increasing need to focus on newborn care and survival for significant reduction in IMR and U5MR and strengthen the care of sick, premature, low birth weight newborns at the various levels of facilities right from the moment to birth through the neonatal period.

In this context, facility based new born care in Special Newborn Care Units (SNCU), Newborn Stabilization Units (NBSU) and Newborn Care Corners (NBCC) at various levels of health care system assume significant importance. Facility based newborn care operational guidelines have been developed by an expert group of leading professionals and programme managers to serve as a tool for both technical staff and programme managers in operationalizing SNCU, NBSU and NBCC. I am confident that these operational guidelines will prove to be very useful for the health personnel in planning, implementing and monitoring facility based newborn care. It would also provide assistance to service providers working in the facilities by way of key clinical protocols.

I earnestly hope the guidelines would be fruitfully used at the national, state, district and sub-district levels to strengthen facility based newborn care and bring down neonatal mortality.

(K. Chandramouli)

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Abbreviations

AMC	annual maintenance contract
ANM	Auxiliary Nurse Midwife
ANC	antenatal care
APH	antepartum hemorrhage
BeMOC	basic emergency obstetric care
BA	birth asphyxia
BCG	Bacillus Calmette-Guerin
BP	blood pressure
CFL	compact fluorescent light
CFT	capillary filling time
CME	continual medical education
CSF	cerebrospinal fluid
DL	Deciliter
ECG	electrocardiography
EBM	expressed breast milk
EDD	expected date of delivery
ELBW	extremely low birth weight
EmOC	emergency obstetric care
FBNC	facility based newborn care
F-IMNCI	Facility based Integrated Management of Neonatal and Childhood Illnesses
GIR	glucose infusion rate
GOI	Government of India
HEP B	Hepatitis B
HIE	Hypoxic- Ischemic Encephalopathy
HR	heart rate
IAP	Indian Academy of Pediatrics
IMNCI	Integrated Management of Neonatal and Childhood Illnesses
IMR	infant mortality rate
IANN	Indian Association of Neonatal Nursing
IV	intravenous
IVF	intravenous feeding
IUCD	intrauterine contraceptive device
JSY	*Janani Suraksha Yojana*

KCL	potassium chloride
KG	kilo
LBW	low birth weight
LMP	last menstrual period
MAS	Meconium Aspiration Syndrome
MCH	maternal and child health
MDG	Millennium Development Goals
ML	milliliter
MOHFW	Ministry of Health and Family Welfare
MTP	medical termination of pregnancy
MVA	manual vacuum aspiration
NBCC	newborn care corner
NBSU	newborn stabilization unit
NIBP	non-invasive blood pressure
NMR	neonatal mortality rate
NNF	National Neonatology Forum
NRHM	National Rural Health Mission
NS	normal saline
NSSK	Navjaat Shishu Suraksha Karyakram
OPV	oral polio vaccine
OT	operation theatre
PHC	Primary Health Centre
PIH	pregnancy induced hypertension
PIP	project implementation plan
PROM	premature rupture of membrane
RCH II	Reproductive Child Health Programme II
RDS	Respiratory Distress Syndrome
RL	Ringer's Lactate
RR	respiratory rate
RTI	reproductive tract infection
SNCU	special newborn care unit
SP02	spot oxygen saturation
SRS	sample registration system
STI	sexually transmitted infection
TSB	Total Serum Bilirubin
U5MR	under-5 mortality rate
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VLBW	very low birth weight
WHO	World Health Organisation

Introduction

Overview

In India, 26 million babies are born every year, and 940,000 babies die before one month of life. The neonatal period is only 28 days; yet, with a neonatal mortality rate (NMR) of 34/1000 live births (SRS 2009), neonatal mortality contributes to about two-thirds of all infant deaths (Infant mortality rate 50/1000 live births, SRS 2009) and about half of all deaths in children younger than 5 years of age (Under 5 mortality rate 69/1000 live births, SRS 2008). Preventable morbidities such as hypothermia, asphyxia, infections, and respiratory distress continue to be the main causes of mortality in the neonatal period.

Infant mortality rate (IMR) in India has steadily declined from 58/1000 live births in 2004 to 50/1000 live births in 2009. However, there is slow progress in reduction of NMR which declined from 37 in 2004 to 34 in 2009. Reduction of deaths in the first week of life has shown the least progress.

There is a growing recognition that to meet national goals and the Millennium Development Goals (MDGs), a substantial reduction in NMR is needed, and reducing deaths in the first week of life is essential to make progress. A rapidly increasing number of newborns are being delivered in hospitals after the launch of the *Janani Suraksha Yojana* (JSY) scheme. The roll out of the Integrated Management of Neonatal and Childhood Illnesses (IMNCI) programme has also led to increased contact with newborns at their households and improved detection and referral of sick newborns to health facilities. Bringing these two together has resulted in an increased number of sick newborns presenting to referral hospitals. Provision and delivery of services for both essential newborn care and care of sick newborns in the existing health facilities at the district and sub-district level has, however, been found lacking. Facility-based newborn care (FBNC) has a significant potential for improving newborn survival. It has been estimated that health-facility based interventions can reduce neonatal mortality by as much as 25-30% (Lancet 365:977-88).

To accelerate the achievement of national goals and MDGs to bring down childhood mortality, the Government of India (GoI) is committed to improving the availability of quality newborn care services in addition to renewing efforts in providing quality health care for women, infants and young children under the National Rural Health Mission (NRHM) and its Reproductive and Child Health Programme (RCH II). One of the key steps in this direction is the setting up of newborn care facilities at various levels of public health services. Provision of newborn care facilities at various levels of health facilities will not only increase the confidence of the community in the health delivery system but also increase the coverage of services at the time of greatest risk – birth and the first days of life – and thus address the challenge of bringing down neonatal mortality in the country.

Purpose

This operational guide on FBNC has been developed to facilitate planning, establishment, operationalisation and monitoring of newborn care facilities at various levels of public health facilities. The guidelines given here will assist programme managers and service providers at national, state and district level in planning and delivering FBNC. The first section of the guide focuses on specifications and processes related to establishment of new facilities, while the second section provides technical guidance (key clinical protocols) to service providers working in newborn care facilities for managing sick newborns. The guidelines have been put together based on recommendations of an expert group that was set up by the GoI and included experts from medical colleges, professional bodies – National Neonatology Forum (NNF) and Indian Academy of Paediatrics (IAP) – and from UNICEF, WHO, USAID and NIPI.

Structure of the operational guide

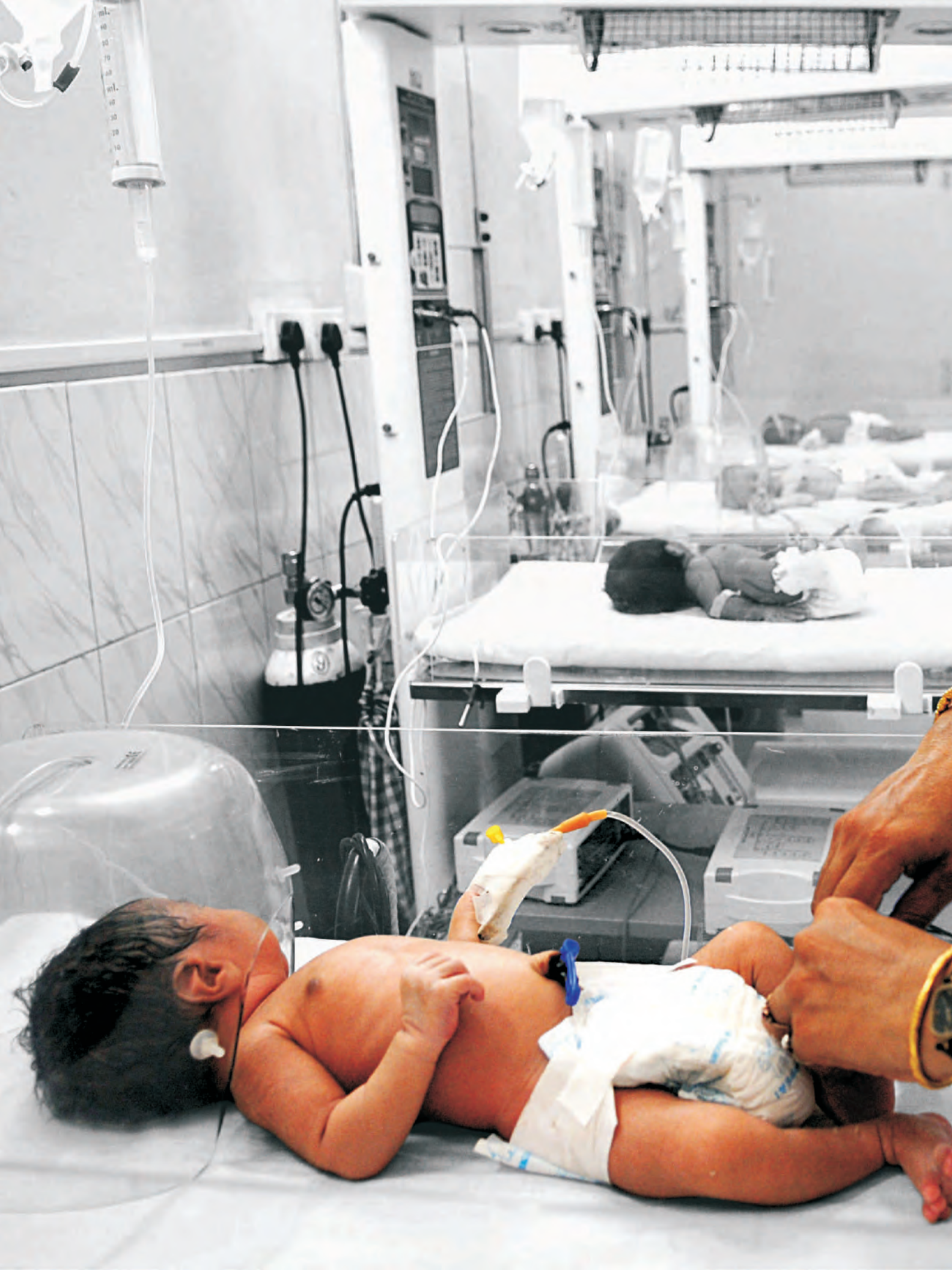
The operational guide includes information on various aspects that need to be addressed for ensuring quality newborn care services and is organised in two sections.

