Every Newborn 4

Health-systems bottlenecks and strategies to accelerate scale-up in countries

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Universal coverage of essential interventions would reduce neonatal deaths by an estimated 71%, benefit women and children after the first month, and reduce stillbirths. However, the packages with the greatest effect (care around birth, care of small and ill newborn babies), have low and inequitable coverage and are the most sensitive markers of health system function. In eight of the 13 countries with the most neonatal deaths (55% worldwide), we undertook a systematic assessment of bottlenecks to essential maternal and newborn health care, involving more than 600 experts. Of 2465 bottlenecks identified, common constraints were found in all high-burden countries, notably regarding the health workforce, financing, and service delivery. However, bottlenecks for specific interventions might differ across similar health systems. For example, the implementation of kangaroo mother care was noted as challenging in the four Asian country workshops, but was regarded as a feasible aspect of preterm care by respondents in the four African countries. If all high-burden countries achieved the neonatal mortality rates of their region's fastest progressing countries, then the mortality goal of ten per 1000 livebirths by 2035 recommended in this Series and the Every Newborn Action Plan would be exceeded. We therefore examined fast progressing countries to identify strategies to reduce neonatal mortality. We identified several key factors: (1) workforce planning to increase numbers and upgrade specific skills for care at birth and of small and ill newborn babies, task sharing, incentives for rural health workers; (2) financial protection measures, such as expansion of health insurance, conditional cash transfers, and performance-based financing; and (3) dynamic leadership including innovation and community empowerment. Adapting from the 2005 *Lancet* Series on neonatal survival and drawing on this Every Newborn Series, we propose a country-led, data-driven process to sharpen national health plans, seize opportunities to address the quality gap for care at birth and care of small and ill newborn babies, and systematically scale up care to reach every mother and newborn baby, particularly the poorest.

Introduction

Reduction of the neonatal mortality rate (NMR; deaths within the first 28 days of life), has lagged substantially behind progress in child mortality, with almost 3 million deaths in 2012 being a major unfinished agenda at the end of the Millennium Development Goal era.[1,2] Globally, the average annual rate of reduction in neonatal mortality is around half that for children after the first month of life and half that for maternal deaths,[3] and progress is even slower for the world's 2·6 million stillbirths.[4] Although some countries have made substantial advances in newborn survival, progress varies between neighbouring countries and within countries. African countries have made the least progress in reducing the risk of neonatal deaths (28%) compared with countries in east Asia (65%).[2]

The first paper in this Series reviews changes and challenges since the first call to action for newborn survival in 2005.[5] Although striking progress has been made in agenda setting and the generation and use of evidence in policy formulation, there is little investment, limited large-scale implementation, and major gaps in data for both coverage and process. Hence, it might not be surprising that progress in newborn survival has been slower than in the reduction of child mortality.[3] However, we now have much clearer epidemiological evidence describing the size of the problem and the action priorities—where, when, and whom to focus on. The time

of greatest risk for both women and babies is around birth.[1] Small babies—either preterm or small for gestational age or both—are especially vulnerable, accounting for more than 80% of neonatal deaths in south Asia and sub-Saharan Africa.[1] Targeting of small babies has been crucial to acceleration of neonatal mortality reduction in high-income and middle-income countries.[6]

Additionally, the evidence for effective and affordable interventions is clearer than ever:[5] universal coverage of maternal and newborn care would avert 59% of maternal deaths, 73% of newborn deaths, and 35% of stillbirths[7] as well as provide ongoing benefits throughout the lifecycle.[1] Table 1 shows the most effective intervention packages to save mothers' lives and address the three main causes of newborn mortality including basic care for neonates at birth. Full scale-up of these intervention packages could substantially reduce deaths due to prematurity (58%), intrapartum-related deaths (79%), and deaths related to infections (84%).[7]

Wide and equitable coverage of care is needed to realise a new vision of grand convergence for the richest and poorest countries of the world,[9,10] including achieving the Every Newborn goals for newborn babies and stillbirths.[1] Of the indicators tracked as a follow-on for the Commission for Information and Accountability,[11] only immunisation is higher than 60% coverage.[12] In fact, coverage is the lowest—and the equity gap the highest—for care around

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Key messages

Status for scaling up
The interventions with the most effect are mainly clinical and usually facility-based, but have the widest equity gap and the greatest health system challenges. Care around birth and the care of small and ill newborn babies have the greatest gaps in coverage, equity, and quality of care in health facilities in low-income and middle-income countries.

