New World Health Organization recommendations for care of preterm or low birthweight infants have the potential to transform maternal and newborn healthcare delivery

Care of Preterm or Low Birthweight Infants Group[a]

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The incidence of preterm birth (gestational age <37 weeks) was 15.2 million in 2019, occurring in 10.9% of live births.[1,2] In 2015 an estimated 20.5 million live births were low birthweight (LBW) (weight < 2500g at birth).[3] The survival, health, growth, and neurodevelopment of preterm and LBW infants lags behind that of full-term infants and special care is needed for these vulnerable infants.[4,5] Preterm and LBW infants are particularly susceptable to impaired respiration, difficulty feeding, growth failure, poor body temperature regulation, and infection.[4,5] Preterm birth accounts for 17.7% of under-five and 36.1% of neonatal deaths. Complications of preterm birth are the most important cause of death in children before their fifth birthday. An estimated 0.94 million deaths were due to preterm birth in 2019.[6]

The Departments of Maternal Child and Adolescent Health and Ageing, and Sexual and Reproductive Health and Research at the World Health Organization (WHO) developed three guidelines for improving preterm birth outcomes in 2011, 2012 and 2015.[7-9] Since then, substantial new evidence has emerged on the effectiveness of interventions for care of preterm or LBW infants.[10]

In 2020, the WHO convened a Guideline Development Group of 25 experts (all of whom are authors of this Comment) to assess the evidence and develop new recommendations for care of preterm or LBW infants. Interventions were prioritised if: the underlying condition had a high clinical or public health burden; guidance was non-existent or conflicting; new evidence was likely to change or update recommendations; or if a recommendation would lead to an important change in clinical practice or program design across countries. Seventeen new systematic reviews were commissioned and 21 additional existing systematic reviews and meta analyses were assessed. Recommendations were based on effects (benefits, harms) on preterm or LBW infant outcomes, certainty of the evidence, values of families and health workers, acceptability, resource requirements, feasibility and equity.

This week WHO published the outcomes of this process and the recommendations.[11] There are 12 new recommendations and one new best practice statement (Table) which reflect a fundamental change in the way care for mothers and their newborn infants is conceptualised and should be provided in the future. New recommendations were made for: immediate Kangaroo Mother Care (KMC) (i.e. the care of preterm or LBW infants in continuous and prolonged skin-to-skin contact with support for exclusive breastfeeding or breastmilk feeding), probiotics, emollients, continuous positive airway pressure (CPAP) immediately after birth, bubble CPAP, and methylxanthines for prevention and treatment of apnoea and for extubation (Table). New recommenations were also made for the way care is provided, including family involvement, family support, home visits, and parental leave and entitlements (Table).

Strong, high-certainty evidence was found for KMC to be provided to all preterm or LBW infants. Previously KMC recommendations were just for stable babies born in health facilities.

Now, for the first time, WHO recommendations include the initiation of KMC as soon as possible after birth for all preterm or LBW infants including those born at home or in the facility except if the infant is unable to breathe spontaneously after resuscitation, is in shock or needs mechanical ventilation.

The WHO recommendations also call for a 're-positioning of power' within health systems, allowing the mother and family to take the pivotal role in their baby's care. The recommendations call for families to be empowered and supported to play their rightful and central role as providers of care for their preterm and LBW infants. This includes mother and family involvement right from the time of birth. The recommendations also call for mothers and newborns to remain together from birth and not be separated, even if the preterm or LBW newborn is sick or requires intensive care, unless the baby is critically ill. The recommendations also call for improvements in family support (including education and counselling, peer support and home visits by trained health workers). A new 'good practice statement' was also made to allow parental leave and entitlements for the care of their preterm or LBW baby (Table).

Other major changes included recommendations for probiotics for gut microbiome health during infancy, emollient therapy to support skin barrier function, and methylxanthines (particularly caffeine) for prevention and treatment of apnoea and for extubation. Although not new, the importance of early initiation of mother's own milk and exclusive breastfeeding to six months was also reinforced, and several other feeding and micronutrient supplementation recommendations were updated, including supplementation with iron, zinc, vitamin D and vitamin A.