Section I: Setting up, costing and operational steps

Section II: Key clinical protocols and other technical documents

Section I

Setting up, Costing and Operational Steps



1.1 Newborn care at different levels

In the overall planning of facility based care it is important to understand the level of care that can be provided at the various facility levels. Table 1 summarizes the required newborn care facilities at different levels.

Table 1: Newborn care facilities at different levels

Health Facility	All Newborns at Birth	Sick Newborns
Primary health centre (PHC)/ Sub-centre (SC) identified as MCH Level I	Newborn care corner in labor rooms	Prompt referral
Community health centre (CHC) / First referral unit (FRU) identified as MCH Level II	Newborn care corner in labor rooms and in operation theatre (OT)	Newborn stabilization unit
District hospital identified as MCH Level III	Newborn care corner in labor room and in operation theater	Special newborn care unit (SNCU)

Terminology

Newborn Care Corner (NBCC)

NBCC is a space within the delivery room in any health facility where immediate care is provided to all newborns at birth. This area is MANDATORY for all health facilities where deliveries are conducted.

Newborn Stabilization Unit (NBSU)

NBSU is a facility within or in close proximity of the maternity ward where sick and low birth weight newborns can be cared for during short periods. All FRUs/CHCs[1] need to have a neonatal stabilization unit, in addition to the newborn care corner.

Special Newborn Care Unit (SNCU)

SNCU is a neonatal unit in the vicinity of the labor room which will provide special care (all care except assisted ventilation and major surgery) for sick newborns. Any facility with more than 3,000 deliveries per year should have an SNCU (most district hospitals and some sub-district hospitals would fulfil this criteria).

[1] *As per the IPHS*

Table 2: Expected services to be provided at newborn care facilities

Newborn Care Corner	Stabilization Unit	Special Newborn Care Unit
Care at birth	**Care at birth**	**Care at birth**
• Prevention of infection • Provision of warmth • Resuscitation • Early initiation of breastfeeding • Weighing the newborn	• Prevention of infection • Provision of warmth • Resuscitation • Early initiation of breastfeeding • Weighing the newborn	• Prevention of infection • Provision of warmth • Resuscitation • Early initiation of breastfeeding • Weighing the newborn
Care of normal newborn	**Care of normal newborn**	**Care of normal newborn**
• Breastfeeding/feeding support	• Breast feeding/feeding support	• Breast feeding/feeding support
Care of sick newborn	**Care of sick newborn**	**Care of sick newborn**
• Identification and prompt referral of 'at risk' and 'sick' newborn	• Management of low birth weight infants ≥1800 grams gwith no other complication • Phototherapy for newborns with hyper-bilirubinemia* • Management of newborn sepsis • Stabilization and referral of sick newborns and those with very low birth weight(rooming in) • Referral services	• Managing of low birth weight infants <1800grams g • Managing all sick newborns (except those requiring mechanical ventilation and majorsurgical interventions) • Follow-up of all babies discharged from the unit and high risk newborns • Immunization services • Referral services
Immunization services	Immunization services	Immunization services

** Availability of laboratory facilities to estimate bilirubin levels is a prerequisite*

Steps in setting up newborn care facilities

Newborn Care Corner

1. Earmark an area about 20-30 sqft in size within the labor rooms of all health facilities for establishing a newborn corner. For FRUs and district hospitals, also set up newborn corners in operation theatres where caesarean sections are conducted.
2. Equip the corner with a radiant warmer and resuscitation kits (Annexure 1.1, A).

Newborn Stabilization Unit

1. For setting up a 4-bedded stabilization unit, at least 200 sqft of floor space is required. The unit should be located within or in close proximity to the maternity ward.
2. In addition, two beds in the postnatal ward should be dedicated for rooming in.
3. Civil work. Basic civil work required to set up a stabilization unit are:
    - Power supply: The unit should have 24 hr uninterrupted stabilized power supply.

- Water supply: The unit should have 24 hr uninterrupted running water supply.
- Lighting: The unit should be well lit, preferably with compact fluorescent light (CFL) panels.
- Floor surfaces: The floor surfaces should be easily cleanable thus minimizing the growth of micro-organisms.
- Walls: As with floors, the ease of cleaning, durability, and acoustical properties of wall surfaces needs to be considered.

4. Equipment: The equipment for maintaining temperature and conducting resuscitation are required (See Annexure 1.1, B : List of Equipment).

Special Newborn Care Unit

1. Project the bed demand.

   The minimum recommended number of beds for an SNCU at the district hospital is 12. However, if the district hospital conducts more than 3,000 deliveries per year, 4 beds should be added for each 1,000 additional deliveries.

2. Estimate the required space and identify the space.

   a. An average floor area of 50 sqft per bed should be available for a patient care area with an additional 50 sqft to be utilized as ancillary area. Therefore, on an average, a total area of 100 sqft per patient is required. For example, for a 12-bedded SNCU, 1,200 sqft floor area is required.

   b. Additional space will be required for the step-down area which will have beds for babies rooming-in with the mothers after the acute phase of illness is over. The number of beds (adult beds would be required for rooming-in babies with mothers) is 30% of the SNCU beds. For example, a 12-bedded unit will require 4 additional adult beds for the step down.

3. Design the unit.

   The unit should be so designed as to have the following areas:

   a. Patient care area: For a unit of 12 beds, the patient care area would be 600 sqft (50 sqft per bed). The patient care area can be designed to have two interconnected rooms separated by transparent observation windows from the nurses' working place in between. While one room can be used for intramural newborns (those born within the health facility), another room can be used for extramural newborns (those born outside the health facility).

   b. Ancillary area: 600 sqft ancillary area should include separate areas for hand washing and gowning area at the entrance, nurses' work station, clean area for mixing intravenous fluids and medications, doctors duty room, computer terminal, mother's area for expression of breast milk and learning mother crafts, unit store and side lab. It is desirable to have areas for portable x- ray, boiling and autoclaving and laundry room.

   c. Step-down area: In addition to the patient care area and ancillary space, the SNCU design should include the step-down unit. The step-down could be within the premises or in close proximity.

4. Identify and provide for civil, electrical and mechanical requirements.

Civil, electrical and mechanical works are essential for effective functioning of SNCU.

a. Power supply: The unit requires 24 hr uninterrupted stabilized power supply, sufficient to take the load of equipment. Stabilized power is critical to prevent any electrical damage to the equipment. Ensuring stabilized power inputs will require careful planning at the design stage. Power generator of appropriate wattage is needed to provide uninterrupted power supply.

b. Floor surfaces: The floor surfaces should be easily cleanable and minimize the growth of micro-organisms.

c. Walls: As with floors, the ease of cleaning, durability, and acoustical properties of wall surfaces must be considered.

d. Water supply: The unit should have 24 hr uninterrupted running water supply. An overhead tank of appropriate size should be provided for.

e. Lighting: Light sources should be as free as possible of glare or veiling reflections. No direct view of the electric light source or sun should be permitted in the newborn space.

f. Temperature: The unit should be designed to provide an air temperature of 78.8°F to 82.4°F (28 ± 2°C).

5. Procure and install equipment.

SNCU equipment include equipment for resuscitation, phototherapy and thermoregulation such as radiant warmers and phototherapy units. It is imperative to ensure adherence to the standards. As mentioned above, it is critical to ensure uninterrupted and stabilized power supply before installation (Annexure1.1, C).

Cost of setting up newborn care facilities

Table 3: Indicative costs for setting up newborn care facilities (in Indian rupees –₹)

	NBCC	NBSU	SNCU
One time establishment cost (in ₹; does not include the cost of training)			
Renovation & civil works (average)	10,000	3,00,000	16,00,000
Equipment & furniture	75,000	2,75,000	25,00,000
Sub Total	85,000	5,75,000	41,00,000
Recurring or running cost (does not include staff salaries)			
Consumables	5,000	25,000	3,50,000
Maintenance cost	15,000	1,50,000	6,50,000
Sub Total	20,000	1,75,000	10,00,000
Total	**1,05,000**	**7,50,000**	**51,00,000**

Human resources for newborn care service

- **NBCC:** One doctor and one staff nurse should be designated to NBCC to ensure appropriate functioning of the corner. All doctors and nurses who are likely to attend deliveries must be trained in *Navjaat Shishu Suraksha Karyakram* (NSSK). If NBCC is established at the sub-centre, then the auxillary nurse midwife (ANM) must also receive NSSK training.
- **NBSU:** One trained doctor is required for the stabilization unit. At least one full-time staff nurse trained in newborn care per shift should be available. This would require at least 4 fulltime staff nurses per unit. The staff at NBSU must be trained in facility based IMNCI (F-IMNCI).
- **SNCU:** A 12-bedded unit (plus 4 beds for the step-down area) requires at least one pediatrician or a trained doctor round-the-clock. Assuming that one doctor provides back-up of 8 hours, at least three to four trained doctors should be available at the facility. It is proposed that one paediatrician trained in neonatology should be posted at the unit, supported by two or three medical officers trained in FBNC.

