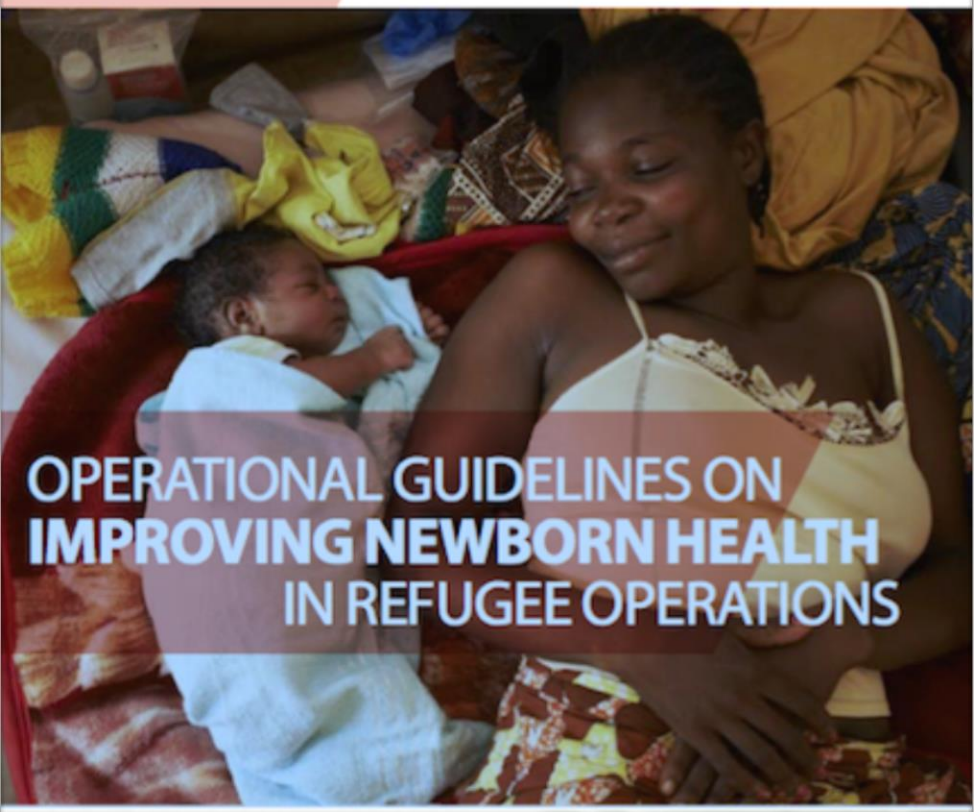

UNHCR
The UN Refugee Agency

WEBINAR: IMPROVING NEWBORN HEALTH IN REFUGEE OPERATIONS: PART 2

UNHCR

July 2019

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Agenda for Neonatal Webinar Part 2

- Brief review of last week's webinar
- Three Leading Causes of Neonatal Mortality
  - Intrapartum related events (birth asphyxia)
  - Serious Infections
  - Preterm birth complications
- Community-level interventions
- Improving Quality of Care
  - Defining your package of care (primary/secondary)
  - Protocols and clinical guidelines
  - Capacity Building for Staff
  - Essential Supplies and Equipment
  - Monitoring Newborn Care Services
- Summary
- Additional Resources (Annex)

OBJECTIVES of WEBINAR

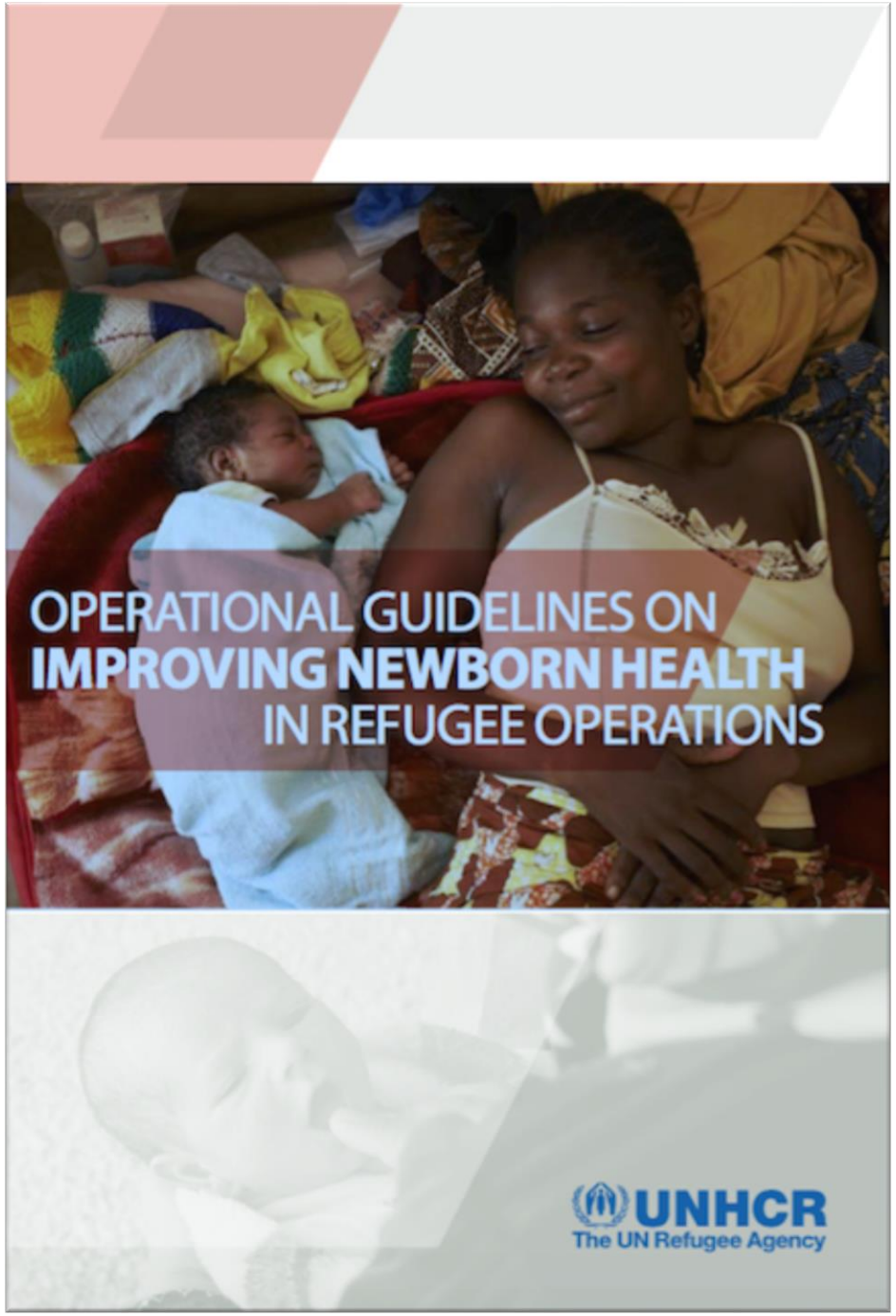
TO UNDERSTAND THE GLOBAL BURDEN OF NEONATAL DEATHS

TO BECOME FAMILIAR WITH THE UNHCR OPERATIONAL GUIDELINES

TO BE FAMILIAR WITH THE HIGH IMPACT PRACTICES THAT CAN BE IMPLEMENTED IN YOUR PROJECTS

TO MOTIVATE YOU TO ASSESS YOUR OWN PROJECT SITES AND MAKE A PLAN TO FILL GAPS

TO SHARE YOUR EXPERIENCES AND IDEAS WITH ONE ANOTHER



Background and Rationale

- "Newborn" or "neonate" is a baby in the first 28 days of life
- High burden of deaths - globally, 7000 newborns die every day, 2.5 million every year[1]
- Most neonatal deaths are **preventable with simple, low-cost interventions**
- Many of these interventions **are not implemented, or need to be scaled-up, in refugee operations**
- *Operational guidelines on improving newborn health in refugee operations* developed in 2013 to help give direction on essential services for newborns.

