ESSENTIAL NEWBORN CARE

STANDARDS FOR NEWBORN CARE

This document is intended to provide guidelines to health service managers, doctors and nurses in charge of neonatal facilities when planning and improving facilities and services for newborns. The information is based on National Standards and work done in Limpopo Province by the Limpopo Initiative for Newborn Care (LINC) team

LEVELS OF CARE AND BED NUMBERS

The Levels at which Newborn services are provided are described below as well as the number of beds for sick and small newborns at each facility. The number of neonatal beds1 required is expressed as beds per 1000 live births. Table 1 shows the number of recommended beds found in the document "Health Plan for Neonatal Care" produced by the 1997 Priorities in Perinatal Care Conference.

Table 1. Recommended Neonatal Bed Numbers.

Level of care	National Recommendation	Practical number used
L I	3 – 4 / 1000 live births	4 / 1000 live births
L II	2 – 3 / 1000 live births	3 / 1000 live births
L III	0.5 – 1 / 1000 live births	0.5 / 1000 live births

Table 2. Calculation the numbers

Level I: Level I services are provided at clinics and district hospitals
4 level I beds / 1000 births (clinic, hospital and home births) in the sub-district And if level II services are not fully available 1 level II (HC) beds / 1000 births in the sub-district – in the district hospital
Level II : Level II services are provided at Regional hospitals
4 level I beds / 1000 births in the sub-district 3 Level II beds / 1000 births in the district
Level III : Level III services are provided at Tertiary hospitals
4 level I beds / 1000 births in the sub –district 3 level II beds / 1000 births in the district, if this hospital also provide level II services 0.5 level III beds / 1000 births in the province
Level IV Level IV services are provided at Central Hospitals and include complex surgery and investigations. Additional bed may be needed, as this service should span across provincial boundaries.

Every hospital has a neonatal unit or nursery for sick and small babies. The extent of the unit depends on the level of care provided and number of deliveries in the area served. The unit is ideally kept in one area, but can be divided or partitioned into the following grades of care: Kangaroo mother care (KMC), Standard care (SC), High care (HC), and Intensive care (ICU). If you cannot include high care beds in your renovations, neonates requiring high care must be accommodated in the main HC and ICU. Well newborns are roomed in with their mothers and never enter the neonatal unit / nursery.

Table 3: Levels of Care

Level of care	Level I	Level I	Level II	Level III
Facility	Clinic / health centre	District hospital	Regional Hospital	Tertiary Hospital
No of beds	1	4 / 1000 births in the sub-district	4 / 1000 births / sub-district + 2 / 1000 births in the district	4 / 1000 births / sub-district + 2 / 1000 births in the district + 0.5 / 1000 birth / province
Neonatal care that should be delivered. ** See table 4	Routine care Initiating KMC	Routine care Kangaroo Mother Care (KMC) Standard inpatient (SIC) High care (HC)	Routine care Kangaroo Mother Care Standard care High Care Intensive care (Short term)	Routine care Kangaroo Mother Care Standard care High Care Intensive care
Ratio of beds / 10* KMC : SIC :HC: ICU	* Approximate ratio	KMC : SIC : HC 4 : 4 : 2	KMC : SIC: HC : ICU 4 : 3 : 2 : 1	KMC : SIC : HC : ICU 2 : 3 : 3 : 2

Table 4: Care required

	Routine care	Standard care	High care	Intensive and highly specialised care
Category of baby requiring care	• Most Full term infants • Most low birth weight infants > 2kg	Babies with: • Low Apgars • Congenital abnormalities • LBW 1500 – 1999g • A Gestational age 32 – 36 wks • Birth weight >4000g • Meconium staining • Wasting • Possible infection • Jaundice	Babies with: • LBW < 1500g • Gestational age < 32wks • Encephalopathy • Meconium aspiration • Septicaemia / meningitis • Recurrent apnoea • Moderate and severe respiratory distress • Convulsions • Severe jaundice	Babies with: • A need for assisted ventilation • Complex Surgical problems • Persistent hypoglycaemia • Cardiovascular problems • Multisystem problems • Problems requiring specialist intervention e.g. ambiguous genitalia •
Care provided	• Safe, clean delivery • Newborn resuscitation • Identification • Apgar score • Vitamin K, eye care, cord care • Thermal support • Emergency care • Assess growth • Full examination • Breast feeding • Immunisation • Care of baby exposed to HIV, TB and Syphilis • Education and follow up plan	In addition to routine care: • Thermal Support • Oxygen Support • Glucose Monitoring • IV Fluid administration • Tube feeding • Bilirubin monitoring and Phototherapy • Drug administration	In addition to routine and standard care: • Cardio-respiratory monitoring • Oxygen therapy > 40% Head box • Nasal prong CPAP • Short term IPPV • Blood transfusion • Chest drains • Exchange blood transfusion	In addition to other neonatal care: • IPPV • Total parenteral Nutrition • Arterial catheterization • Therapeutic cooling • Advanced neurological monitoring • Ultrasound and Echo-cardiography • Sophisticated diagnostic investigation • Sub-specialist consultation • Neonatal surgical intervention