  Such a unit will also require three nurses in each shift, round-the-clock. In addition, there should be sufficient nurses recruited to provide for leave vacancy and contingency.

  In addition to doctors and paramedics, dedicated support staff should be available to clean the nursery at least once during every shift and more often depending on the need. In addition, a part-time lab technician and a data operator will be required for the unit.

Note: It is important that doctors and nurses trained in newborn care are retained in SNCU/NBSU/NBCC and are not rotated to duties outside the newborn care facilities.

Training of staff on newborn care

To ensure that the staff has the necessary skills to provide the appropriate level of care, the staff should, at a minimum, undergo training in the following programme areas:

- **NBCC:** Doctors, staff nurses and ANMs working at newborn corners should be trained in NSSK
- **NBSU:** Doctors and nurses at facilities with stabilization units should be trained in F-IMNCI
- **SNCU:** The staff posted at the SNCU need to further undergo training in FBNC

Given below is a brief on each of the trainings proposed for staff at newborn care facilities:

Navjaat Shishu Suraksha Karyakram (NSSK)

Birth asphyxia is among the major direct causes of neonatal deaths, along with preterm birth and severe infections. NSSK is a new programme in basic newborn care and resuscitation that has been rolled out with support from the IAP and NNF. NSSK addresses important interventions of care at birth, that is basic newborn resuscitation, prevention of hypothermia, prevention of infection, early initiation of breast feeding, and equips the staff with appropriate knowledge and skill to provide essential newborn care in primary health care settings.

A two-day training module for medical officers, staff nurses and ANMs at primary health facilities (24x7 PHCs, sub-centres identified at MCH centres) has been developed.

NSSK is recommended as an essential training for all health workers conducting deliveries at 24x7 PHCs and sub-centres identified as MCH centres.

The specific details are as follows:

Training	Navjaat Shishu Suraksha Karyakram (NSSK)
Venue	District hospital or medical colleges
Trainers	Paediatricians from medical colleges and district hospitals
Trainees	Medical officers, staff nurses and ANMs
Batch Size	32 per batch
Duration	2 days

Facility based IMNCI (F-IMNCI)

Capacity building of service providers at NBSUs is essential to ensure quality care for normal and sick newborns. Keeping in view the non-availability of specialists (paediatricians) at many FRUs, it becomes important to build skills of medical officers and staff nurses at these facilities. It is recommended that all NBSU staff at FRUs is trained in F-IMNCI, which includes the package on 'facility based care of sick newborns and children'. F-IMNCI is skill-based training, based on a participatory approach combining classroom sessions with hands-on clinical sessions.

Medical officers and nurses not trained in IMNCI and working at health facilities should receive the full package of training with duration of training being 11 days.

Medical officers and nurses already trained in IMNCI will receive a training of the facility based care (FBC) portion of 5 days duration only.

The operational guidelines for F-IMNCI (already available) must be followed in this regard. Specific details include:

Training	F-IMNCI
Trainees	Medical officers and staff nurses at 24x7 PHCs, FRUs, district hospitals, MCH Level I, II and III.
Trainers	Senior paediatricians in district hospitals; faculty members of departments of paediatrics and community medicine of the medical colleges.
Venue	Medical college hospital, district hospital or private health facility with adequate number of deliveries and admitted cases of sick newborns and children under 5 years of age (at least 5 each).
Duration	11 days for medical officers and staff nurses who have not been trained in IMNCI and 5 days for those already trained in IMNCI.
Batch size	16 participants per batch.

Facility based newborn care training programme

All doctors and nurses posted in SNCUs need to undergo a more intensive training programme, including an observership at a recognized centre. The training programme includes skill-based training on essential and special care. Besides skills on clinical management, additional training is provided on housekeeping and maintenance of the equipment. The box on page 11 summarises the programme.

Training	Facility Based Newborn Care (FBNC).
Trainees	Medical officers and staff nurses posted in SNCU.
Trainers	National facilitators from National Neonatology Forum (NNF) and Indian Association of Neonatal Nurses (IANN), Faculty members, Department of Neonatology of National & Regional SNCU Collaborative Centres.
Venue	Training in a district hospital (SNCU) followed by obsevership in an SNCU collaborative centre or a medical college hospital with level-3 neonatology unit.
Duration	4 days of training followed by 2 weeks of observership.
Batch size	20-24 participants per batch of training and 4 participants per batch of observership.

1.2 Operational steps for planning and rolling out facility based newborn care in the state and districts

A National Collaborative Centre for FBNC will be engaged at the national level. This centre will provide technical expertise and overall support to the government for effective implementation and monitoring of the progress in the states. The National Collaborative Centre will work in close association with regional and state collaborative centres (see section 1.3) to build capacity of the service providers located at the newborn care facilities as well as extend mentoring support to the SNCU teams and state/district programme managers.

State orientation and planning meeting

- State planning meeting of at least one day should be organized for key state/district programme managers to plan for all components, phasing and budgeting of newborn care units. A detailed plan with budgets should be available with the state and concerned districts. The operational guideline should be disseminated to all the concerned programme managers and experts in the state and a one-day orientation can be carried out, if required
- If the plan and budgets have been approved in the state project implementation plan (PIP), a 'roll out' plan should be developed by involving the state and district programme managers. This includes physical establishment as well as recruitment and training of requisite human resources

Prioritisation of districts

The aim is to have an SNCU in each district hospital and at those sub-district hospitals where more than 3,000 deliveries are conducted per year. However, prioritisation of districts has to be done in setting up newborn care facilities and this can be guided by the following criteria:

- Prioritise the high focus districts (those districts which are performing poorly on RCH indicators). Within these districts, focus on districts with high infant mortality and those with high levels of institutional deliveries. High mortality districts are those with IMR higher than the state average
- Within the districts, prioritise facilities having high institutional delivery rates
- In the identified districts, newborn care facilities must be planned as follows:
  - Newborn care corners: In OT and labor room of district hospitals, sub-district hospitals, FRU/CHCs and at all 24x7 PHCs and MCH level 1 centres, that is at all delivery points.
  - Newborn stabilization unit: At all FRUs and CHCs with less than 3,000 deliveries per year

- SNCU at district hospitals and sub-district hospitals conducting more than 3,000 deliveries per year. If a newborn care unit exists in the medical college hospital, then it should be ensured that it fulfils the requirements of an SNCU as specified here.

Setting up a multi-disciplinary team

State should set up a multi-disciplinary team composed of doctors, civil works team (from the public works department) and biomedical engineers to oversee the overall assessment, civil work and refurbishment plans at the district and state level.

Procurement, supply and maintenance of the equipment

Based on a facility assessment, efforts should be made to mobilize unused essential newborn care equipment in peripheral units. Acquisition of new equipment should be as per RCH-II or state suggested mechanisms. It should be ensured that the equipment is of appropriate quality and comply with the specifications laid down in this regard. It is preferred that indigenously manufactured equipment be procured. Equipment is critical for optimal performance of SNCUs. Inadequate functioning or non-use of equipment will lead to ineffective services. Very often reasons for poor functioning of the equipment are non-stabilized power input, limited skills in use of equipment, lack of preventive maintenance and troubleshooting, absence of an annual maintenance contract (AMC) and non-honouring of AMC.

State should ensure some of the following steps for the maintenance and adequate functioning of the equipment:

- Build multiyear AMC into procurement contracts
- Provide designated automatic power back-up of adequate power
- Carry out power audit of the units, ensuring stabilized power input
- Train SNCU staff in use, preventive maintenance, and troubleshooting of equipment before installation
- Create network of trained technicians and biomedical engineers for optimum functioning of the equipment
- Earmark funds for local repair, and place funds with the unit in order to avoid inordinate delays in sanctioning of funds
- Conduct regular audit for functionality of equipment
- Outsource some selected maintenance services (e.g. medical and laboratory equipment maintenance)

Recruitment and training of staff

The quality of services offered at a facility depends on the availability of clinical expertise round-the-clock, backed by monitoring devices and equipment.

- Identify staffing requirements (see the section on human resources) and take steps to get the staff into position.
- Assess training needs and training load, and develop a training plan for the state and district. Trainings should be timed as close as possible to the operationalisation of the newborn care unit.

Record keeping

Each unit will record information on each admitted newborn in the standard case-recording sheet (Annexure 2.2). Standard case definitions would be used for recording the clinical conditions among admitted newborn babies (Annexure 2.1). Use of standard definitions would ensure that the data is valid, reliable and comparable across the units. Ideally, all units should have a computerised data entry system.