However, there are important evidence gaps (Table). Research is needed on the effectiveness of immediate KMC in critically ill preterm or LBW infants who are currently excluded from the recommendation. The cost effectiveness of scaling up immediate KMC in routine health systems is also currently unknown. Research is also needed on the optimal combination of probiotic genera, species, and strains, and which emollients (which products, what composition) are most effective and safe, particularly in Africa. Strategies to increase family support and participation in the care of their preterm or LBW infants are also required. The effects of different delivery channels for home visits such as standard 'in-person' home visits compared with 'digital' home visits (e.g., online video, mobile-application) for post-discharge care are also unknown.

Overall, the recommendations substantially expand the 'what', 'where' and 'how' for ensuring preterm and LBW infant survival, health and well-being. However, implementation of the recommendations at scale require changes in 'health systems building blocks',[12] including innovations in policy, infrastructure, workforce, service delivery, financing, and measurement. WHO and UNICEF are currently analysing benchmarks and norms and developing implementation guidance for KMC and for field testing of the recommendations in 'level 2' special care units in district hospitals. WHO is also updating core 'derivative tools' including the Integrated Management of Childhood Illnesses (IMCI) chart booklet; the WHO Pocket Book of Hospital Care for Children; and the WHO Small and/or Sick Newborn Care (SSNC) training courses.

Integrating the new recommendations into maternal and child health systems requires commitment and concerted action, including structural changes to place mothers and families at the centre of care, commitment by political and programme leadership, dedicated funding in national maternal and child health programmes, and the development and implementation of a monitoring and evaluation framework to track progress. We believe that rigorous implementation of the WHO recommendations is likely to transform maternal and newborn healthcare delivery across low-, middle-, and high-income countries.

The authors are (i) An independent, international panel of experts convened by the World Health Organization (Guideline Development Group [GDG]) who formulated the WHO recommendations for care of preterm or low birth weight infants (GLD [co-chair], NHA, SA, MB, LCT, QF, PFR, RUH, ZH, AAI, CK, VNK, RK, SD, SM, KM, RM, MM, SN, SR, MSHTT, AW, BW, KY, VKP [co-chair]); (ii) The WHO Secretariat (RB, DC, VC, KE, LGS, SG, AP, SR), who supported the GDG but did not take part in the formulation of the recommendations; and (iii) the external methodologist (RC) who provided external independent advice to the GDG and secretariat. MM is the President/Legal Director of the Asociación Latinoamericana de Seguimiento Pediátrico y Neonatal. RC reports consulting fees from WHO, payments made to him and his institution. SM reports Member of European Foundation for the Care of Newborn Infants (EFCNI) Trustee Board as well as EFCNI Executive Board, participation in both EFCNI boards are non-paid. CK reports CEO Council of International Neonatal Nurses, Inc. (COINN). Secretary, Health Care Professionals Associations (HCPA), Partnership for Maternal Newborn and Child Health (PMNCH). The other authors declare no other competing interests.

[a]Gary L. Darmstadt, Nafisa Hamoud Al Jaifi, Shabina Arif, Rajiv Bahl, Mats Blennow, Doris Chou, Roger Chou, Liz Comrie-Thomson, Karen Edmond,* Qi Feng, Patricia Fernandez Riera, Lawrence Grummer-Strawn, Shuchita Gupta, Rizwan Ullah Hassan, Zelee Hill, Ayede Adejumoke Idowu, Carole Kenner, Victoria Nakibuuka Kirabira, Reinhard Klinkott, Socorro De Leon-Mendoza, Silke Mader, Karim Manji, Rhonda Marriot, Monica Morgues, Sushma Nangia, Anayda Portela, Suman Rao, Mohammod Shahidullah, Hoang Thi Tran, Andrew Weeks, Bogale Worku, Khalid Yunis, Vinod K. Paul