KEY FACTS ON NEONATAL MORTALITY

- SDG 3.2 is to reduce neonatal mortality to at least 12 per 1000 live births by 2030. Current global average is 18 per 1000 live births.
- Most countries facing humanitarian crisis are much higher and not on track for SDG
- Of the 16 countries with the highest neonatal mortality rates, 11 have experienced recent humanitarian crisis[1]
- Neonatal deaths now comprise 47% of all U5 deaths
- Most deaths NN deaths occur during the first day of life (40%) and first week of life (75%)

Neonatal mortality rates across 27 countries with protracted emergencies

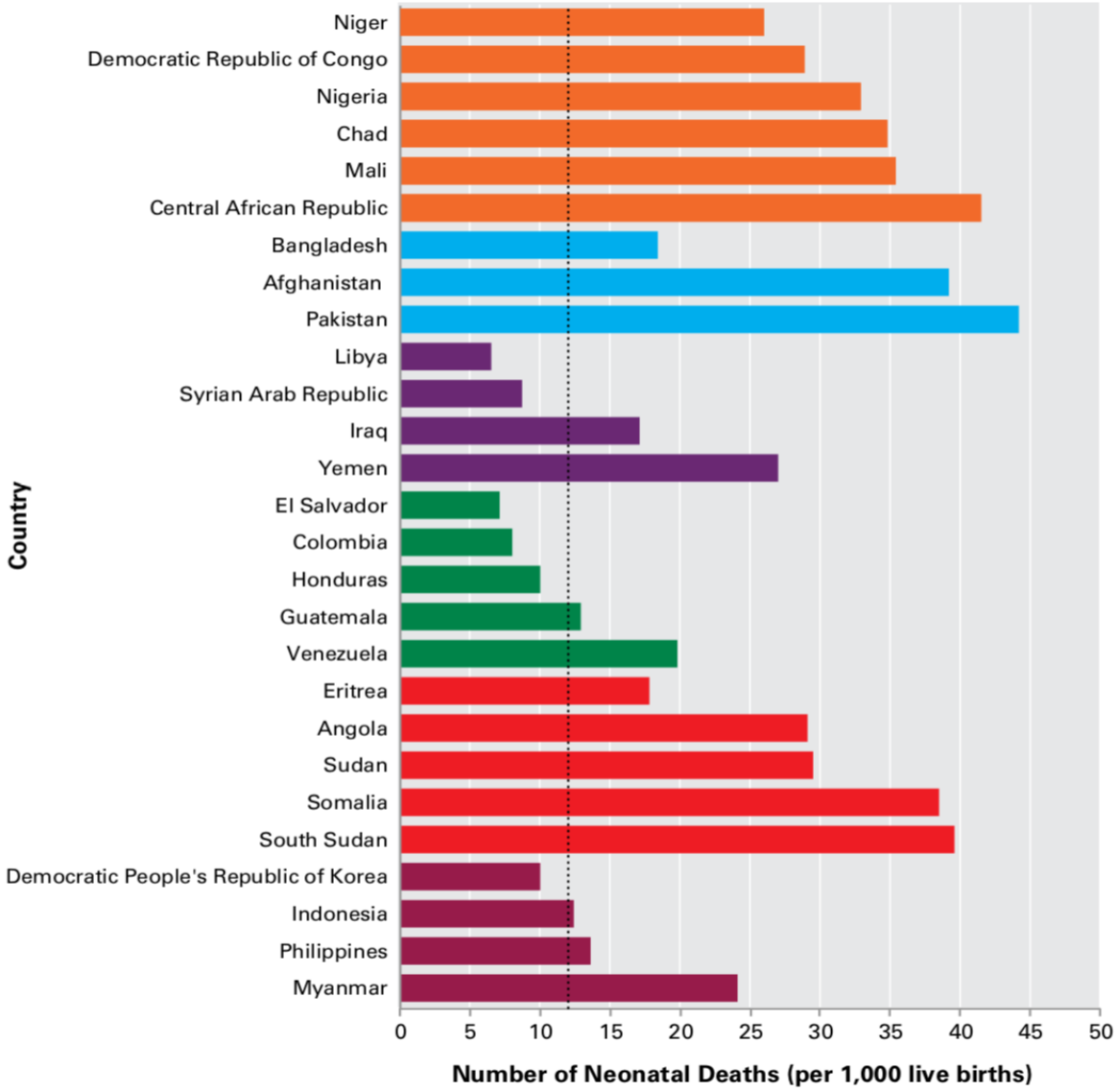


Figure Source: pg 6 IAWG (2019): **SURVIVING DAY ONE:** Caring for Mothers and Newborns in Humanitarian Emergencies on the Day of Childbirth

How can we address the 3 leading causes of neonatal mortality?

INTRAPARTUM-RELATED (BIRTH ASPHYXIA)

SERIOUS INFECTIONS

PRETERM BIRTH COMPLICATIONS

Preterm births

Preterm birth complications is THE LEADING cause of death among children under 5 years. Many others are left disabled.

Preterm/premature is defined as a baby born alive before 37 completed weeks of pregnancy.

Low birth weight (<2500g) is a term that may apply to preterm babies as well as those who are at term but small for gestational age (SGA)

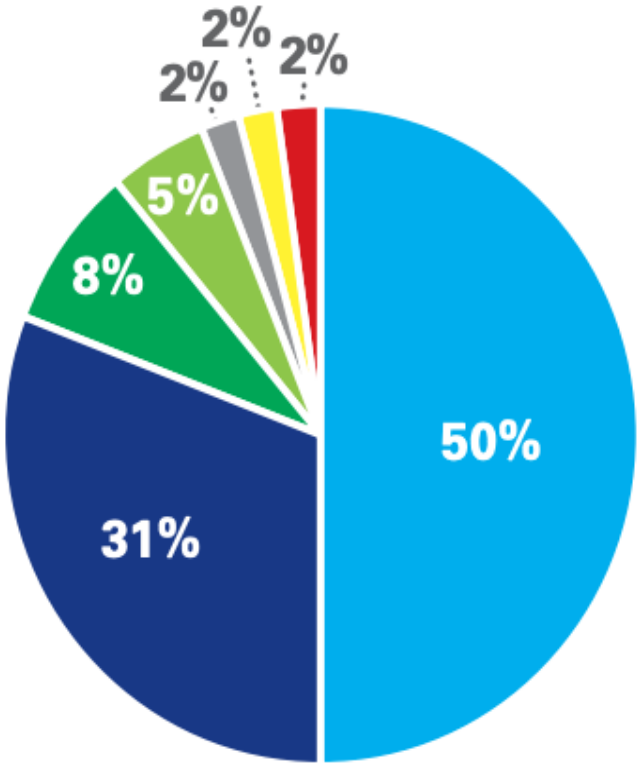
- Approximately 11% of all births are preterm (range between 5-18%). Rates are increasing globally.
- Majority of preterm births occur between 32 to <37 weeks and most in this age range can survive with simple care interventions.

Key Interventions to Reduce Preterm-Related Deaths

Preterm complications

Preterm Birth Complications

- Hospital care of preterm babies including kangaroo mother care
- Antenatal steroids for preterm labour
- Neonatal resuscitation
- Labour and delivery management
- Antibiotics for PPROM
- Balanced energy supplementation
- Micronutrient supplementation (multiple micronutrients plus iron folate)



Source: Bhutta et al. Can available interventions end preventable deaths in mothers, newborn babies, and stillbirths, and at what cost? Lancet 2014, 384(9940):308.

Figure source: IAWG Newborn Health in Humanitarian Settings Field Guide, 2018, pg 35

Threatened Preterm Birth: Antenatal Corticosteroids (ACS)

- For threatened preterm birth (24-34 weeks**), to speed surfactant development in fetal lungs and reduce respiratory distress syndrome (leading cause of preterm death)
- Antenatal corticosteroids (dexamethasone or betamethasone) are inexpensive and readily available (cost $0.50-$1).
- Equity divide: in high income countries, 90% of women in preterm labor receive ACS, but in low income countries coverage rates are estimated at 10%....

** lower limit to consider local limits of fetal viability

Other Treatments for Threatened Preterm Labour

- **Tocolytics** (nifedipine)*
- **Antibiotic** treatment for all women with preterm, prelabour rupture of membranes (PPROM)
- **Magnesium sulfate** is recommended for women at risk of imminent preterm birth before 32 weeks of gestation for *prevention of cerebral palsy* in the infant and child. Risk of gross motor dysfunction decreased by 39%; risk of cerebral palsy reduced by 30%

WHO recommendations on interventions to improve preterm birth outcomes. 2015.
https://apps.who.int/iris/bitstream/handle/10665/183037/9789241508988_eng.pd?sequence=1

Image: © Laerdal Global Health

Kangaroo Mother Care – Simple and Saves Lives!