Based on the case records, the units will generate the report, using the standard reporting format (Annexure 1.3), and submit to the districts. The districts will send the collated reports to the relevant state health authorities and to the state collaborative centre.

Review and feedback

At each level, the reports will be analysed and performance reviewed on standard indicators (Annexure 1.2). At the unit level, review of cases and feedback to staff is a continuous process, and the medical officer in-charge/medical superintendent will be responsible for the review. The monthly reports should be compiled and sent to the district. At the district level, monthly reports should be compiled from all health facilities providing newborn care and forwarded to the state.

At the state (or divisional level), state or regional collaborative centres should provide a quarterly feedback to the districts and newborn care units.

The data compiled from all the districts will be forwarded by the state to the RCH division at the central level.

Supervision and monitoring

Periodic review by the state and district officials and by the faculty of the collaborative centres would be conducted to assess implementation and suggest mid-course correction.

Each SNCU must be assigned a mentoring team of two experts from the state, at least for the initial one to two years till the functioning of the units is well established. These can be the experts designated by NNF, IAP or the Indian Association of Neonatal Nursing (IANN) who will be required to undertake regular monitoring visits and provide mentoring support to the local teams. They should also assist the teams in analysing the data (case records, death audits, facility assessment, etc) and to accordingly plan and implement steps for quality improvement. Provision for mentoring visits can be built in the PIPs.

Ensuring quality of care

Adherence to standard operating procedures for housekeeping and for clinical care of admitted newborns is critical for ensuring quality care at the facilities. Refer to Section II for the details on housekeeping and clinical protocols.

Planning for newborn care facilities at district level

A district will have newborn care facilities established as a three-tiered system. While MCH centres and 24x7 PHCs will have NBCCs, the FRU/CHC will have NBSUs (in addition to NBCCs attached to the labor room and OT). SNCUs will be established at the district or sub-district hospital (wherever 3,000 or more deliveries are being conducted in a year).

Illustration 1: Assume a district that has one district hospital with more than 3,000 deliveries per year, five FRUs, and twenty 24x7 PHCs[4]. In one such district, the facilities required for newborn care are listed in Table 3.

Table 3: Facilities for newborn care in a district having one district hospital with more than 3,000 deliveries per year, five FRUs, and twenty 24x7 PHCs

Health Facility	Services	Nos.
Primary health centre/MCH Level I	Newborn care corners in labor rooms	20
First referral unit/ Community health centre/ MCH Level II	Newborn care corners in labor rooms	5
	Newborn care corners in OT	5
	Newborn stabilization unit	5
District hospital/ MCH Level III	Newborn care corners in labor rooms	1
	Newborn care corners in OT	1
	Special newborn care unit	1

1.3 Collaborative centres

Institutions fulfilling the following criteria will be identified, designated and supported to be collaborative centres:

- Have a functional Level II or Level III nursery (certified by NNF).
- Express interest in supporting FBNC in rural India.
- Have adequate and motivated faculty to support the units, who are willing to travel to the remote districts for about 1-2 weeks per year for training and mentoring visits.
- Follow rational practices of clinical newborn care and of housekeeping in their own units.
- Involved in operational research activities related to evidence based newborn care.

National Collaborative Centre

An apex institute or medical college will provide clear leadership and technical guidance for ensuring uniform, high quality implementation of FBNC.The designated National Collaborative Centre will be responsible for coordinating the activities of the regional and state collaborative centres.

The National Collaborative Centre will:

- Prepare technical guidelines, norms and protocols, and update them from time-to-time
- Monitor the progress and quality
- Review and analyse reports
- Mentor and support some regional/state collaborative centres
- Provide recommendations to the Ministry of Health and Family Welfare (MOHFW) to improve the implementation and make course corrections
- Build capacity of the regional and state collaborative centres

[4]*Population norm for PHC/FRU, CHC/DH*

Regional and state collaborative centres

Existing Centres of Excellence in newborn care will be identified and designated as regional collaborative centres. These will provide technical support in operationalisation of newborn care facilities, establishing a monitoring system, and conducting quality assessment. King Edward Memorial Hospital (Mumbai), PGIMER (Chandigarh), Institute of Child Health (Chennai), and Kalawati Saran Children's Hospital (New Delhi) have already been identified as collaborative centres.

In consultation with the state, one medical college will be identified as the state collaborative centre. As far as possible, these centres will be the ones identified already as state resource centres for skilled birth attendance.

The regional collaborative centre will ensure that in the state collaborative centre

- appropriate perinatal practices are followed;
- capacity of the faculty and staff is built so that they can play the role of local trainers and mentors; and
- data is well managed to allow for analysis and feedback.

Regional/State collaborative centres will perform the following tasks:

i. Capacity building of SNCU staff and administrators
   - Establishing the state trainer pool
   - Training of SNCU staff including doctors (medical officers and paediatricians) and nurses equipped with knowledge and skills for efficient management of sick newborns
   - Training of all staff in housekeeping protocols for SNCUs and equipment maintenance
   - Training in administration/managerial issues for in-charge MOs and nurse managers
   - Refresher courses or continuing medical education (CME)

ii. Supporting the establishment of a standard recording and reporting system
   - The regional/state collaborative centre will generate quarterly analysis report on various trends in the SNCUs, for example trends of admissions (inborn vs out-born), gestation, birth weight, causes of deaths, etc

iii. Ongoing support
   - Follow-up observership visits to the collaborative centre for 2 weeks (after the FBNC training).
   - Mentoring visits by the collaborative team to each centre once every three months. The mentoring visits will be made to look into all operational issues, including the quality of care being provided at the units. For a suggested checklist for mentoring visits see Annexure 1.4.
   - Establish a technical helpdesk for queries related to patient care, unit management and case discussions.

iv. Quality assurance
   - The regional/state collaborative centre will ensure that quality assurance systems for SNCUs are developed and bi-annual quality assessment is performed for these SNCUs

v. Operational research

- The national/regional/state collaborative centres will conduct focused operational research on issues where there is identified gap in knowledge or felt need for generating new evidence.

vi. Review meetings

- The regional/state collaborative centre will organise bi-annual review meetings of the in-charges of newborn care units in the states and districts, and also actively participate in the annual review meeting of all the collaborative centres.

