World Health Organization

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WHO & UNICEF GLOBAL EXPERT CONSULTATION ON A GENERIC MODEL FOR INPATIENT CARE OF SMALL AND/OR SICK NEWBORNS

Wednesday 1, Thursday 2 & Friday 3 December 2021

13:00-16:00 CET (Geneva time)

Please note we have interpretation for English, French, Portuguese, Spanish and Arabic.
Please click the globe icon and choose your language in which you want to hear the presentation.

MEETING RULES

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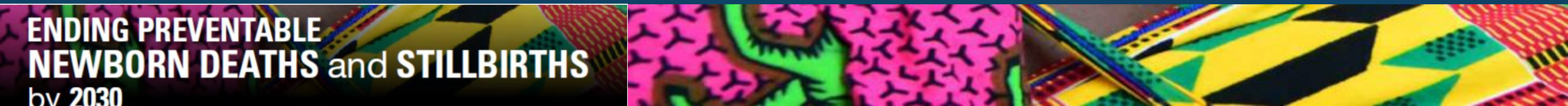
1. Due to the size of the meeting, we will not introduce each person.
You can give a greeting in a ChatBox

2. Please rename your profile to include your country name

3. Kindly remain on mute.

4. Please post your questions in the ChatBox.
If there is additional time, we can give the floor to individuals who raise their hands during question time.



AGENDA DAY 1

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Time	Session:		
Time	Session 1 - Introduction (20min)	Moderator - Rajiv Bahl (WHO)	
13:00-13:05	Welcome, Objectives & Outputs	Rajiv Bahl	5 mins
13:05-13:20	Opening remarks	Kim Dickson (UNICEF) Lily Kak (USAID) Anshu Banerjee (WHO)	15 mins
Time	Session 2: Learning from Country experiences - Core elements of the model of care	Moderator – Gagan Gupta (UNICEF)	
13:20-14:05	Asian Experiences	India Bangladesh Viet Nam	15 mins each
14:05-14:25	Discussion		20 mins
14:25-14:35	Break		10 mins
Time	Session 2 (Continued) Learning from Country experiences: Core elements of the model of care	Moderator - Teshome Desta (WHO)	
14:35-15:35	Sub-Saharan Africa Experiences	Ethiopia Malawi Uganda Sierra Leone	15 mins each
15:35-16:00	Discussion		25 min

AGENDA DAY 2

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Time	Activity		
13:00-13:15	Session 2 (continued): Learning from Country experiences Questions and Answers: Malawi, Ethiopia, Sierra Leone & Uganda	Moderator Teshome Desta (WHO)	10 mins
	Learning from Country experiences	Moderator Hema Magge (BMGF)	
13:15-13:45	PAHO Experiences	Brazil Argentina	15 mins each
13:45-14:00	Discussion		15 mins
	Session 3 - Specialist perspective on SSNC		
14:00-14:20	What does it take to scale up facility based newborn care?	Gagan Gupta (UNICEF)	20 mins
14:20-14:35	Synthesis of country experiences	Cyril Engmann (PATH)	15 mins
14:35-14:50	Discussion		15 mins
14:50- 15:00	Break		10 mins
15:00- 15:40	Country groups discussion to exchange lessons	Teshome/Gagan	40 mins
15:40-15:55	MNICU	Harish Chellani - Vardhman (India)	15 mins
15:55-16:10	HR road maps	Karen Walker (COINN)	15 mins

QUESTIONS & ANSWERS

Learning from country experiences: Core elements of the model of care

MALAWI, ETHIOPIA, SIERRA LEONE AND UGANDA

AGENDA DAY 2

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Session 2 – Learning from Country experiences: Core elements of the model of care

BRAZIL & ARGENTINA

MODERATOR: DR HEMA MAGGE, BMGF

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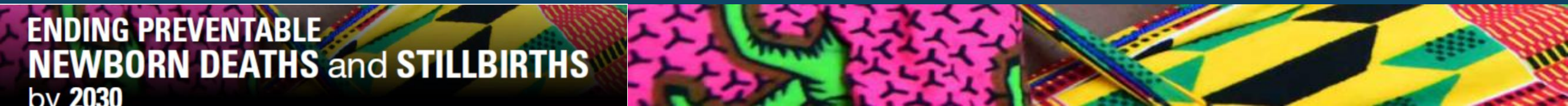


Experience on care delivery

WHO UNICEF ENAP EXPERT CONSULTATION TO DEVELOP A GENERIC MODEL FOR INPATIENT SMALL OR SICK NEWBORN CARE IN LOW-RESOURCE SETTINGS

December 1rst-2nd 2021

Dr. Zeni Carvalho Lamy
Universidade Federal do Maranhão
Consultora da Coordenadoria de Saúde da Criança
Ministério da Saúde - Brasil

BRAZIL…

Is the 5th largest country in the world (8.51 million square kilometers)

It is divided in 5 big regions characterized by cultural, geographical and economical differences and 27 states.

Population: 210 million inhabitants

Infant Mortality Rate: 13,3/1000 NV

Neonatal Mortality: 9,9/1000

Total Live Births: 3,000,930

Low Birth Weight Rate: 8,45%

Maternity hospitals (receive LBW babies): about 2,000

In Brazil, Kangaroo Care is a **National Health Policy,** since 2000, that integrates a set of actions aimed at **improving the quality of care** of the newborn, its parents and family

PORTARIA GM nº 1683 de 12/07/2007 – Journal, in-print
http://www.saude.ba.gov.br/wp-content/uploads/2017/09/portaria_1683_12julho2007.pdf

PORTARIA Nº 930, DE 10 DE MAIO DE 2012

Neonatal Unity

Divided according to care characteristics

- Care of a **severe or life-threatening** newborn;

- Care of newborns considered to be of **medium risk** and that require continuous care, **but less complex than in the NICU**.

- Care for newborns considered to be at **medium risk**, with an infrastructure that allows **mother and child to be** in the same environment, 24 hours a day.

https://bvsms.saude.gov.br/bvs/saudelegis/gm/2012/prt0930_10_05_2012.html

MINISTRY OF HEALTH

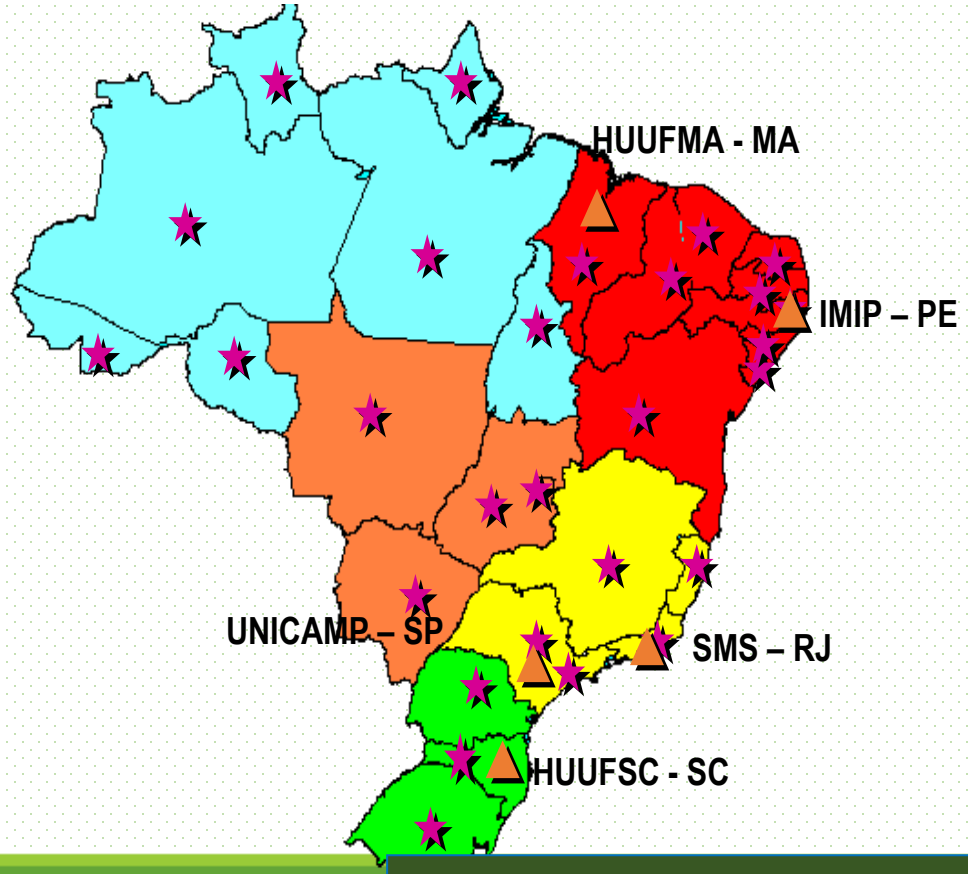
GENERAL COORDINATION OF CHILD HEALTH

DECENTRALIZATION AND IMPLEMENTATION

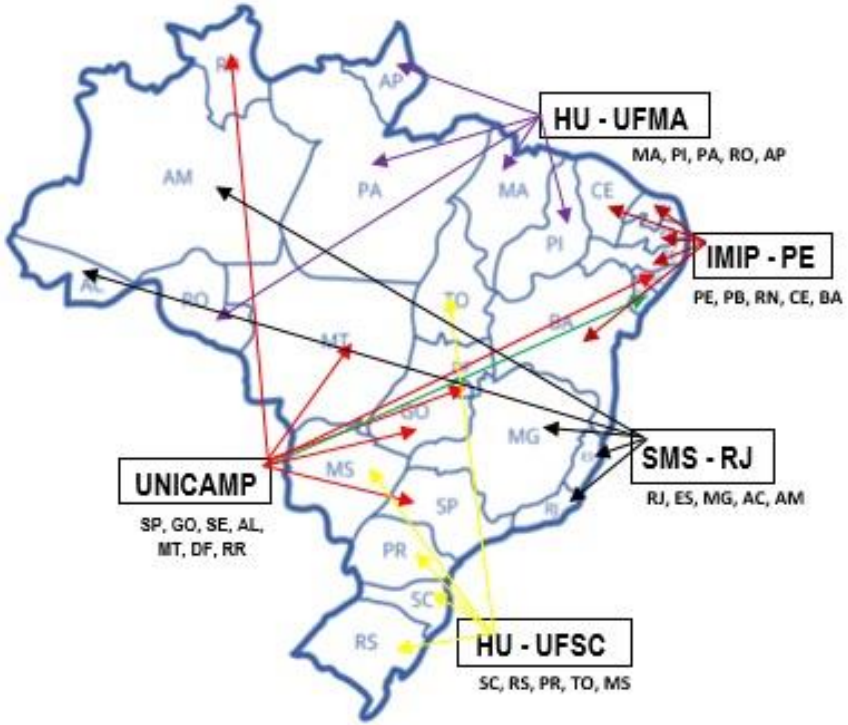
National Center of Reference ▲

State Reference Maternities ★

National Consultants



State Tutors



All 27 states have at least one UTIN

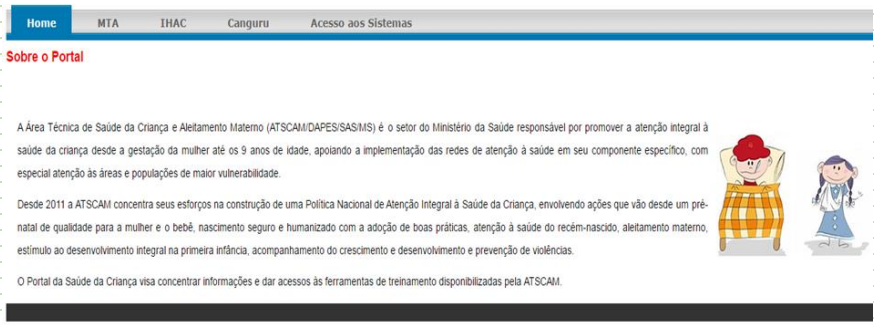
TRAINING

https://portaldeboaspraticas.iff.fiocruz.br/

Training of trainers courses
Sensibilization courses: ead.iff.fiocruz.br

In person
On line

MONITORING

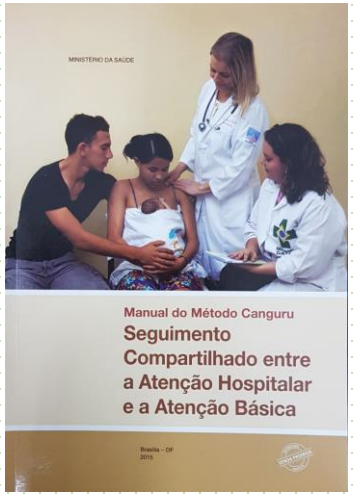


Monitoring system http://www.saudedacrianca.datasus.gov.br/

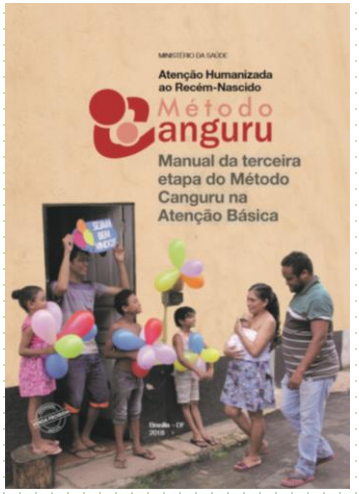
Technical handbooks and videos to help Kangaroo care implementation

http://bvsms.saude.gov.br/bvs/publicacoes/atencao_humanizada_metodo_canguru_manual_3ed.pdf

http://bvsms.saude.gov.br/bvs/publicacoes/metodo_canguru_diretrizes_cuidado.pdf



http://bvsms.saude.gov.br/bvs/publicacoes/manual_metodo_canguru_seguimento_compartilhado.pdf



https://bvsms.saude.gov.br/bvs/publicacoes/manual_terceira_etapa_metodo_canguru.pdf

http://bvsms.saude.gov.br/bvs/publicacoes/guia_orientacoes_metodo_canguru.pdf

Vídeo Atenção Humanizada ao RN - MC
https://www.youtube.com/watch?v=zed8GTpgtag

CLIP Kangaroo method
https://vimeo.com/137529480.

QUALINEO Strategy

Ten steps for neonatal care

01. Follow neonatal ressucitation guidelines and **avoid hypothermia**.
02. **Use CPAP** from delivery room and avoid intubating the newborn
03. Control the use of oxygen. **Avoid hyperoxia**.
04. **Feed the newborn as early as possible**, preferably with **breast milk**.
05. **Sanitize your hands** and **avoid unnecessary antibiotics**.
06. **Use all medications judiciously**.
07. **Practice the Kangaroo Method** and integrate the entire multidisciplinar team in **individualized care**.
08. Follow **safety patient** rules in the newborn care.
09. Use rationally the existing resources and practice **bed management**.
10. Use the **indicators of your neonatal Unity as a source of improvement**

Thanks!

zenilamy@gmail.com

FEDERAL UNIVERISTY OF MARANHAO. UNIVERSITY HOSPITAL
NEONATAL INTENSIVE CARE UNITY

Maranhão State
Surface:
331 937,450 km²
Population: 7 153 262 hab.
Life expectancy : 70,3 y
Infant mortality: 22,4‰

Dr. Marynéa Vale

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HOSPITAIS UNIVERSITÁRIOS FEDERAIS

PÁTRIA AMADA BRASIL
GOVERNO FEDERAL

HUUFMA – MOTHER AND CHILD UNITY

- Training center for health professionals: average 4000 births per year
- Reference for high-risk pregnancies
- National Reference Center for the Kangaroo Method
- Baby-Friendly Hospital
- Own technological park/Assistance, administrative, teaching managements
- Electronic medical record system/data collection system - EPIMED

CARE IN DELIVERY ROOM

- Pediatrician on duty (24 hours /day)
- Team trained in Neonatal Resuscitation
- Good practices at birth
  - Umbilical cord clamping
  - Skin to skin contact
  - Breastfeeding at first hour

NICU Structure

NICU

Neonatal Intermediate Care Unit

Follow up Clinic for premature newborns

NICU
Kangaroo Care

First stage 20 intensive care beds

Second stage 12 UCINCo beds
10 UCINCa beds

Multidisciplinary, with individualized and progressive care for any new born and his/her family

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FOLLOW UP CLINIC FOR PREMATURE NEWBORNS

Multidisciplinary follow up for babies discharged from the Unit until 5 Years old

Household phone calls program for children at high risk

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NICU

Focus: humanized care, respecting individuality and subjectivity of each baby and his/her family

Reception
Promotion of skin-to-skin contact
Parental Involvement in Baby Care
Guarantee of breastfeeding
Favoring family reunion
Unique Therapeutic Care
Building a social support network

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NICU

Team:

- **Pediatricians and Neonatologists** on a daily base
- **Pediatricians and Neonatologists** on duty
- **Pediatricians** in follow up clinic
- **Multidisciplinary team**: occupational therapist, phonoaudiologist, nurse, psychologist, social worker, dietitian and physiotherapist
- **Medical Residency** in Pediatrics and Neonatology
- **Multidisciplinary Residency** for social workers, physiotherapists, psychologists, nurses, occupational therapist and phonoaudilogists.

NICU ACTIVITIES

- Pediatric antenatal visit
- Multidisciplinary care to hospitalized pregnant women at risk
- Individualized care to the family
- Visit of siblings and grandparents
- Meeting with families
- Promotion of breastfeeding
- Post-death follow-up

CARE TRANSITION: *safety huddle*

Shared responsibilities for problems, seeking solutions to guarantee and continue comprehensive care.

Unresolved issues are forwarded to the next levels of management and presented in feedback at the next meeting.

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PLAN OF GOALS WITH EVALUATION

- Nutrition
- Ventilatory assistance
- Devices (CVC, PICC, umbilical catheter, OGT, gastrostomy, ETT, VPA)
- Special care: neuroprotection, colostrum therapy, phototherapy, analgesia, skin to skin contact
- Medications
- *Bundles*
- Management of assistance risks (pressure lesions, falls, hypothermia, phlebitis)
- Training: Good practices at birth, Resuscitation and Neonatal Transport, Perinatal Intensive Care Unit

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Management at sight indicators

1st Indicator – Corrected Neonatal Mortality
Meta: 10 %

2nd Indicator – Nosocomial Rate
Goal: 15 %

3rd Indicator – Incidence of Pneumonia Associated with Medical Ventilation
Goal: 2 %

4th Indicator – hypothermia of premature newborn less than 34 weeks when admitted at NICU

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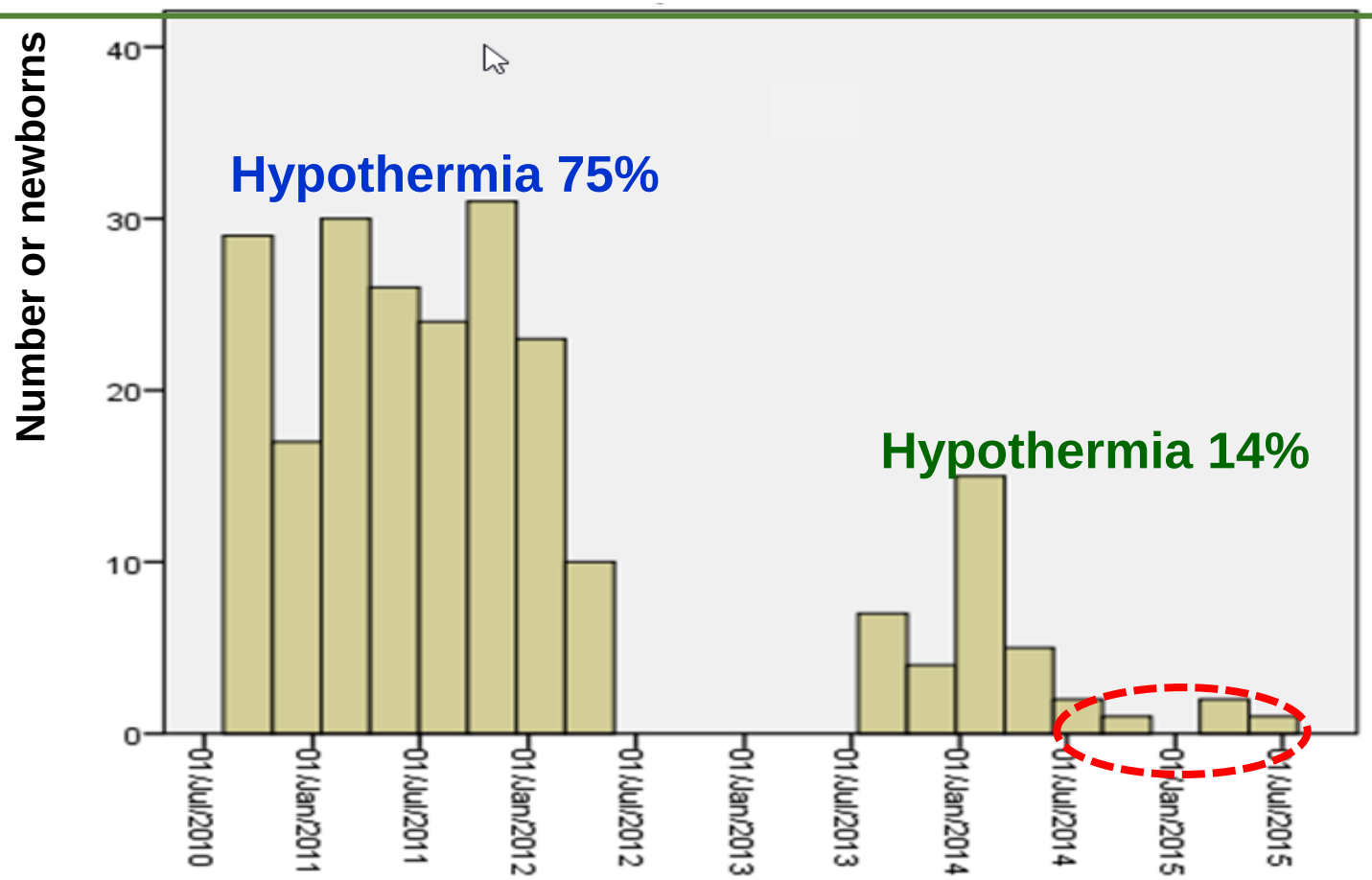
MEASURES TO REDUCE HYPOTHERMIA IN PRETERM NEWBORNS GA 23-33 WEEKS TO THE NICU IN 2014



Pre intervention (n=254)

Post implementation (n=268)