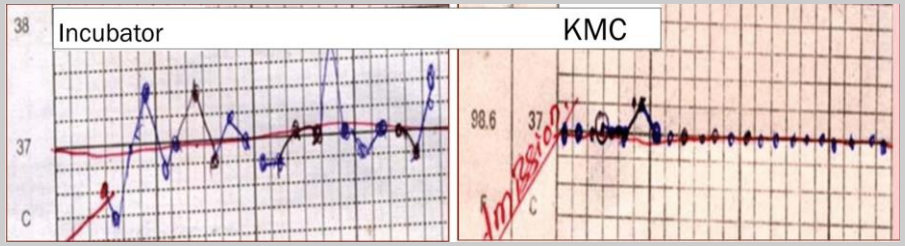
KMC is a package of care for the preterm newborn. It includes 3 pillars - continuous skin-to-skin contact; exclusive breastfeeding or feeding with expressed breast milk; and early discharge from hospital.

WHO recommendations (2015): *Newborns weighing 2000 g or less at birth should be provided as close to continuous Kangaroo mother care as possible. Intermittent Kangaroo mother care, rather than conventional care, is recommended for newborns weighing 2000 g or less at birth, if continuous Kangaroo mother care is not possible.*

- Research: 40% reduction in neonatal mortality comparted conventional care, 51% less risk of nosocomial infections, 66% lower risk of hypothermia
- Decreased length of hospital stay; increased breastfeeding rates, bonding, and satisfaction.

Reference: WHO (2015). Recommendations on interventions to improve preterm birth outcomes https://apps.who.int/iris/bitstream/handle/10665/183037/9789241508988_eng.pd?sequence=1

What about incubators?



Potential Risks of Incubators

- ✗ Incubator care is less effective than kangaroo mother care. Radiant warmers have equal outcomes to incubators
- ✗ Nosocomial infections if strict hygiene standards not maintained or if multiple babies are put in the incubator together
- ✗ Hyper and/or hypothermia
- ✗ Frequent breakdowns. Needs continuous electricity
- ✗ Reduced breastfeeding due to separation of baby and mother
- ✗ Increased risk to newborn if newborn is left unattended in incubator without frequent observations

Minimum Conditions to Consider Incubator Use

- ✓ Secondary-level health facility or higher
- ✓ Staff are well-trained in how to use incubator, including refresher trainings and trainings for new staff
- ✓ Dedicated staff is available to monitor newborns in incubators (newborns are not left frequently unattended). Regular vital signs/observations are taken and recorded
- ✓ Biomedical technician is available for maintenance and repairs
- ✓ Electricity supply is reliable without power cuts
- ✓ Very strong infection control procedures are in place and followed
- ✓ Mothers stay close by and assisted to BF or express

Implementing Kangaroo Mother Care

- Check if a national policy on newborn care exists, and if KMC is included in it. Connect with functioning units.
- Can be integrated at all levels of care. Discuss with primary and secondary providers: admission/discharge/referral criteria.
- Health workers need training (and convincing)
- Provide KMC wraps* Order or made locally
- Ensure protocols (admission/discharge, feeding, observations, etc.) clinical guidelines, and patient clinical records forms are in place.

* Soon to be added to UNHCRs Essential Medicines List. See also https://laerdalglobalhealth.com/products/careplus/

Assess your health facilities for readiness to provide care for preterm births

	KEY INTERVENTIONS	YES/NO
THREEATENED PRETERM LABOUR	Determination of gestational age (LMP, SFH, or ultrasound)	
	Maternal antenatal corticosteroids (betamethasone or dexamethasone) for fetal lung development (24-34 weeks)	
	Antibiotics (for women with pre-term pre-labor rupture of membranes)	
	Magnesium sulfate for fetal neuroprotection (<32 weeks)	
	Tocolytic (nifedipine)	
	Protocols/clinical guidelines	
CASE MANAGEMENT: PRETERM NEEWBORN	Kangaroo mother care for babies <2000g +/- other thermal management methods	
	Breastfeeding support, and expressed breast milk feeding (using nasogastric tube, spoon or cup)	
	Antibiotics and related supplies for administration	
	Safe oxygen use (with protocols)	
	Advanced respiratory support CPAP; surfactant (secondary or tertiary levels only)	
	Ensure stabilization of the newborn before transfer, particularly if the transfer will be long or difficult. Transfer in kangaroo position with mother whenever possible.	

Safe and Effective Oxygen Use for Inpatient Care of Newborns

DO NO HARM TECHNICAL BRIEF

Oxygen is important in the care of newborn infants because many conditions that affect babies in the first days of life can result in low levels of oxygen in the body. Hypoxemia, or low level of oxygen in the blood, is a life-threatening condition that results in increased mortality and morbidity. Prematurity and respiratory distress syndrome (surfactant deficiency), pneumonia and other severe infections, asphyxia and difficulties in the transition from fetal to neonatal life can all result in hypoxemia. Supplemental oxygen is an essential lifesaving treatment.

Why is Safe Oxygen Use Important?

Access to appropriate oxygen therapy has been demonstrated to reduce death from childhood pneumonia and neonatal respiratory distress. Improved detection of hypoxemia and the safe administration of oxygen has resulted in a 35% reduction in the risk of death from childhood pneumonia in high-burden settings.[1] Historically, the administration and delivery of oxygen with pressure that helps maintain lung inflation has resulted in a dramatic improvement in survival of premature infants.[2] Oxygen therapy remains an essential element in the treatment of newborn respiratory distress, with specialized delivery methods being increasingly used in low and middle-income countries.[3,4]

How can unsafe oxygen use cause harm?

Oxygen is fundamental for sustaining life, but it is also toxic. Unique developmental vulnerabilities of newborns put them at a greater risk of injury from oxygen use than adults. Injury may occur from high levels of oxygen in the blood, regardless of the administered oxygen concentration, and from exposure of the lungs to high concentrations of oxygen. The two main complications of oxygen use with newborns are retinopathy of prematurity (ROP) and lung injury. The historical success of improving survival of premature infants was tempered by blindness in some survivors that was caused by low, but unmonitored, oxygen exposure. Even with low concentrations of administered oxygen, levels in the blood can rise far above normal. ROP is the abnormal development of blood vessels in the retina of the eye. In its most severe form, ROP can result in blindness. Exposure to supplemental oxygen also produces complications from direct oxygen toxicity to lung tissue. Chronic lung disease (also known as bronchopulmonary dysplasia) is a serious consequence in extremely preterm infants, but cumulative oxygen exposure also leads to lung problems in infancy among moderately preterm babies.[5]

There are multiple ways in which inadequately regulated oxygen use can cause harm. In the special care of newborns the most common include:

- 100% oxygen administration
- Unmonitored oxygen saturation during any supplemental oxygen administration
- "Prophylactic" administration of oxygen to sick or at-risk newborns without clinical indication
- Environmental enrichment with oxygen (i.e. oxygen in incubator)
- Use of non-rebreathing mask or funnel to deliver oxygen
- Interrupted oxygen administration (rotating allocation of available oxygen)

What are current WHO recommendations for oxygen therapy?

Current WHO recommendations and clinical guidelines address several aspects of oxygen therapy (Table 1).

Clinical indications for oxygen use include resuscitation of preterm infants and advanced resuscitation of term infants as well as the full spectrum of respiratory illness from mild hypoxemia to moderate/severe respiratory distress and respiratory failure. Routine resuscitation of term and moderate-to-late preterm infants begins with bag-and-mask ventilation using room air. However, preterm infants < 32 weeks should receive ventilation beginning with 30% oxygen or air if blended oxygen is not available (rather than 100% oxygen). Oxygen concentration should be guided by blood oxygen saturation levels. Titrating the concentration of oxygen to meet time-specific saturation targets (Table 2). The adjustment of the concentration of oxygen levels should be by 10% (FiO2=0.1) per 30 seconds and must be guided by oxygen saturation levels reached.[6]

EVERY PREEMIE SCALE · USAID FROM THE AMERICAN PEOPLE · PCI · gapps · AMERICAN COLLEGE of NURSE-MIDWIVES

- Hyperoxygenation in preterm neonates can be dangerous
- Retinopathy of prematurity has emerged as leading cause of blindness in children in middle income countries -> due to scale up of services without QUALITY
- Any health facility which has oxygen must also have protocols on safe oxygen use and use pulse oximetry

Technical document (English/French): https://www.everypreemie.org/wp-content/uploads/2017/07/Oxygen_7.6.17.pdf

Discussion: Management of Premature Newborns

- Questions?