Table 5: Newborn facilities

Level of care	Level I (Clinic / Community Health Centre)	Level I (District)	Level II (Regional hospital)	Level III (Tertiary hospital)
Facility required	Emergency space next to resuscitation	A single neonatal unit with areas for different levels of care. The neonatal unit is best situated between the labour ward and postnatal ward.		
Facility design		• The neonatal unit is ideally be in one area, with a central nurses station • Glass partitions by grade of care with 6 – 8 babies in an area • The area should be restricted to general traffic. • A dual corridor rather than a central corridor is ideal. • The KMC unit is part of the neonatal unit and is ideally interleading or adjacent. It should have a bathroom, and lounge / diningroom area. • All mothers should have lodger facilities nearby.		
Areas required in the unit	Next to resuscitation	• KMC • Standard care (SC) • High care (HC) • Lodger mothers • Counselling room • Central Nurses station • Utility / storage areas • Unit manager's office • Staff rest room • Milk preparation area	• KMC • Standard care (SC) • High care (HC) • Intensive Care (NICU) • Lodger mothers • Counselling room • Central Nurses station • Utility &storage rooms • Unit manager's office • Staff rest room • Milk preparation area • Doctors Office • Meeting room • Doctors overnight	KMC • Standard care (SC) • High care (HC) • Intensive care (NICU) • Lodger mothers • Counselling room • Nurses stations • Utility&storage rooms • Unit manager's office • Staff rest room • Milk preparation area • Doctors Offices • Meeting room • Doctors overnight
Minimum Space required for each level of care	7.2m ^{2} / mother and baby	• 6m^2 / baby for SIC • 7.2 m^2 / mother and baby for KMC • 7.2 - 10 m^2 / HC	• 6m^2 / baby for 6IC • 7.2 m^2 / mother and baby for KMC • 7.2 - 10 m^2 / HC • 10 - 15 m^2 / ICU	• 6 m^2 / baby for SIC • 7.2 m^2 / mother and baby for KMC • 7.2 - 10 m^2 / HC • 10 - 15 m^2 / ICU
Hand washing sinks with elbow or foot controls	1 per 6 Beds or per cubicle	1 per 6 Beds or per cubicle	1 at entrance of unit PLUS 1 per 6 Beds	1 at entrance of unit PLUS 1 per 6 beds

Level of care	Level I (Clinic / Community Health Centre)	Level I (District)	Level II (Regional hospital)	Level III (Tertiary hospital)
Temperature	~24° C	~24° C	~24° C	~24° C
Heating / cooling	Heaters	Air-conditioning	Air-conditioning	Air-conditioning
Lighting	Daylight White fluorescent light White / off white walls	Daylight White fluorescent White /off white walls	Daylight White fluorescent White/off-white walls	Daylight White fluorescent White/off white walls
Electrical points		KMC 4 / bed IC 4 - 6 / bed HC 6 – 8 / bed	KMC 4 / bed IC 4 - 6 / bed HC 6 – 8 / bed ICU 12 / bed	KMC 4 / bed IC 4 - 6 / bed HC 6 – 8 / bed ICU 12 / bed
Oxygen points	1 O_2 point per / 1000 deliveries / year, plus 1	1 per KMC / SC beds 2 per HC beds	1 per KMC / SC beds 2 per HC beds	1 per KMC / SC beds 2 per HC / ICU beds
Air points		1 per HC bed	1 per HC bed	1 per HC and ICU bed
Suction points		1 per 2 IC beds 1 per HC bed	1 per 2 IC beds 1 per HC / ICU beds	1 per 2 IC beds 1 per HC / ICU beds

3. EQUIPMENT

The equipment required is outlined in the table. Buy good quality equipment and ensure adequate in-service training on its use as well as an efficient system of repairing equipment.