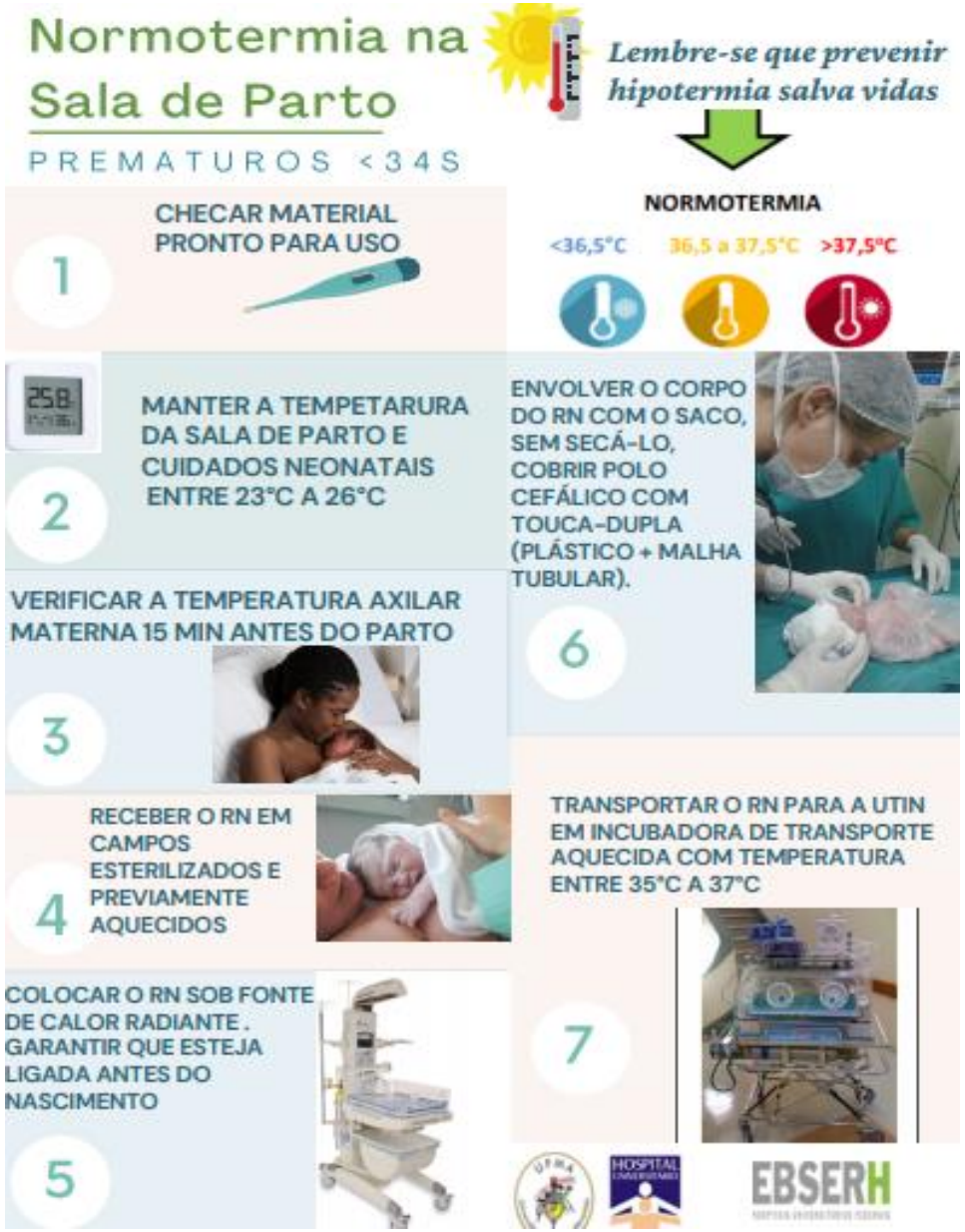
Hypothermia (< 36,0ºC) each trimester

EBSERH HOSPITAIS UNIVERSITÁRIOS FEDERAIS | Ministério Educação | Ministério da Saúde | GOVERNO FEDERAL BRASIL PAÍS RICO É PAÍS SEM POBREZA

UFMA Universidade Federal do Maranhão

HOSPITAL UNIVERSITÁRIO Saúde e Educação Trabalhando Juntas

CHECK-LIST



- Material check
- Temperature: Delivery and neonatal care rooms (23-26ºC)
- Maternal temperature 15 minutes before delivery
- Receive the newborn in warm blankets
- Position under radiant heat source
- Wear the plastic bag without drying
- Place oximeter sensor in the right hand palm
- Dry his/her head and put on 2 caps
- Transport in incubator 35-37oC
- Axillary temperature at 5 minutes and on arrival at the NICU
- Remove plastic bag and caps after thermal stabilization in the NICU

Thank you!!

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Argentina

Postdischarge follow up of at risk newborns

Dra. Patricia Fernández Riera
Coordinadora Area Neonatología DSPYN

Ministerio de Salud
Argentina

1000 días

Ministerio de Salud
Argentina

Argentina

100 días

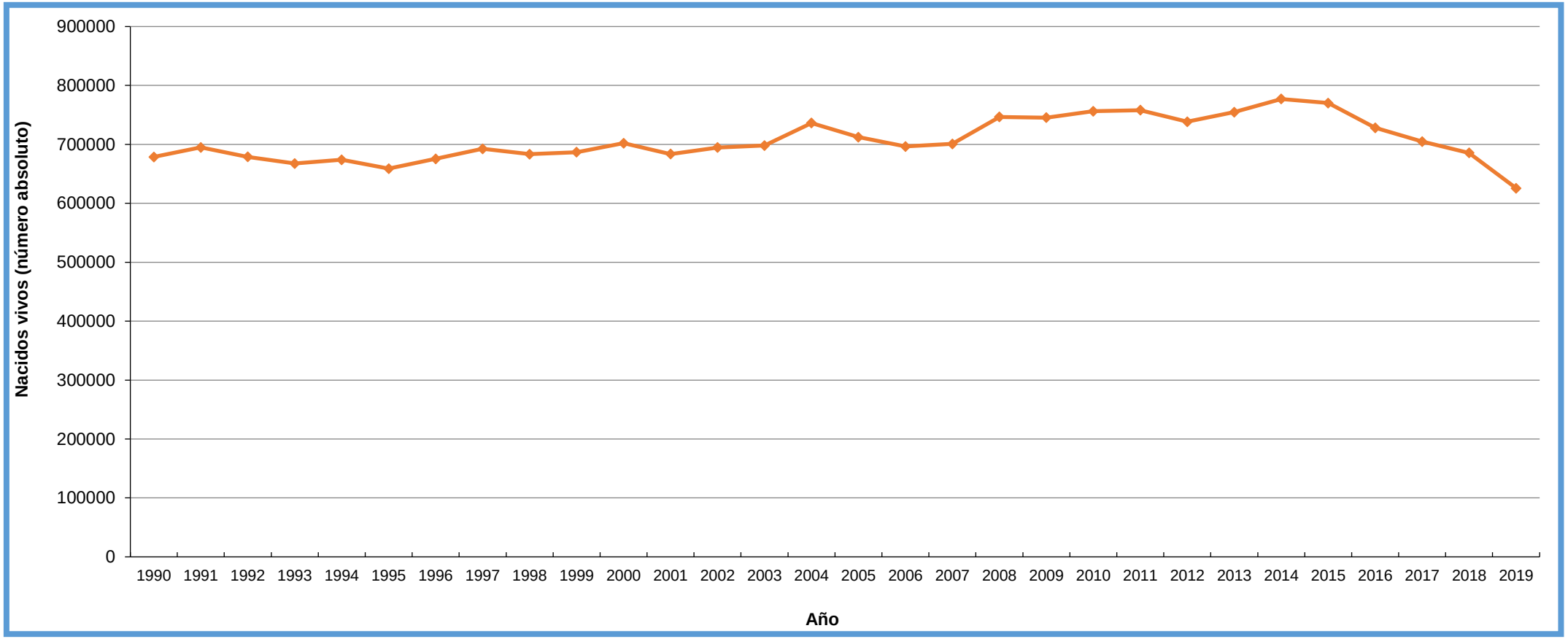
Ministerio de Salud
Argentina

Argentina 2019

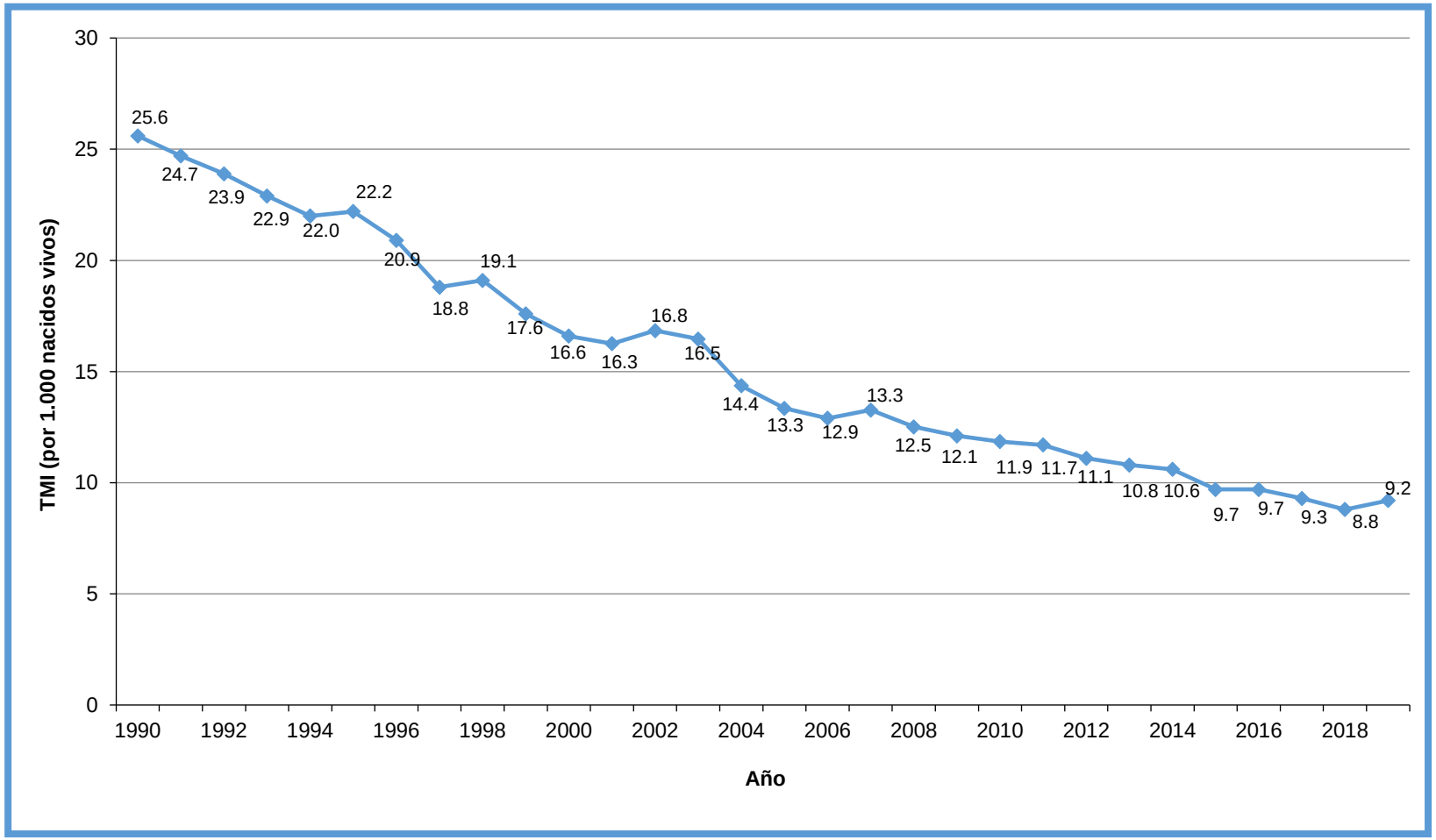
- 625.000 births/year
- 56.000 Preterm (9%)
  43.000 BW < 2500 g (7,2%)
  6.900 BW < 1500 g (1,1%) survive 5.200 (75%)

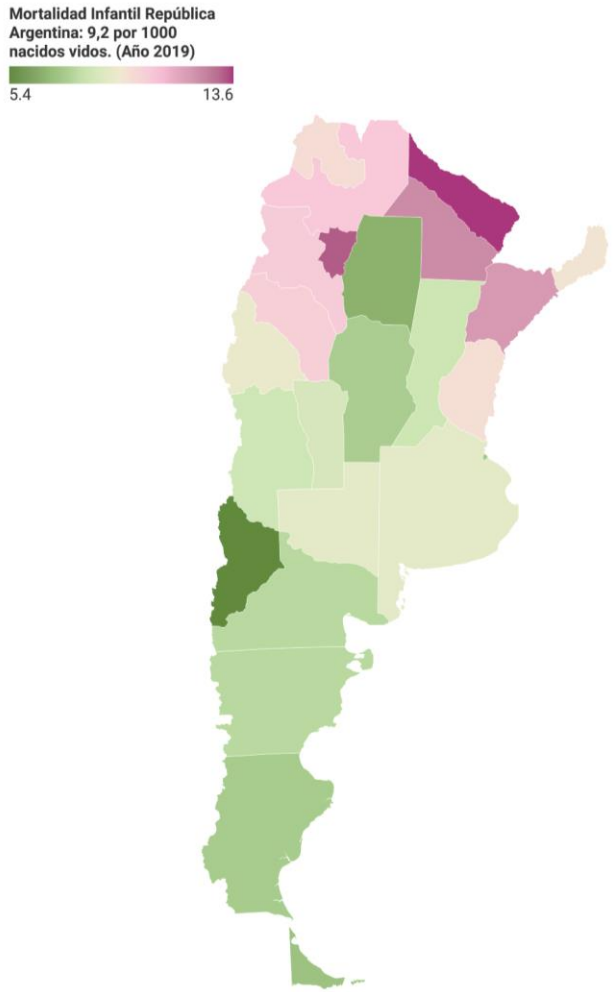
Contribute to more than 50% Infant Mortality

Argentina 2019 NV

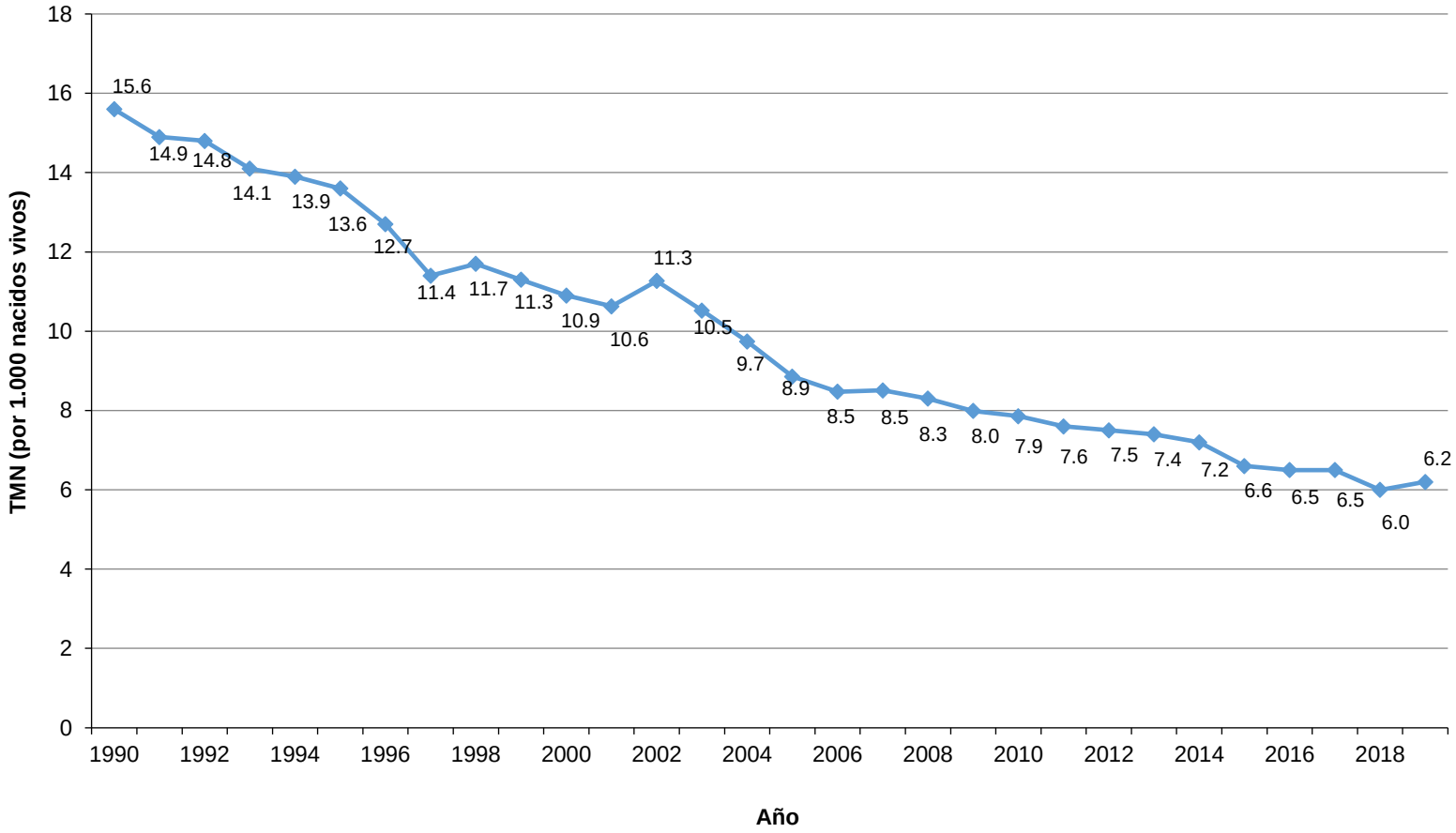


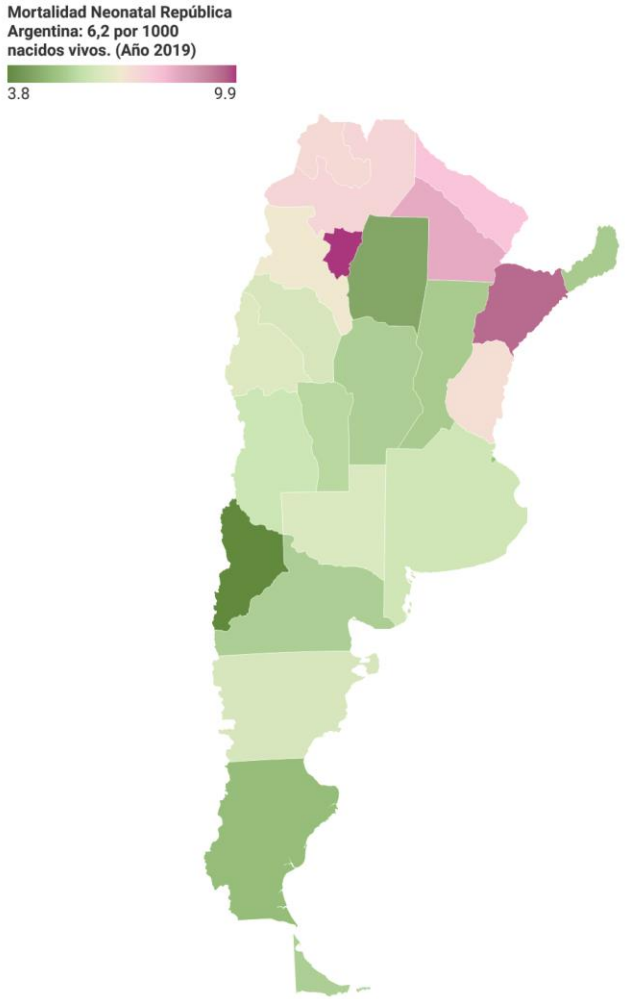
Argentina 2019 TMI





Argentina 2019 TMN





Population

- Heart Birth Defects
- Complex surgical pathology
- HIE
- New interventions

- Hyperbilirubinemia
- Severe metabolic disorders
- Mother-Newborn Transmitted Infections
- Psychosocial problems
- MV

PREMATURITY

Prematurity - Morbidity

- Respiratory, cardiovascular, growth diseases
- Developmental and neurosensory disabilities
- Affect quality of life
- They require differential benefits: education, health, recreation, leisure, sports → have a strong social impact

Conditions for institutional discharge

- **GA >36 weeks**
- **Respiratory:** Absence of apnea and bradycardia episodes in the last 2 weeks; SpO2 ≥ 92% in aa.
- **Nutritional status:** >2000 g, good progress in previous week, assessment sucking/swallowing disorders, **Breastfeeding**
- **Thermal regulation** in an environment of 20-25 ºC
- **Cardiovascular: C**ardiovascular function stable; no treatment modification in the previous 2 weeks
- **Audiological and metabolic screening**
- **Ophthalmology: OF**
- **Immunizations according to chronological age**
- **Planning of Passive Immunoprophylaxis SRV**
- **Neurological clinical evaluation**
- **Saturation monitoring (car seat)**
- **Social and environmental conditions. Ensure provision of NEAS**

Conditions for institutional discharge
Caregivers Education

- Safe sleep and SIDS prevention
- Infection prevention
- Special treatments
- CPR course for caregivers
- **Breastfeeding**
- High Risk Newborn Follow-up Program Team

Benefits of a High Risk Follow-up program

- Assistance and follow-up of infants after discharged from the NICU
- Early diagnosis and timely treatment
- Results return to NICU - medium- and long-term safety and quality of care
- Results-based health policies
- Promotion of networking

Surveillance

- Nutrition and Growth
- Neurodevelopmental: Cognitive, Behavioral, Language
- Sensory: Hearing - Vision

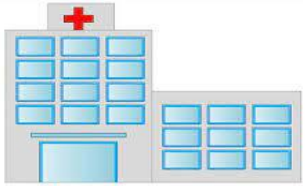
7 years

Planning the care process

- Population?
- Desertion?

- How often? Home visits?
- Until when? Transition?

- Referral to PHC?
- Diagnosis? Treatment?