Health-systems bottlenecks impeding scale-up
- Interventions with the greatest bottlenecks are the prevention and management of preterm births, inpatient supportive care of ill and small newborn babies, the management of severe infections, and kangaroo mother care.
- Common constraints to scale-up of high-effect intervention packages are found in all high-burden countries and include, most importantly, bottlenecks related to the health workforce, finance, and service delivery.
- Context-specific constraints, where, despite similar health systems, an intervention such as kangaroo mother care can be scaled up in some settings or countries but faces substantial challenges to scale-up in others, despite similar health-systems bottlenecks.

Learning from fast progressing countries
Some low-income and middle-income countries have made remarkable progress in reducing neonatal deaths, and if their regional neighbours achieved the same rates, then the Every Newborn Series and action plan mortality goals would be exceeded. Lessons from fast progressing countries draw attention to specific strategies that can be implemented to overcome bottlenecks and improve access to and quality of care, such as addressing health workforce shortages, removal of financial barriers, and improvement of access to care through innovative delivery strategies such as task shifting.

Systematic scale-up in countries by overcoming bottlenecks
Adapting from *Lancet* 2005 Series on neonatal survival and on the basis of the analyses in the Every Newborn Series, we propose four steps for countries to phase in strategies to increase financing, improve the availability and skills of providers, and close the quality gap. Context-specific strategies are needed; countries with low mortality need to focus on quality and equity, whereas those with higher mortality need to improve supply and demand as well as equity and quality.

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the time of birth, when mortality risk is highest. More than three-quarters of newborn deaths occur in high-mortality settings (NMR higher than 15 deaths per 1000 livebirths) characterised by struggling health systems with low numbers of health workers and facility births (table 2).[1] The interventions that have the greatest effect are especially dependent on health-system infrastructure, capacity, and resources; strengthening of clinical care in facilities is essential because it provides the backbone of services that save the lives of women and children, particularly newborn babies.[7,16]

In 2005, Knippenberg and colleagues[17] noted that the strengths and weaknesses of a health system are crucial but are often not assessed in health programme design,[18] and proposed a four-step systematic approach to assess the context and scale-up of newborn care in communities and facilities. Clinical and community services are inextricably linked, and health-systems strengthening involves addressing of both.[17,19] Neonatal deaths and stillbirths could be the most sensitive marker of linkages between community and facility care. The big challenge remains how to put health-systems strengthening into

practice to achieve high, equitable, and effective coverage of care. We suggest that faster progress needs systematic, context-specific identification of the health systems barriers or bottlenecks, to plan and implement strategies to accelerate progress.[17,20]

Objectives
Every Newborn is a multipartner process initiated in response to country demand for more guidance and action from the global community on newborn survival and health. In the February, 2014, online consultation, which was initiated to allow stakeholders to review the Every Newborn plan, more than 300 comments were received including comments from more than 40 country governments, indicating interest and need for the plan.

In this paper, the fourth of *The Lancet* Every Newborn Series,[1,5,7,21] we present the results of two analyses: first, multicountry analyses of health-system bottlenecks for scaling up intervention packages to reduce neonatal deaths and improve health; and second, analyses of specific enabling factors that have facilitated progress in reducing neonatal mortality in selected countries. On the basis of this information, we propose strategies to accelerate the scale-up of high-effect interventions, with a particular focus on closing the quality gap for care at birth.

To assess the bottlenecks, we selected key high-burden countries and undertook a series of collaborative workshops to assess the bottlenecks to scale-up (panel 1). We also selected fast progressing countries for NMR reduction in three regions, Africa, Asia, and Latin America and the Caribbean, to analyse the factors that might have accelerated progress (panel 1).

Barriers to scale-up of care
We categorised the most frequently mentioned bottlenecks and innovative solutions for each health-system building block into 17 thematic areas (table 3); the specific country teams that drew attention to these bottlenecks are also shown in table 3. Figure 1 summarises the grading across the nine intervention packages overall across all the countries, as well as grouped by NMR and by region.