- Discussion:
  - In your setting, what are the main barriers to provision of antenatal corticosteroids?

  - Please share any experiences implementing kangaroo mother care in your operations

Community-level interventions to improve newborn outcomes

In emergency phase, or where access to skilled birth attendance is poor, distribution of clean delivery kits (with education on proper use)

Ensure transportation from home to health facility for women in labour (often main barrier to facility delivery)

Train CHWs to follow a **structured program** of home visits during pregnancy in the first week postnatal. Focus on health education, referrals, and identification of danger signs.

Use of participatory community groups (mother-to-mother, breastfeeding support groups, mens groups “École de maris”, etc.)

Home visits for pregnancy/postnatal

Research has shown that **well planned and supervised home visits by community workers can:**

- Contribute to reducing maternal morbidities; stillbirths; perinatal mortality; neonatal mortality[1]
- Increase referrals to health facilities for complications in pregnancy and newborn; increase rates of early breastfeeding[1]
- CHWS in UNHCR assessments were found to be lacking key knowledge (danger signs, umbilical cord care) and counseling/communication skills; poor supervision; no set structure of content or timing of visits.

Strengthening your CHW home visit program:

- Programs must be well structured and well supervised. Concentrate visits in first week of life.
- Provide training specific to pregnancy and newborn, plus refreshers
- Determine key functions (chlorhexidine, thermometer, etc.)

[1] Lassi, Zohra SHaider, Batool A, Bhutta, Zulfiqar A. *Community-based intervention packages for reducing maternal and neonatal morbidity and mortality and improving neonatal outcomes*. Cochrane Database of Systematic Reviews, 11 (11) 2010

Community health worker training materials

WHO's Caring for the Newborn at Home

- Training materials
- Picture books
- Referral forms
- Sample registers
English, French, Arabic

Improving Quality of Newborn Care

1. Defining your ‘package of care’ for newborns

2. Ensuring protocols, clinical guidelines, and documentation is in place

3. Capacity building/training for staff

4. Ensuring Essential supplies and Equipment

5. Monitoring Newborn Care

1. Determine Your 'Package' of Newborn Care

- Primary and secondary (referral) health facilities should jointly determine what level/type of neonatal care will be provided where
- Know capacity of referral facilities
- Once 'package of care' for newborns is determined, ensure you have the skills, medications, and equipment to match.
- Specify stabilization steps to be taken before transfer
- See Annex for examples

LBW:

- Sample **admission** criteria for primary care level:
- KMC care for >1800 g; vital signs stable; normal respiratory rate and effort; does not require oxygen; able to breastfeed or able to take expressed breastmilk feeds by cup or spoon feeding; (+/- nasogastric feeds).
- **Referral to higher level of care**: Initial stabilization completed before referral; <1800 g; respiratory distress or requiring oxygen; unstable vital signs; lost more than 10% of birth weight; not regaining birth weight by 7-10 days of life; after 10 days of life, not gaining weight at expected rate (15 g/kg/day).
- **Discharge:** Gaining weight of at least 15g/kg/day for at least 3 days; temperature stable for at least 3 days in KMC position; no danger signs; mother understands and capable of providing ongoing care at home (KMC position), follow up appointments arranged.

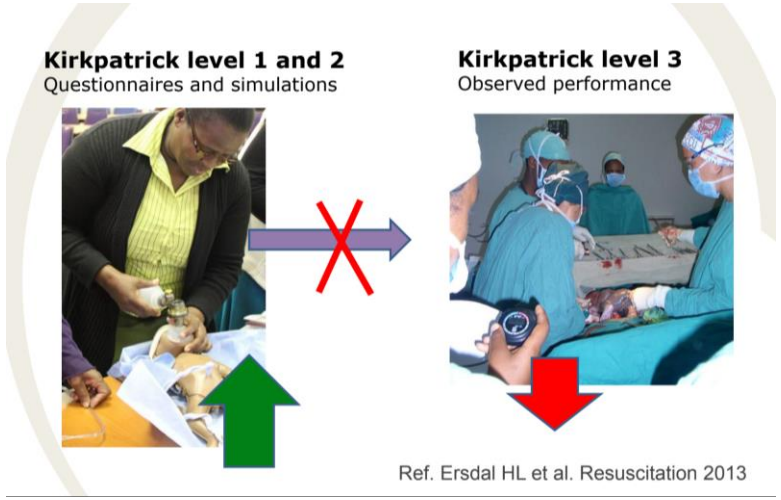
2. Ensure Guidelines and Documentation in Place

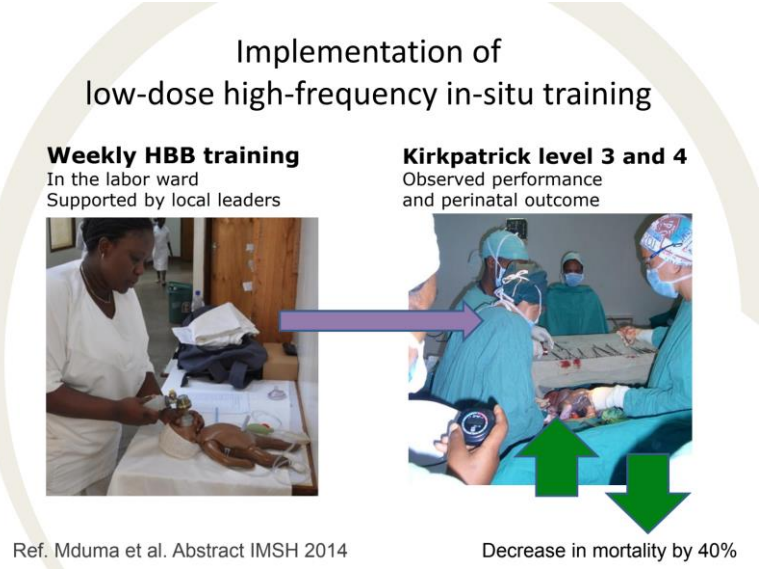
Ensure documentation is available

- Routine postnatal chart
- Inpatient NN record
- Partograph
- Discharge checklist

All health facilities must have key clinical guidelines and protocols (see annex for examples):

- ANC
- Childbirth and Postpartum
- EmONC
- Integrated Management of Newborn and Childhood Illnesses
- Kangaroo Mother Care and Feeding Guidelines
- Resuscitation
- Neonatal care (general)
- Hospital Infection Control





3. Capacity Building of Health Care Workers

- Majority of medical staff never receive training in neonatal care
- Emergency skills tend to degrade quickly if not practiced regularly
- Frequent, short, in-house refresher trainings are required to maintain skills (Low Dose High Frequency). Classroom theory is less effective.
- *Helping Mothers Survive* and *Helping Babies Survive* packages (offering short courses followed by weekly exercises and drills) supplement regular EmONC and ENC

Training Courses

Helping Babies Survive Courses:

- Essential Care for Every Baby
- Essential Care for Small Babies
- Helping Babies Breathe

Helping Mothers Survive (Preeclampsia/Eclampsia, Bleeding after Birth, Threatened Preterm Birth)

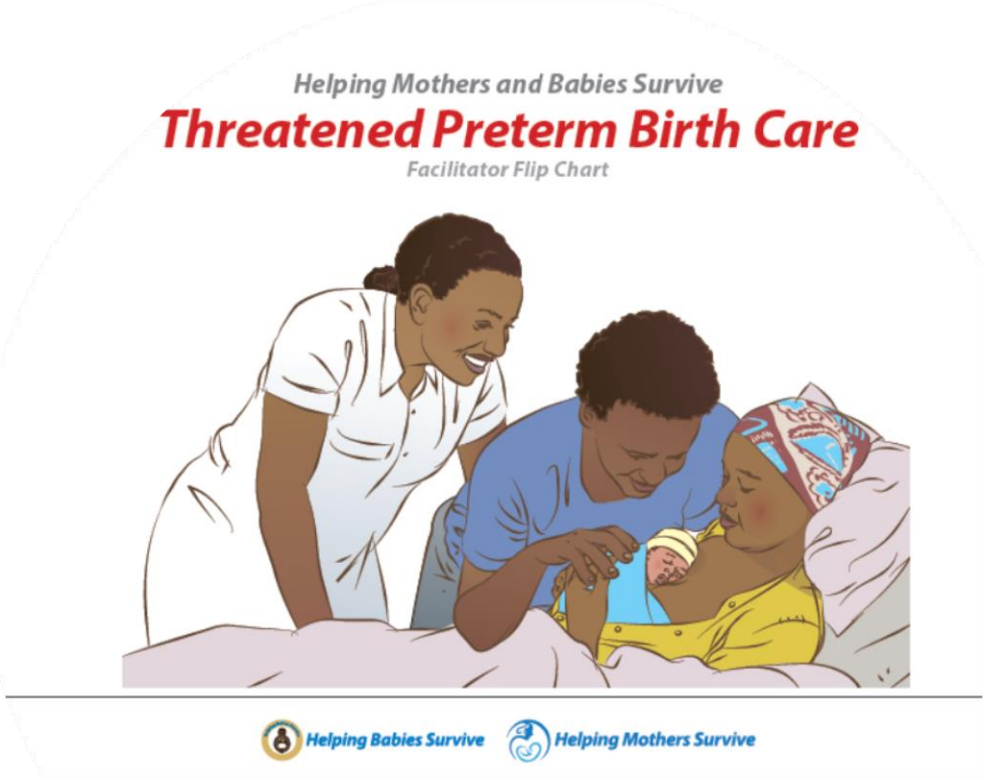
Order training materials:

- https://laerdalglobalhealth.com/products/newborn-health/

E-learning course: Postnatal Care (2 hours)

- https://www.globalhealthlearning.org/course/postnatal-care

UNICEF/Save the Children: **Kangaroo Mother Care (4 day)** https://www.healthynewbornnetwork.org/hnn-content/uploads/KMC-Guide.pdf (also with links to sample clinical records and protocols)

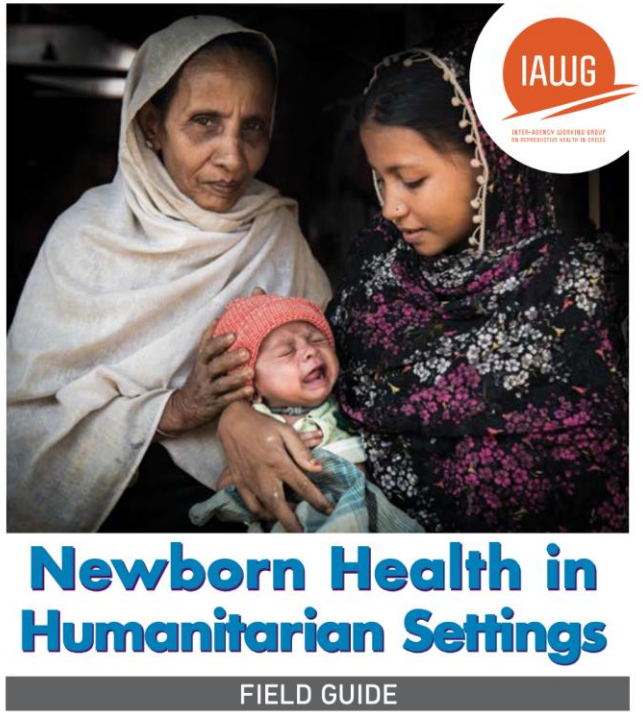


4. Ensuring Essential Drugs and Equipment

Condition	UNHCR Essential Drugs List
Essential newborn care	❑ Tetracycline eye ointment ❑ Vitamin K ❑ Chlorhexidine digluconate 7.1% ❑ Weighing scale
Threatened preterm labour	❑ Nifedipine ❑ Betamethasone or Dexamethasone for fetal lung development ❑ Magnesium sulfate ❑ Antibiotics (erythromycin for preterm prelabour rupture of membranes)
Management of low-birth weight and preterm births	❑ **Kangaroo mother care wraps (COMING SOON)** ❑ Nasogastric feeding tubes ❑ Caffeine citrate (for apnea – secondary level or above) ❑ Antibiotics ❑ Glucometer ❑ Warming table ❑ Oxygen and supplies (nasal cannulae) ❑ Pulse oximeter
Intra-partum complications (birth asphyxia)	❑ Neonatal bag and mask (with two sizes of mask – 0 and 1) ❑ Oral/nasal suction device (Penguin) ❑ Stethoscope ❑ **Venteuse/vacuum * UNFPA – pending on UNHCRs list**
Potentially Serious Bacterial Infection	❑ Oral and parenteral antibiotics (amoxicillin, ampicillin, gentamycin, benzyl-penicillin, procaine benzylpenicillin, ceftriaxone etc.)
Neonatal jaundice	❑ Phototherapy lights ❑ **Bilirubinometer (*pending)**
Other	❑ Local purchase - towel/cloth, baby clothes, hat

NEONATAL SUPPLIES IN THE EMERGENCY PHASE

- **Newborn Care Supply Kits** have been developed to complement the interagency RH kits for each level of care: Community; Primary; Secondary.
- Includes items such as blankets and hats; scales; chlorhexidine; KMC wraps; feeding cups for expressed breastmilk.
- Order simultaneously with RH kits



Save the Children World Health Organization unicef

https://www.healthynewbornnetwork.org/resource/newborn-health-humanitarian-settings-field-guide/

5. Monitoring Newborn Health

Analyse HIS data monthly. Know “expected” rates for key indicators. Be alert to both LOW and high results. Audit reports. Re-train front-line staff

Community surveillance of deaths and neonatal mortality audits

Balanced Score Card ‘RH comprehensive module’ +/- supplementary checklists for neonatal care services/items

Make joint monitoring visits with UNHCR, MoH, implementing partner, UNFPA or UNICEF (if active)

HIS indicator	Target	Very high values	Very low values
Neonatal mortality rates	?Similar to or below host rates (after emergency phase) SDG Goal 2030: 12 per 1000 live births	• Poor maternal or neonatal care • ++ home births • Poor nutrition status • Infectious disease outbreaks • Poor access to skilled care • Poor acceptability of care	• Missing events (home births, deaths occurring enroute or at referral hospital not recorded in camp HIS) • Weak community-based surveillance • Hiding deaths (health worker or family) • Misclassifying as stillbirth
Stillbirth rates	?Similar to or below host rates SBRs are often similar to NMRs SDG Goal 2030: 12 per 1000 total births 50% are intrapartum	• Poor management of labor and birth • Poor antenatal care/poor management of pregnancy risk factors (post-dates, diabetes, HTN) • Low attendance ANC/skilled delivery • Neonatal deaths being misclassified as stillbirths	• Lack of reporting • Stillbirths occurring at home
Low birth weight	<15%	• Adolescent pregnancy • Short interpregnancy interval • Malnutrition (acute or chronic) • Infections in pregnancy • Smoking/alcohol in pregnancy	• Health workers not actually taking birth weight (falsifying BW in register) • Home births (weights not recorded) • Referred-out cases not entered into HIS

Summary: Taking Action

Conduct a rapid assessment to check for readiness to provide essential newborn care, EmONC functions, neonatal resuscitation, preterm birth, and infection prevention and treatment. Identify gaps and take action. Familiarize yourself with national policy on key newborn interventions

Agree on your package of services for newborns by level. Focus on improving/implementing the low-cost, high impact practices

Ensure health workers have access to up-to-date protocols and clinical guidelines, essential equipment and medications. Ensure an annual training plan for health workers that includes key neonatal topics

Encourage supportive supervision and day-to-day coaching in health facilities (by health partner management)

Increase joint monitoring visits with PHO/health partner/MoH/UNFPA/UNICEF

THANK YOU FOR YOUR ATTENTION

Questions?

ANNEXES

Sample Care Packages by Level of Care

Sample levels of care reference: WHO/UNICEF Survive and Thrive: transforming care for every small or sick newborn. 2019.