Section II

Key Clinical Protocols and Other Technical Documents

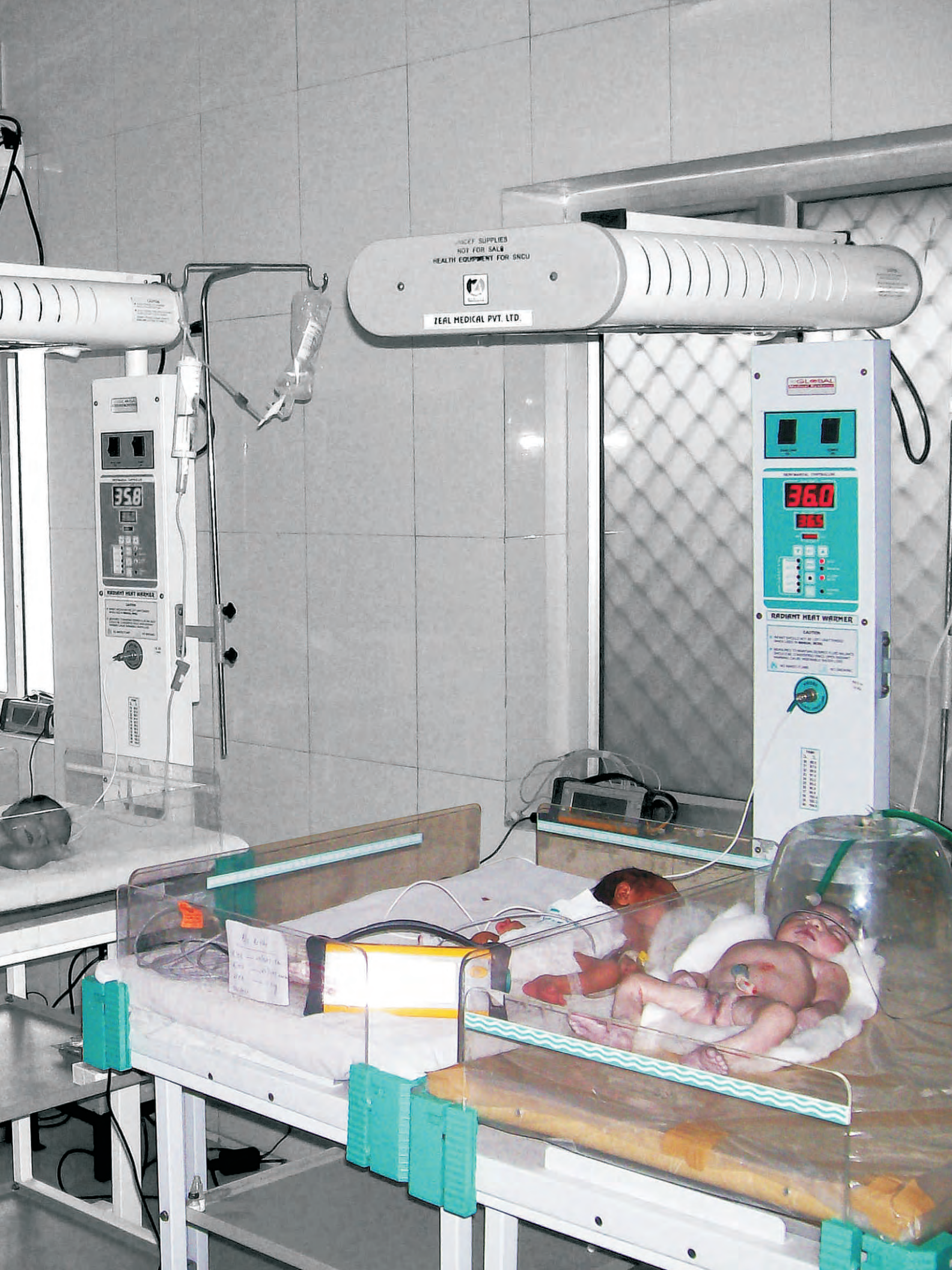
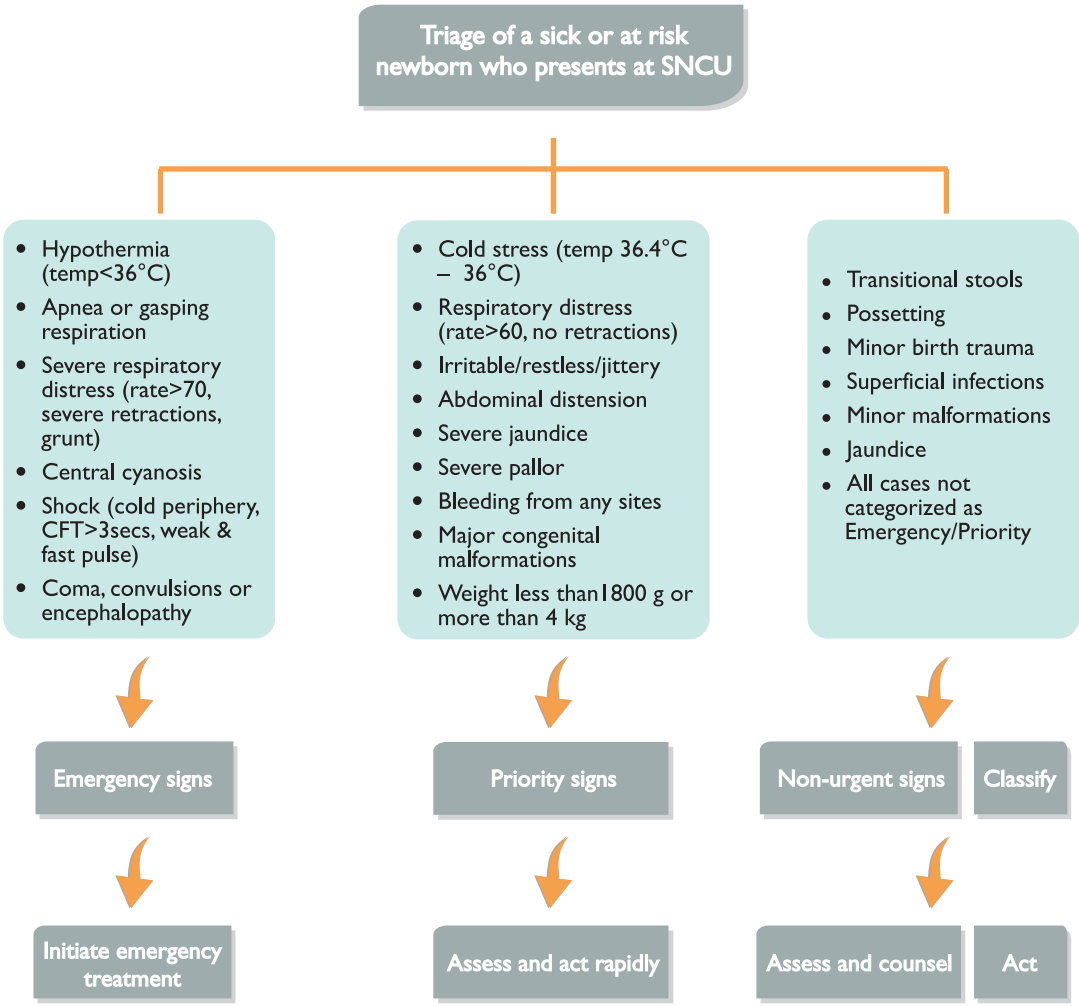

NOT FOR SALE
ZEAL MEDICAL PVT. LTD.
36.0
RADIANT HEAT WARMER

Chart 1

Triage of sick newborns

Triaging is sorting of neonates to rapidly screen sick neonates for prioritizing management



*Newborns classified as "Emergency" require urgent intervention and emergency measures. All such newborns will be admitted to SNCU after initial stabilization.

Newborns classified as "Priority" are sick and need rapid assessment and admission to SNCU.

Newborns classified as non–urgent do not require urgent attention but require further assessment and counseling.

Chart 2

Assessment and treatment of newborns displaying emergency signs

	ASSESS FOR EMERGENCY SIGNS (In all cases)		TREAT EMERGENCY SIGNS
TEMPERATURE	• Cold to touch (Abdomen)	**IF POSITIVE** →	• Re-warm hypothermic babies • Rapidly re-warm if there is severe hypothermia (<32°C) up to 35°C and then gradual re-warming • Make sure young infant is warm

AIRWAY AND BREATHING	• Not breathing or gasping or
	• Central cyanosis or
	• Severe respiratory distress
	  ○ Respiratory rate 70/min
	  ○ Severe lower chest in-drawing
	  ○ Apnoeic spells
	  ○ Grunting
	  ○ Unable to feed
		ANY SIGN POSITIVE →	• Manage airway
			• Provide tactile stimulation if apnoeic
			• If still apnoeic or gasping – Provide PPV
			• Give oxygen
			• Make sure neonate is warm

CIRCULATION	• Capillary refill longer than 3 seconds, and • Weak and fast pulse (>160)	**IF POSITIVE** →	• Give oxygen • Insert IV line and give 20 ml/kg normal saline over 30 min • Proceed immediately to full assessment and treatment • Make sure neonate is warm
CONVULSIONS	• Convulsions	**IF CONVULSING** →	• Manage airway • Check & correct hypoglycemia • Give anticonvulsant • Make sure neonate is warm

For all newborns displaying emergency signs:

- Provide the treatment as above
- Call for help
- Draw blood for emergency investigations (Glucose, Calcium, sepsis screening)

Chart 3

Criteria for admissions to SNCU and criteria for transfer to step-down unit and discharge

Any newborn with following criteria should be immediately admitted to the SNCU:

- Birth weight <1800 g or gestation <34 weeks
- Large baby (>4.0 kg)
- Perinatal asphyxia
- Apnea or gasping
- Refusal to feed
- Respiratory distress (Rate >60/min or grunt/retractions)
- Severe jaundice (Appears <24 hrs/stains palms & soles/ lasts>2 weeks)
- Hypothermia <35.4°C, or hyperthermia (>37.5°C)
- Central cyanosis
- Shock (Cold periphery with CFT>3 seconds and weak & fast pulse)
- Coma, convulsions or encephalopathy
- Abdominal distension
- Diarrhea/dysentery
- Bleeding
- Major malformations

Criteria for transfer from SNCU to the Step-Down

- Babies whose respiratory distress is improving and do not require oxygen supplementation to maintain saturation
- Babies on antibiotics for completion of duration of therapy
- Low birth weight babies (less than 1800 g), who are otherwise stable (for adequate weight gain)
- Babies with jaundice requiring phototherapy but otherwise stable
- Babies admitted for any condition but are now thermodynamically and hemodynamically stable

Criteria for discharge from SNCU to home

- Baby is able to maintain temperature without radiant warmer
- Baby is hemodynamically stable (normal CFT, strong peripheral pulses)
- Baby accepting breast feeds well
- Baby has documented weight gain for 3 consecutive days; and the weight is more than 1.5 kg
- Primary illness has resolved

In addition to the above, mother should be confident of taking care of the baby at home.