Figure 1A shows that for all countries, the bottlenecks most frequently identified (affecting more than five interventions) as very major or significant were health financing (six interventions), health workforce (six interventions), health service delivery (five interventions), and essential medical products and technologies (five interventions). When countries were categorised according to their mortality context (figure 1B, 1C), health service delivery and the health workforce were frequently mentioned in workshops in both mortality contexts.

The country teams in the two regions perceived bottlenecks somewhat differently (figure 1D, 1E). For the country teams from Africa, all the health-system building blocks except for leadership and governance (three interventions) were frequently cited as having very major or significant bottlenecks across interventions, dominated by

	Intervention package	Tracer(s)
Antepartum period		
Prevention and management of preterm birth	Detection of women at risk or already in preterm labour, use of tocolytics or a different route of delivery	Antenatal corticosteroids for fetal lung maturation
Intrapartum period		
Skilled birth attendance	Birth provided by skilled personnel who is an accredited health professional (such as a midwife, doctor, or nurse) who has been educated and trained to proficiency in the skills needed to manage normal (uncomplicated) pregnancies, childbirth, and the immediate postnatal period and in the identification, management, and referral of complications in women and newborn babies	Clean birth kits or delivery sets, oxytocin and partograph
Basic emergency obstetric care	Seven signal functions that can be done in health centres without the need for an operating theatre: administration of parenteral antibiotics, parental oxytocics, parental anticonvulsants, manual removal of placenta, assisted vaginal delivery, and manual removal of retained products of conception, plus basic neonatal resuscitation	Assisted vaginal delivery
Comprehensive emergency obstetric care	Needs an operating theatre and is typically delivered in district hospitals; includes all seven basic care functions plus caesarean section and safe blood transfusion	Caesarean section and blood transfusions
Immediate postnatal period		
Care for all*	A set of basic, preventive, and supportive measures that are needed to ensure the survival of all newborn babies including assessment of babies for breathing difficulties immediately after birth and during the postnatal period	Cleanliness, thermal control (including drying and wrapping, skin-to-skin contact, and delayed bathing) and support for breastfeeding
Intrapartum-related complications	Neonatal resuscitation is urgent care at the time of birth to support the establishment of breathing and circulation	Bag and mask
Postnatal period		
Preterm birth	Kangaroo mother care is a package consisting of continuous skin-to-skin contact with the baby placed facing the caregiver or mother's bare chest (the kangaroo position) and support for frequent and exclusive breastfeeding or breast milk feeding in stable newborn babies	Not applicable
Infections	Management of severe infections in newborn babies needs proper assessment and use of injectable antibiotics as well as full supportive care during the postnatal period	Injectable antibiotics
Ill or small newborn babies	Inpatient supportive care for ill and small newborn babies is comprehensive care provided to severely ill babies with severe infections or those who are too small to maintain their body temperature, to breathe or to feed actively	Intravenous fluids, feeding support, and safe oxygen

*Basic newborn care prevents deaths for all newborns including for the three major causes. For more information on the intervention packages, see reference 8.

Table 1: **Key intervention packages of the maternal-newborn bottleneck analysis tool**

health finance issues (nine interventions) and health service delivery (eight interventions). In Asia workshops, health financing seemed to be an issue for only three interventions and the dominant issue was the health workforce (seven interventions) followed by community ownership and partnership (six interventions). Health service delivery (five interventions) was also notably mentioned.

The health workforce and health service delivery therefore emerged as the health-system building blocks that were consistently rated by country participants as having very major or significant bottlenecks irrespective of mortality context or geographical region. Lack of skills, low competency of health-care providers, and poor quality of care were specifically mentioned as common bottlenecks in all the workshops (table 3).

The results from the grading patterns of intervention-specific bottlenecks suggested that, overall, for all eight countries, the prevention and management of preterm births, kangaroo mother care (KMC), the management of severe infections, and inpatient supportive care of ill and small newborn babies had most frequently very major or significant bottlenecks across more than 50% (more than four) of the health-system building blocks (figure 1A).