- Monitoring
- Continuous improvement

Newborn Health (DSPyN) – National Ministry of Health

- In-Service Training
- Guidelines for NB care - Family-centred care – Rights at bi
- National NCPR Program
- Stabilization and transfer of at-risk NB (ACoRN
- Newborn screening: metabolic, audit, eart disease (pulse oximetry), ROP (red reflex).
- National program for the pr blindness due to ROP
- National strategy for th p of at-risk newborns
- Respiratory dis tion program in at-risk infants (Palivizumab)
- Prematur
- Moni -NEO – SIP (Perinatal Information System CLAP/WR-PAHO/WHO)

Perinatal Regionalization – CONE

Supplies

- 2007 Program for Prevention of ARI in preterm infants at >risk- Palivizumab
- 2014 hexavalent vaccine in very premature infants (<1500g)
- 2015 Preterm milk formula (High Risk Follow-up Clinics)

Prematurity Week Campaigns

DECALOGUE OF THE PREMATURE INFANT
UNICEF / National and Provincial MCh - 3 sub-sectors
Prenatal - Perinatal - Neonatal - Follow up

Nº7 "A child who was a high-risk preterm newborn should have access, after neonatal discharge, to special follow-up programs"

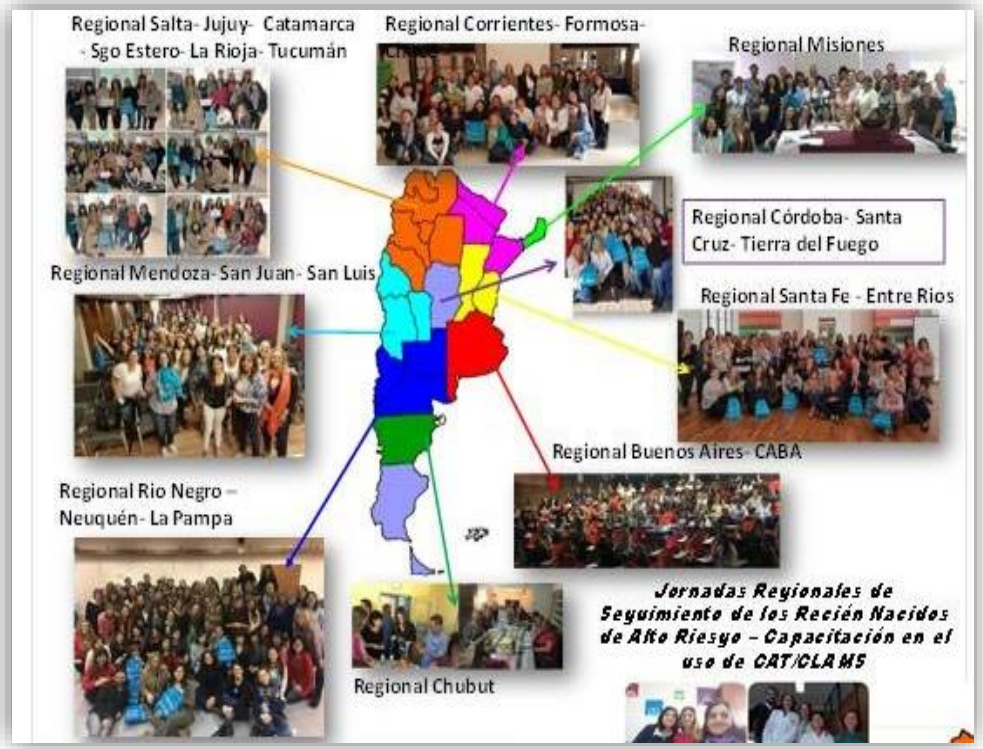
Training virtual courses

- Follow-up of preterm newborns
- Neonatal nursing
- Neonatal nutrition
- ROP
- Neurodevelopment in children with a history of prematurity
- CPR for caregivers of at-risk infants

Follow-up regulations

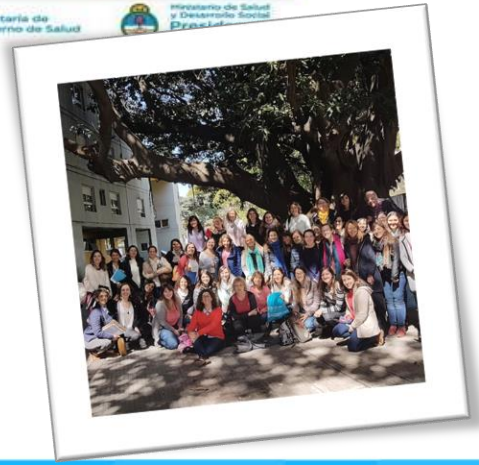
- Guidelines for the Follow-up of at-risk NBs (Res 649/2003)
- Organization of a Follow-up Program for “High-Risk Premature Babies" 2016
- National Clinical Guideline for the Follow-up of Children with a History of Prematurity.

Training in Child Care and Development Networks
High Risk Newborn Programs (HRNBP)



May 2017- October 2018
HRNBP Regional Meetings
938 professionals

PBA RS VI, June 2019
60 professionals



CABA, September 2019
50 professionals

100 días

Ministerio de Salud Argentina

Strengthening health care networks

Georeferencing map of follow-up clinics

datos.dinami.gov.ar

HR Whatsapp Follow-up

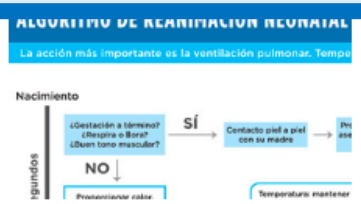
Covid-19 Pandemic

- Recommendations on **follow-up of high-risk newborns** in the context of the covid-19 pandemic.
- Recommendations **National Program for the prevention of neonatal blindness due to retinopathy of prematurity** (ROP) in the context of the Covid-19 pandemic.
- Recommendations **for access to care for children and adolescents** with disabilities in the context of a pandemic.
- Health access manual in times of pandemic: guidelines **for perinatal and child health care**.
- **TeleHealth Model for at-risk newborns clinics**

Resources

Recomendaciones para el manejo del embarazo y el recién nacido en los límites de la viabilidad

Detección de Cardiopatías Congénitas por Oximetría de Pulso en recién nacidos asintomáticos



Algoritmo de reanimación neonatal en sala de partos

Informes / Análisis científicos

Algoritmo mural de procedimientos para Salas de Reanimación de maternidades.

Tema: Neonatología , Salud infantil , Ginecología y Obstetricia

Manual de Reanimación Cardiopulmonar Neonatal

Manuales

Reanimación Cardiopulmonar para lactantes y desobstrucción en la vía aérea

Video

Recomendaciones para la práctica del traslado neonatal

Guía de Práctica Clínica para la prevención, diagnóstico y tratamiento de la Retinopatía del Prematuro (ROP) - Versión Resumida

tención y cuidado del recién acido prematuro. Recepción, stabilización, traslado y dmisión en la Unidad Neonatal. lecomendaciones y neamientos prácticos

Organización del Seguimiento de Prematuros de Riesgo

Guías / Abordajes / Estrategias

Atención y cuidado del recién nacido prematuro. Cuidados respiratorios.

Nutrición del niño prematuro

Manejo hidroelectrolítico. Termorregulación. Cuidado de la piel.

100 días

Ministerio de Salud
Argentina

National legal frameworks and regulations

- NATIONAL CONSTITUTION OF ARGENTINA
- LAW 26061/2005 Integral Protection of the Rights of Children and Adolescents. Art. 14
- Resolution 1613/2010 National Program for the Prevention of Blindness in Childhood due to ROP
- LAW 26279/2007 Neonatal screening
- LAW 25415/2001 National Program for early detection and care of hearing impairment
- LAW 25.929/2004 Humanised childbirth
- Resolution 641/2012 NICU
- Resolution 670/2019 CONE
- **LAW 27611/2020 1000 Days - Prematurity Policy**

Law 1000 days (27.611/20)
objectives

Strengthen the **support**, **protection and comprehensive care of the health and life** of pregnant women and children in the **first three years** of life, in order to reduce mortality, malnutrition and undernutrition, **protect and stimulate early bonds**, **physical and emotional development and health in a comprehensive manner**, and prevent violence.

Integrated health care model

Law 1000 days - Comprehensive Policy for Prematurity

I- Reduce preterm births

II - Increase survival of preterm newborns

III- Reduce morbidities associated with prematurity.

IV- Preventing disability associated with prematurity

- Organize risk surveillance by articulating the levels of care (Regionalization - Community Networks)
- To ensure timely support for children born prematurely, focusing on families and communities
- Working for access to special health care within the framework of the International Classification of Functioning

Challenges

- Integrated inter-sectoral care, with transition throughout life, full social integration, access to special health care and special health care needs
- Community education campaigns to achieve a qualified demand - Tools to identify families with greater vulnerability
- Creation and support for local programmes
- Regionalisation of perinatal and pediatric services
- Centralised information system - Indicators to provide long term evidence
- Federal interdisciplinary teams

It is a work of and among all

100 días

Ministerio de Salud
Argentina

Useful links

- The resource bank of the National Ministry of Health: *http://www.msal.gob.ar/index.php?option=com_bes_contenidos*
- The COVID-19 page of the National Ministry of Health: *https://www.argentina.gob.ar/coronavirus/equipos-salud*
- *The web page of the Statistics and Health Information Department* *http://www.deis.msal.gov.ar*
- *The Deputy Secretary for Strategic Actions web site* *https://datos.dinami.gov.ar/*

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World Health Organization

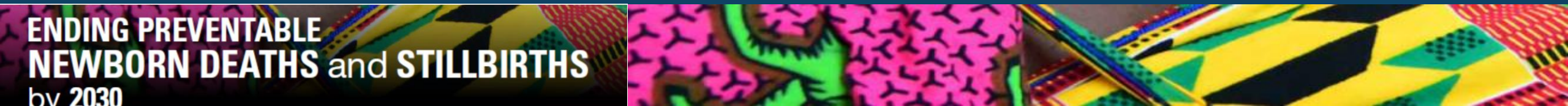
unicef

Session 3
Specialist perspectives on small and sick newborn care

What does it take to scale up facility based newborn care?
DR GAGAN GUPTA, UNICEF

Synthesis of country experiences
DR CYRIL ENGMANN, PATH

DISCUSSION MODERATED BY DR HEMA MAGGE, BMGF



Scaling Up Facility Based Newborn Care

What Does It Take??

Global Relevance of Learnings from India and Other Countries

Dr. Gagan Gupta, UNICEF - HQ

The SNCU Story of India

Pilot to National Scale up in 10 years

It’s a journey – Countries need to plan it well

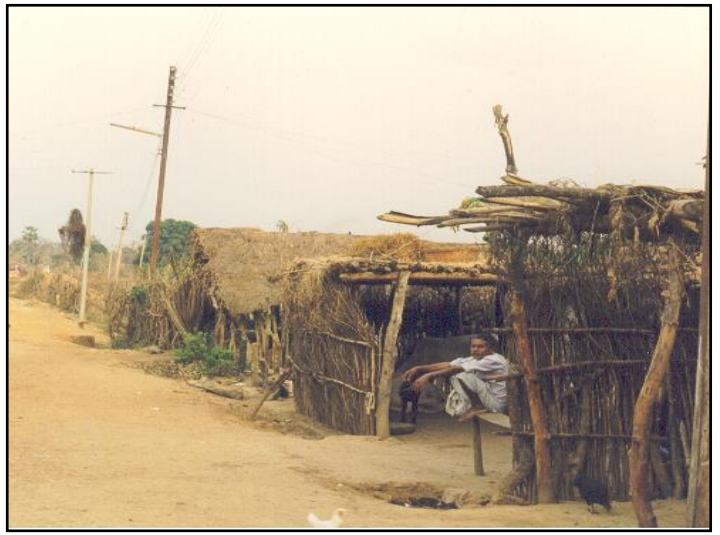
Focus initially was on Community Based Care

Referrals to Where??

Narrative is Shifting – Home to Hospitals

- **Year 2005**

- Every second women delivered at home
- Focus was on community based care



- **Year 2015**

- 8 out of 10 deliver at health facility
- Increasing load of newborn and referrals

The Big Challenge… Globally

Maximizing Gains of Facility Births for Newborn Survival

54% Increase in Institutional Delivery in Two Decades

The Spectrum of Facility Based Care for Newborn

Newborn Care Corner at all delivery points

Newborn Stabilization Units –Sub District

Care for Small and Sick – SNCUs at District

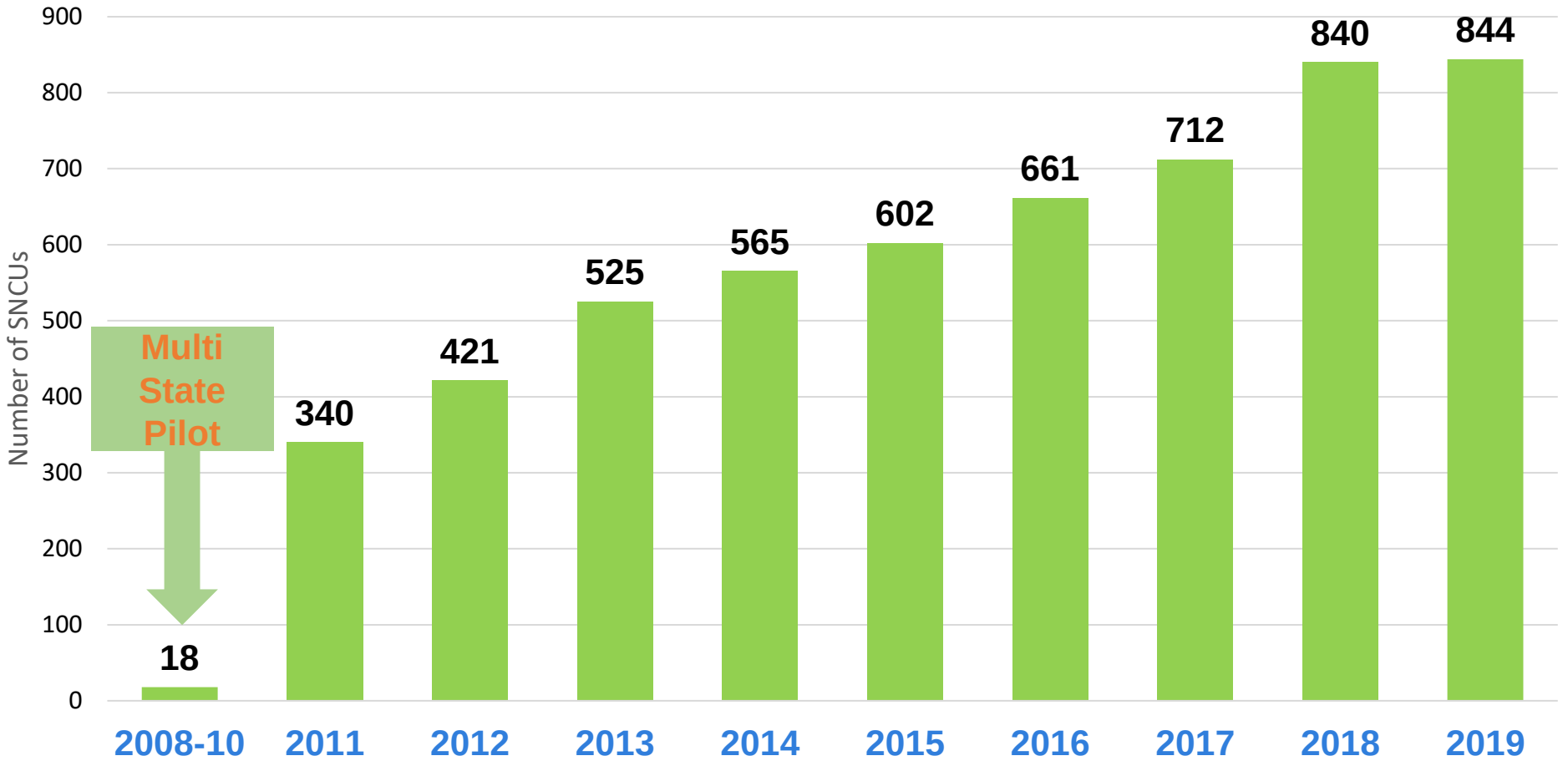
Kangaroo Mother/ Father Care in vicinity of SNCU

Addressing Five Key Prerequisites for Roll out

- **Defining levels of facility based newborn care** and ensuring necessary funding with **clear budget lines** in national, state and district plans
- Investment on **infrastructure upgradation and standardization**
- Putting in place a system for **equipment procurement and maintenance**
- **HR norms and policy to attract needed human resources + capacity building**
- **Real time monitoring** and follow up system

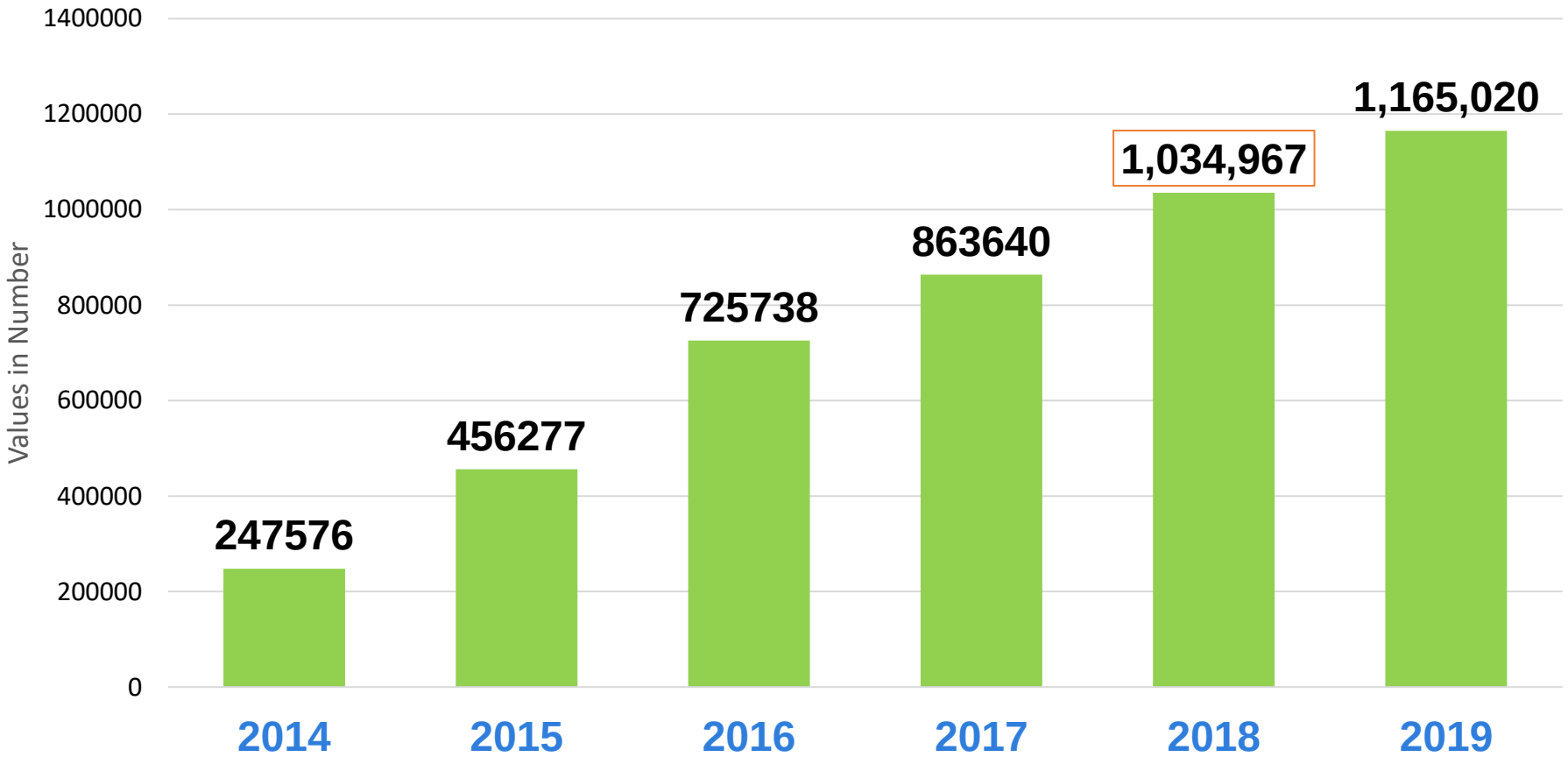
Working Simultaneously and Not Sequentially

SNCUs – Pilot to National Scale up



Number of Special Newborn Care Units (SNCUs) by Year

SNCUs – Reaching the One Million Mark



Annual Admissions in SNCUs

Source: *SNCU online database*

Scaling Up Facility Based Newborn Care

What Does It Take??