Equipment	Maternity service Clinic, Labour ward, Theatre and postnatal ward	Level I Neonatal Unit	Level II Neonatal Unit	Level III Neonatal Unit
Incubators, bassinettes, and general neonatal equipment				
Closed incubator		1 per SC bed	1 per SC bed	1 per SC bed
Bassinette (Washable)	4 per 1000 deliveries	1 per SC bed		
Transport incubator	1 per 3 labour ward beds 2 per maternity theatre			
Overhead servo incubator	0	1 per HC bed	1 per HC / ICU bed	1 per HC / ICU bed
Heat Shield	0	1 per HC bed	1 per HC / ICU bed	1 per HC / ICU bed
Phototherapy units	1/ Health centre 1/ 6 postnatal beds	1 per 2 NNU beds	1 per 2 NNU beds	1 per 2 IC and HC beds
Transcutaneous bilirubin meter	1 / Health centre 1 / Postnatal ward	1 per NNU	1 for KMC and SC 1 for HC and ICU	1 for KMC and IC 1 for HC and ICU
Electronic scale	1 per clinic 1 per 6 labour ward beds 1 per 12 postnatal ward beds	1 per Neonatal unit cubicle	1 per Neonatal unit cubicle	1 per Neonatal unit cubicle

Equipment	Maternity service Clinic, Labour ward, Theatre and postnatal ward	Level I Neonatal Unit	Level II Neonatal Unit	Level III Neonatal Unit
Equipment for respiratory support and oxygen therapy				
Ventilators (Complete)		0	1 – 2 for short term ventilation	1 per ICU bed
Nasal CPAP (Complete)		1 per HC bed	1 per HC bed	1 per HC bed
Head boxes	1 per Clinic 1 for Labour Ward 1 for Postnatal Ward	1 per IC and HC bed	1 per IC and HC bed	1 per IC and HC bed
Pulse oximeters*	1 per Health Centre 1 for Labour ward 1 for postnatal ward	1 per HC beds 1 per 2 SC beds	1 per HC beds 1 per 2 SC beds	1 per HC / ICU beds 1 per 2 SC beds
Oxygen blender		1 per HC bed	1 per HC bed	1 per HC bed
Oxygen analyser		1 per 2 HC bed	1 per 2 HC bed	1 per 2 HC bed
Apnoea monitors		1 per 2 HC bed	1 per 2 HC bed	1 per 2 HC bed
Trans-illumination light		1	1 per HC unit 1 per ICU unit	1 per HC unit 1 per ICU unit
Chest drain kit		1	1	2
Fluid controllers and cardiac monitors				
Intravenous infusion controllers		1 per NNU bed	1 per NNU bed	1 per NNU bed
Multi-parameter monitors		1 per HC bed	1 per HC / ICU bed	1 per HC / ICU bed
BP monitor – portable		1	1	1
Syringe pumps			1 per ICU bed	1 per ICU bed
Mobile suction apparatus	1 per clinic	1 per Neonatal unit	1 per 6 beds	1 per 6 beds
Mobile X Ray		1 in the hospital	1 in the unit	1 in the unit
Ultrasound machine			1 mobile with infant probe available to the neonatal unit	1 in the unit with neonatal probes, including echo-cardiography
Blood gas analyser		1 in large hospitals	1 in the hospital	1 in the unit

Equipment	Maternity service Clinic, Labour ward, Theatre and postnatal ward	Level I Neonatal Unit	Level II Neonatal Unit	Level III Neonatal Unit
Resuscitation equipment				
Resuscitaire	1 per clinic 1 per labour ward bed 2 per theatre 1 per postnatal ward	1 per unit	1 per unit	1 per unit
Self-inflating neonatal bag and mask and masks (sizes 00, 0, 1)	2 per resuscitaire 2 per advanced resuscitation trolley	2 per advanced resuscitation trolley	2 per advanced resuscitation trolley	2 per advanced resuscitation trolley
Suction catheters	Size 10 3 per advanced resuscitation trolley 3 at each labour ward bed	Size 10 3 per advanced resuscitation trolley 3 at each labour ward bed	Size 10 3 per advanced resuscitation trolley 3 at each labour ward bed	Size 10 3 per advanced resuscitation trolley 3 at each labour ward bed
Advanced Resuscitation trolley	1 per health centre 1 per 6 labour ward beds	1 per unit	1 per 6 HC / IC beds	1 per 6 HC / IC beds
Neopuff			1 per ICU unit	1 per ICU unit
Laryngoscope handle and straight miller blade size 00, 0 ,1, spare batteries	1 per health centre 1 per 6 labour ward beds	1 per advanced resuscitation trolley	1 per advanced resuscitation trolley	1 per advanced resuscitation trolley
Endotracheal tubes	4 sizes 2.5, 3.0, 3.5 and 4,0 per resuscitation trolley	4 sizes 2.5, 3.0, 3.5 and 4,0 per resuscitation trolley	4 sizes 2.5, 3.0, 3.5 and 4,0 per resuscitation trolley	4 sizes 2.5, 3.0, 3.5 and 4,0 per resuscitation trolley
Introducer	1 per advanced resuscitation trolley	1 per advanced resuscitation trolley	1 per advanced resuscitation trolley	1 per advanced resuscitation trolley
Mcgills forceps	1 per advanced resuscitation trolley	1 per advanced resuscitation trolley	1 per advanced resuscitation trolley	1 per advanced resuscitation trolley