In reviewing the intervention bottlenecks according to mortality level (figure 1B, 1C), we noted that workshop participants in most countries in the higher NMR category (≥30 deaths per 1000 livebirths) reported very major or significant bottlenecks across all seven health-systems building blocks for the prevention and management of preterm births and inpatient supportive care for ill and small newborn babies. The management of severe infections was also reported to face bottlenecks (across six building blocks). Fewer intervention bottlenecks were identified by participants in countries with NMR between 15 and 30 deaths per 1000 livebirths, with only KMC meeting the greater than 50% criterion we had set.

Perhaps the most interesting findings are those related to the context-specific differences for the intervention packages. When we separated out the bottlenecks according to region (figure 1D, 1E), workshop participants in Africa reported more very major or significant bottlenecks across all the intervention packages. However, the African country teams seemed to feel that implementation of KMC was feasible because this practice had the fewest very major or significant bottlenecks across the building blocks, mostly related to the absence of champions or political commitment and financial investment by governments for scale-up (table 4). By contrast, the Asian country workshop participants consistently reported major bottlenecks for scale-up of

	Group 1, NMR <5 deaths per 1000 livebirths (49 countries)	Group 2, NMR 5 to <15 deaths per 1000 livebirths (71 countries)	Group 3, NMR 15 to <30 deaths per 1000 livebirths (49 countries)	Group 4, NMR ≥30 deaths per 1000 livebirths (25 countries)
Health financing				
Median government spending on health per head (US$)	1615	221	33	16
Median out-of-pocket expenditure on health as percentage of total expenditure on health (%)	18·2%	34·6%	34·2%	42·2%
Health workforce				
Median nurse and midwifery personnel per 10 000 population	73·7 (54–105·3)	35·2 (18·2–49·9)	8·5 (4·65–21·7)	5·4 (2·3–5·4)
Percentage of the global total of nurses and midwives (%)	45·9%	39·5%	6·5%	8·1%
Median physicians per 10 000 population	31·7 (25·4–37·4)	15 (9·3–25·5)	2 (0·7–4·8)	1 (0·5–1·8)
Percentage of the global total of physicians (%)	34·0%	51·3%	4·1%	10·5%
Health service delivery				
At least one antenatal visit (median %)	98·5%	96·9%	88·4%	79·8%
Skilled attendance at birth (median %)	99·9%	98·5%	69%	55·3%
Caesarean delivery (% median coverage)	25·3% (20·0–32·0)	20·9% (14·2–27·3)	5·9% (3·4–12·3)	4·3% (2·6–7·1)
Access to neonatal intensive care unit (median % of births)	100%	97% (44·0–99·0)	3·4% (2·6–69·0)	2·4% (1·2–3·0)
Access to special care baby unit (median % of births)	100%	97% (88·0–99·0)	34% (26·0–92·0)	12% (6–30·0)
20 analysis countries (ARR % for 2000–12 based on 2012 estimates)				
Analysis countries with highest numbers of neonatal deaths	..	Brazil 5·7%, Peru 5·1%, Sri Lanka 4·4%, Thailand 3·8%	Tanzania 4·4%, Bangladesh 4·3%, Uganda 3·8%, Ethiopia 3·8%, Kenya 1·6%	India 2·6%, Afghanistan 2·5%, Nigeria 1·8%, Pakistan 1·3%, Democratic Republic of the Congo 0·7%
Analysis countries with fast progressing reductions in ARR	..	China 6·6%, Indonesia 3·2%	Rwanda 5·9%, Malawi 4·3%, Senegal 4·3%, Nepal 3·8%	..

Data for health financing are from reference 13, for the health workforce are from reference 14, for health service delivery are from reference 11, and neonatal mortality data are from reference 2. Adapted from Lawn and colleagues.[15] Data in parentheses are IQR. NMR=neonatal mortality rate. ARR=annual rate of reduction.

Table 2: 192 countries arranged by NMR in 2012 showing health financing, health workforce, and health-service delivery indicators

KMC across all seven health-system building blocks. In both Africa and Asia, prevention and management of preterm births, inpatient supportive care of ill and small newborn babies, and the management of severe infections were the three intervention packages still graded by most country teams as having a large number of bottlenecks. Table 4 shows specific examples of bottlenecks reported for the four most frequently cited intervention packages.