Chart 4

Indications of admission to newborn stabilization unit (NBSU)

Newborn presenting with any of the following signs to a facility with neonatal stabilization unit requires admission for initial stabilization and transfer to SNCU:

- Apnea or gasping
- Respiratory distress (Rate > 70/min with severe retractions/grunt)
- Hypothermia <35.4°C
- Hyperthermia (>37.5°C)
- Central cyanosis
- Shock (Cold periphery with CFT>3 seconds and weak & fast pulse)
- Significant bleeding that requires blood or component transfusion

Newborns, who after assessment and stabilization, can be managed at stabilization unit*

- Newborns with respiratory distress, having respiratory rate 60-70/min without grunting or retractions (for observation and oxygen therapy)
- Newborns with gestation less than 34 weeks or weight <1800 g (for observation and assisted feeding)
- Newborns with hypothermia and hyperthermia who are hemodynamically stable after initial stabilization
- Newborns with jaundice requiring phototherapy
- Neonates with sepsis who are hemodynamically stable, for observation and antibiotic therapy

* Others would require referral to an SNCU after stabilization, if an SNCU and appropriate referral is available in the district

Chart 5

Grading and management of hypothermia

Baby who is cold to touch both centrally and peripherally or temperature is less than 35.5°C

Grading of hypothermia

- Normal temperature : 37.5–36.5°C
- Cold stress : 36.4–36.0°C
- Moderate hypothermia : 35.9–32°C
- Severe hypothermia : < 32°C

Management of hypothermia

- Record the actual body temperature
- Re-warm a hypothermic baby as quickly as possible:
    - Severe hypothermia – Radiant warmer
    - Mild to moderate hypothermia – Kangaroo mother care or Radiant warmer

If hypothermia still persists despite taking above measures, infection should be suspected

Management of severe hypothermia

1. Keep under radiant warmer
2. Reduce further heat loss
3. Infuse IV 10% Dextrose @ 60ml/kg/day
4. Inject Vitamin K 1.0 mg intramuscular
5. Provide oxygen
6. Consider and assess for sepsis

Prevent hypothermia: warm chain
Baby must be kept warm at all times right from birth. The "warm chain" is a set of 10 interlinked procedures carried out at birth and later
1. Warm delivery room (>25°C)
2. Warm resuscitation
3. Immediate drying
4. Skin-to-skin contact between baby and the mother
5. Breast feeding
6. Bathing and weighing postponed
7. Appropriate clothing and bedding
8. Mother and baby together
9. Warm transportation
10. Training/awareness-raising of healthcare provider

Chart 6

Expression of breast milk

Breast milk expression is required for optimal feeding of newborns for preterm, low birth weight and sick newborns that cannot breastfeed but can tolerate assisted feeding.

Expressing breast milk (Figure 1)

Teach the mother to:

- Wash hands with soap and water before expression. Hold, handle or cuddle the baby
- Sit comfortably and hold the clean container near the breast
- Put thumb and index finger on the breast at the rim of the areola opposite each other. Support the breast with other three fingers
- Press thumb and index finger slightly inwards towards the chest wall
- Press the breast between the fore-finger and thumb. Press and release, press and release. This should not hurt
- Press the areola in the same way from the sides, this ensures that milk is expressed from all segments of the breast
- Avoid rubbing or sliding fingers along the skin
- Express one breast for at least 3-5 minutes until the flow slows; then express the other side; and then repeat on both sides
- To express breast milk adequately it may take 20-30 minutes

Storing expressed breast milk (EBM)

- Cover the container of EBM with a clean cloth or a lid
- EBM can be kept at room temperature for 8 hours and in the refrigerator for 24 hours
- EBM stays in good condition longer than animal milk. Do not boil the EBM. For warming, place the container in a bowl of warm water
- Before feeding. gently shake the container or use a stirrer to recombine the separated fat globules with the rest of the milk
- Feed with cup or spoon or paladai, never feed with bottle

Figure 1: Technique of manual expression of breast milk

Chart 7

Assisted feeding of low birth weight neonates

Newborns that require assisted feeding:

- Preterm <34 weeks or birth <1800 g
- Babies having mild respiratory distress
- Babies with inability to feed at breast or by katorispoon/paladai
- Oro-facial defects/malformation (Cleft lip or palate)

Guidelines for the modes of providing fluids and feeding

Birth weight (grams)	<1200	1200-1800	>1800
Gestation (weeks)	<30	30-34	>34
Initial feeding	Intravenous fluids try gavage feeds, if not sick	Gavage, try katori-spoon if not sick	Breastfeeding, if unsatisfactory, give katori-spoon feeds
After 1-3 days	Gavage	Katori-spoon	Breastfeeding
Later (1-3 weeks)	Katori-spoon	Breastfeeding	Breastfeeding
After some more time (4-6 weeks)	Breastfeeding	Breastfeeding	Breastfeeding

Mode for providing fluids and feeds

Breast milk is the ideal feed for low birth weight babies.

Those unable to feed directly on the breast can be fed expressed breast milk (EBM) by gavage OR katori-spoon or paladai.

Techniques of assisted feeding

Gavage feeds

- Place an oro-gastric feeding catheter of size 5-6 Fr after measuring the correct insertion length from ala of nose to tragus and from tragus to midway between xiphisternum and umbilicus
- Check correct placement by pushing in air with 10 ml syringe and listening with stethoscope over upper abdomen
- Attach 10 ml syringe (without plunger) at the outer end of the tube, pour measured amount of milk and allow milk to trickle by gravity. Close outer end of tube after feeding
- Place baby in left lateral position for 15 to 20 minutes to avoid regurgitation
- Leave oro-gastric tube in situ
- Pinch the oro-gastric tube during withdrawal
- Measure pre-feed abdominal girth just above the umbilical stump. Do not attempt pre-feed aspirates
- Evaluate baby for ileus, if abdominal girth increases by >2 cm from baseline

ROUTINE PRE-FEED GASTRIC ASPIRATES ARE NOT RECOMMENDED

Katori-spoon/paladai feeds

- Place the baby in a semi-upright posture
- Place the milk filled spoon at the corner of mouth
- Allow milk flow into baby's mouth slowly, allowing him to actively swallow, avoiding the spill
- Repeat process till required amount has been fed
- Try gentle stimulation if baby does not actively accept and swallow the feed
- If unsuccessful, switch back to gavage feeds

Figure 2: Gavage feeding

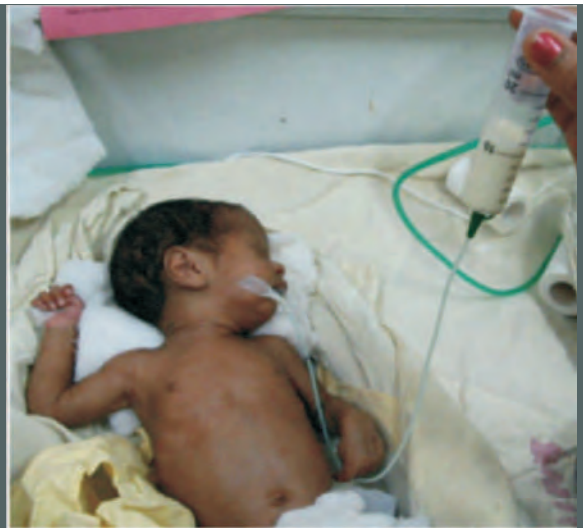


Figure 3: Paladai feeding

Chart 8

Intravenous fluid therapy for newborns

Criteria for starting intravenous fluids among newborns

- Neonates with lethargy and refusal to feed
- Moderate to severe breathing difficulty
- Babies with shock
- Babies with severe asphyxia
- Abdominal distension with bilious or blood stained vomiting

Choice of intravenous fluids

- Determine required volume of fluid as per birth weight and age (Table 2)
- Use 10% Dextrose for initial 48 hours of life
- After 48 hours, if baby is passing urine, use commercially available IV fluids such as Isolyte P
- If the premixed solution is not available or baby requires higher GIR (Glucose infusion rate),
    - Take normal saline (NS) 20 ml/kg body weight
    - Add remaining fluid volume as 10% Dextrose
    - Add 1ml KCl/100ml of prepared fluid

Administration of IV fluid

- Use micro-drip infusion set (where 1 ml = 60 microdrops)
- In this device, ml of fluid per hour is equal to number of micro-drops per minute
  e.g. 6ml/hr = 6 micro-drops/minute
- Calculate rate of administration, monitor to ensure that micro-dropper delivers required rate
- Change the IV infusion set and fluid bag every 24 hours
- Before infusing IV fluid, carefully check:
    - Expiry date of the fluid
    - Seal of the infusion bottle or bag
    - Fluid is clear and free from any visible particles

Monitoring of babies receiving IV fluid

- Inspect infusion site every hour for redness and swelling
- If redness and/or swelling is present, stop infusion, remove cannula, and establish a new IV line in a different vein
- Check the volume of fluid infused, compare to the prescribed volume and record all findings
- Measure blood glucose every nursing shift, i.e. 6–8 hours
- If the blood glucose is less than 45 mg/dl, treat for low blood glucose
- If the blood glucose is more than 150 mg/dl on two consecutive readings: Change to 5% Dextrose solution – measure blood glucose again in three hours
- Weigh the baby daily. If the daily weight loss is more than 5%, increase the total volume of fluid by 10 ml/kg body weight for one day
- If there is no weight loss in the initial 3 days of life, do not give the daily increment
- If there is excessive weight gain (3-5%) decrease the fluid intake by 15-20 ml/kg/day
- Check urine output: Normally a baby passes urine 5–6 times everyday

Fluid requirements of newborns

Day of life	Amount of fluids required (ml/kg/day)	
	Birth weight >1500 g	**Birth weight<1500 g**
1	60	80
2	75	95
3	90	110
4	105	125
5	120	140
6	135	150
Day 7 onwards	150	150

Chart 9

Management of hypoglycemia

Hypoglycemia in newborns is defined as blood glucose levels less than 45 mg/dl

Management of hypoglycemia

- Establish an IV line. Infuse a bolus of 2 ml/kg body weight of 10% dextrose slowly over 5 min
  - If baby has convulsions, give bolus of 4–5 ml/kg of 10% dextrose
  - If an IV line is not available, administer 2 ml/kg body weight of 10% dextrose by gastric tube
- Start infusion of dextrose at the daily maintenance volume to provide at the rate of 6 mg/kg/min
- Measure blood glucose after 30 min and then every four to 6 hrs
- If blood glucose <25 mg/dl:
  - Repeat bolus of dextrose as above
  - Increase to infusion rate of 8 mg/kg/ min
- If the blood glucose >25 mg/dl but <45 mg/dl:
  - Increase infusion rate by 2 mg/kg/min
  - Measure blood glucose after 30 min
  - Continue the infusion at this rate until 2 consecutive values 6 hrs apart are above 45 mg/dl
- Begin breastfeeding as soon as baby is able to breastfeed
  - If cannot be breastfed, give EBM by spoon or paladai
- As feeding improves, slowly decrease (over 1-2 days) IV dextrose and increase oral feeds