Equipment	Maternity service Clinic, Labour ward, Theatre and postnatal ward	Level I Neonatal Unit	Level II Neonatal Unit	Level III Neonatal Unit
Consumables				
Oxygen tubing*	2 per oxygen point	2 per oxygen point	2 per oxygen point	2 per oxygen point
Nasal prongs*	2 neonatal and preterm per clinic 2 neonatal / preterm per oxygen point	2 neonatal / preterm per oxygen point	2 neonatal / preterm per oxygen point	2 neonatal / preterm per oxygen point
Venturi's*	1 full set per oxygen point	1 full set per oxygen point in SC / HC	1 full set per oxygen point in SC / HC	1 full set per oxygen point in SC
CPAP circuit		4 circuits / machine available for reuse	4 circuits / machine available for reuse	4 circuits / machine available for reuse
Ventilator circuits		4 circuits / machine available for reuse	4 circuits / machine available for reuse	4 circuits / machine available for reuse
Neonatal saturation probes	2 per machine available for reuse	2 per machine available for reuse	2 per machine available for reuse	2 per machine available for reuse
Neonatal incubator temperature probes		1 spare per servo incubator	1 spare per servo incubator	1 spare per servo incubator
Infusion sets	5 x 60 dpm set	60 dpm or Correct set for infusion controller	60 dpm or Correct set for infusion controller	60 dpm or Correct set for infusion controller
IV cannulas	5 x 24 and 22 G	Many 24 and 22 G	Many 24 and 22 G	Many 24 and 22 G
Dial – a – flow	5 per clinic 5 in labour ward, and postnatal ward	Infusion controllers are preferable	Infusion controllers are preferable	Infusion controllers are preferable
Consumables for bilicheck				
IV fluids	• 10% Neonatolyte, • N Saline, • 10% dextrose • 5% dextrose	• 10% Neonatolyte, • N Saline, • 10% dextrose • 5% dextrose	• 10% Neonatolyte, • N Saline, • 10% dextrose • 5% dextrose	• 10% Neonatolyte, • N Saline, • 10% dextrose • 5% dextrose
Feeding equipment				
Breast pumps	Not recommended in clinics and hospitals as they are difficult to clean and sterilise. Express milk by hand into a cup			
Equipment for flash heat treating milk 2 plate stove, aluminium pots		1 per 12 beds	1 per 12 beds	1 per 12 beds
200ml and 50ml feeding cup	4 per 10 deliveries	8 per bed	8 per bed	8 per bed
Disinfection	Autoclave at clinic	Autoclave	Autoclave and gas steriliser	Autoclave and gas steriliser

1. STAFFING, SKILLS, GUIDELINES AND TRAINING

Nurseries at Level II and III hospitals and larger Level I hospitals need permanent nursing staff whose only duty is the care of ill neonates. Professional nurses at level II and III facilities should be trained in Neonatal Intensive Care.