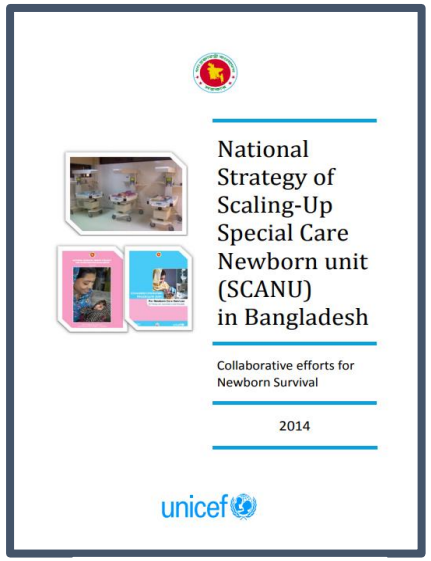
Step 1: Need For a Long Term Vision – 10 Years Journey

- **Set up a National technical working group for facility based newborn care**
  - **Federal Government led with engagement of provinces/states** and related departments
  - Strong **partner engagement** both in pilot and scale up
  - Representation and commitment from **professional bodies**
  - **Technical experts:** nurses, pediatricians, gynecologists, engineers, procurement and HR team
  - Civil societies and **parents group** representation – Family centered care

Government Leadership is Critical to Align All Efforts, Irrespective of Funding

Step 2: Put in Place a National Plan with Timelines

- **Define the levels of care for different levels of health facilities**
  - **Level 1 care:** Sub district level facility
  - **Level 2 care:** District Level or an equivalent unit
  - **Level 3 care**: Teaching hospitals/ regional hospitals
  - Essential newborn care and KMC at all health facilities
  - Need assessment helps to understand gaps better



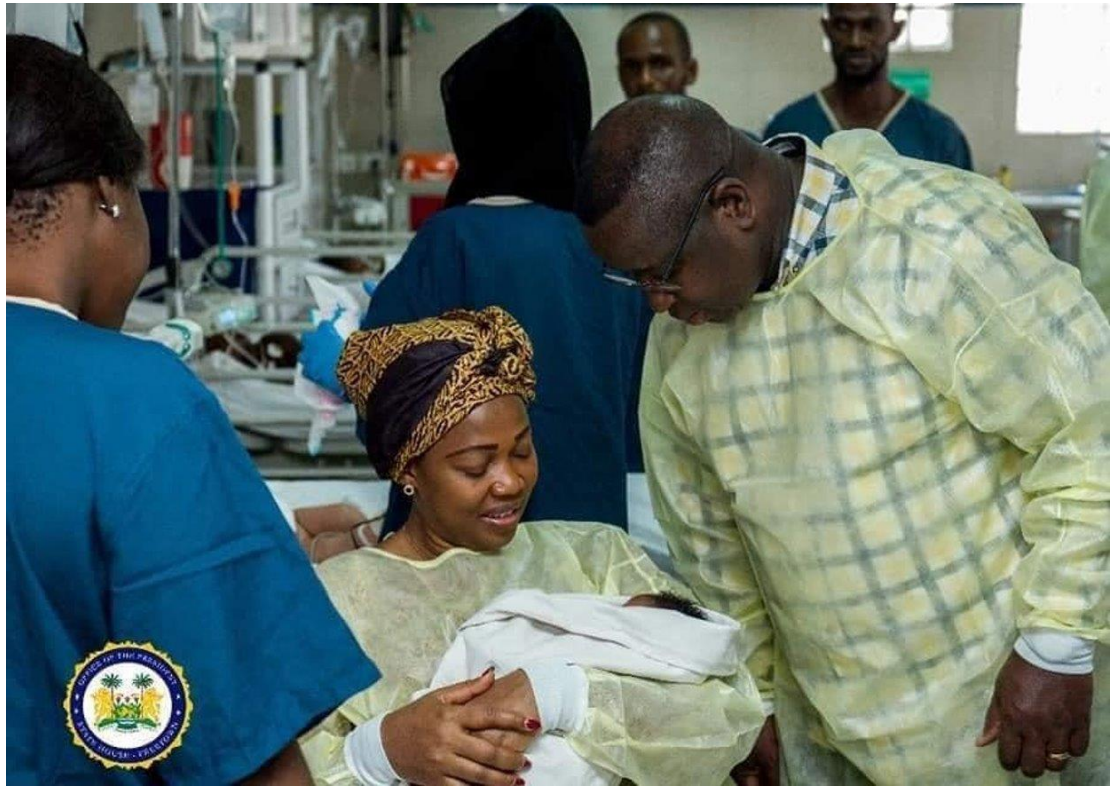
Bangladesh

- **Plan should cover all critical components of facility-based care**
  - Infrastructure, Equipments, HR including capacity building and supportive supervision, Quality improvement, Data systems, Follow up care and early intervention, Referral transport
- **Plan for a multi district pilot to get buy in across states**
  - Pilots may be partner funded but operating cost to be preferably met using government funding

Step 3: Get the Buy in of Political Leadership

- **Seeing is believing, critical for leveraging funding and policy decisions**

Chief Minister of Madhya Pradesh State in India



President of Sierra Leone, His Excellency Dr Julius Maada Bio and the First Lady Fatima Maada Bio visiting SCBU in Bo

Step 4: Ensure adequate funding with clear budget lines

- **Budgeting is an interplay of establishment cost and operating expenses**
  - **Specific budget lines** for key components to be included in national, state and district plans
  - **Provision of running cost (HR, drugs, equipment maintenance, contingency)** is vital
  - Getting the bed strength and Human resources right is critical
  - **Establishing costing norms for each component** help in standardization
  - Scale up is best done through government resources
  - **Mix of domestic (national + state) and partner resources** can also be used to secure funding

Setting Up Budgeting Norms by Government

	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**

Source: Government of India – SNCU Operational Guidance 2013

Line Item	Unit cost	Quantity for MCH/DH (30 bed)	Total Cost
Table, Resuscitator, newborn with radiant warmer	1000000	10	10,000,000
Radiant Warmer, fixed height stand,	350000	20	7,000,000
Neonatal Phototherapy Unit, Single head, high intensity,	150000	10	1,500,000
Monitor, vital sign, NIBP, HR,SpO2, ECG, RR,Temp,	50000	10	500,000
Cot, baby, hospital, w/bassinet, on castors,	20000	20	400,000
CPAP (Continuous Positive Airway Pressure)	400000	5	2,000,000
Ventilator machine	600000	2	1,200,000
Syringe pump, 10,20,50 ml, single phase,	80000	25	2,000,000
Light,examination,mobile,220-12V,	5000	10	50,000
Stand, infusion, double hook, on castors,	3000	30	90,000
Bilirubinometer, total bilirubine, capillary based,	20000	5	100,000
Glucometer	5000	10	50,000
Sterilizer,steam,40L,electric,w/access	20000	3	60,000
Tape, measure, vinyl-coated, 1.5m.	2000	20	40,000
Infantometer, plexi, 3½ft/105cm,	4000	5	20,000
Pulse Oxymeter (Neonatal)	25000	10	250,000
Pump suction, foot operated,	5000	5	25,000
Pump Suction, Portable, 220v, w/access,	10000	5	50,000
Scale, baby, electronic (10kg)	5000	5	25,000
Stethoscope for Neonatal use	2000	50	100,000
Sphygnomanometer (Neonate)	3000	25	75,000
Neonatalie Complete, Light (Neo Natalie Newborn Simulator + Bag & Mask + Bulb suction)	6000	10	60,000
Neonatalie Bulb Suction,	1000	50	50,000
Neonatalie Resuscitator,	3000	50	150,000
Oxygen Concentrator	15000	5	75,000
Oxygen hood, S and M, set of 3 each, including connecting tubes (Prongs, nasal, Oxygen, neonate)	2000	20	40,000
Clinical/Digital Thermometer (Neonate)	100	100	10,000
Room Thermometer	100	4	400
Air conditioner (3 ton)	150000	4	600,000

Standardization with Unit Cost for Equipment: Bangladesh

Table 5 - Equipment and renewables for SBCU *

SN	Item Description	Essential (E) or Desirable (D)	Minimum Quantity for 10 Bed SBCU
1	Open care system: radiant warmer, fixed height, with trolley, drawers	E	6
2	Radiant warmer, fixed height stand	E	4
3	Basinet on trolley, neonatal, with mattress	E	4
4	Phototherapy unit, single head, high intensity	E	4
5	Bag and mask, neonate, 250-500 ml with masks 0-1 + Penguin sucker	E	6
6	Pump, suction, portable, 220 V, w/access	E	10 (Each bed side)
7	Infusion pump	E	6
8	Infusion Syringe pump, 10, 20, 50 ml, single phase	E	2
9	Thermometer, clinical, digital, 32-43°C	E	10
10	Scale, baby, electronic, 10 kg <5g>	E	2
11	Pulse oximeter, bedside, neonatal	E	6
12	Stethoscope, neonate	E	10 (Each bed side)
13	Sphygmomanometer, neonate, electronic	E	4
14	Oxygen Concentrator	E	8
15	Light, examination, mobile, 220-12V	E	4
16	Bed side Monitor (multifunctional)	E	6
17	CPAP system with air oxygen blender	E	4
18	Bilirubinometer	E	1
19	Micro Centrifuge machine including rotor	E	1 Outside care area

Essential Equipment List for SBCU: Sierra Leone

Step 5: Infrastructure Planning and Standardization

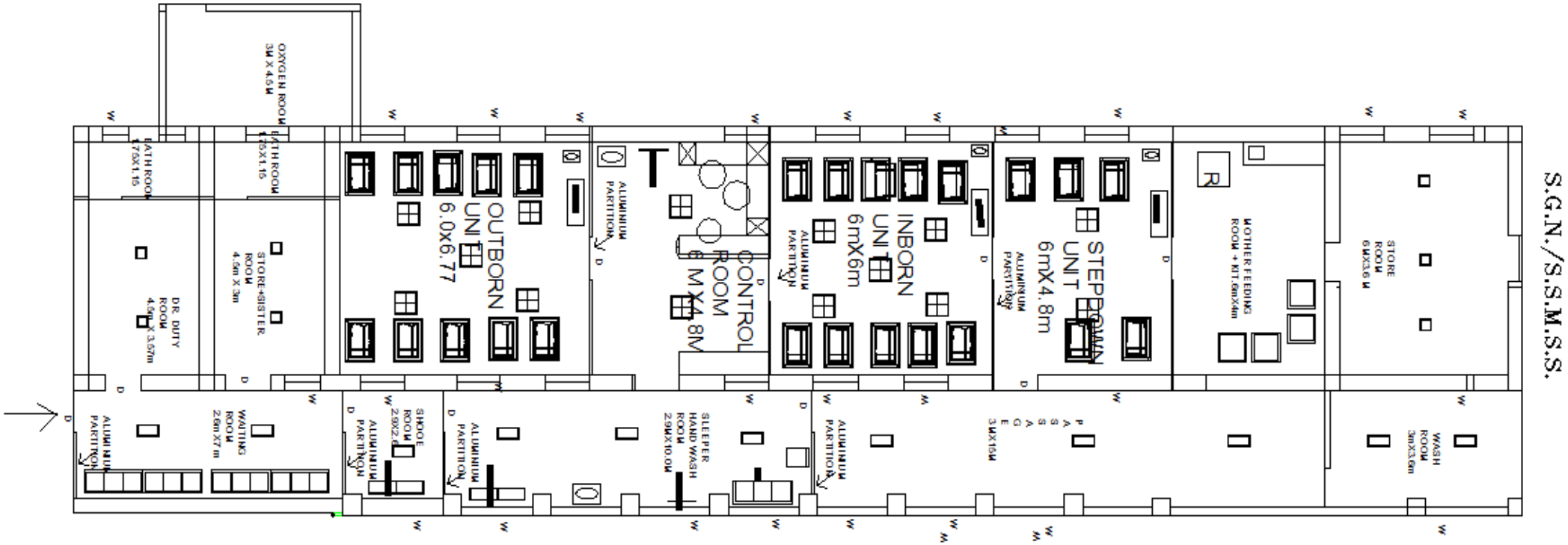
- **Infrastructure planning: What are the key considerations?**
  - **New construction versus renovation of existing space – cost implications**
  - Begin by identifying all essential services that you need to include in the design
  - **Do not miss out on Labor room** and space for mothers
  - Develop standard costed floor plans and prototypes to meet different space needs

Step 5: Infrastructure Planning and Standardization

- **Identifying optimal bed capacity is critical**
  - Function of delivery load and referrals + average duration of stay
  - Target for 80% Bed occupancy, factor in for population growth and rise in institutional deliveries
  - Too small might not be cost efficient, too big a unit might be underutilized
  - **Practical Experience: 20 Bedded unit can cater to nearly 1000 admissions per year**

Essential services to be considered in the SNCU design:

- Triage or receiving room, handwashing stations, reception/ observation desk, waiting area
- **Patient care area (Approx. 50 sq. feet/ bed taken by India, Bangladesh, Sierra Leone, Ethiopia)**
- Step down, KMC, Breast feeding support, Mothers ward, Follow up clinic, counselling room
- **Support services** (Oxygen room, generator room, store and linen, autoclave, side lab, radiology, duty rooms, toilets, waste disposal)



PLAN OF S. N. C. U. AT SATNA

Need to make provisions for adequate space without disrupting existing services

20 bedded unit ,each unit can treat nearly 1000 Newborn per year

Step 6: Establish System of Equipment Procurement + Maintenance

- **Easy to procure and deploy but difficult to maintain and sustain**
  - Group as **essential and desirable equipment** (ENAP commodities group to come with guidance)
  - Initial procurement may be supported by partners but **developing domestic capacity is critical**
  - Standardize specifications and **establish rate contracts in long run:** Ethiopia (EPSA), India
  - **Build local capacity to repair** – Biomedical technicians/ engineers (Sierra Leone, Malawi, Uganda)
  - SNCU equipment inventory and functionality to be part of reporting and data base
  - Provision of 20 to 30% buffer stock- factoring for repair time
  - Include training and annual maintenance cost for 3-5 years

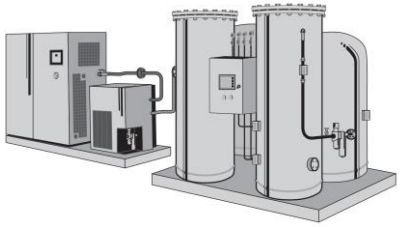
Don't Forget – consumables, generators, power stabilizers, oxygen cylinders, fire extinguishers, laboratory and radiology equipment

UNICEF supply catalogue offering example, Essential supplies for delivering oxygen and monitoring

Minimum supplies to deliver oxyger

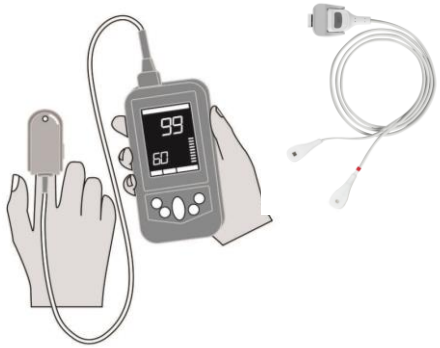
Nasal cannula (prongs)
(adult, pediatric and neonatal sizes)

Oxygen concentrator



PSA Plant

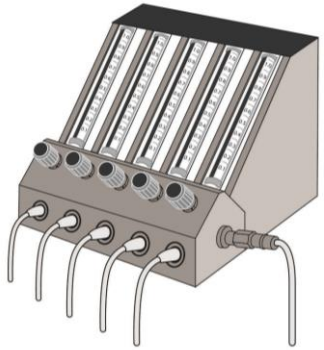
Essential for efficient and rational use of oxygen



Pulse oximeters and probes
(adult, pediatric and neonatal sizes)

Extra oxygen tubing

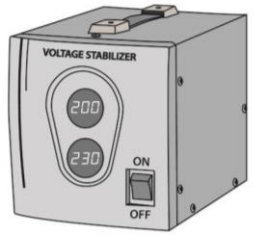
Oxygen analyzer



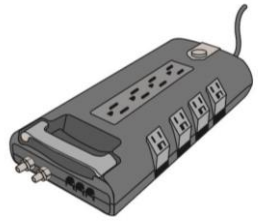
Flow splitter (flowmeter stand)

Highly suggested (to prolong device life)

- source locally where possible



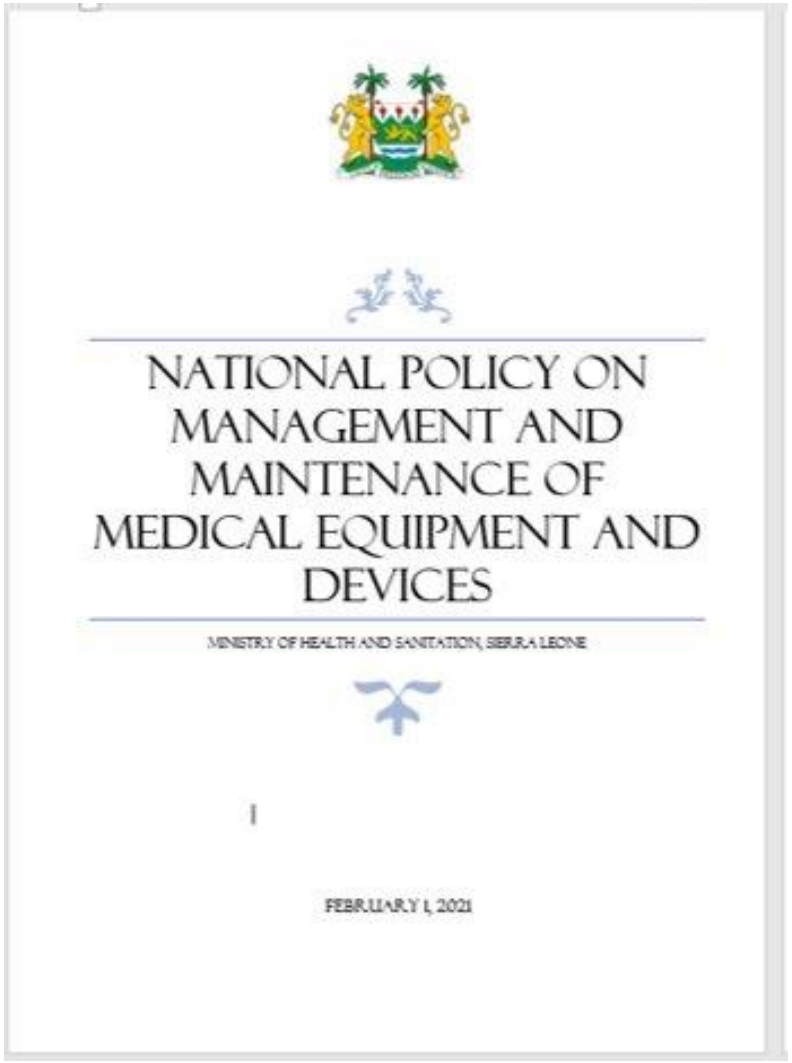
Voltage stabilizer

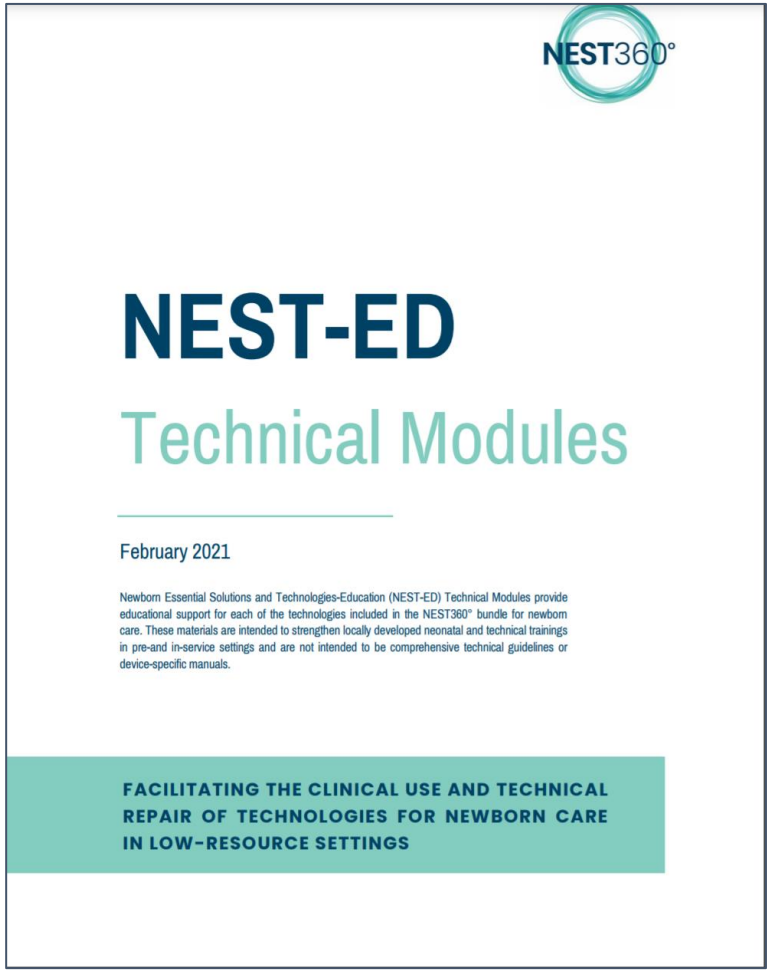


Surge suppressor

Uninterruptible power supply (UPS)

Step 6: Establish System of Equipment Procurement + Maintenance





Sierra Leone: Equipment Maintenance Resources

NEST Modules: Equipment Repair

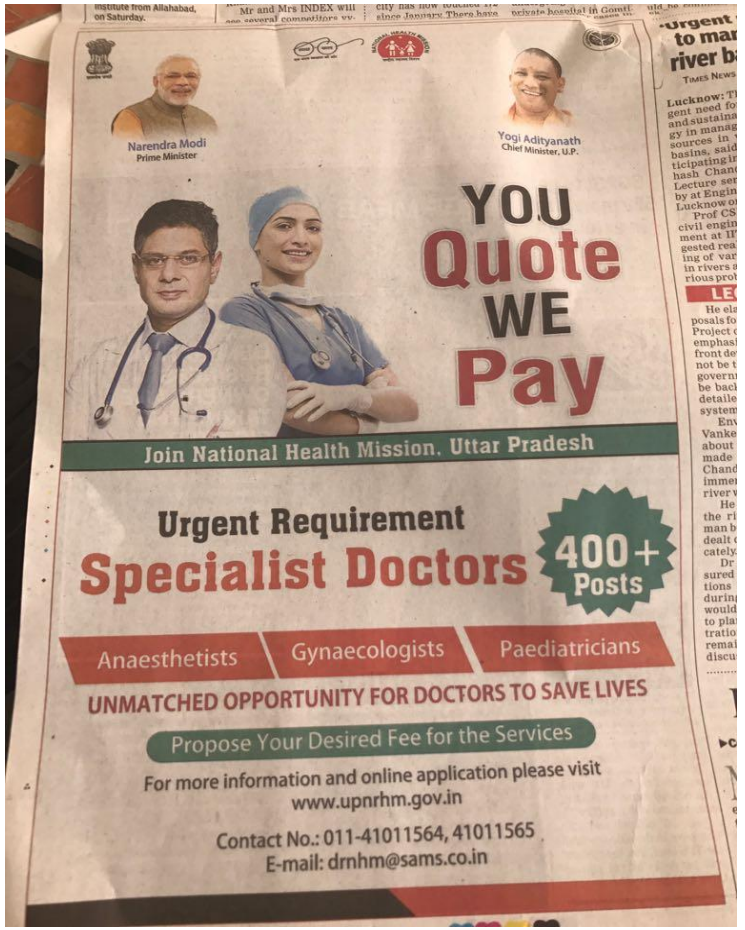
Step 7: Addressing HR Needs for Level 2 Care

- **Attracting and retaining HR is a challenge but No getting away from it**
  - There is no single solution, requires a multipronged approach
  - **The Big HR dilemma: Redeploying existing staff versus creating new positions**
  - **Establish national norms for SNCU staffing**, reflect them in the plan and budgets and slowly move towards achieving them
  - Good working conditions and an open-door policy helps to attract and retain staff
  - **Political and Bureaucratic commitment** is crucial

Never ever assume - Doctors and Nurses are not available

India: Policy Changes to Address HR Needs

- **Decentralizing recruitment and Walk in interviews** for all cadre
- Pay package revised to attract and retain staff
- **Difficult area allowances** – You quote we pay policy
- Enforcement of 2 years **service bond** for fresh post-graduates
- Flexibility in place of posting for candidates under service bond
- Time bound **regularization plan** for contractual staff.
- Retaining trained staff in SNCUs even after regularization.
- Increase in **retirement age** from 60 to 65 years
- **Task Shifting –** Training Medical graduates for newborn care



What are the HR Needs for Level 2 Units?

