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Newborn health research priorities beyond 2015

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In 2012, an estimated 2·9 million newborn babies died[1] and 2·6 million were stillborn in 2009.[2] An even greater number have long-term impairment associated with preterm birth, intrauterine growth restriction, congenital anomalies, and intrapartum or infectious insults. Despite the increasing proportion of child deaths that are neonatal—estimated at 44% at present—programme and research funding is modest.[3] In view of the Millennium Development Goal (MDG) deadline in 2015 and the shift to a new framework targeting the unfinished survival agenda and beyond, including healthy development, growth, and human capital, there is increased attention to birth outcomes as highlighted in the *Lancet* Every Newborn Series[3–7] and the upcoming Every Newborn Action Plan. Research priorities are required for this wider agenda and longer timeframe.

In 2007–08, WHO held a series of exercises to set global research priorities to reduce mortality among newborn babies and children until 2015.[8–12] In 2013, a new priority setting process was initiated for the post-MDG era, initially to 2025, regarding maternal, newborn,

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child, and adolescent health. As part of this initiative, the global exercise to set research priorities for newborn health was coordinated by WHO and Saving Newborn Lives/Save the Children, with support from the Bill & Melinda Gates Foundation.

We adapted and used the Child Health and Nutrition Research Initiative (CHNRI) method.[13] The CHNRI process is transparent, replicable, and feasible for online application and has been used for many exercises varying from mental health to primary care.[14] We identified and approached 200 of the most productive researchers in the field in the past 5 years and 400 programme experts, and 132 of them submitted their three best research ideas online. Ideas were collated into a set of 205 research questions, and sent for scoring to the 600 experts originally approached. The 205 research questions were scored against five predefined criteria (answerability, efficacy, deliverability, impact, and equity) by 91 responding experts. Research priority scores were then computed as the mean of the aggregated scores to identify priorities in the three domains of research: delivery, development, and discovery.

Nine of the ten top-ranked priorities were in the domain of delivery (table), exploring how to take effective interventions to every mother and every newborn baby. Research priority scores ranged from 79% to 90%, and the interscorer variability analyses showed a high level of agreement (65–77%). The top delivery research priorities included identifying approaches to scale up simplified newborn resuscitation at lower levels of the health system, identification and management of newborn infection at community level, addressing barriers in the scaling up of exclusive breastfeeding and facility-based kangaroo mother care, evaluating chlorhexidine cord cleansing for neonates born in health facilities, and developing strategies to improve the quality of facility-based care during labour and childbirth.

In the domain of development to improve existing interventions, the overall research priority scores ranged from 74% to 82%, with moderate to high agreement between scorers (57–64%). The top ranked priorities included evaluating the impact and safety of kangaroo mother care initiated at the community level, early detection of high-risk women in pregnancy and labour, improved and simplified intrapartum monitoring, evaluation of appropriate oral antibiotics for treatment of neonatal sepsis, and the role of perinatal audits in improving quality of care during labour and childbirth.

Discovery research priorities emphasised the need to invest in science and technology to expand the arsenal of effective interventions. Overall research priority scores ranged from 61% to 71% and agreement scores from 43% to 49%. The highest priorities in this domain were to discover causal pathways of preterm labour, new tocolytics to delay preterm birth, stable surfactant with easier mode of delivery, and to discover more accurate and affordable ways to detect fetal distress. These research priorities align with solution pathways for understanding the biological basis of preterm birth and devising new methods of prevention.[15]

Large inequities exist in present research funding for newborn health as compared with other diseases globally, and also between different neonatal disorders themselves. Disorders that affect newborn babies in high-income countries receive more funding and attention than

those affecting newborn babies in low-income countries. For instance, research on care for preterm babies in neonatal intensive care units has received substantially more funding[16] in comparison with intrapartum-related birth outcomes.

In coming years, the newborn health research agenda should be placed at the forefront of efforts to reduce global under-5 child mortality and improve human capital. The results described here will assist both donors and researchers in setting evidence-based priorities to address the key gaps in knowledge that could make the most difference in saving newborn lives, preventing stillbirth, and other birth outcomes.

We challenge the many partners linked to the Every Newborn Action Plan, including governments, non-governmental organisations, research institutes, and donors, to ensure that the top ranked priorities are evaluated and inform accelerated progress around the world for every women, every newborn baby, and every child.

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Table

Research priorities for improving newborn health and birth outcomes by 2025 as ranked by 91 experts

	Research priorities	Score
Delivery domain		
1	Can a simplified neonatal resuscitation programme delivered by trained health workers reduce neonatal deaths due to perinatal asphyxia?	90
2	How can health workers' skills in preventing and managing asphyxia be scaled up?	88
3	Can simple clinical algorithms used by community health workers identify and refer neonates with signs of infection and consequently reduce newborn mortality?	86
4	How can exclusive breastfeeding in low-resource contexts be promoted to reduce neonatal infections and mortality?	85
5	Can training of community health workers in basic newborn resuscitation reduce morbidity and mortality due to perinatal asphyxia?	83
6	How can the administration of injectable antibiotics at home and first-level facilities to newborns with signs of sepsis be scaled up to reduce neonatal mortality?	82
7	How can facility-based initiation of kangaroo mother care or continuous skin-to-skin contact be scaled up?	80
8	How can chlorhexidine application to the cord be scaled up in facility births and in low neonatal mortality rate settings to reduce neonatal infections and neonatal mortality?	80
9	How can quality of care during labour and birth be improved to reduce intrapartum stillbirths, neonatal mortality, and disability?	79
10	Can community-based extra care for preterm/low birthweight babies delivered by community health workers reduce neonatal morbidity and mortality in settings with poor access to facility care?	79
Development domain		
1	Can community-based initiation of kangaroo mother care reduce neonatal mortality of clinically stable preterm and low birthweight babies?	82
2	How can the accuracy of community health workers in detecting key most important high-risk conditions or danger signs in pregnant women be improved?	77
3	Can perinatal audits improve quality of care in health facilities and improve fetal and neonatal outcomes?	74
4	Can intrapartum monitoring to enhance timely referral improve fetal and neonatal outcomes?	74
5	Can training community health workers to recognise and treat neonatal sepsis at home with oral antibiotics when referral is not possible reduce neonatal mortality?	74
Discovery domain		
1	Can stable surfactant with simpler novel modes of administration increase the use and availability of surfactant for preterm babies at risk of respiratory distress syndrome?	71
2	Can the method to diagnose fetal distress in labour be made more accurate and affordable?	66
3	Can strategies for prevention and treatment of intrauterine growth restriction be developed?	64
4	Can novel tocolytic agents to delay or stop preterm labour be developed in order to reduce neonatal mortality and morbidity?	63
5	Can major causal pathways and risk factors for antepartum stillbirth be identified?	61

Overall and criterion specific scores ranged from 0% to 100%.