Do not discontinue the glucose infusion abruptly to prevent rebound hypoglycemia

Achieving appropriate glucose infusion rates using a mixture of D10 & D25

Volume of Fluids	Volume Required (ml/kg/d)											
	Glucose Infusion Rate											
	6 mg/kg/min				8 mg/kg/min				10 mg/kg/min			
	D10	D25	NS	DW	D10	D25	NS	DW	D10	D25	NS	DW
60	42	18	-	-	24	36	-	-	5	55	-	-
75	68	7	-	-	49	26	-	-	30	45	-	-
90	60	10	20	-	40	30	20	-	20	50	20	-
105	85	-	20	-	65	20	20	-	45	40	20	-
120	86	-	20	14	88	12	20	-	70	30	20	-
135	86	-	20	29	115	-	20	-	80	25	20	-
150	86	-	20	44	115	-	20	15	120	10	20	-

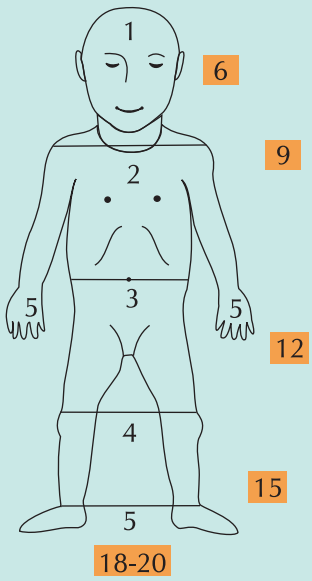
Chart 10

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):

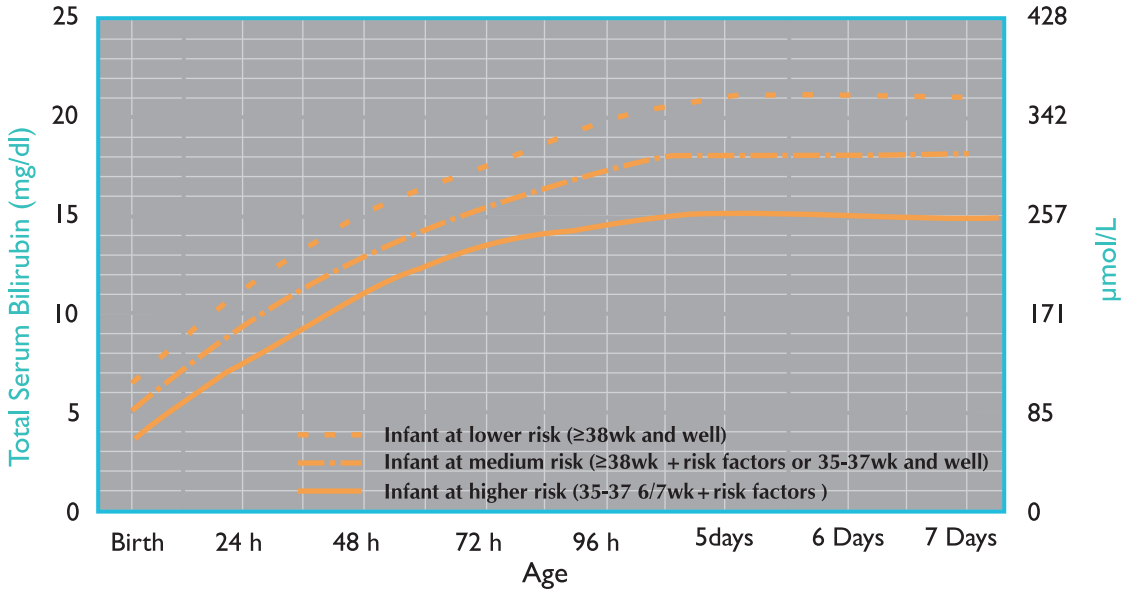
- Clinical jaundice in first 24 hrs of life
- Total Serum Bilirubin (TSB) increasing by >5mg/dl/day or 0.5 mg/dl/hour
- TSB >15 mg/dl
- Conjugated serum bilirubin >2 mg/dl
- Clinical jaundice persisting for >2 week in full term and >3 weeks in preterm neonates

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

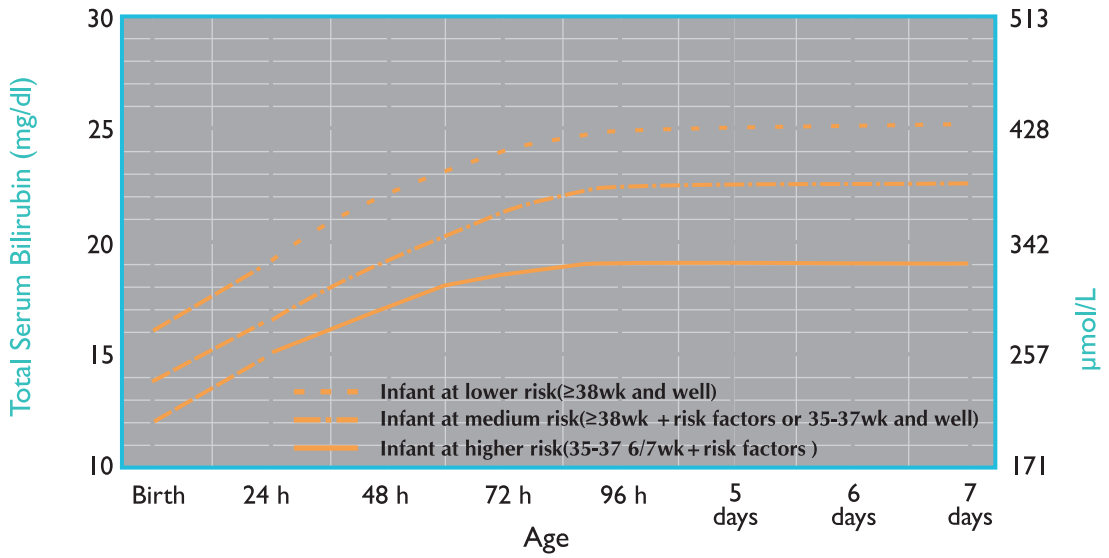
For newborns>35 weeks:	**Consult Normogram-1 to identify requirement for phototherapy** **Consult Normogram to identify requirement for Exchange transfusion**

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

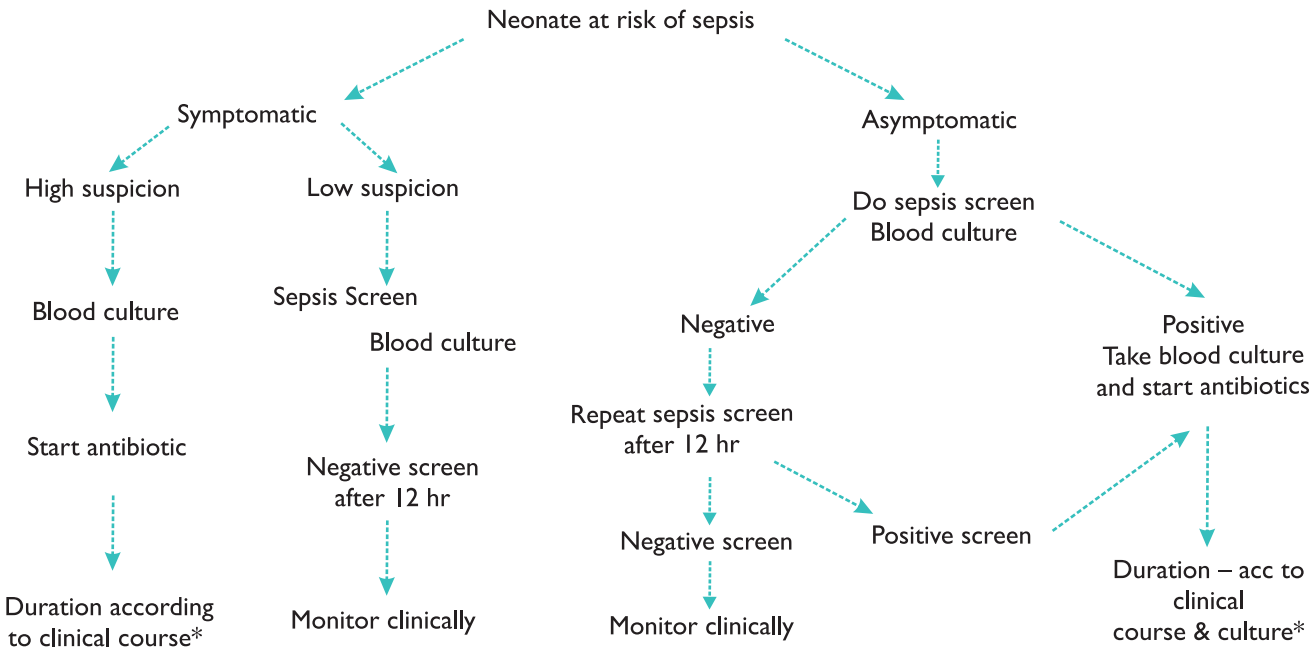
Laboratory diagnosis of a newborn with sepsis