Suggestive Staffing Based on Country Experiences: For Discussion

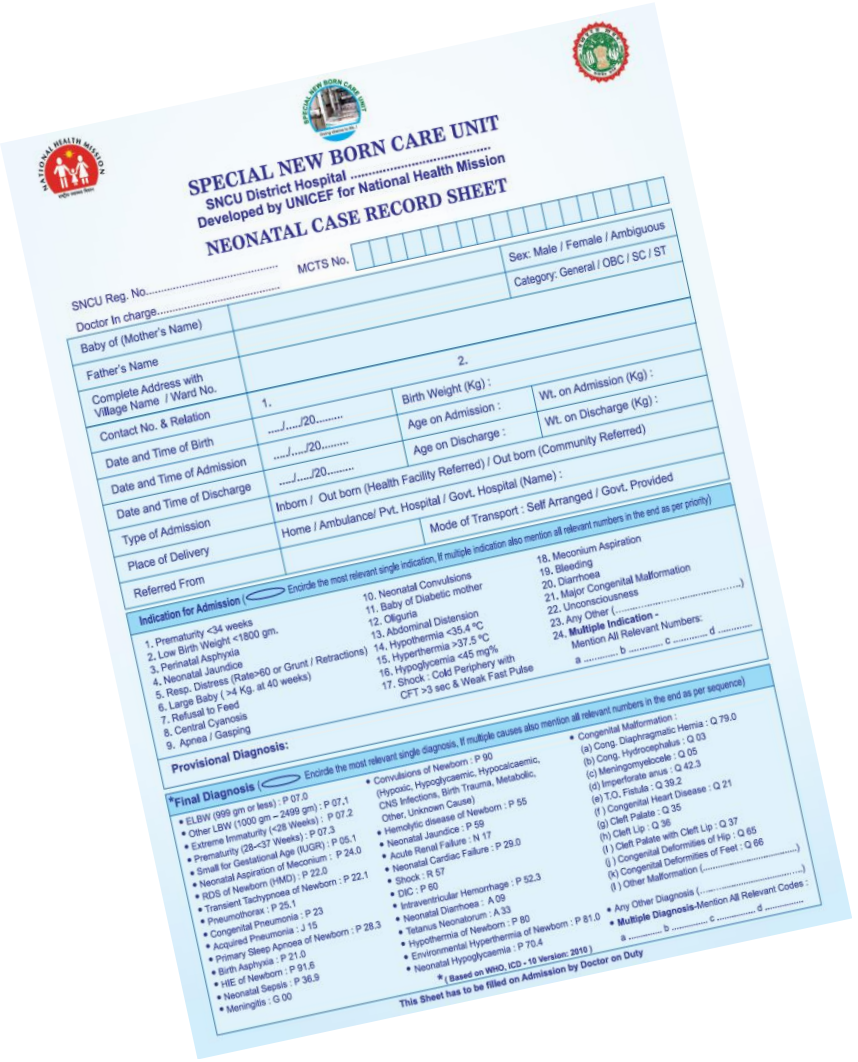
- Start with a mix of Pediatricians and Medical officers trained in newborn care (on site versus on call)
- Staff nurses: Start with general nurses aim for neonatal nurses in long run, Optimal bed nurse ratio?
- Lab Technicians
- Data clerk
- Ancillary staff for cleaning , Security guards, Electrician
- Biomedical technician, linked with a regional Biomedical engineer
- Pediatric surgeon and developmental specialists/ clinic at regional level catering to group of SNCUs
- Standardize capacity building, have job aids, integrate supportive supervision under QI initiatives

Entire staff exclusively for SNCU duty, discourage rotation

Step 8: Put in Place a Robust Data System

- **Tracking performance and outcomes across units is critical**
  - **Standardize data recording sheets** and registers agreeing on key variables to track
  - Start with a paper-based system and aim to shift to a digital or hybrid system
  - **Regular analysis** of data on key parameters **with a clear feedback loop**
  - Data and **evidence to guide policy and program actions** including QI efforts
  - **Prioritize units with poor performance for supportive supervision**
  - Select indicators to be linked to HMIS (Uganda, Bangladesh) – can't link everything

Monitoring Solution for SNCUs: India



SPECIAL NEW BORN CARE UNIT
SNCU District Hospital .....
Developed by UNICEF for National Health Mission
NEONATAL CASE RECORD SHEET

SNCU Reg. No..... MCTS No.
Doctor In charge.....
Sex: Male / Female / Ambiguous
Category: General / OBC / SC / ST

Baby of (Mother's Name)			
Father's Name	2.		
Complete Address with Village Name / Ward No.			
Contact No. & Relation	1.	Birth Weight (Kg) :	Wt. on Admission (Kg) :
Date and Time of Birth	..../..../20.....	Age on Admission :	Wt. on Discharge (Kg) :
Date and Time of Admission	..../..../20.....	Age on Discharge :	
Date and Time of Discharge	..../..../20.....	Inborn / Out born (Health Facility Referred) / Out born (Community Referred)	
Type of Admission	Home / Ambulance/ Pvt. Hospital / Govt. Hospital (Name) :		
Place of Delivery		Mode of Transport : Self Arranged / Govt. Provided	
Referred From			

Indication for Admission (Encircle the most relevant single indication, If multiple indication also mention all relevant numbers in the end as per priority)

1. Prematurity <34 weeks
2. Low Birth Weight <1800 gm.
3. Perinatal Asphyxia
4. Neonatal Jaundice
5. Resp. Distress (Rate>60 or Grunt / Retractions)
6. Large Baby (>4 Kg. at 40 weeks)
7. Refusal to Feed
8. Central Cyanosis
9. Apnea / Gasping
10. Neonatal Convulsions
11. Baby of Diabetic mother
12. Oliguria
13. Abdominal Distension
14. Hypothermia <35.4 °C
15. Hyperthermia >37.5 °C
16. Hypoglycemia <45 mg%
17. Shock : Cold Periphery with CFT >3 sec & Weak Fast Pulse
18. Meconium Aspiration
19. Bleeding
20. Diarrhoea
21. Major Congenital Malformation
22. Unconsciousness
23. Any Other (.....)
24. **Multiple Indication -** Mention All Relevant Numbers: a ..... b ..... c ..... d .....

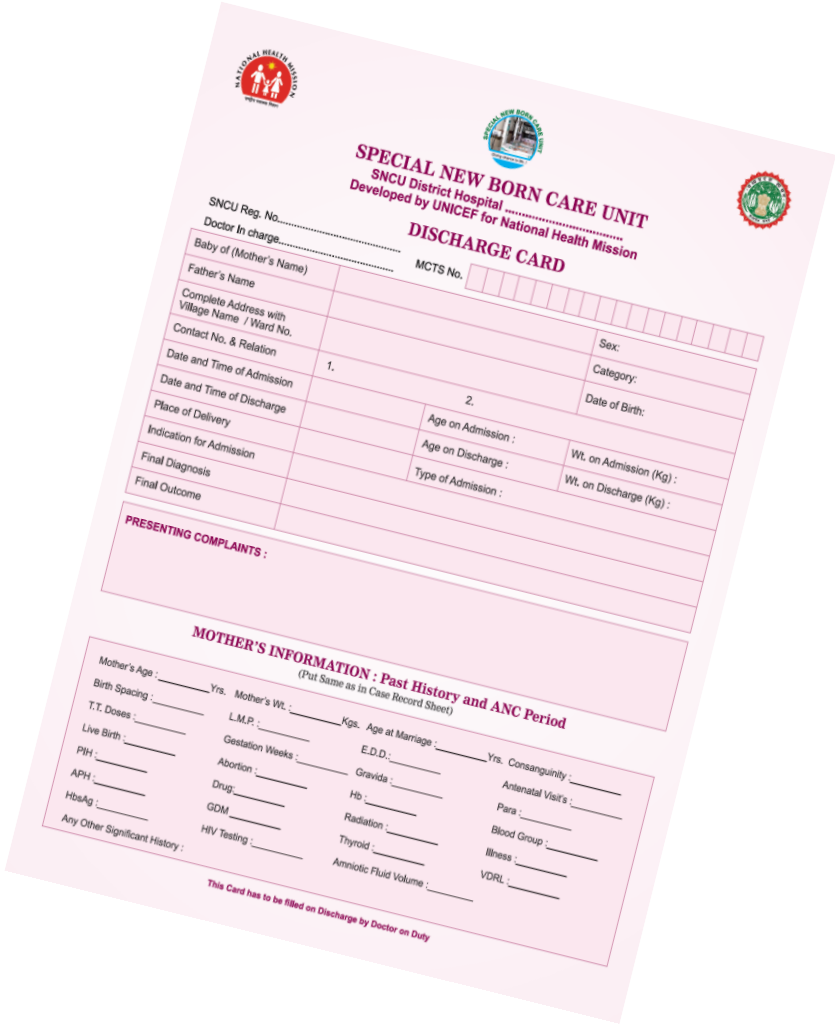
Provisional Diagnosis:

***Final Diagnosis** (Encircle the most relevant single diagnosis, If multiple causes also mention all relevant numbers in the end as per sequence)

- ELBW (999 gm or less) : P 07.0
- Other LBW (1000 gm – 2499 gm) : P 07.1
- Extreme Immaturity (<28 Weeks) : P 07.2
- Prematurity (28-<37 Weeks) : P 07.3
- Small for Gestational Age (IUGR) : P 05.1
- Neonatal Aspiration of Meconium : P 24.0
- RDS of Newborn (HMD) : P 22.0
- Neonatal Aspiration of Newborn : P 22.1
- Transient Tachypnoea of Newborn : P 22.1
- Pneumothorax : P 25.1
- Congenital Pneumonia : P 23
- Acquired Pneumonia : J 15
- Primary Sleep Apnoea of Newborn : P 28.3
- Birth Asphyxia : P 21.0
- HIE of Newborn : P 91.6
- Neonatal Sepsis : P 36.9
- Meningitis : G 00
- Convulsions of Newborn : P 90 (Hypoxic, Hypoglycaemic, Hypocalcaemic, CNS Infections, Birth Trauma, Metabolic, Other, Unknown Cause)
- Hemolytic disease of Newborn : P 55
- Neonatal Jaundice : P 59
- Acute Renal Failure : N 17
- Neonatal Cardiac Failure : P 29.0
- Shock : R 57
- DIC : P 60
- Intraventricular Hemorrhage : P 52.3
- Neonatal Diarrhoea : A 09
- Neonatorum : A 33
- Tetanus Neonatorum : P 80
- Hypothermia of Newborn : P 80
- Environmental Hypothermia of Newborn : P 81.0
- Neonatal Hyperthermia : P 70.4
- Neonatal Hypoglycaemia : P 70.4
- Congenital Malformation :
  (a) Cong. Diaphragmatic Hernia : Q 79.0
  (b) Cong. Hydrocephalus : Q 03
  (c) Meningomyelocele : Q 05
  (d) Imperforate anus : Q 42.3
  (e) T.O. Fistula : Q 39.2
  (f) Congenital Heart Disease : Q 21
  (g) Cleft Palate : Q 35
  (h) Cleft Lip : Q 36
  (h) Cleft Palate with Cleft Lip : Q 37
  (i) Cleft Palate with Cleft Lip : Q 37
  (j) Congenital Deformities of Hip : Q 65
  (k) Congenital Deformities of Feet : Q 66
  (l) Other Malformation (.....)
- Any Other Diagnosis (.....)
- **Multiple Diagnosis-**Mention All Relevant Codes : a ..... b ..... c ..... d .....

*** (Based on WHO, ICD - 10 Version: 2010)**

This Sheet has to be filled on Admission by Doctor on Duty



SPECIAL NEW BORN CARE UNIT
SNCU District Hospital .....
Developed by UNICEF for National Health Mission
DISCHARGE CARD

SNCU Reg. No..... MCTS No.
Doctor In charge.....

Baby of (Mother's Name)			
Father's Name			Sex:
Complete Address with Village Name / Ward No.			Category:
Contact No. & Relation	1.		Date of Birth:
Date and Time of Admission	2.		
Date and Time of Discharge		Age on Admission :	Wt. on Admission (Kg) :
Place of Delivery		Age on Discharge :	Wt. on Discharge (Kg) :
Indication for Admission		Type of Admission :	
Final Diagnosis			
Final Outcome			

PRESENTING COMPLAINTS :

MOTHER'S INFORMATION : Past History and ANC Period
(Put Same as in Case Record Sheet)

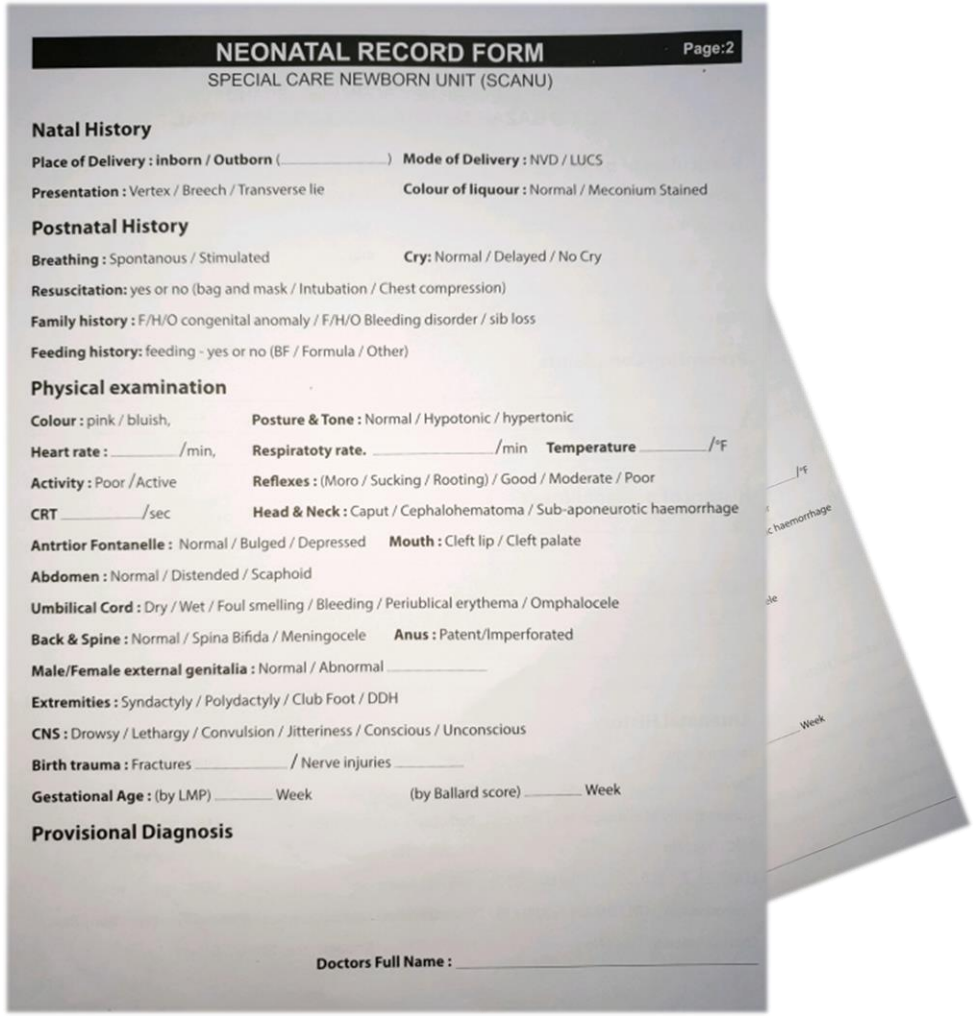
Mother's Age : _____ Yrs. Mother's Wt. : _____ Kgs. Age at Marriage : _____ Yrs. Consanguinity : _____
Birth Spacing : _____ L.M.P. : _____ E.D.D. : _____ Antenatal Visit's : _____
T.T. Doses : _____ Gestation Weeks : _____ Gravida : _____ Para : _____
Live Birth : _____ Abortion : _____ Hb : _____ Blood Group : _____
PIH : _____ Drug : _____ Radiation : _____ Illness : _____
APH : _____ GDM : _____ Thyroid : _____ VDRL : _____
HbsAg : _____ HIV Testing : _____ Amniotic Fluid Volume : _____
Any Other Significant History :

This Card has to be filled on Discharge by Doctor on Duty

Uniform Data Recording Sheets

Simultaneous Online Entry
Dedicated data operator

Monitoring Solution for SNCUs: Bangladesh



NEONATAL RECORD FORM Page:2

SPECIAL CARE NEWBORN UNIT (SCANU)

Natal History

Place of Delivery : inborn / Outborn (_____) **Mode of Delivery :** NVD / LUCS

Presentation : Vertex / Breech / Transverse lie **Colour of liquour :** Normal / Meconium Stained

Postnatal History

Breathing : Spontanous / Stimulated **Cry:** Normal / Delayed / No Cry

Resuscitation: yes or no (bag and mask / Intubation / Chest compression)

Family history : F/H/O congenital anomaly / F/H/O Bleeding disorder / sib loss

Feeding history: feeding - yes or no (BF / Formula / Other)

Physical examination

Colour : pink / bluish, **Posture & Tone :** Normal / Hypotonic / hypertonic

Heart rate : _____/min, **Respiratoty rate.** _____/min **Temperature** _____/°F

Activity : Poor /Active **Reflexes :** (Moro / Sucking / Rooting) / Good / Moderate / Poor

CRT _____/sec **Head & Neck :** Caput / Cephalohematoma / Sub-aponeurotic haemorrhage

Antrtior Fontanelle : Normal / Bulged / Depressed **Mouth :** Cleft lip / Cleft palate

Abdomen : Normal / Distended / Scaphoid

Umbilical Cord : Dry / Wet / Foul smelling / Bleeding / Periublical erythema / Omphalocele

Back & Spine : Normal / Spina Bifida / Meningocele **Anus :** Patent/Imperforated

Male/Female external genitalia : Normal / Abnormal _____

Extremities : Syndactyly / Polydactyly / Club Foot / DDH

CNS : Drowsy / Lethargy / Convulsion / Jitteriness / Conscious / Unconscious

Birth trauma : Fractures _____ / Nerve injuries _____

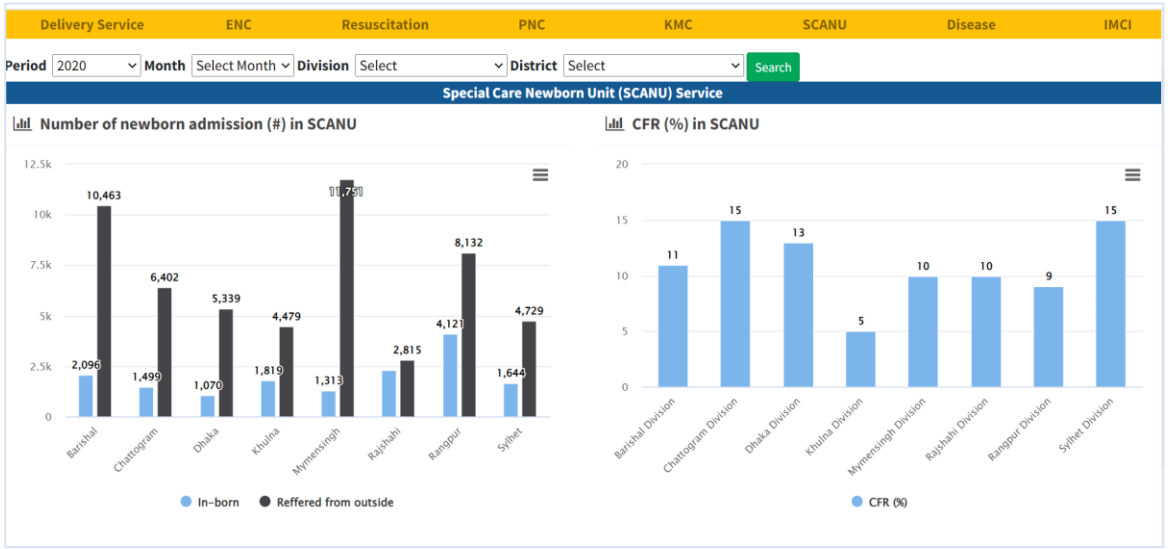
Gestational Age : (by LMP) _____ Week (by Ballard score) _____ Week

Provisional Diagnosis

Doctors Full Name : _____

Bangladesh: Uniform Data Recording

Realtime Data Entry: Dedicated Nurse in SCANU



SCANU Data Dashboard in DHIS 2

Step 9: Ensure a System for Post Discharge Follow up

- **Survival in SNCUs only is not enough: Post discharge care is also critical**
  - Counselling and Screening at discharge: Vision and Hearing
  - Follow up at home by community health worker (counselling and identification of danger signs)
  - Build on existing mechanism of home visits with high coverage
  - Scheduled visits to SNCU for clinical follow up
  - Early intervention in case of developmental delay

Counselling on Discharge


Need to Extend Continuum of Care..
Back to Community

Step 10: Engage Families in Care from Beginning

- **Families need to be at the center of planning of inpatient care**
  - Policies should encourage family and mother's engagement in care and zero seperation
  - Free food, toilets, shower and a place for mother to stay should be part of plan
  - Nurturing care needs to be encouraged at every point
  - Support for bereavement

Vietnam: Mothers engagement

Sierra Leone: Mothers Part of Care

Areas That Need To Be in Our Radar

- **Gender gaps in care seeking for girl child** (India, Bangladesh, Sierra Leone)
- Infection Prevention and Control and integration of WASH
- **Care in Labor room impacts** SNCU admissions and outcomes
- **Quality needs to match coverage**: Can not be an afterthought
- Referral Transport designed for Newborn and improving inter-facility transfer
- Linking survival with Early childhood development
- **COVID impact on inpatient newborn care:** utilization, follow up, mother baby separation, staff attrition, funding

What Will Help….. Being Pragmatic

- Having a clear vision and long-term plan: **Where you want to be in 2025 and 2030?**
- **Secured funding:** Domestic or pooled resources
- **Working simultaneously on different steps and not sequentially**
- **Adapting and Evolving** as you move forward
- **Seeing is Believing:** Create advocates and champions
- **Leadership** and ownership by government
- **Continued support by partners**, academic institutions, professional bodies for scale up
- **Standardization –** Designs, HR norms, Budget lines, Training package, Reporting
- **Seeing more opportunities than challenges, Think Big and Act Big**

Dream is Not Something that you see in Sleep

Dream is Something…

That does not let you Sleep

The neoLENS Project

Journeys to scale up care for small and sick newborns in Ethiopia, India, Malawi, and Rwanda

WHO/UNICEF Global Newborn Expert Consultation: Dec 2, 2021

Cyril Engmann, MD FAAP

Senior Director-Program Quality & Impact,
Institutional Official
PATH, Seattle
&
Attending Neonatologist Joint Professor
Departments of Pediatrics & Global Health
Schools of Medicine & Public Health,
University of Washington & Seattle Children's Hospital, Seattle,

PATH

Lessons Learned in **E**stablishing Inpatient **N**ewborn Care: The ***neo*LENS** Project

Goal: To document approaches taken, barriers and enablers, and lessons learned for establishing and strengthening inpatient newborn care services across four countries – Ethiopia, India, Malawi, Rwanda.

Why: Understanding country-level pathways to establishing models of inpatient newborn care is vital to informing future investments and implementation strategies for achieving the new WHO standards of care.