*Corresponding author: edmondk@who.int

Prematurity Research Center, Department of Pediatrics, Stanford University School of Medicine, Stanford, California, USA (GD); Sana'a University, Sana'a, Yemen (NHAJ); Aga Khan University, Karachi, Pakistan (SA); World Health Organization, Geneva, Switzerland (RB, DC, KE, LG-S, AP, SG, SR); Karolinska Institutet and University Hospital, Stockholm, Sweden (MB); Oregon Health and Science University, Portland, USA (RC); Burnet Institute, Melbourne, Australia (LC-T); Department of Pediatrics, Peking University First Hospital, Beijing, China (QF); Ministry of Health, Buenos Aires, Argentina (PFR); Ministry of Public Health, Kabul, Afghanistan (RUH); University College London, London, UK (ZH); University of Ibadan, Ibadan, Nigeria (AAI); Council of International Neonatal Nurses, USA (CK); Nsambya Hospital, Entebbe, Uganda (VNK); Klinikum Garmisch-Partenkirchen, Garmisch-Partenkirchen, Germany (RK); Kangaroo Mother Care Foundation, Philippines, Inc, Phillipines (SDL-M); European Foundation for the Care of Newborn Infants, Munich, Germany (SM); Muhimbili University of

Health and Allied Sciences, Dar Es Salaam, Tanzania (KM); Murdoch University, Perth, Australia (RM); Universidad de Chile, Santiago, Chile (MM); Lady Hardinge Medical College & Kalawati Saran Children's Hospital, New Delhi, India (SN); Bangabandhu Sheikh Mujib Medical University, Bangladesh (MS); Da Nang Hospital for Women and Children, Da Nang, Viet Nam (HT); University of Liverpool, Liverpool, UK (AW); Ethiopian Pediatric Society, Addis Ababa, Ethiopia (BW); American University of Beirut, Beirut, Lebanon (KU); National Institution for Transforming India (NITI Aayog), New Delhi, India (VP).

Affiliations

Authors (in alphabetical order by family name, except for co-chairs in first and senior author positions)	Affiliation
Gary L. Darmstadt	Prematurity Research Center, Department of Pediatrics, Stanford University School of Medicine, Stanford, California, USA
Nafisa Hamoud Al Jaifi	Sana'a University, Sana’a, Yemen
Shabina Ariff	Aga Khan University, Karachi, Pakistan
Rajiv Bahl	World Health Organization, Geneva, Switzerland
Mats Blennow	Karolinska Institutet and University Hospital, Stockholm, Sweden
Doris Chou	World Health Organization, Geneva, Switzerland
Roger Chou	Oregon Health and Science University, Portland, USA
Liz Comrie-Thomson	Burnet Institute, Melbourne, Australia
Karen Edmond	World Health Organization, Geneva, Switzerland
Qi Feng	Department of Pediatrics, Peking University First Hospital, Beijing, China
Lawrence Grummer-Strawn	World Health Organization, Geneva, Switzerland
Patricia Fernandez Riera	Ministry of Health, Buenos Aires, Argentina
Shuchita Gupta	World Health Organization, Geneva, Switzerland
Rizwan Ullah Hassan	Ministry of Public Health, Kabul, Afghanistan
Zelee Hill	University College London, London, UK
Ayede Adejumoke Idowu	University of Ibadan, Ibadan, Nigeria
Carole Kenner	Council of International Neonatal Nurses, USA
Victoria Nakibuuka Kirabira	Nsambya Hospital, Entebbe, Uganda
Reinhard Klinkott	Klinikum Garmisch-Partenkirchen, Garmisch-Partenkirchen, Germany
Socorro De Leon-Mendoza	Kangaroo Mother Care Foundation, Philippines, Inc, Phillipines
Silke Mader	European Foundation for the Care of Newborn Infants, Munich, Germany
Karim Manji	Muhimbili University of Health and Allied Sciences, Dar Es Salaam, Tanzania