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

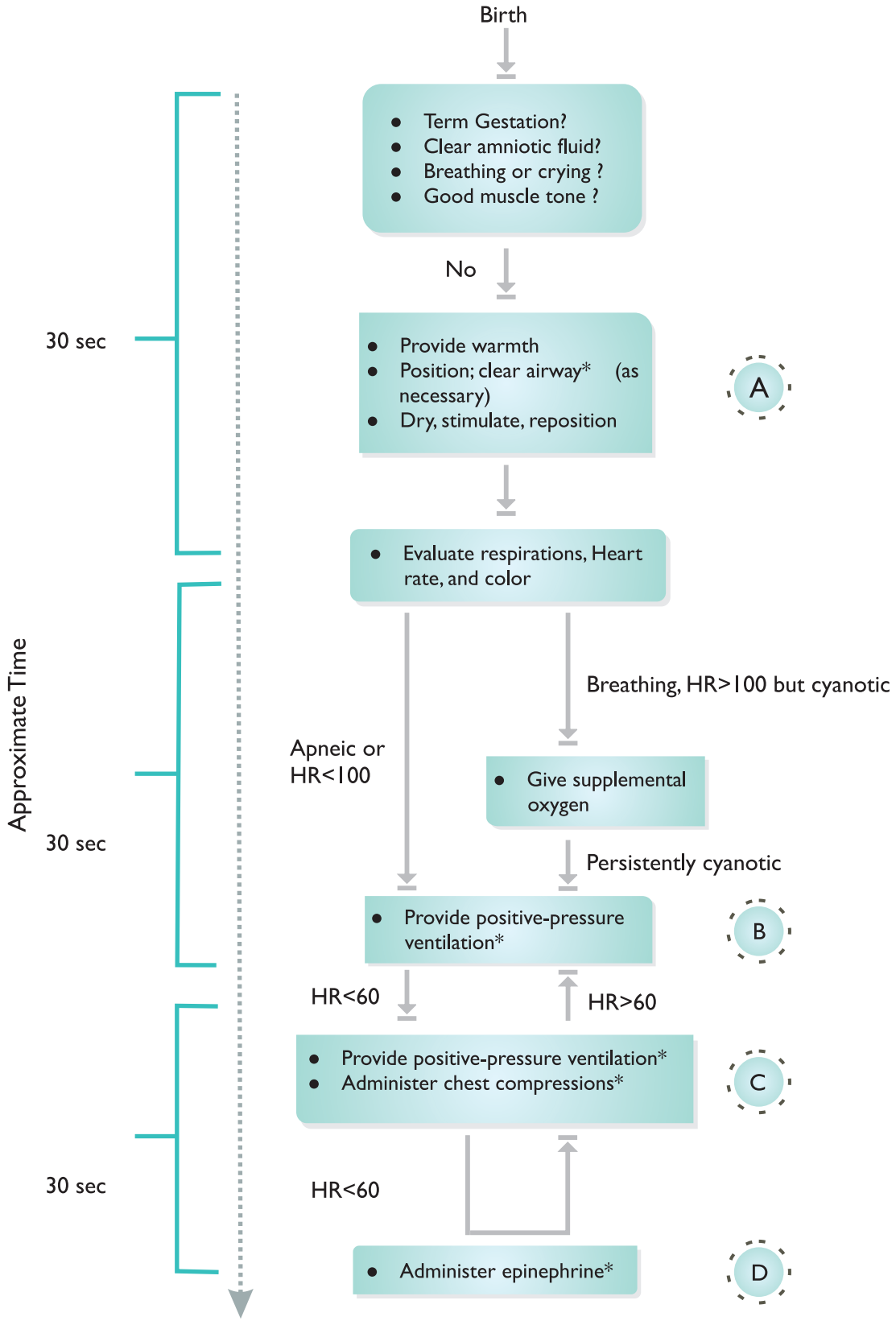
Chart 13

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 to 15 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 1min = 10 x 2.5 = 25 ug

Amount of dopamine required in 1hr= 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 — Inj Phenobarbitone, Inj Phenytoin
  (Refer to Chart 15)

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

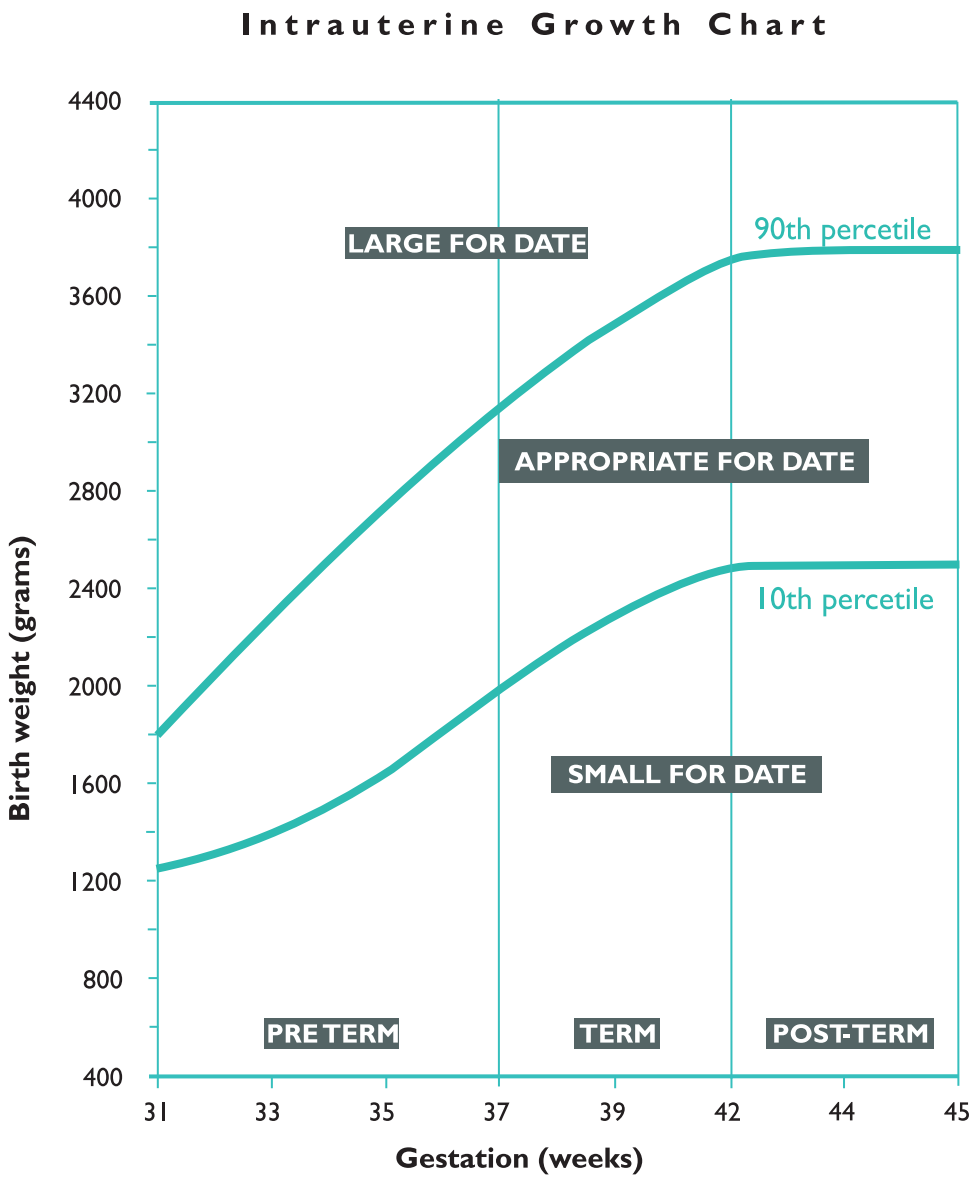
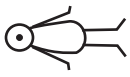
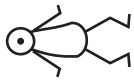
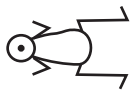
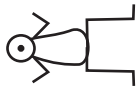
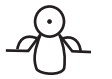
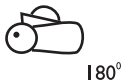
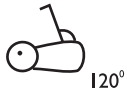
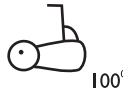
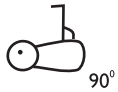
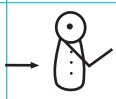
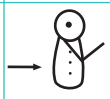


Chart 19

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	Maturity Rating
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	

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

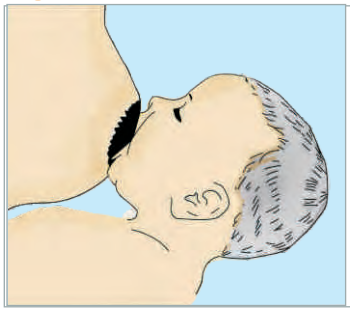
For mothers to produce enough milk, the baby must suckle often enough, and must also suckle in the correct manner. Correct positioning ensures effective suckling and prevents breast engorgement as well as sore nipples.

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:

_____
_____
_____
_____
_____

NOTES

NOTES