How: Mapping a framework based on the WHO Health System Building Blocks to document processes and innovation strategies in establishing inpatient newborn care systems.

BILL & MELINDA GATES foundation

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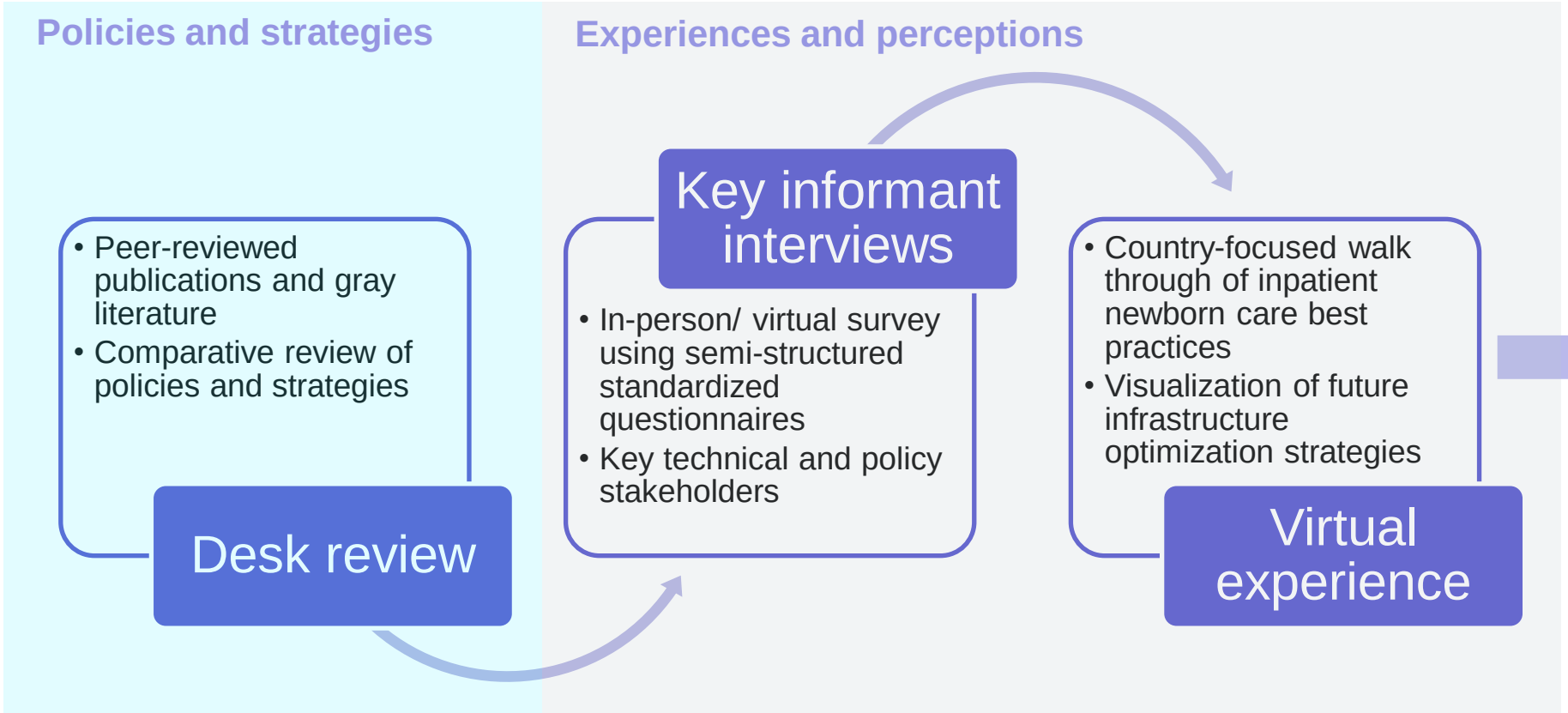
neoLENS: Documenting the journey of approaches taken, barriers and enablers, and lessons learned through in-depth case studies across Ethiopia, India, Malawi, and Rwanda



To describe the roadmap to reduction of neonatal mortality observed over time.

To drive improved access to care for the small and sick newborn.

Launch of neoLENS case studies and virtual experience –January 2022

www.path.org/program/maternal-newborn-child-health-and-nutrition/neolens

Example - RWANDA: Initial barriers and challenges to establishing small and sick newborn care

Around **2010** in Rwanda, the barriers and challenges to achieving inpatient care for the small and sick newborn cut across all aspects of the health system building blocks as described below.

We use the World Health Organization (WHO) Health System Building Blocks to guide this journey, since inpatient care for small and sick newborns touches every part of the health system. The Health System Building Blocks presented here have been adapted to fit the circumstances specific to providing care for the small and sick newborn.

Leadership and governance

- Lack of clear policies and strategy for decentralized newborn care.
- Lack of norms, standards, and protocols for newborn care in facility and community-based neonatal programs.

Human resources

- Lack of a focal point for neonatal care at the Ministry of Health (MOH).
- Lack of pediatricians, neonatologists, and specialized neonatal nurses in district hospitals.
- No nurses allocated only for newborn care.
- Lack of skilled health care workers to provide proper management for small and sick newborns.
- Turnover of staff impeded continuity and quality of care.

Health information systems

- No newborn indicators integrated into the health management information system (HMIS) due to lack of services for small and sick newborns.

Infrastructure

- Insufficient space for neonatal intensive care and second level of newborn care.
- Lack of funds to support built environment.
- Inconsistent electricity and lack of running water in all locations.

Health system financing

- No defined budget allocated for inpatient newborn care.
- No system in place, such as performance-based financing, to motivate health care providers.

Essential medical supplies and devices

- Lack of essential equipment for specialized small and sick newborn care (i.e., continuous positive airway pressure [CPAP], oxygen, syringe pump).
- Some neonatal drugs were not on the national list of essential drugs (e.g., vitamin K, caffeine).

Service delivery

- High impact interventions for newborns such as essential newborn care, Helping Babies Breathe (HBB), care for small and sick babies including Kangaroo Mother Care (KMC), and postnatal care were not harmonized.
- Low acceptability of KMC by providers when it was first introduced.

Family-centered Care

- No focus on including family in newborn care.

The journey towards establishing a system of care for small and sick newborns

This section describes the period from **2010** onwards in Rwanda when stakeholders began to consider how best to establish and operationalize inpatient care for small and sick newborns.

> *"Until 2010 ... the survival of preterm babies was not even a subject of discussion. Since the launch of Millennium Development Goals, the Ministry of Health started pushing and advocating, then [an] initial step was to understand the small and sick newborn concept as a separate entity that requires attention, [instead of] comparing to the old children that we mixed with small and sick newborns."*
>
> *—Key informant interview 09*

Photo: Partners in Health, 2021.

Example: The emerging Rwanda MOH vision for small and sick newborn care

The policy framework utilized by the Rwanda MOH during the period when inpatient care for small and sick newborns was being established solidified their commitment to improving newborn health. All planning was from an integrated reproductive, maternal, newborn, and child health (RMNCH) perspective; no separate newborn health strategic plan was developed.

Mission of the MNCH strategic plan 2013-2018[4]

To improve women, newborn and child health by providing an environment where unwanted pregnancies are avoided, women go through pregnancy and childbirth safely, their newborns are born alive and healthy and where children grow and develop their full potential, thereby fulfilling their role in the socio-economic development of Rwanda.

> *"The DHS of 2000 has been an eye-opener and provided evidence especially on neonatal mortality rate, which was about 37/1,000."*
>
> *—Key informant interview 08*

> *"Obstetricians and gynecologists, pediatricians, and the National council of nurses and midwives worked together to plan mentorships and review meetings to improve these plans. All these meetings were led by the [Maternal, Child, and Community Health Division]. Findings from these meetings were translated into trainings and mentorships for improvement."*
>
> *—Key informant interview 04*

Evidence base used for decision-making

The MOH analyzed various reports and data on small and sick newborn morbidity and mortality to quantify the nature and magnitude of the problem. They used this information to tailor appropriate measures and interventions to scale up small and sick newborn care. Key documents that helped advance the decision to establish care included:

- Published Rwamagana District Hospital case study, which described the impact of a model of small and sick newborn care in a rural district hospital.[5]
- Institute of Health Metrics 2012 Global Burden of Disease Report that advanced national prioritization of newborn care by showing that the majority of death in Rwanda occurred within the first 28 days of life.
- Reports that highlighted data about preterm birth in Rwanda [Every Preemie-SCALE country reports and situation analysis of inpatient newborn care].
- Millennium Development Goal number 4: Reduce child mortality.[6,7]
- Published article of newborn survival case study in Rwanda, which reviewed evidence- based interventions and coverage levels already implemented in the country and identified bottlenecks in service delivery and uptake of services and recommendations to accelerate reduction of newborn mortality.[8]
- Maternal and Child Survival Program Report of Situation Analysis for Inpatient Care of Newborns and Young Infants in Rwanda (2018).[9]

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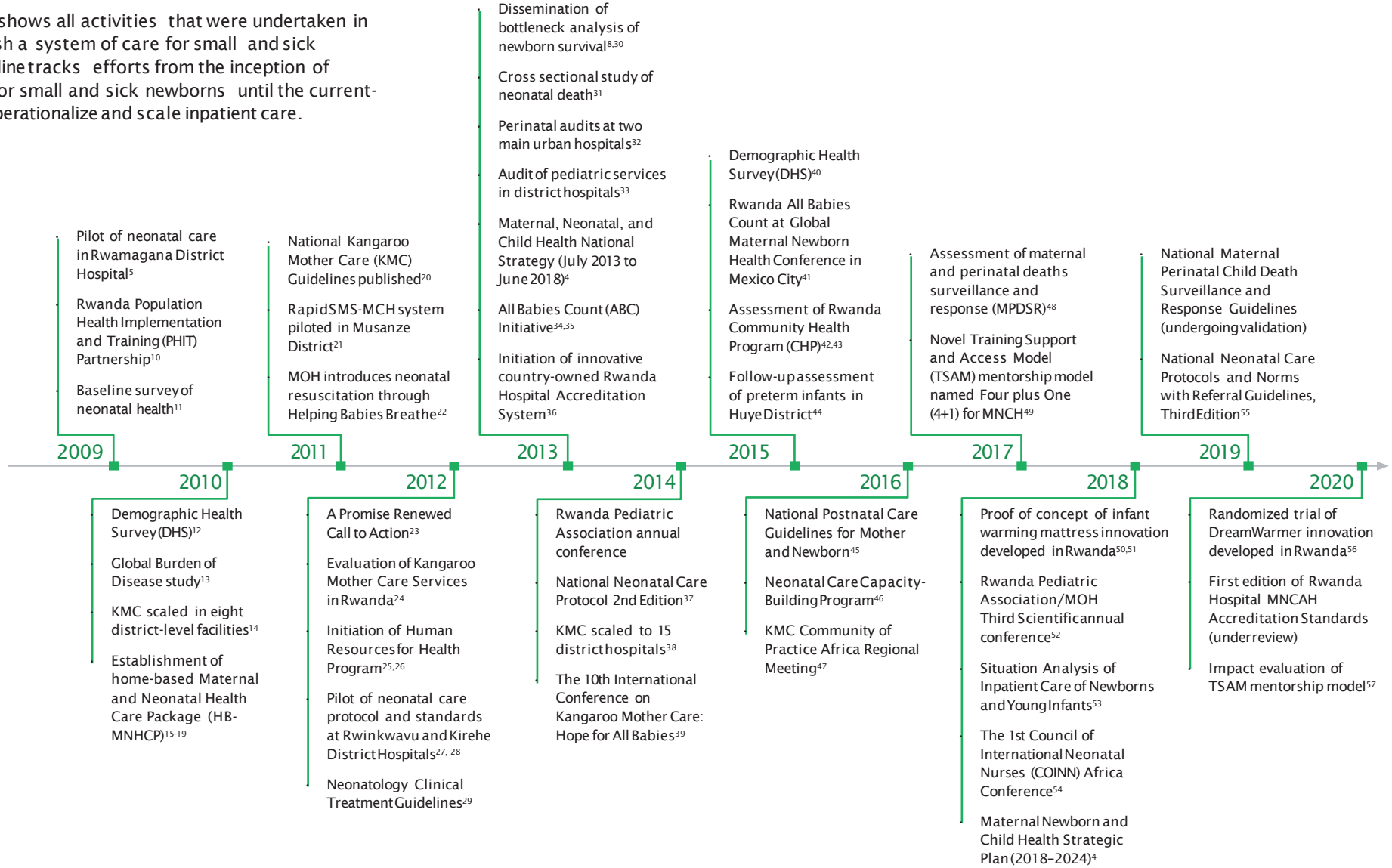
Example: Event timeline: Rwanda 2009–2020

This event timeline shows all activities that were undertaken in Rwanda to establish a system of care for small and sick newborns. The timeline tracks efforts from the inception of planning for care for small and sick newborns until the current-day activities to operationalize and scale inpatient care.



Unique strategy and innovation used to strengthen the health system

In this section, we detail the strategies and innovation put into action in Malawi to support inpatient care for small and sick newborns.

For each Health System Building Blocks, we describe the strategy and an example of at least one innovation used in Malawi, as well as a list of specific actions undertaken by stakeholders to strengthen care for small and sick newborns.

Example: Malawi human resources

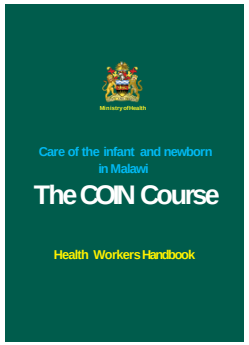
STRATEGY

Building capacity among available personnel to create a pool of specialized health workers to deliver inpatient care and are retained within the setting by embedding neonatal care in preservice training and specialized courses decisions to scale up care in order to prevent neonatal mortality.

- Established learning sites in liaison with MOH and PACHA and trained staff using the COIN manual with positive results; following COIN training, routine data collection about newborns improved.
- Established a mentoring system both within and external to the newborn unit to reinforce good neonatal skills and understanding of care, provide support, and ready access to help when needed.
- Created staffing rotations and transfer schedules that allowed for continuity of small and sick newborn care by trained specialized staff.
- Avoided rotation of health personnel that had been trained in neonatal care from neonatal facilities to non-neonatal facilities.
- Built a case with district health management teams to freeze rotations of personnel experienced and trained in care for small and sick newborns and to designate staff for neonatal units.
- Built capacity of bioengineers to enable them to develop contextualized equipment.
- Established the quality management directorate at the MOH to support quality improvement through staff training and feedback sessions at facility level.
- Held regular meetings at national and facility level between obstetricians and pediatricians to review neonatal deaths, and learning meetings where districts present their data and are critiqued afterwards for learning purposes.
- Demonstrated personal initiatives of trained staff that had been transferred to another district when they would initiate newborn care as they were taught and practiced in the previous setting.

INNOVATION

Implementing the COIN curriculum in preservice training for all health providers (including clinical officers) that do not receive directed training on small and sick newborn care.



> *... There wasn't a specific place for the newborns, plus there wasn't a specific staff to manage the newborn care units."*
>
> *—Participant 1006*

Example: Ethiopia human resources

STRATEGY

Accelerate health workforce development through in-service training, mentorship, and continuing professional development of mid-level health workforce

- Developed policy guidelines and standards for neonatal care.
- To support task shifting, designed basic training curriculum for nurses onneonatology.
- Created and delivered NICU training package to ensure that hospitals are staffed with trained NICU service providers (primarily neonatal nurses and physicians).
- Provided continuous support for newborn health care providers and managers.
- Trained nurses to promote KMC with standardized set of KMC protocols, guidelines, training materials, job tools, and checklists to support implementation.
- Trained providers on BEmONC services and provided onsite post-training coaching and mentoring.
- Created Masters in Neonatology programs at universities in pre-service education.
- Established the first nursing PhD program in Ethiopia and the first hybrid in-person/remote program in Africa[68] through a collaboration between Addis Ababa University and Emory University Nell Hodgson Woodruff School of Nursing.

INNOVATION

Task shifting small and sick newborn inpatient NICU care from doctors to trained nurses[69,70]

Photo caption and credit to come

Example: Rwanda human resources

STRATEGY

Building capacity of specialized workforce to deliver small and sick newborn care through a learning collaborative model where doctors, nurses, CHWs, and political leaders share data and take appropriate decisions to scale up care in order to prevent neonatal mortality.

- Established CHWs.
- Human Resources for Health program focused on building capacity among pediatricians and neonatal nurses.
- Task shifting so general practitioners and nurses who rotated into neonatology received training.
- Hired specialized health care providers including pediatricians and specialized nurses, who also provided mentorship to the lower level.
- Improved service delivery maintained through low-dose, high-frequency training and mentorship.
- Obstetricians, gynecologists, pediatricians, and National Council of Nurses and Midwives worked together with Rwanda Biomedical Centre/Maternal, Child and Community Health (MCCH) Division to plan mentorships and hold review meetings to improve these plans and develop necessary training and additional mentorship for continuous improvement.
- Scaled up operational quality improvement plan with internal guidelines to prevent complications to health center level.

INNOVATION

Development of new cadres and staffing models including partnership with Rwanda Pediatric Association for a continuous mentorship model.

> *"You cannot make a huge progress without human resources. For me this is the key—you need to have competent and committed people to go far."*
>
> *—Key informant interview 03*

Mentorship being conducted as part of the Rwanda Pediatric Association continuous mentorship model.

Photo: Rwanda Pediatric Association.

Lessons learned and advice

Reflecting on the Rwanda experience in establishing inpatient care for small and sick newborns can be helpful to other countries that are working to improve care for this vulnerable group. This section provides a summary of the lessons learned and advice to stakeholders in other countries who are developing and implementing plans to establish lifesaving care for small and sick newborns.

Infant at Gahini District Hospital. Photo: UNICEF, 2019.

> *"Now all 47district hospitals have the basics to take care of small and sick newborns—a basic care unit and a KMC unit. All referral hospitals have all levels of small and sick newborn care, including special neonatal intensive care units. In terms of staff, we have 2-3 neonatologists and 18specialized newborn care nurses. The Ministry of Health worked a lot in collaboration with various partners to get all these achievements."*
>
> *—Key informant interview 12*

Lessons learned from Rwanda

Leadership and governance

1. Strong leadership of the MOH during the last two decades contributed to the implementation of evidence- based interventions for small and sick newborn care.
2. Leadership from ministers who were pediatricians facilitated advancement of the agenda.
3. Appoint a neonatal focal point person at the MOH.
4. Support close collaboration and coordination of partners through a neonatal technical working group.

Human resources

5. Availability and certification of neonatal champions (nurses and doctors) at national and district level were motivating factors in advancing the newborn agenda.
6. Involvement of the Rwanda Pediatric Association is key to continuous capacity-building.
7. Involvement of the CHWs at community level was critical to the success of small and sick newborn care.

Health information systems

8. Local evidence on newborn care helped build momentum for inpatient care services.
9. Use of data for decision-making was very key; cunduct regular neonatal data analysis to identify gaps and propose relevant strategies.

Infrastructure

10. Inpatient units allocated enough space for very sick babies, isolated infectious babies, KMC babies, and a nursing room.
11. Infection prevention and control should be integrated into all spaces.

> *"Ten years ago, the neonatal deaths were about 27/1000 deaths in 2010, and we worked hard to improve. The last 2015 DHS report has shown a tremendous decrease to 20/1000 deaths. In the beginning, we [did not have] enough doctors and nurses; however we started sending general and specialist doctors and midwives as well. Also, we improved the quality of equipment and supplied new ones. As of now all hospitals have basic equipment, including infant warmer, CPAP, incubators, oxygen concentrators, and oxygen piping especially in provincial and referral hospitals."*
>
> —*Key informant interview 14*

Health system financing

12. Community health insurance can remove barriers to accessing health services, while at the same time transform health- seeking behavior.

Essential medical supplies and devices

13. Establish equipment maintenance and replacement plans at all levels of care.
14. Assure an effective supply chain for essential small and sick newborn equipment.

Service delivery

15. The KMC Center of Excellence at Muhima Hospital and the initial site for piloting care for small and sick newborns at Rwamagana District Hospital were the triggers for the country to establish inpatient small and sick newborn care.
16. Quality improvement projects regarding neonatology contribute to improved small and sick newborn care.
17. Establish a focal point person specialized in small and sick newborn care at each hospital.

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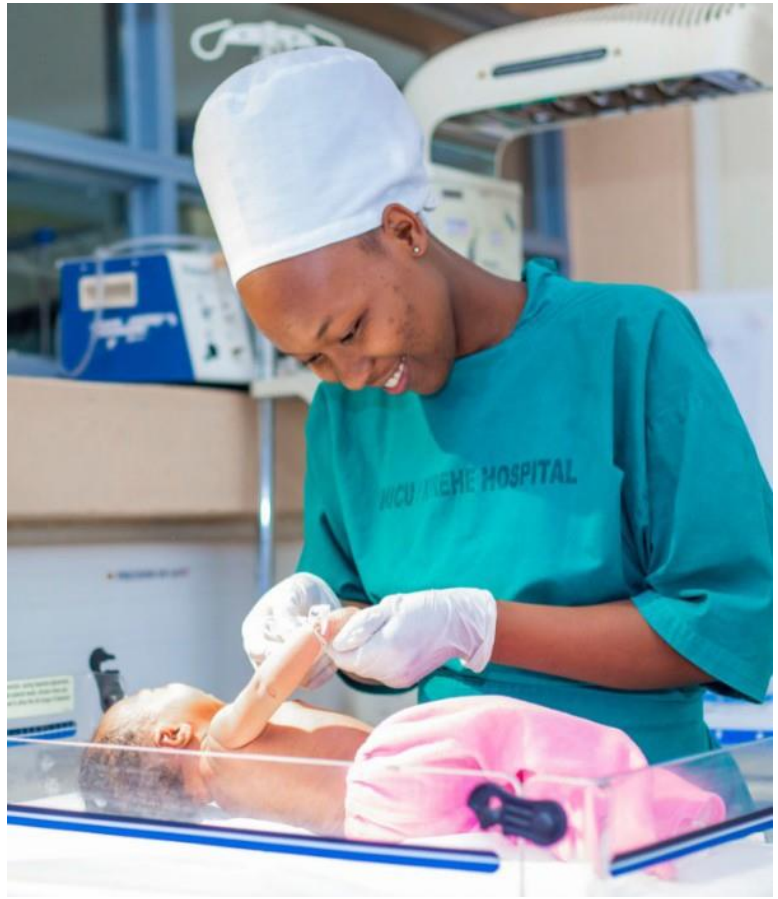

Baby Gasaro laying under an infant warmer, while Nurse Jeannette Nyirisafari looks for an IV line, in the PIH-supported neonatology unit at Kirehe Hospital.
Photo: Partners in Health, 2021.