PRIMARY: EESENTIAL NEWBORN CARE

Health system requirements: Primary		Evidence-based interventions

Place	• Space for childbirth, with specific area for resuscitation, stabilization and care, and for postnatal mother and baby to stay together
	• Infrastructure for handwashing
	• Outpatient: routine postnatal care and management of newborn problems
		• Immediate newborn care (thorough drying, skin-to-skin contact of newborn with mother, delayed cord clamping, hygienic cord care)
		• Neonatal resuscitation
		• Early initiation and support for exclusive breastfeeding
		• Routine care (Vitamin K, eye care and vaccinations, weighing and clinical examinations)
		• Prevention of mother to child transmission of HIV
		
		• KMC (for stable LBW newborns >1800g) or to stabilize in KMC position for transfer to higher level facility
		• Outpatient follow-up for discharged KMC
		
		• Assessment, management and referral of:
		  ○ Bacterial infections including treatment of Possible Severe Bacterial Infection (PSBI) where referral not possible
		  ○ Jaundice and diarrhea
		  ○ Birth defects and other problems
		
		• Pre-discharge advice on mother and baby care and follow-up

People	• Skilled birth attendance (midwifery and nursing staff +/- doctors) • Support staff (cleaners, matrons)	
Materials	• Linen/towels for drying and wrapping newborn • Bag and mask resuscitation, manual suction • Radiant heater • Thermometer • Equipment for clean cord care • Vitamin K, eye ointment • Weighing scale, measuring tape • Immunization commodities • Antibiotics • Oxygen and pulse oximeter	
Support system	• WASH and infection prevention and control • Communication and functional referral system • Newborn patient record and facility register • Written policy on zero separation • Easy access to family	

SECONDARY: SPECIAL NEWBORN CARE

Health system requirements: Secondary		Evidence-based Interventions

Place	• Dedicated warm space, with specific area for resuscitation, stabilization and care
	• Dedicated area for KMC
	• Accommodation for mothers
	• Electricity supply (generator back-up)
	• Infrastructure for storage of human milk
		• Thermal care
		• KMC and outpatient follow-up
		• Comfort and pain management
		• Assisted feeding (cup feeding and nasogastric feeding)
		• Safe administration of oxygen
		• Prevention of apnoea
		• Detection and management of:
		  ○ Infection
		  ○ Hypoglycemia
		  ○ Jaundice
		  ○ Anemia (and blood transfusion)
		  ○ Neonatal encephalopathy
		  ○ Seizures
		• Safe administration of IV fluids
		• Detection and referral for birth defects
		• Transition to intensive care:
		  ○ Continuous positive airway pressure (CPAP)
		  ○ Exchange transfusion
		  ○ Detection and management of necrotizing enterocolitis (NEC)
		• Specialized follow-up of high risk infants

People	• Specialized nursing and midwifery staff (24/7) • Doctor with neonatal skills on call • Support staff (cleaners, auxiliary staff)	
Materials	• Oxygen supply, pulse oximeter, and newborn oxygen accessories (concentrator, blenders) • Syringe pump and accessories (neonatal cannulae) • Feeding equipment (nasogastric tubes and cups/spoons) • Basic diagnostics (glucometer, urine dipsticks) • Medicines (antibiotics, caffeine, IV fluids, phenobarbital) • X-ray • Warmers and cots • Phototherapy equipment • Continuous positive airway pressure (CPAP)	
Support system	• 24/7 access for mothers and caregivers • Facilities for bathing, laundry and cooking • Clinical charts and facility register	

TERTIARY: INTENSIVE NEWBORN CARE

Health system requirements: Tertiary		Evidence-based interventions
Place	• Designated intensive care ward • 24/7 uninterrupted electricity • Space for mother to room in and stay close to their baby	• Advanced feeding support (e.g. parenteral nutrition) • Mechanical/assisted ventilation including intubation • Screening and treatment for retinopathy of prematurity • Surfactant treatment • Investigation and management of birth defects • Paediatric surgery • Genetic services
People	• Nurses and doctors with specialized competencies in neonatal care 24/7 • Neonatologist on call • Other specialist doctors with competencies in neonatal care (anaesthetics, surgery, radiology, etc.) • Allied health professionals (physiotherapy, nutrition, audiology, etc.)	
Health technologies	• *In addition to special care equipment and commodities:* • Intermittent positive pressure ventilation, high flow oxygen via nasal cannula • Monitoring equipment • Surfactant therapy • Advanced medicines • Supplies for advanced nutrition support (e.g. total parenteral nutrition) • Specialist equipment and accessories	
Support system	• 24/7 advanced laboratory support and other diagnostics including medical imaging • Transport and safe referral if needed • Hospital information management system	

Other Resources

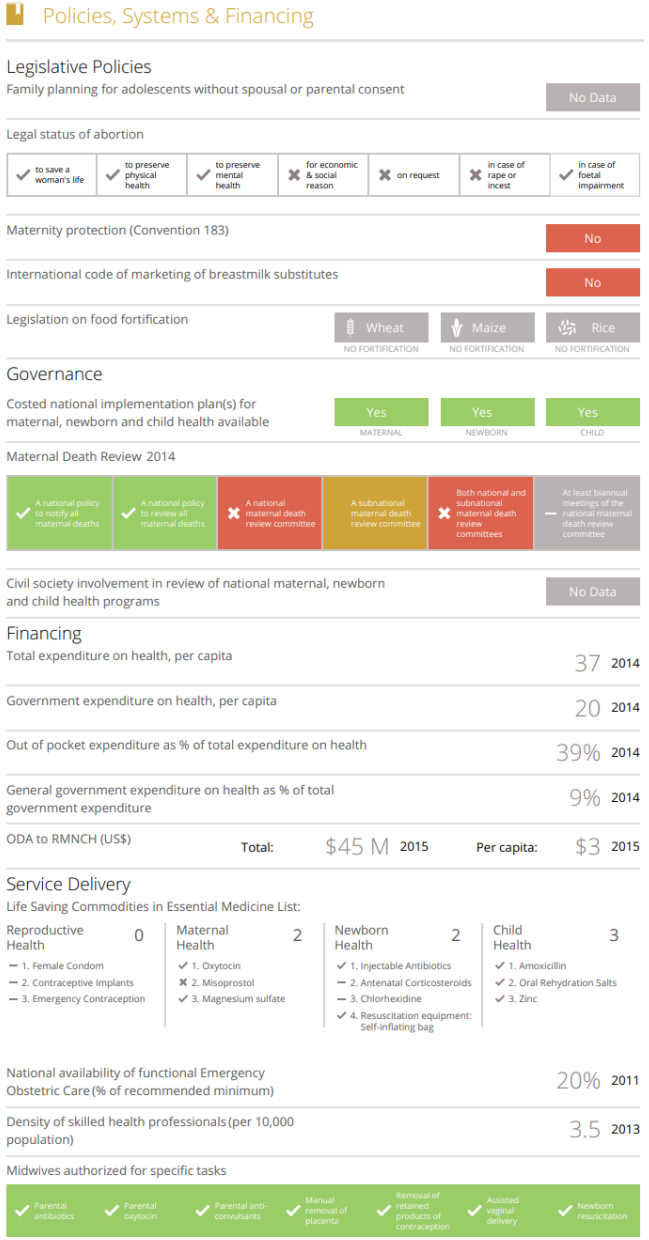
Type of Guideline	Example (local MoH guidelines have preference if available and updated)
ANC guidelines	WHO. 2015. Pregnancy, Childbirth, Postpartum and Newborn Care: A guide for essential practice, Third Edition Available from: https://apps.who.int/iris/bitstream/handle/10665/249580/9789241549356-eng.pdf?sequence=1 For policy makers: WHO. 2016. WHO recommendations on antenatal care for a positive pregnancy experience. (new recommendations for 8 ANC contacts) https://www.who.int/reproductivehealth/publications/maternal_perinatal_health/anc-positive-pregnancy-experience/en/
PNC guidelines	WHO postnatal Care guidelines: https://www.who.int/maternal_child_adolescent/publications/WHO-MCA-PNC-2014-Briefer_A4.pdf?ua=1 PNC :Pre-discharge checklist Bedside poster: https://www.healthynewbornnetwork.org/hnn-content/uploads/PNC-Bedside-Pre-Discharge-Poster_Asia-2016-1.pdf Pre-discharge checklist: https://www.healthynewbornnetwork.org/hnn-content/uploads/PNC-Checklist_Asia-1.pdf
Labour and delivery/Newborn guidelines	WHO. 2015. IMPAC: Pregnancy, Childbirth, Postpartum and Newborn Care: A guide for essential practice, Third Edition Available from: https://apps.who.int/iris/bitstream/handle/10665/249580/9789241549356-eng.pdf?sequence=1
Emergency obstetric and new-born care guidelines (EmONC)	WHO. 2017. Managing Complications in Pregnancy and Childbirth: A guide for midwives and doctors.2nd edition. Available from: https://apps.who.int/iris/bitstream/handle/10665/255760/9789241565493-eng.pdf?sequence=1 MSF: Obstetrical and Neonatal Care: http://refbooks.msf.org/msf_docs/en/obstetrics/obstetrics_en.pdf
Guidelines for Care of Sick newborns	Outpatient: Integrated Management of Newborn and Childhood Illnesses (IMNCI): WHO. 2014. IMNCI Chart booklet (English). (Includes separate section on 0-2 months) Available from: https://www.who.int/maternal_child_adolescent/documents/IMCI_chartbooklet/en/ WHO. 2003. Managing newborn problems: a guide for doctors, nurses, and midwives. https://apps.who.int/iris/bitstream/handle/10665/42753/9241546220.pdf?sequence=1 WHO. 2013. Pocket book of hospital care for children https://www.who.int/maternal_child_adolescent/documents/child_hospital_care/en/ MSF. 2015. Advanced Neonatal Care https://www.healthynewbornnetwork.org/hnn-content/uploads/MSF_Advanced-Neonatal-Care_2015.pdf MSF: Obstetrical and Neonatal Care: http://refbooks.msf.org/msf_docs/en/obstetrics/obstetrics_en.pdf
Guidelines for care of pre-term or low birth-weight new-borns	WHO. 2003. Kangaroo Mother Care, a Practical Guide. https://www.who.int/maternal_child_adolescent/documents/9241590351/en/ KMC Implementation guide: https://www.mchip.net/sites/default/files/mchipfiles/MCHIP%20KMC%20Guide.pdf WHO. 2011. Guidelines on optimal feeding of low birth-weight infants in low- and middle-income countries. (for policy makers) https://www.who.int/maternal_child_adolescent/documents/9789241548366.pdf?ua=1