Progress is possible
Accelerating factors in fast progressing countries

Between 2000 and 2010, at least 77 countries including 13 low-income countries showed that rapid progress could be made in neonatal survival by reducing their NMR by more than 25%.[2] All the fast progressing countries we reviewed have shown improvements in the coverage of the key intervention packages for maternal and newborn health (appendix). Of these countries, the greatest rates of reduction in newborn mortality have been in Latin American countries. In Africa, Rwanda has shown a remarkable turnaround from a country ridden by mass violence and high mortality rates to one that has reduced mortality in all age groups and is now the fastest progressing country for NMR in Africa.[1,55,56] Although further progress still needs to be made, these fast progressing countries have also narrowed the equity

gaps for specific intervention packages for maternal and newborn health (appendix).

The literature review found important accelerating factors affecting reductions in neonatal mortality, including socioeconomic factors such as economic growth, anti-poverty programmes, and increased female literacy.[1,3] Sociocultural factors including women's autonomy and gender equality have been emphasised for Sri Lanka.[57] Specific health-related accelerating factors include health policy reforms and initiatives to expand basic services to all, particularly to poor groups, increased government expenditures on health, and the development of specific programmes for mothers and newborn babies were also identified as accelerating factors.[55,58–63] In Malawi and Peru, dynamic government leadership with effective donor coordination generated high-level commitment to newborn health, which has led to policy development and programmatic change during the past decade (panel 2, 3).[3,26,30,35]

Higher burden, greater challenges

The highest burden of mortality and morbidity is often seen where health-system gaps are the greatest.[1] Countries with higher mortality have higher out-of-pocket expenditure, lower government expenditure on health, lower health workforce density for both doctors and

Panel 1: Assessing bottlenecks and strategies to scale-up of care

Selection of countries for analyses
We selected countries from the 193 UN member states on the basis of the most recent mortality data available in early 2013 when the Every Newborn analyses process started.[22] For analysis 1, the health-system bottleneck analysis, we selected the 13 countries with the highest numbers of newborn deaths in 2011 (appendix).[22] We expanded beyond the highest ten countries to ensure that we would get data from a minimum set of high-burden countries, recognising the challenges of getting data from multiple countries through this intensive process within a short timeframe.[23] For analysis 2, we selected three of the top fast progressing countries for reduction of neonatal mortality rate (NMR) in each of the Africa and south Asia regions, and two countries in the Latin America and Caribbean region excluding all countries with less than 10 000 births per year since the annual rate of reduction is less stable statistically in these countries (appendix).

Analysis 1: Systematic analysis of bottlenecks to scale-up of newborn care in high-burden countries
Maternal-newborn bottleneck analysis tool
To assist countries in analysis of their health-system bottlenecks and challenges that prevent the scale-up of high-effect, cost-effective intervention packages for newborn babies, and to identify potential solutions, the Every Newborn Steering Group (appendix) developed the maternal-newborn bottleneck analysis tool to assist data collection, compilation, analysis, and comparison across countries.[23] The tool is in two sections: section 1 on newborn care, and section 2 with subsections on nine maternal and newborn health facility-based intervention packages (table 1). We focused on facility-based interventions at the time of birth—labour, childbirth, and immediate postnatal care—because they have the potential for the greatest effect on mortality reduction for both babies and mothers.[7] So-called tracer interventions and commodities were selected for each package—eg, those most likely to reflect common challenges for that particular package or for interventions delivered at the same time period through a similar platform.