Rwanda: Advice to other countries interested in establishing small and sick newborn care

- Use available means to establish services for small and sick newborn care and don't wait until all conditions (infrastructure and equipment) are in place.
- Identify and use champions at all levels of the health system.
- Ensure geographical and financial access to health care services.
- Establish and institutionalize quality improvement through an accreditation mechanism/framework.
- Improve the pre-hospital and emergency services to support small and sick newborns.
- Locate all inpatient units close to the maternity ward, and equip them with required life-saving commodities.
- Emphasize raising awareness about small and sick newborn services to counter traditional beliefs that enable small newborns to be ignored by the community.
- Teach mothers and the community about breastfeeding and nutrition.
- Come to Rwanda for a study tour!

> *"In the last ten years, in Muhima Hospital, we used to have a lot of neonatal deaths especially premature babies under 1kg, but now we can even survive a 500g newborn."*
>
> *—Key informant interview 10*

15

Lessons learned from India

Leadership and governance

Take measures to diffuse best practices from states/districts with well-functioning FBNC to states/districts with poor coverage and quality; create opportunities for this cross learning

Private sector

Conduct situational analysis of neonatal care services in the private sector and assess scope to improve their quality

Consider providing neonatal care through public–private partnership. National programs (like Ayushman Bharat) may facilitate this, upon piloting experiments done to test models

Human resources

SNCUs clearly stand out in district hospitals as they are well developed in infrastructure, have a dedicated HR, and best practices are being followed

Health information systems

Invest in operations research to improve quality of care and neonatal outcomes at the facilities

Analyse SNCU online data periodic and access should be given to all

Infrastructure

Strengthen the NBSU model, by integrating KMC facilities, standardizing protocols and having a follow-up system in place, to make this level of FBNC more functional & effective

Strengthen linkages between SNCUs, NBSUs and PHCs

.

Essential medical supplies and devices

Standardization of equipment allows for more efficient training of biomedical engineers.

Service delivery

Engage medical colleges' faculty and other eminent pediatricians to mentor quality FBNC

Consider involving more medical colleges for mentoring and improving the quality of facility based newborn care

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India: Advice to other countries interested in establishing small and sick newborn care

- Incentivize staff of hospitals with better remuneration, appreciation and employment contract rates would make them more efficient
- Involve more medical colleges faculty for mentoring will improve the quality of facility based newborn care
- There is a big scope for the private sector and facilities in providing neonatal care through public–private partnership
- Investing in operations research will go miles in improving quality of care and neonatal outcomes at the facilities
- For equipment maintenance, training local staff for equipment maintenance, instead of relying on third party technical experts wholly
- There should be constant sharing of best practices from states /districts with well-functioning FBNC to states/ districts with poor coverage and quality

"If you provide facilities, the people will come to you. Political will is important. SNCUs showed that if there is a political will then government sector can deliver far more critically and with a far more human touch."

—Key informant interview

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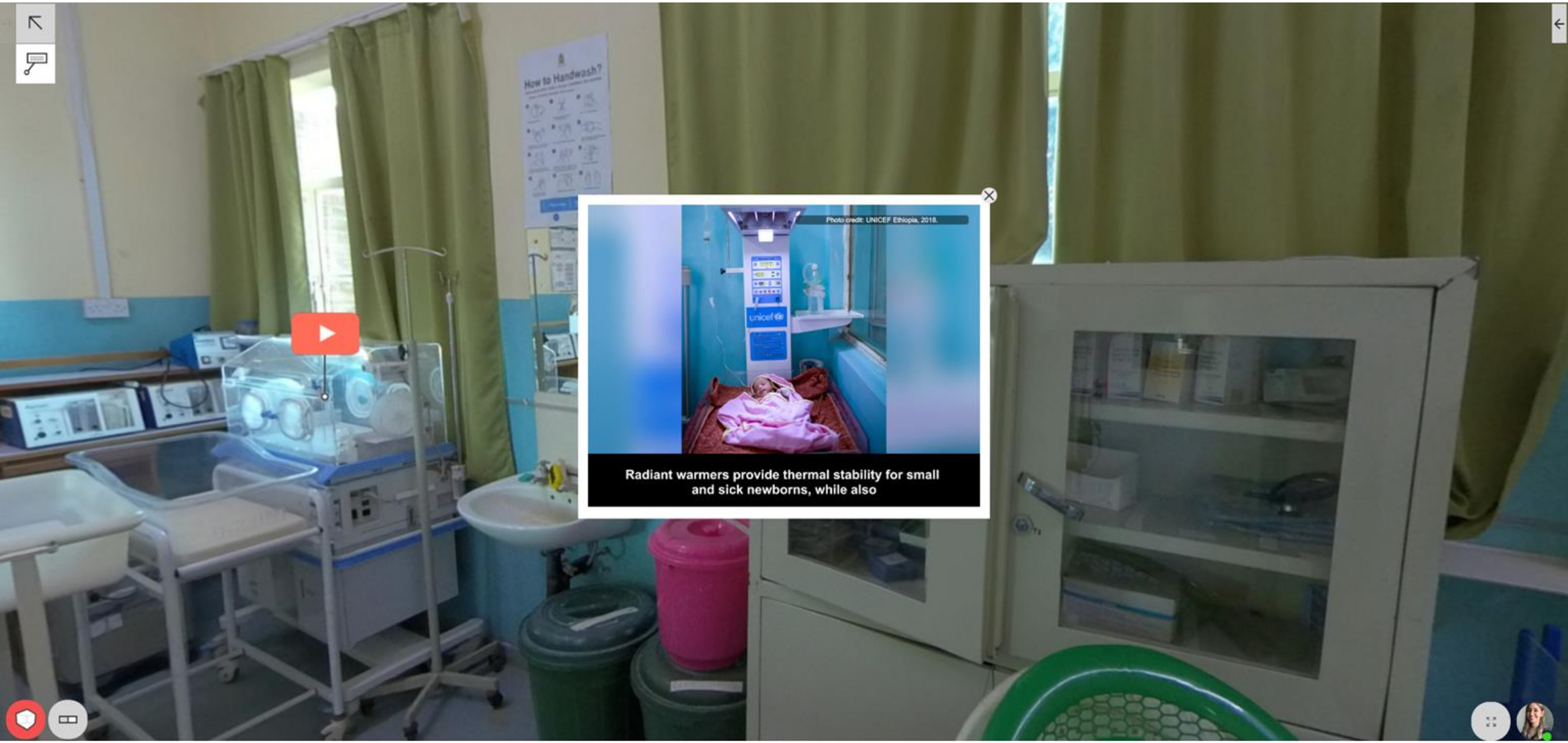
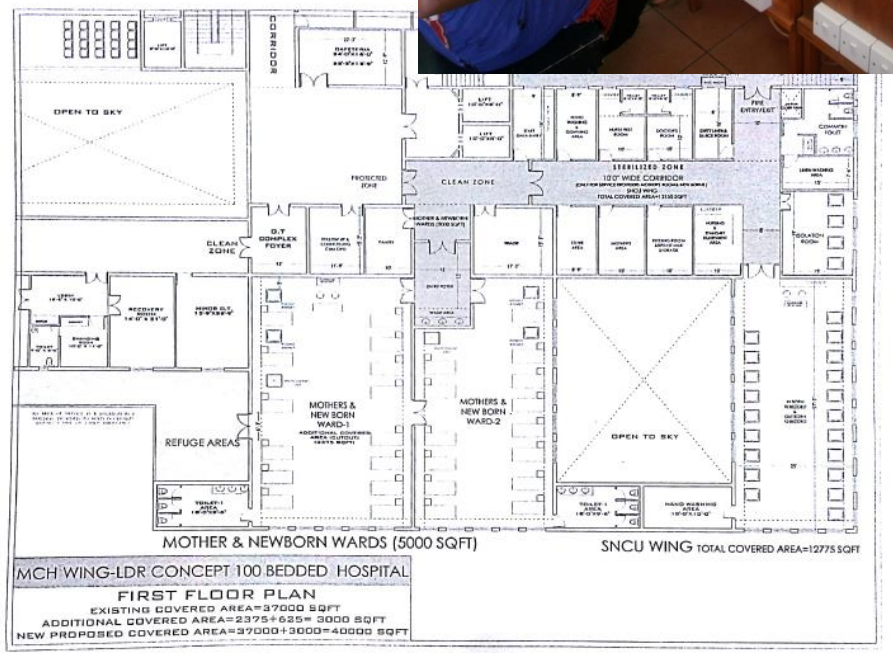

How to Handwash?
Photo credit: UNICEF Ethiopia, 2018.
unicef
Radiant warmers provide thermal stability for small and sick newborns, while also

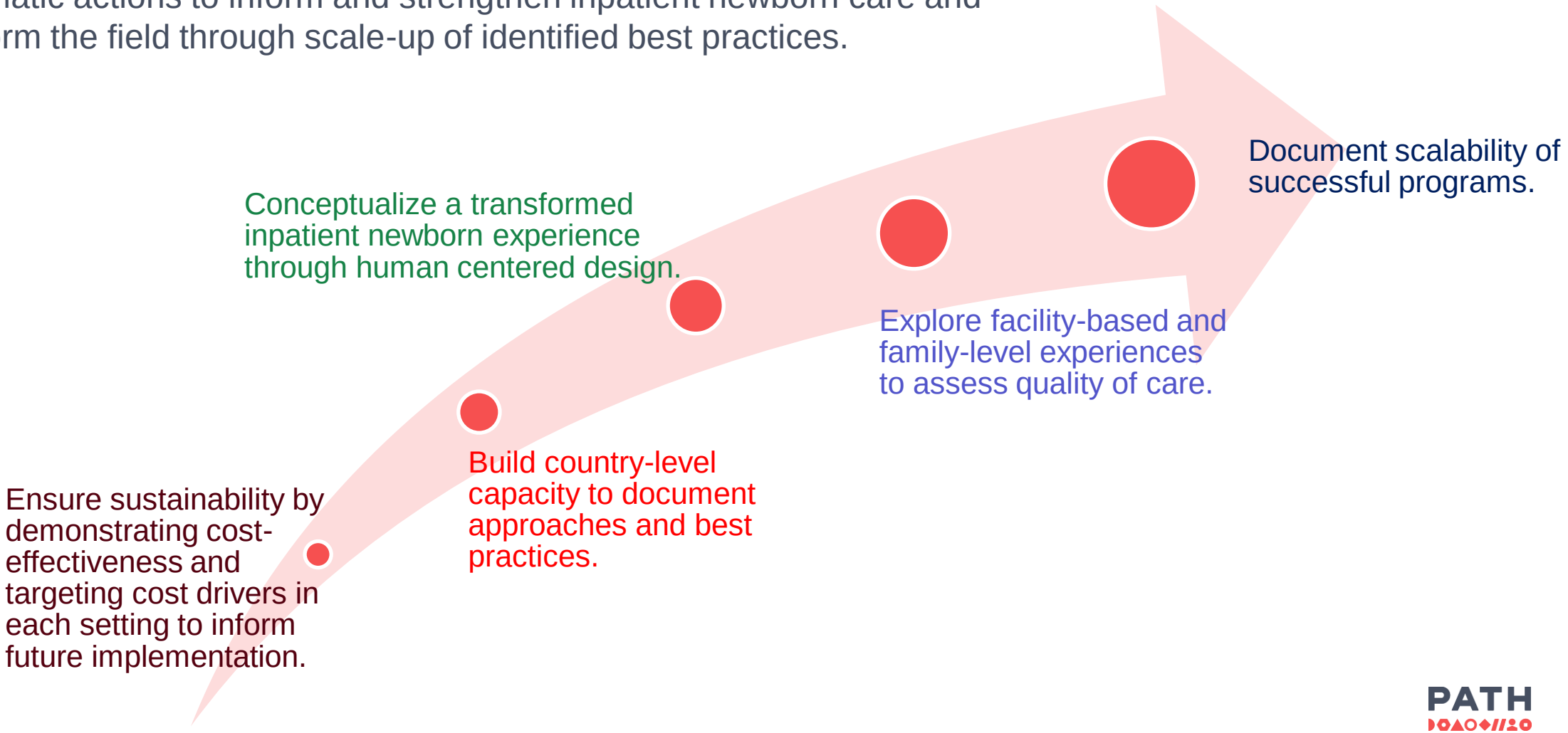
neoLENS preliminary findings indicate understanding of the country-level scale-up experience and historical perspective is lacking

- Content specific to the small and sick newborn in policy documents reflects **partial alignment with WHO standards**, which may not depict the larger scale of actual implementation and practice.
- Country-level barriers, enablers & **innovation strategies** are uniquely distinct and require greater documentation and recognition.
- **Journey mapping** is a powerful tool for learning/ sharing a roadmap to success, and for planning key strategies to advance along pathway to scale for care of SSN



Next steps and future vision: neoLENS Accelerator to act on best practices identified in case studies

Systematic actions to inform and strengthen inpatient newborn care and transform the field through scale-up of identified best practices.



Acknowledgements

Ethiopia team members: Mitiku Bekere (consultant to PATH); Nesibu Agonafir (PATH); Tirsit Grishaw (PATH). We are grateful to the 12 stakeholders who shared their insights and perspectives on the efforts to establish and scale care for small and sick newborns in Ethiopia. We acknowledge the efforts and leadership of the Ethiopia Ministry of Health in implementing a vision for small and sick newborn care, and Professor Bogale Worku and Dr. Abeba Ayele for their external review of the information in the case study.

India team members: Dr. Sudhir Maknikar (PATH), Dr. Vaibhav Ambhore (PATH), Dr. Jayendra Kasar (PATH), Dr. Aishwarya Kharade (PATH), Kelsang Choeki Namgyal (consultant to PATH). We are grateful to the 11 stakeholders who shared their insights and perspectives on the efforts to establish and scale care for small and sick newborns in India. We acknowledge the efforts and leadership of the Ministry of Health and Family Welfare (MoHFW), State Health Departments, the National Neonatology Forum and supporting partners in implementing a vision for small and sick newborn care. We also acknowledge Dr. Deepak Chawla and Dr. Praveen Kumar for their external review of the information in the case study.

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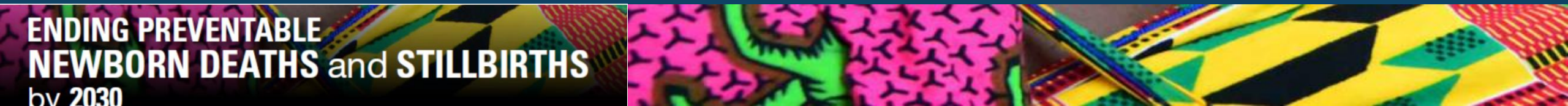
Group work - Introduction

DR GAGAN GUPTA – UNICEF



Group Work Time & Purpose

- Time: 14:50- 15:30 (40 mins)
- Each room has 2/3 facilitators
- Select a Chairperson and a Rapporteur to give a written feedback - Please use the ChatBox to make your contributions
- **Purpose**: To reflect and exchange lessons

Task-1: Present situation: Where does your country stand in scaling up the special care unit at district level? (**national policy**, **adoption of WHO standards for small or sick newborn**, **district coverage** etc.)

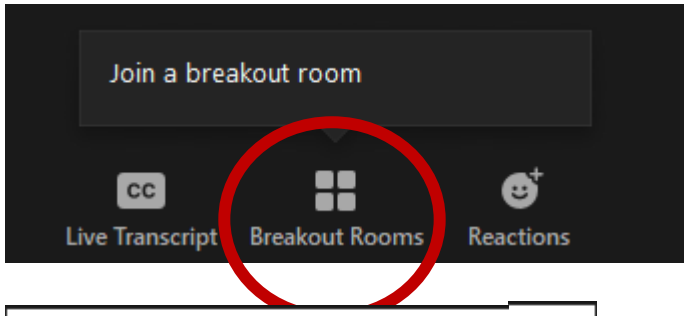
Task-2: Lessons for scaling-up: What are the key 3-5 lessons that you have learnt that can be implemented in your setting for scaling up?

Task-3: Please share your Group Work output to the following:

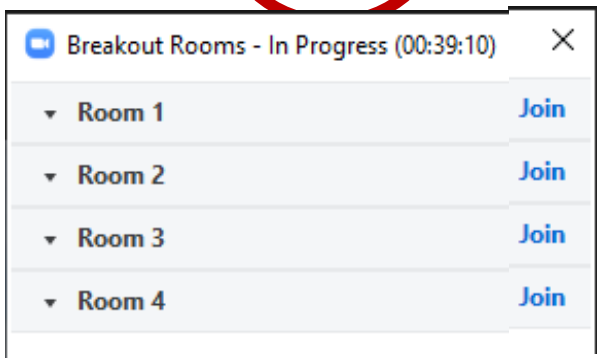
- Teshome Desta – destawolde@who.int
- Gagan Gupta UNICEF- ggupta@unicef.org

Instructions to JOIN THE BREAKOUT ROOM

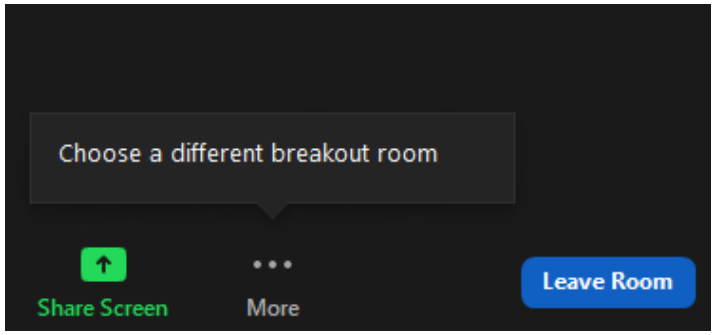
STEP 1:



STEP 2:



CHANGE ROOM OR LEAVE STEP 1:



Groups	Room 1	Room 2	Room 3	Room 4
Countries	Afghanistan Bangladesh Egypt India Indonesia China Pakistan Philippines Sudan Viet Nam Yemen	Benin Burundi Chad Comoros Côte d'Ivoire Djibouti Central African Republic Democratic Republic of the Congo Mali Equatorial Guinea Guinea Mauritania Niger	Ethiopia Kenya Lesotho Liberia Malawi Nigeria Somalia Sierra Leone United Republic of Tanzania South Sudan Uganda	Angola Argentina Brazil Guinea- Bissau Mozambique
Facilitators	Rajesh, Gagan & Howard	Olga & Helenlouise	Assumpta, Teshome & Fatima	Pablo & Nellia, Benidle

Country Group Work – Room & Facilitators

Groups	Breakout room 1	Breakout room 2	Breakout room 3	Breakout room 4
Countries	Afghanistan Bangladesh Egypt India Indonesia China Pakistan Philippines Sudan Viet Nam Yemen	Benin Burundi Chad Comoros Côte d'Ivoire Djibouti Central African Republic Democratic Republic of the Congo Mali Equatorial Guinea Guinea Mauritania Niger	Ethiopia Kenya Lesotho Liberia Malawi Nigeria Somalia Sierra Leone United Republic of Tanzania South Sudan Uganda	Angola Argentina Brazil Guinea-Bissau Mozambique
How to Join: CLICK THE BREAKOUT ICON	1. Click Breakout room 2. Click Join Room 1	1. Click Breakout room 2. Click Join Room 2	1. Click Breakout room 2. Click Join Room 2	1. Click Breakout room 2. Click Join Room 4
Facilitators	Rajesh, Gagan & Howard	Olga & Helenlouise	Assumpta, Teshome & Fatima	Pablo & Nellia, Benidle

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Session 3 (continued)
Specialist perspectives on small and sick newborn care

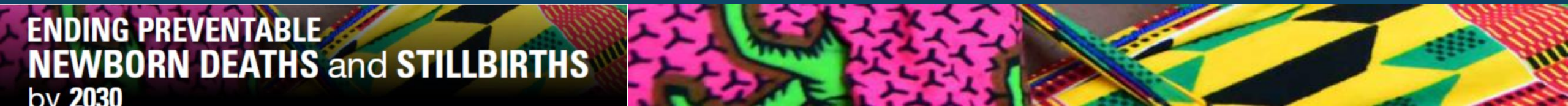
MNICU

DR HARISH CHELLANI – VARDHMAN MEDICAL

Human Resource Roadmaps

DR KAREN WALKER- COINN

MODERATOR: DR RAJIV BAHL



Mother – Neonatal Intensive Care Unit: Paradigm shift in care of small or sick newborn

Dr Harish Chellani

Department of Paediatrics, Obstetrics, VMMC & Safdarjung Hospital, Delhi, India

What is M-NICU?

Mother in NICU or Mother Newborn Care Unit is a facility where sick or small newborns are cared with their mothers 24x7 with all facilities of level II newborn care and provision for postnatal care to mothers.

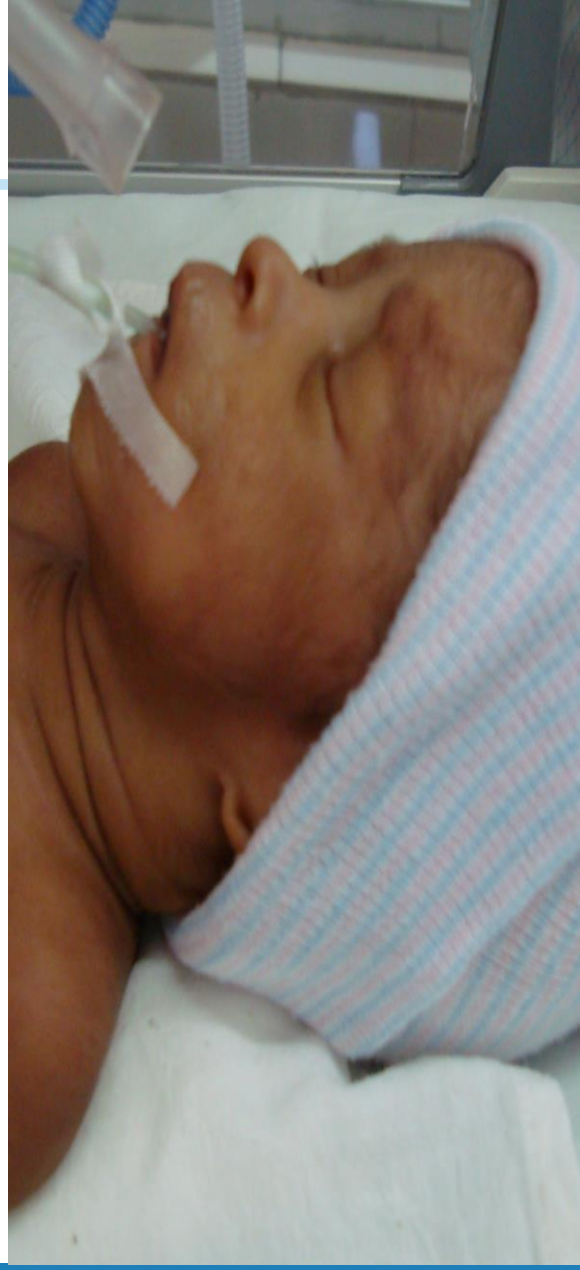
There is no such thing as a baby, there is a baby and someone” (D. Winnicott)

Mother in NICU: Is it just an emotional concept or does it have hard objective benefits?