Check newborn health policy and key indicators for your country

Every Preemie Scorecards

Countdown to 2030 Scorecards

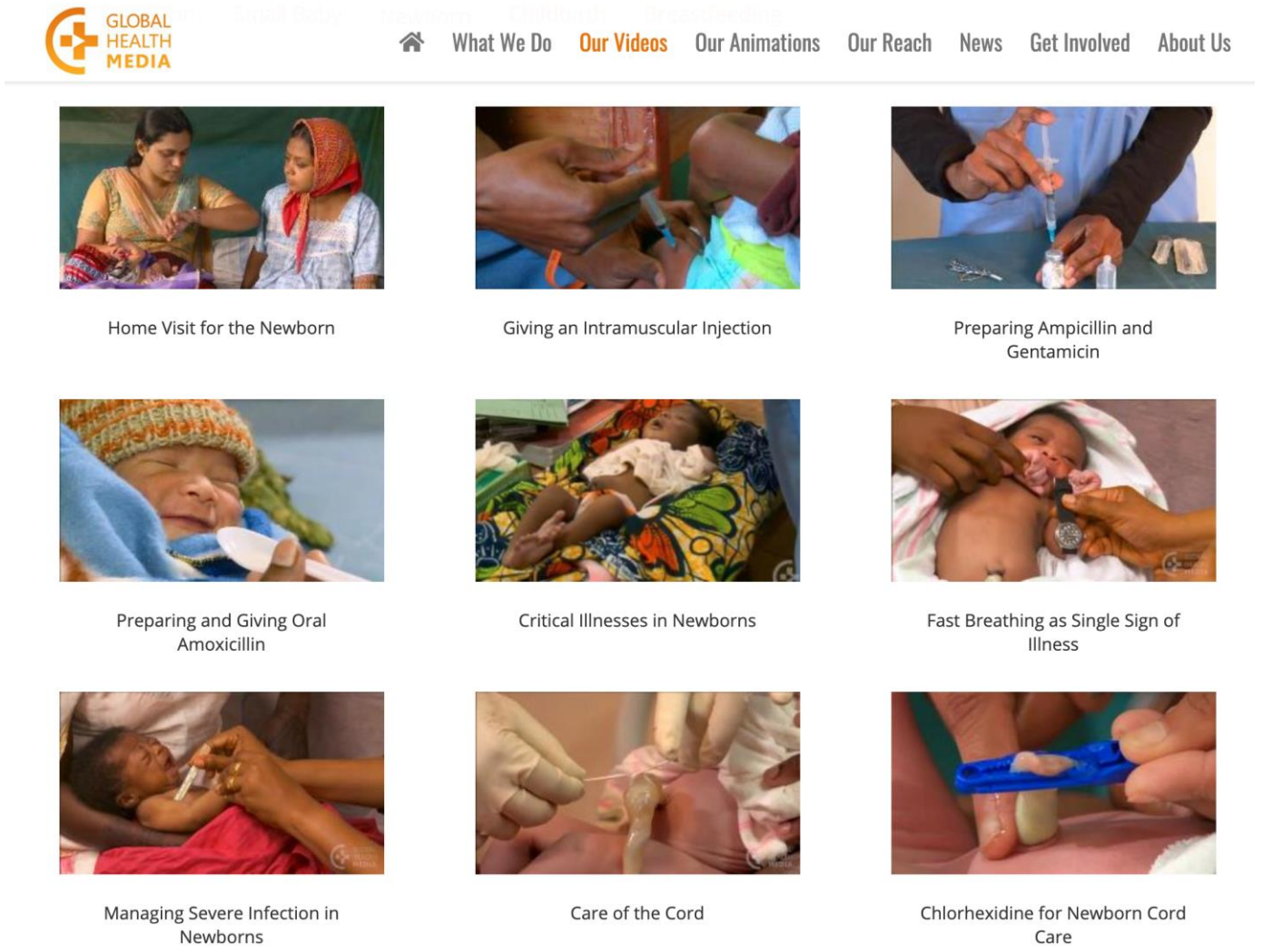
[Every Preemie Country Profiles]



[Countdown to 2030 - Newborn Health Country Profiles]