Table 7. Staff requirements: skills, guidelines and training

	Level I (Clinic / Community Health Centre)	Level I (District)	Level II (Regional hospital)	Level III (Tertiary hospital)
Medical Staff		Medical officer	Medical officer / full time Paediatrician	MO's / Registrars Paediatricians and Neonatologist
Nursing staff requirements	Professional nurses with midwifery training, EN / ENAs	Permanent nurses (Professional nurses and EN / ENA)	Permanent nurses PN with Neonatal (NICU) training	Permanent nurses PN with Neonatal (NICU) training
Nurses per shift		1 PN per 6 babies in SIC 1 PN per 3 HC babies 1 Nurse per 6 KMC	1 PN per 3 HC / ICU babies 1 PN per 6 beds 1 Nurse per 3 HC babies 1 Nurse per 6 babies SIC, KMC	1 PN per 2 ICU 1 PN per 3 HC babies 1 nurse per 3 ICU / HC babies 1 nurse per 6 babies SIC, KMC
Skills required	• Resuscitation of newborn • Examination of newborn • Routine care • Observation • Measure blood glucose and treat hypoglycaemia • Commence IV infusion • Monitor and maintain baby's temperature • Assess breast feeding • Administer oxygen and monitor • Kangaroo Mother Care	• As for level clinc + : • administer parenteral antibiotics • nasogastric feeding • provide phototherapy and monitor bilirubin • Perform lumbar punctures, U&E, Ca, Mg, FBC • Nasal Prong CPAP	• As for District Hospital + • chest drains • caridorespiratory monitoring • Initiate IPPV	• As for regional hospital + • Ventilator support • Ultrasound examination • Total parenteral nutrition • Exchange transfusions • Care of neonates with surgical problems
Professional nurse competency required	Midwifery Neonatal resuscitation Routine Newborn Care	Midwifery Neonatal resuscitation Routine Newborn Care Basic newborn training	Midwifery Neonatal resuscitation Routine Newborn Care Basic newborn care Neonatal Intensive care	Midwifery Neonatal resuscitation Routine Newborn Care Basic newborn care Neonatal Intensive care
In-service training or self study courses recommended	Routine newborn care (LINC) Helping Babies Breathe PMTCT Lactation management PEP2 – Primary newborn care	Routine newborn care Helping Babies Breathe MSSN(LINC) PMTCT Lactation management PEP[2] – Newborn Care	RNC (LINC) Helping Babies Breathe MSSN (LINC) NRP or equivalent PMTCT Lactation management PEP[2] – Newborn care	RNC (LINC) Helping Babies Breathe MSSN (LINC) NRP or equivalent PMTCT Lactation management PEP – Newborn care

2 PEP =Perinatal Education Programme, MSSN = Management of Sick and Small Newborns, RNC = Routine Newborn Care, NRP = Neonatal Resuscitation Programme, PMTCT = Prevention of Mother to Child Transmission

PROTOCOLS AND POLICIES

Newborn protocols and policies need to be in place at each hospital. Review and adopt policies and protocols for your service. The following guidelines are recommended.

- Essential Newborn Care Charts: Management of the sick and small newborns in hospital.
- Essential Newborn Care Charts: Routine Newborn Care
- Limpopo Guidelines for Newborn Care
- Standard Treatment Guidelines and Essential Drug List for South Africa: Hospital Level Paediatrics

REFERRALS

Referral policies need frequent review. As services at Level II hospitals develop, more babies with severe problems can be transferred for high care and Neonatal Intensive care. There are still some services that are only available at the tertiary or quaternary levels and referral should be expedited without unnecessarily going via all the levels. Good communication is essential for referral services to work well and for equity of care. The following must exist.

- Telephones at all facilities.
- District hospitals and clinics to have access to ambulances with portable incubators and portable oxygen to transport ill neonates.
- Regional and tertiary hospitals to have access to ambulances with advanced neonatal care including portable incubators, IV flow controllers, pulse oximeters and ventilators

NEWBORN RECORDS.

A uniform newborn admission record as that developed for Limpopo Province:

- Ensures that there is adequate perinatal information
- Facilitates the management of patients
- Diminishes missed opportunities
- Makes transfer of patients more efficient.

MONITORING AND EVALUATION

Regular monitoring and evaluation of the neonatal service involves the following

- Correct documentation of births and perinatal deaths in the maternity register and then in DHIS and PPIP
- Review of perinatal deaths using the PPIP format, assessing obstetric cause, neonatal cause of death and avoidable factors
- Complete recording of Neonatal Admissions in the Neonatal Admission Register, and Neonatal Deaths in the Neonatal Death Register
- Monthly summary of Neonatal admission and Deaths
- Meetings within 24 hours of a death with the relevant role players to determine the cause of death
- Monthly neonatal and perinatal improvement meetings to discuss progress with improvements, new improvements, good and adverse outcomes.
- Documentation of Birth Defects in Monthly Summary Form and Notification