Making a case for Zero Separation

Global burden of LBW

- Every year **20 million** (~15% of all births) infants are born with LBW
- **>95%** are in LMICs
- Account for **70-80%** of all neonatal deaths
- LBW infants are also at increased risk of **early growth retardation** and **developmental delay**



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Kangaroo Mother Care – current WHO recommendations

KMC is recommended in health facilities for the routine care of newborns weighing **2000g or less at birth.**

Brief sessions of KMC should be initiated when clinical condition begins to **stabilize.**

As close to **continuous KMC** as possible should be provided when **clinically stable**

40% reduction in mortality

Rationale for the Immediate KMC Trial

1

Studies included in Cochrane mortality review: mean age of randomization **~3 days** (range 10 h to 24.5 d)

2

About half of preterm deaths occur in first 24h, **over three quarters** in the first week

3

Thus, majority of preterm deaths occur before KMC can be initiated as per current guidelines

Research question

Does continuous KMC initiated immediately after birth (immediate KMC) compared with current guidelines improve newborn survival?

Immediate KMC study

A multi-country RCT to evaluate the impact of continuous KMC initiated immediately after birth (I) compared to KMC initiated after stabilization (C) in newborns with birth weight 1.0-1.8 kg (P)on their survival(O) in low-resource settings

Short title: Immediate KMC study

Sites: India, Malawi, Ghana, Nigeria and Tanzania

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Department of Maternal, Newborn, Child & Adolescent Health

Control group: KMC after stabilization

Continuous KMC initiated after the baby is stable and shifted out of NICU

Intervention

Three Components :

1. Continuous skin-to-skin contact with mother or surrogate starting within 2 hours of birth, aiming > 20 hours/day

2. Counselling and support for exclusive breastmilk feeding / breastfeeding

3. Provision of required medical care for mother and baby in STS contact without separation, as much as possible

New Mother–Newborn ICU

Mother in NICU

- ➔ Supported from hospital budget
- ➔ HR recruited for MNICU

MNICU – Infrastructure for care of mother

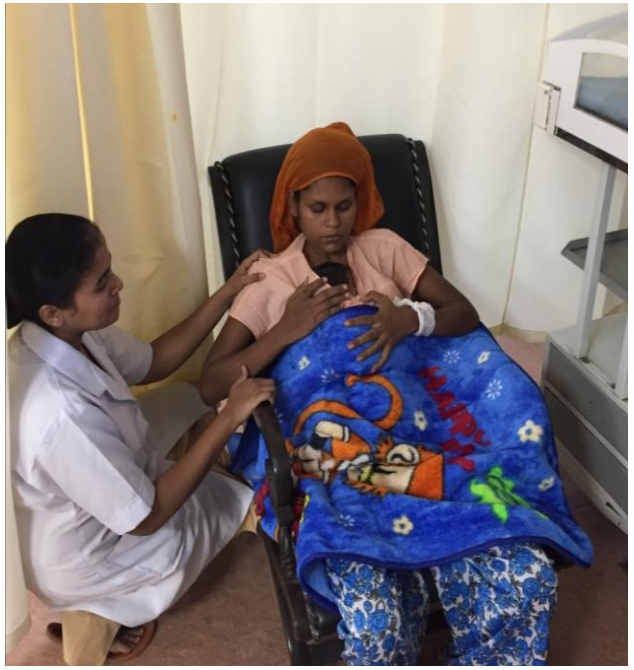
Mother examination cubicle

Pantry

Toilet & Bathing Room

MNICU Improves opportunities for KMC

STS (hours per day)	M-NICU	NICU
Median	16.9 hours	1.5 hours
IQR	(13.0–19.7)	(0.3–3.3)



Provision of respiratory support with KMC

Mean duration of KMC

17 hours/day

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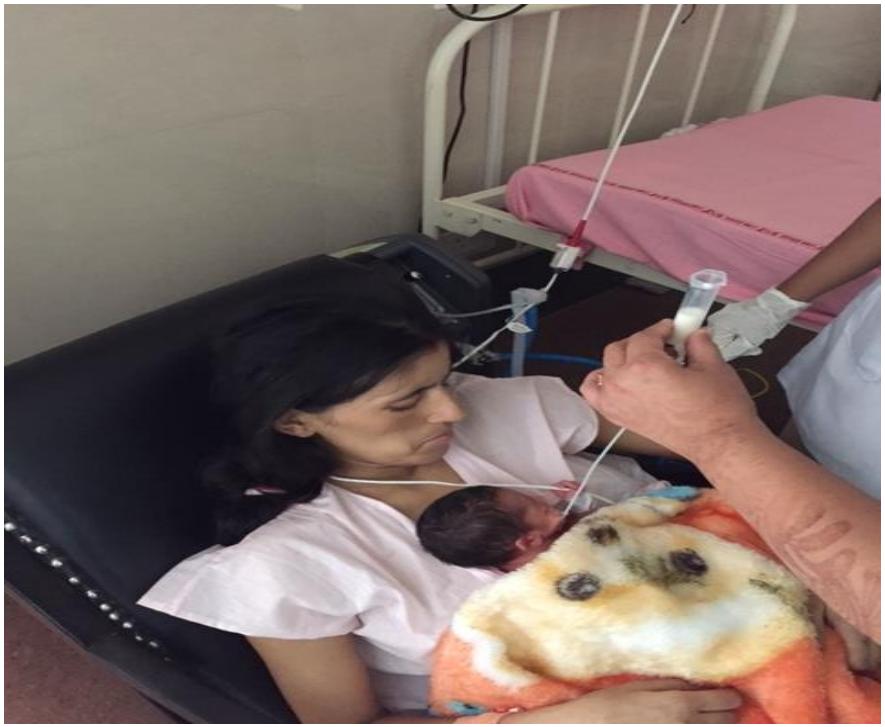
Improved opportunities for Breastfeeding



Provides opportunity for Mother to be the primary care giver in M-NICU

Mother changing diaper

Developmentally supportive care

Improves opportunities for counselling the mother – Discharge preparedness

M-NICU - Experience of mothers and staff

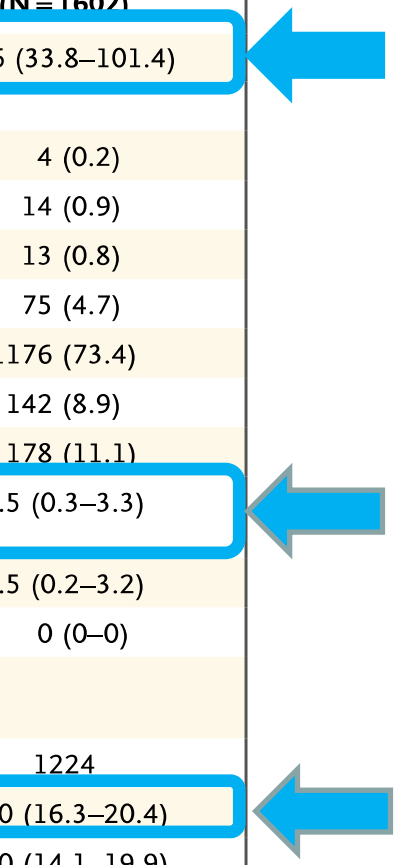
- Mothers easily trained to follow asepsis routines, monitor the neonates, better prepared for post-discharge care of neonates.
- Mothers get more support for breast feeding and expression of breast milk
- Less anxiety and stress among mothers by being with baby in NICU all the time
- Better parental satisfaction compared to NICU
- Positive feedback from patients & staff
- Staff has less workload due to presence of mother in M-NICU as care provider

Baseline characteristics of the infants and mothers and their households

Characteristic	Intervention	Control
Total no. of mother–infant pairs	1609	1602
Infants		
Median age at enrollment (IQR) — min	35 (20–55)	33 (20–54)
Mean birth weight — kg	1.5±0.2	1.5±0.2
Mean gestational age at birth — wk†	32.6±3.0	32.6±2.8
Male — no. (%)	752 (46.7)	748 (46.7)
Infants born as twins — no. (%)	430 (26.7)	430 (26.8)
Delivery by cesarean section — no. (%)	559 (34.7)	614 (38.3)
Site of birth — no. (%)		
Ghana	205 (12.7)	205 (12.8)
India	695 (43.2)	682 (42.6)
Malawi	217 (13.5)	222 (13.9)
Nigeria	108 (6.7)	107 (6.7)
Tanzania	384 (23.9)	386 (24.1)
Mother and household		
Total no. of mothers	1470	1474
Age of mother — yr	26.7±5.8	26.7±5.8
Median yr of schooling (IQR)‡	10 (7–12)	10 (7–12)

Initiation and duration of skin-to-skin contact of infants with Mothers or surrogates

Variable	Intervention (N = 1609)	Control (N = 1602)
Median time to initiation of skin-to-skin contact (IQR) — hr*	1.3 (0.8–2.7)	53.6 (33.8–101.4)
Time to initiation of skin-to-skin contact by category — no. (%)		
<2 hr	1084 (67.4)	4 (0.2)
2 to <6 hr	314 (19.5)	14 (0.9)
6 to <12 hr	94 (5.8)	13 (0.8)
12 to <24 hr	65 (4.0)	75 (4.7)
24 to <168 hr	35 (2.2)	1176 (73.4)
≥168 hr to end of neonatal period	1 (0.1)	142 (8.9)
Never initiated	16 (1.0)	178 (11.1)
Median duration of skin-to-skin contact in control NICU or Mother–NICU (IQR) — hr/day	16.9 (13.0–19.7)	1.5 (0.3–3.3)
With mother	12.3 (6.8–16.5)	1.5 (0.2–3.2)
With surrogate	2.3 (0.1–6.5)	0 (0–0)
Duration of skin-to-skin contact in kangaroo mother care ward — hr/day		
Total no. of hr	1300	1224
Median (IQR) — hr/day	20.2 (18.6–21.3)	19.0 (16.3–20.4)
With mother	19.4 (14.8–20.6)	18.0 (14.1–19.9)
With surrogate	0 (0–0.85)	0 (0–0)



Experience of KMC transport

- **KMC transport is feasible-** 71% of small and sick newborns in intervention group transported in KMC. Although most KMC transport done with surrogates (62.2% vs 8.6%) as these babies need to be transported to M-NICU soon after birth.

- **KMC transport is efficacious-** 98.2% babies received in M-NICU euthermic following KMC transport

- **KMC transport is not only safe but also babies stabilized during transport-** Babies had less desaturation following KMC transport (4.3% in KMC group vs 9.8% in non KMC group), less severe chest indrawing (5.9 vs 10.2%), less nasal flaring (2.4% vs 6.4%), less grunting (2.0 vs 7.2%)

Primary and secondary outcome

Outcome	Intervention (N = 1609)	Control (N = 1602)	Risk Ratio, Hazard Ratio, or Difference (95% CI)†	P Value
Primary				
Death between enrollment and 28 days — no./total no. (%)	191/1596 (12.0)	249/1587 (15.7)	0.75 (0.64–0.89)	0.001
Death between enrollment and 72 hr after birth — no./total no. (%)	74/1606 (4.6)	92/1599 (5.8)	0.77 (0.58–1.04)	0.09
Secondary‡				
Exclusive breast-feeding at end of neonatal period — no./total no. (%)	1208/1401 (86.2)	1140/1336 (85.3)	1.01 (0.98–1.05)	
Fully breast-fed (i.e., by suckling) at hospital discharge — no./total no. (%)	62/1435 (4.3)	55/1376 (4.0)	1.06 (0.73–1.53)	
Hypothermia — no./total no. (%)§	90/1609 (5.6)	133/1602 (8.3)	0.65 (0.51–0.83)	
Median time to clinical stabilization — hr (IQR)¶	73.8 (26.8–138.5)	74.8 (25.3–140.6)	0.98 (0.90–1.07)‖	
Suspected sepsis — no./total no. (%)**	361/1575 (22.9)	434/1561 (27.8)	0.82 (0.73–0.93)	
Hypoglycemia at any time between 0 and 36 hr after birth — no./total no. (%)††	82/799 (10.3)	66/651 (10.1)	1.15 (0.85–1.56)	
Mean duration of hospital stay — days‡‡	14.9±0.2	15.2±0.2	1.07 (0.99–1.16)‖	
Mean score for maternal satisfaction§§	9.2±1.0	9.1±1.2	0.11 (0.03–0.19)¶¶	
Maternal depression — no./total no. (%)‖‖	2/1276 (0.2)	7/1231 (0.6)	0.23 (0.05–1.14)	

World Health Organization

Additional breastfeeding indicators

Outcome	Intervention (n=1609)	Control (n=1602)	RR (95% CI)
Initiation of breastmilk feeds within 24 hr, n (%)	941 (58.5%)	729 (45.5%)	1.29 (1.20–1.37)
Infant put to breast before 72 hr of age, n (%)	1108 (68.9%)	832 (51.9%)	1.32 (1.24–1.41)
Age Infant first put to the breast in hr, median (IQR)	41 (21–83)	66 (36–138)	1.50 (1.40–1.62)*
Reached full breastmilk feeds within 7d, n (%)	1261 (78.4%)	1105 (69.0%)	1.14 (1.09–1.19)
Discharge on exclusive breastmilk feeding**, n (%)	1208 (93.1%)	1067 (88.7%)	1.05 (1.02–1.08)

* Hazard ratio
** only among discharged infants (1298 intervention; 1203 control)

Challenges in operationalizing Zero Separation:

- Initiating KMC in labor room or operation theatre
- Transportation in KMC position
- Creating a mother and baby friendly infrastructure in NICU- **Mother- NICU**
- Optimizing respiratory support in KMC Position
- Monitoring for asepsis/infection control practices
- Coordination with the obstetrics team for providing care for the mother

Initiating KMC in delivery room

- Initiation of skin to skin contact with mother on delivery table
- Designated iKMC area with bed and KMC chair in labour room
- Initiating KMC with surrogate and transporting to Mother-NICU

Transport in KMC from labour room to Mother-NICU

Optimizing respiratory support in KMC position

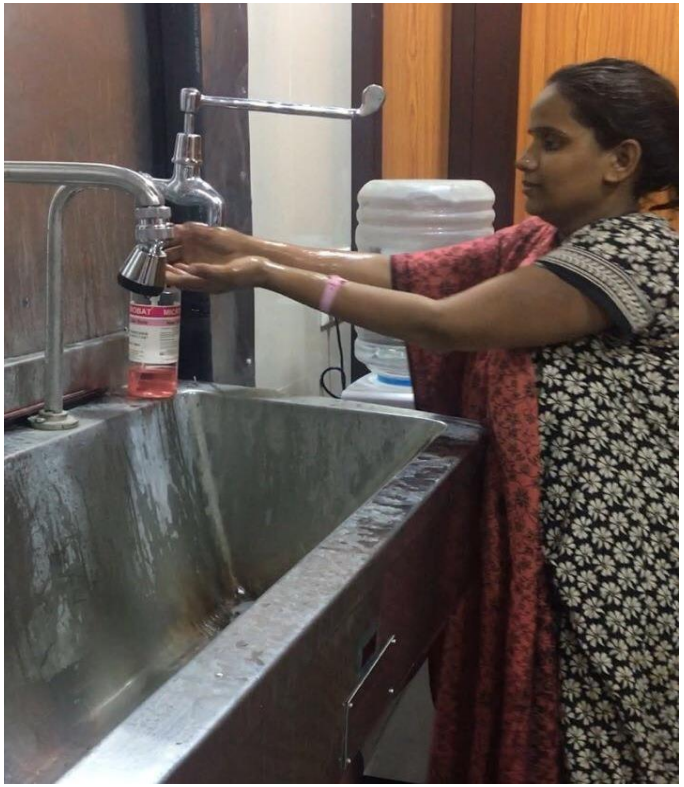
- Maintaining Airway: Binder used to maintain neck in slightly extended position
- Optimizing Nasal Interface for Continuous Positive Airway Pressure
- Major challenge is ensuring proper fixation with baby in KMC
- Continuous SpO2 and Heart rate monitoring for optimizing PEEP and FiO2

KMC garment

Binder

KMC shirt

Does entry of Mother/Surrogate in M-NICU increase infections ?

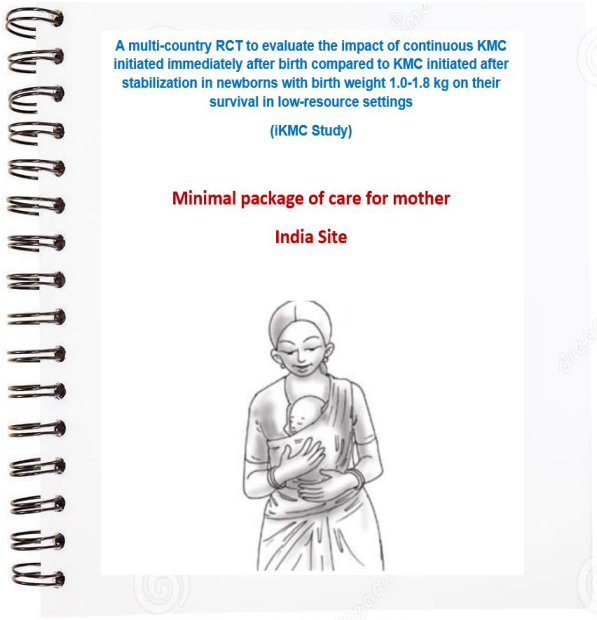


- A major concern on part of Pediatricians and policy makers that presence of mothers in NICU will bring more infections
- Systematic review 2014: strong evidence KMC reduces nosocomial infection
- Experience of M-NICU suggests mothers can be easily trained to follow asepsis routines

* Conde-Agudelo A, Díaz-Rossello JL. Cochrane Database of Systematic Reviews 2014, Issue 4. Art. No.: CD002771.

Care of Mothers in M-NICU

- A major challenge in M-NICU as these mothers have just delivered
- **Essential care package developed for immediate post-natal care , in which neonatal nurses are trained**
- Obstetric team to see and care for the mothers in the M-NICU unit
- Equal partnership & strong collaboration and co-ordination with the obstetricians a **Must**



Zero separation of small and sick babies

- **Zero separation of small and sick babies is feasible-** Median duration of STS in iKMC group 16.9 hours per day
- **Zero Separation is efficacious-** 25 % reduction in mortality, translate to 150,000 live globally every year
- **Zero Separation is safe-** No increase in risk of sepsis, hypothermia and hypoglycemia
- **Zero Separation is acceptable-** Positive feedback from parents and health personnel

Mother-NICU in Covid Pandemic

After completion of study, M-NICU facility has been continued at Safdarjung Hospital

All mothers screened at the time of delivery and only Covid negative mothers transferred to M-NICU

All covid appropriate behaviours ensured in M-NICU including strict use of mask, hand hygiene and respiratory hygiene

If any mother develops symptoms suggestive of Covid infection, she is shifted immediately to Covid suspect area.

With these measures, this facility running successfully throughout the ongoing pandemic with 100% occupancy of 12 mothers with 12 to 18 babies as many of these mothers have twin babies with them.

Implications: System Changes

POLICY

to permit Mother & surrogate in NICU 24/7

M-NICU/MNCU

to keep the mother and baby together right from birth with zero separation

Revolutionize the way neonatal intensive care is currently practiced

Training & Monitoring

Health care providers need training to:

Initiate I-KMC in delivery room

Transport to M-NICU in KMC

Support mothers for KMC with CPAP

Use binders

Continuous monitoring
with pulse oximeter

Mother Newborn Couplet Care in M-NICU/MNCU

OBSTETRIC ROUNDS

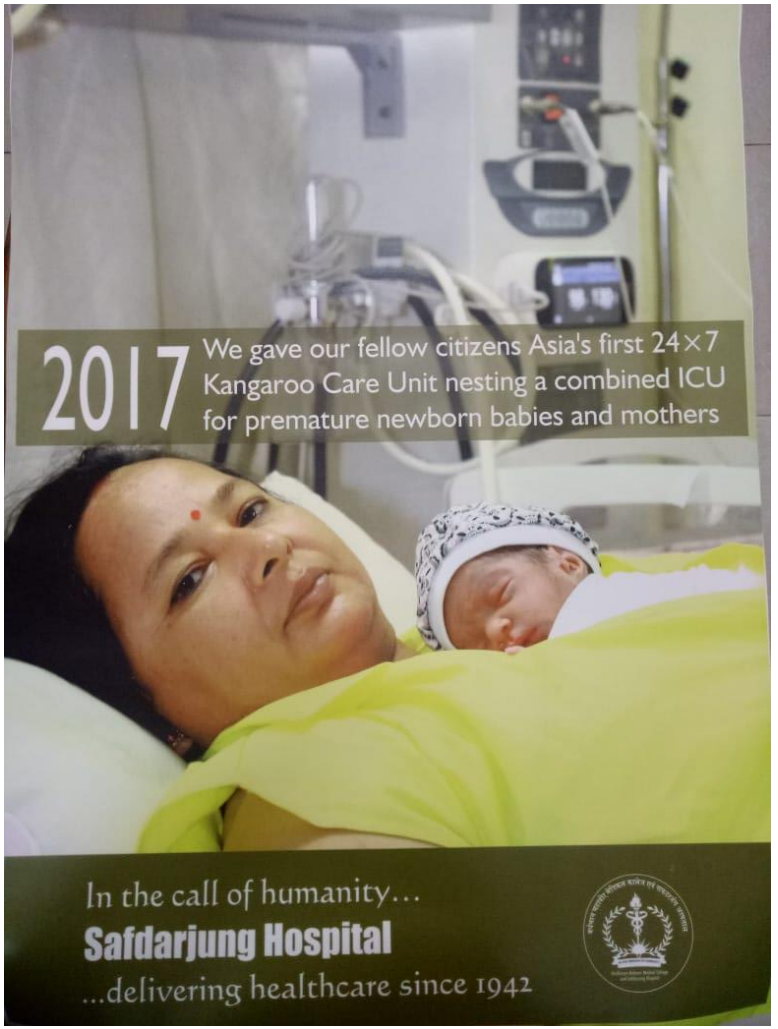
NEONATAL ROUNDS

Minimal care for Mother & Baby

Conviction of Health Workers

World Health Organization

Mother is a care provider not mere visitor to NICU



Thank You

END OF DAY 2
THANK YOU

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