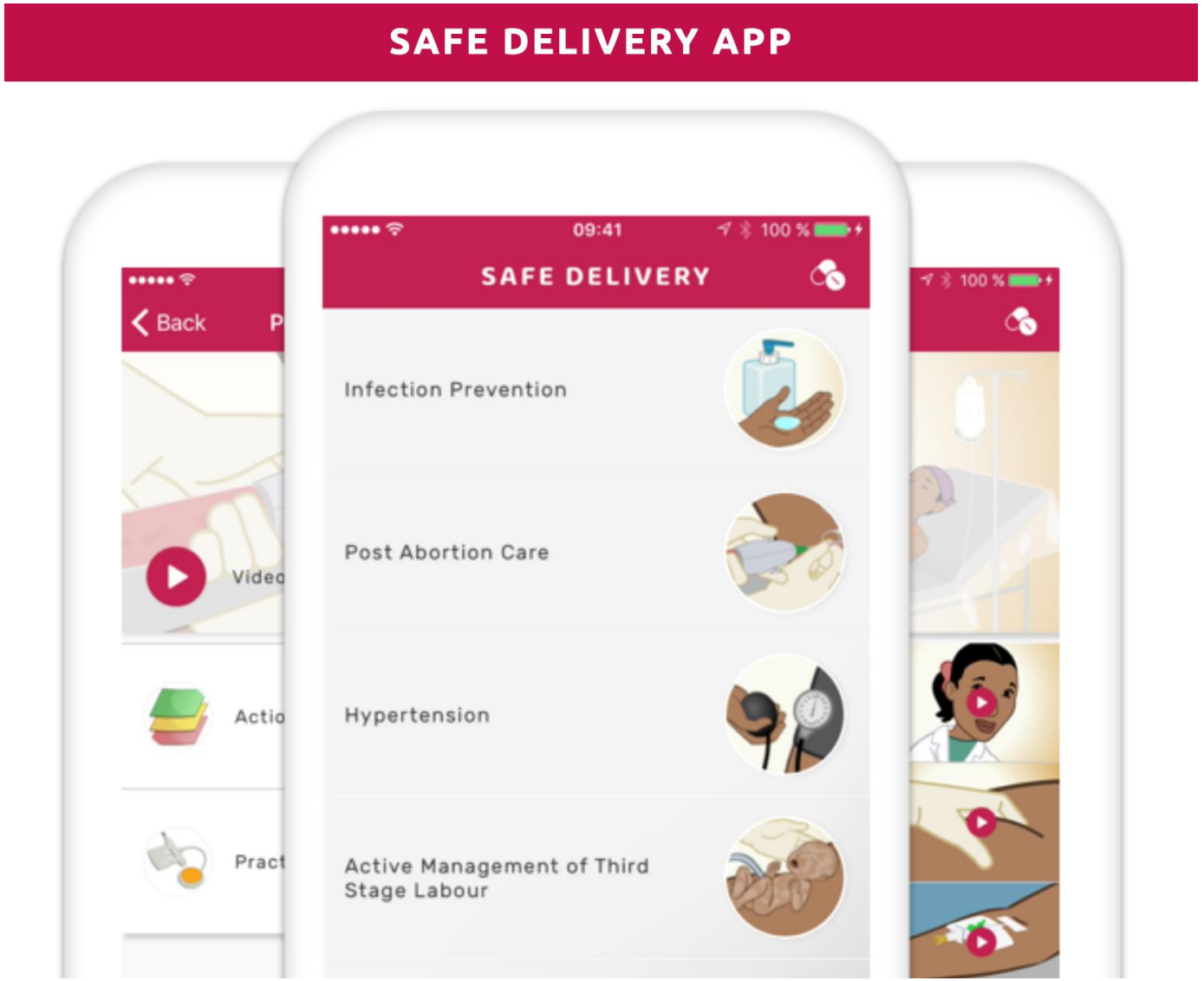
Global health media project

https://globalhealthmedia.org/videos/



Safe Delivery App

English/French



https://www.maternity.dk/download/

Technical Briefs on Neonatal Care Topics

https://www.everypreemie.org/donoharmbriefs/

English/French/Spanish

Safe and Effective Oxygen Use for Inpatient Care of Newborns

DO NO HARM TECHNICAL BRIEF

Oxygen is important in the care of newborn infants because many conditions that affect babies in the first days of life can result in low levels of oxygen in the body. Hypoxemi condition that results in increased mortality and morbidit deficiency), pneumonia and other severe infections, asph life can all result in hypoxemia. Supplemental oxygen is a

Why is Safe Oxygen Use Important?

Access to appropriate oxygen therapy has been demonstra respiratory distress. Improved detection of hypoxemia an reduction in the risk of death from childhood pneumonia delivery of oxygen with pressure that helps maintain lung of premature infants.[2] Oxygen therapy remains an essenti with specialized delivery methods being increasingly used

How can unsafe oxygen use cause harm?

Oxygen is fundamental for sustaining life, but it is also toxic. Unique developmental vulnerabilities of newborns put them at a greater risk of injury from oxygen use than adults. Injury may occur from high levels of oxygen in the blood, regardless of the administered oxygen concentration, and from exposure of the lungs to high concentrations of oxygen. The two main complications of oxygen use with newborns are retinopathy of prematurity (ROP) and lung injury. The historical success of improving survival of premature infants was tempered by blindness in some survivors that was caused by low, but unmonitored, oxygen exposure. Even with low concentrations of administered oxygen, levels in the blood can rise far above normal. ROP is the abnormal development of blood vessels in the retina of the eye. In its most severe form, ROP can result in blindness. Exposure to supplemental oxygen also produces complications from direct oxygen toxicity to lung tissue. Chronic lung disease (also known as bronchopulmonary dysplasia) is a serious consequence in extremely preterm infants, but cumulative oxygen exposure also leads to lung problems in infancy among moderately preterm babies.[5]

There are multiple ways in which inadequately regulated oxygen use can cause harm. In the special care of newborns the most common include:

- 100% oxygen administration
- Unmonitored oxygen saturation during any supplemental oxygen administration
- "Prophylactic" administration of oxygen to sick or at-risk newborns without clinical indication
- Environmental enrichment with oxygen (i.e. oxygen in incubator)
- Use of non-rebreathing mask or funnel to deliver oxygen
- Interrupted oxygen administration (rotating allocation of available oxygen)

EVERY PREEMIE SCALE

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Safe and Effective Human Milk Feeding for Small and Sick Newborns

DO NO HARM TECHNICAL BRIEF

Human milk feeding and breastfeeding have immediate and long-term benefits for all babies.[1,2] Small and sick newborns face considerable problems with breastfeeding because of immaturity or medical conditions that interfere with effective oral feeding including sucking and swallowing.[3] Small newborns are further handicapped by variation in the gut microbiome and increased risk for infections. They often need care in special newborn care units (SNCUs) or neonatal intensive care units (NICUs) which can result in separation from their mothers creating additional challenges to feeding. Small and sick babies require extra care and supervision to ensure they receive the support they need without inadvertently causing harm. This care must promote safe, optimal use of human milk and subsequent breastfeeding.

Why is human milk feeding important?

Human milk is unique because it provides nutrition to the newborn, protects against infections, and supports the establishment of a healthy functional gut biome.[4,5] Mother's own milk has many advantages over breastmilk substitutes, especially for preterm and low birthweight (LBW) and very low birthweight (VLBW) babies. These advantages include decreased infections such as neonatal sepsis, pneumonia, diarrhea, meningitis, and urinary tract infection especially in low and middle-income countries (LMICs). Necrotizing enterocolitis (NEC), inflammation of the intestine, is also decreased among preterm infants exclusively fed human milk.[1,6,7,8,9] Human milk provides critical protective benefits and may prevent or decrease suboptimal/poor nutrition. Human milk feeding is also associated with lower mortality including decreased occurrence of sudden infant death syndrome (SIDS) and chronic problems in later life, such as diabetes, ischemic heart disease, Crohn's disease and ulcerative colitis.[10,11,12] Both human milk feeding and direct breastfeeding enhances cognitive development.[2] Benefits for the mother include decreased postpartum bleeding and reduced risk of ovarian and breast cancer.[13,14,15] Provision of human milk as expressed breastmilk to babies who cannot suck adequately followed by subsequent breastfeeding are associated with lower costs of care.[16]

What are examples of practices that can result in harm?

In addition to actively promoting the use of human milk and exclusive breastfeeding, it is essential that care is taken to avoid harmful practices, some of which are listed below.

- Delayed initiation of and infrequent breastfeeding/breastmilk feeding (expressed breastmilk) can jeopardize effective establishment of milk supply and result in breast engorgement, decreased milk supply, and unnecessary use of breast milk substitutes for the baby.[17]
- Withholding colostrum from newborns is harmful. Secretion of colostrum occurs as early as the 16th week of pregnancy and is available for all newborns at birth including preterm newborns.[18]
- Needless separation from the mother, besides having a detrimental impact on breastfeeding, increases the baby's risk of exposure to more dangerous nosocomial infections.
- Poor hygienic practices in breast milk expression, storage, and administration also increase the risk of infection.[19]
- Use of formulas/breastmilk substitutes, even when used for partial supplementation, carries a risk for infections, especially in facilities with poor infection prevention practices and among lower economic quintiles with low education and poor hygiene.[20]
- In high income countries (HIC), pacifiers are frequently used to decrease pain during procedures and to promote maturation of the sucking reflex.[21] However, they are likely to increase risk of infections in LMICs, especially when their use is continued at home after discharge.

What are the current WHO/UNICEF recommendations for human milk feeding?

To improve child survival, health and development, WHO and UNICEF recommend use of human milk for all term, normal weight, preterm and LBW babies. The recently revised and relaunched Baby Friendly Hospital Initiative (BFHI) Implementation Guidance (2018) to support breastfeeding in health facilities includes considerations for small and sick newborns.[22] More specific support for use of human breastmilk and subsequent breastfeeding of these vulnerable babies is promoted in other WHO documents including those on Kangaroo Mother Care (KMC); WHO Guidelines on Facility-based Maternal and Newborn Care; WHO Guidelines on Optimal Feeding of Low Birth-Weight Infants in Low- and Middle-Income Countries; the Neo-BFHI, the adaptation of the BFHI to target these high-risk newborns; and The Ten Steps to Promote and Protect Human Milk and Breastfeeding in Vulnerable Infants.[1,23,24,25,26]

Key WHO/UNICEF recommendations related to feeding small and sick newborns:

- Promote use of human milk for preterm/LBW babies with priority being the baby's own mother's milk, with the following options for supplementation if weight gain is inadequate:
  - Use pasteurized donor human milk (PDHM) as the second option in preference to formulas. However, as WHO has specified, this "recommendation (is) relevant for settings where safe and affordable milk-banking facilities are available or can be set up;"[23]
  - Use formulas as the next option taking care to counsel the mothers/families on their proper and clean use; and
  - Use preterm formulas only when the VLBW baby is not gaining weight on standard formula and it can be afforded.
- In VLBW babies (<1500 gm) and premature infants <32 weeks who can tolerate feeds, initiate early feeding of human milk.[25]
- Use cup feeding for babies who can tolerate oral feeds but are unable to directly breastfeed. Compared with bottle feeding, cup feeding is associated with more stable respiration, heart rate and oxygen saturation, fewer desaturations and higher incidence of breastfeeding at discharge.[27]
- Once vulnerable infants have been discharged from special care units, feeding recommendations, counselling and support

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