Rhonda Marriott	Murdoch University, Perth, Australia
Monica Morgues	Universidad de Chile, Santiago, Chile
Sushma Nangia	Lady Hardinge Medical College & Kalawati Saran Children's Hospital, New Delhi, India
Anayda Portela	World Health Organization, Geneva, Switzerland
Suman Rao	World Health Organization, Geneva, Switzerland
Mohammod Shahidullah	Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh
Hoang Thi Tran	Da Nang Hospital for Women and Children, Da Nang, Viet Nam
Andrew Weeks	University of Liverpool, Liverpool, UK
Bogale Worku	Ethiopian Pediatric Society, Addis Ababa, Ethiopia
Khalid Yunis	American University of Beirut, Beirut, Lebanon
Vinod K. Paul	National Institution for Transforming India (NITI Aayog), New Delhi, India

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Table. New World Health Organization recommendations, good practice statement, and priority research questions for care of preterm or low birthweight infants

Intervention	Recommendation
Kangaroo Mother Care (KMC)	KMC for preterm or LBW infants should be started as soon as possible after birth.
Probiotics	Probiotics may be considered for human-milk-fed preterm infants <32 weeks' gestation.
Emollients	Application of topical oils to the body of preterm or LBW infants may be considered.
Continuous positive airway pressure (CPAP) immediately after birth	CPAP may be considered immediately after birth for very preterm infants <32 weeks' gestation, with or without respiratory distress.
CPAP pressure source (Bubble CPAP)	For preterm infants <37 weeks' gestation who need CPAP, Bubble CPAP may be considered rather than other pressure sources (e.g. ventilator CPAP).
Methylxanthines for treatment of apnoea	Caffeine is recommended for treatment of apnoea in preterm infants <37 weeks' gestation.
Methylxanthines for extubation	Caffeine is recommended for extubation of preterm infants <34 weeks' gestation.
Methylxanthines for prevention of apnoea	Caffeine may be considered for prevention of apnoea in preterm infants <34 weeks' gestation.
Family involvement	Family involvement in routine care of preterm or LBW babies in health-care facilities is recommended.
Family support	Families of preterm or LBW infants should be given extra support to care for their infants, starting in health-care facilities from birth, and continued during follow-up post-discharge. The support may include education, counselling, and discharge preparation from health workers, and peer support.
Home visits	Home visits by trained health workers are recommended to support families to care for their preterm or LBW infant.
	Best practice statement
Parental leave and entitlements	Parental leave and entitlements should address the special needs of mothers and fathers of preterm or LBW infants.
	Research question
KMC	What is the effectiveness of immediate KMC in critically ill preterm or LBW infants, such as infants who are mechanically ventilated or on blood pressure support (e.g., vasopressors)?

	How can immediate KMC be scaled up in routine health systems?
Probiotics	What is the effectiveness and safety of probiotics on mortality, morbidity, growth, immunological status, gut microbiome, and development outcomes in human milk fed preterm or LBW infants? • What are the optimal compositions, i.e., the optimal combination of genera, species, and strains? • What is the optimal dosage and duration? • What is the effectiveness of probiotics alone compared with a combination of prebiotics and probiotics? • What is the role of probiotics in prevention and management of postnatal growth restriction in preterm infants?
Emollients	What is the effect of emollients on mortality, invasive infection, sepsis, mortality, growth, thermoprotection, microbiome, and longer-term neurodevelopment of preterm or LBW infants in high-, middle-, and low-income countries, especially in Africa? • Which emollients (which products, what composition) are most effective and safe? • What is the optimal regime (dose, frequency, duration) and application mode of application (e.g. non-touch applications) for very or extremely preterm infants?
Family involvement	What strategies can be used to increase family participation in the care of their preterm or LBW infants in intensive and special care units, and in settings without dedicated newborn units?
Family support	What is the most effective type of family support (including education, counselling, discharge preparation, peer support) for families of preterm or LBW infants?
Home visits	What is the effectiveness of standard ‘in-person’ home visits compared with ‘digital’ home visits (e.g., online video, mobile-application [app], m-Health) for post-discharge follow-up of preterm or LBW infants?