Sections 1 and 2 of the questionnaire were organised according to the six WHO health-systems building blocks.[24] The seventh building block, community ownership and partnership, was included on the basis of the recommendations of the Ouagadougou declaration on primary health care.[25]

Participants and process for country consultations
The maternal and newborn health bottleneck analysis tool was used in a series of national workshops held between July 1, and Sept 30, 2013, in eight of the selected high-burden countries (appendix). The number of workshop participants varied by country and included members of national or provincial maternal and newborn health technical working groups that consisted of Ministry of Health programme managers, UN agencies, the private sector, non-governmental organisations,

professional bodies, academia, bilateral agencies, and other stakeholders at both national and subnational levels (appendix). The working groups' members are experts from diverse fields nominated by government to provide advice on maternal and newborn health issues on a regular basis, although the regularity of their meetings depends on how functional the working group is. The Every Newborn country consultations brought the working group members together to focus on the particular issue of identifying bottlenecks and solutions to newborn scale-up. The working groups' mandate also includes follow-up of implementation of solutions. More than 500 individuals participated in these workshops, which were led by the Ministry of Health in each country with support from different facilitating partners. Two regional workshops (appendix) were also held with more than 100 participants: one in Dakar, Senegal, in July, 2013, to test the tool with country participants from selected African countries and orientate facilitators; and the second in Kathmandu, Nepal, in August, 2013, to share findings from completed Asian country workshops.

The workshops followed a predefined agenda coordinated by facilitators who had been orientated on the tool. Participants examined each of the seven health-system building blocks—on the basis of data and experience—to identify the key bottlenecks to the scale-up of newborn care in general (section 1) and for each of the nine interventions (section 2). The groups then came to a consensus on whether the bottlenecks to the health-system area should be graded as good (not a bottleneck), needs some improvements (minor bottleneck), needs major improvements (significant bottleneck), or inadequate (very major bottleneck). Finally, participants proposed potential strategies and solutions to address the priority bottlenecks identified. The Ministry of Health programme managers and working group members were responsible for the collation of all responses and submission of the final data; they also served as points of contact for clarification of any issues.

The multicountry bottleneck analyses workshops, as part of the Every Newborn process, provided an opportunity to engage country teams in identifying and prioritising their context-specific health-systems barriers to the scale-up of crucial maternal and newborn health interventions. These government-led stakeholder consultations, supported by global partners, have generated a renewed national-level focus on newborn care as well as south-to-south exchange of experiences. Coordination between national and global actors has previously been identified as an important element for bringing attention to newborn issues.[26–28] The workshops have played a key part in drawing further political attention to newborn care as part of the Every Newborn process. The limitations of the tool or the process should therefore not distract from the main conclusions of this analysis.

(Panel 1 continues on next page)

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Data analysis and grading of bottlenecks
We received complete national-level data from six countries, and subnational data from India (from two states) and Pakistan (five provinces), with 2465 bottlenecks identified. We reviewed all the bottlenecks for each maternal and newborn health intervention per health-system building block and all solutions presented by country participants to identify common bottlenecks and innovative solutions. Bottlenecks and solutions were classified by health-system building block into thematic areas, and defined as common if reported by at least three countries.

We then extracted only the bottlenecks that workshop participants categorised as significant or very major, to establish whether there were health-system areas and specific interventions that could be prioritised for action. We defined a health-system building block to be a priority if more than 75% of the reporting country teams graded at least five interventions (ie, >50% of the nine interventions examined) as significant or very major bottlenecks. We graded an intervention as a priority if country teams reported at least four of seven health-system building blocks to have significant or very major bottlenecks for the same intervention. For more context-specific subanalysis, we categorised the eight countries into the two geographical regions of Africa and Asia and also considered two NMR settings: NMR ≥30 and NMR between 15 and less than 30 per 1000 livebirths. For the two countries with subnational data, the national-level grade was represented by the average of the subnational data (appendix). We recognise that by combining the data into one national input, nuances might be lost and that in large countries data from selected areas might not reflect the whole country. However, in Pakistan, we received data from all provinces except Sindh (from which the data were incomplete); only the tribal areas were not represented. In India, we received data from only two of the 28 states, but these two states are among the most marginalised; thus, this subnational data could represent a worst case scenario.

We recognise that the data collection process was mainly qualitative and subjective; however, the results are in line with district health systems assessment coverage data gathered by most of these countries between 2010 and 2012 (Malawi, Democratic Republic of the Congo, Nigeria, India, Nepal, and Bangladesh) using a quantitative bottleneck analysis tool developed by UNICEF and the World Bank with other partners to systematically assess bottlenecks on the basis of influential work by Tanahashi and Piot.[16]

Analysis 2: Review of accelerating factors in fast progressing countries
To identify factors or strategies that might have assisted the national acceleration of newborn survival, we searched PubMed, Google Scholar, and the Cochrane Database for all articles published in English since 2000. Our search terms included the eight selected fast progressing countries, and terms related to effective strategies to address health-system bottlenecks for each building block. The search terms, references, coverage data, equity profiles, a complete list of identified accelerating factors for countries, and strategies for each health-systems building block are available in the appendix.

In-depth reviews of three countries were done to further assess accelerating factors and provide context-specific examples of strategies implemented to address common health-systems building block challenges (panels 2, 3, 4). For Malawi and Nepal, the case studies were based on previously published work[28,30,35] using methods described by Lawn and colleagues[3] and also considered national political analyses by Smith and colleagues.[26] A de-novo, in-depth analysis was done for Peru, using comparable analytical and epidemiological approaches, as well as key informant interviews, as part of the Countdown to 2015 country case study process.[54]

midwives, and lower intervention coverage than do those with lower mortality (table 2). This analysis is the first to engage such high-burden countries to systematically assess the health-system constraints to the scale-up of high-effect maternal and newborn intervention packages. The eight countries involved in the bottleneck analysis process together account for 1 575 000 newborn deaths in 2012 (55% of the global total)[22] and 146 800 maternal deaths in 2010 (51% of the global total).[64] Whereas other investigators have examined health-system challenges to the scale-up of pneumonia, diarrhoea,[65] and malaria treatment[66] and management of intrapartum-related deaths,[67] this analysis provides new insight into which system bottlenecks are major and common in these countries for newborn health. The solutions proposed by the country teams (table 3) serve as a basis for country follow-up and further dialogue for countries to develop evidence-based, data-driven operational plans. Following the newborn bottleneck analyses in 2013, and using evidence-based data from national and district-level bottlenecks analyses, countries such as Malawi and India have organised further dialogue with national experts and key stakeholders to develop their newborn action plans.

Improvements in maternal and newborn health and survival can come with socioeconomic development and good governance.[3,68,69] However, this is not always the case—some countries gain wealth, yet fail to invest to reach the poorest groups, whereas others have had little change in gross national income yet have halved their child mortality.[16] Improvements in intervention coverage are fundamental to mortality reduction and are reliant on strong health systems to expand access to services.[70]

Overcoming bottlenecks
We categorised bottlenecks by health-systems building blocks to allow the identification of issues and implementation of solutions. However, we recognise that barriers to care are inter-related and their solutions cut

across several building blocks.[71] For instance, low demand for care could be due to current non-availability of services (health service delivery and health workforce),[14,15] poor quality of care (health service delivery),[72] affordability (health financing),[73] or lack of community awareness (community ownership and partnership).[74,75]

Our analysis of the health-systems bottlenecks also shows that the prevention and management of preterm births, inpatient supportive care of ill and small newborn babies, the management of severe infections, and KMC need immediate and deliberate attention in most countries. The third paper in the Series shows that scale-up of these intervention packages could avert most preterm and infection-related deaths.[7] Increasing intervention coverage and institutionalisation of services will need an increased number of skilled providers, changes in the infrastructure, procurement, and supplies of life-saving commodities, and establishment of functional referral mechanisms. Research is ongoing into innovative approaches for management of newborn infections in the community[76] and expansion of KMC;[77] however, a strong health-system infrastructure will still be needed to support the community management of care. Advancement of newborn health also needs additional formative research to improve understanding of the context-specific differences in the perception of bottlenecks preventing the scale-up of crucial intervention packages such as KMC.

Since neonatal mortality can be regarded as a tracer for the health system,[17] countries are split into categories by NMR (table 2) to provide a framework for prioritisation and phasing in of strategies to scale up the key intervention packages (table 1).[13,17,67] The categorisation of strategies according to the mortality context provides a basis for identification of priorities for the context and places an emphasis on continual improvement of the health system's performance by offering strategies to move from one category to the next.[67] Adapting from the *Lancet* 2005 Series on neonatal survival[78] and on the basis of the analyses in this *Lancet* Every Newborn Series, including those in this paper, we propose a phased approach (figure 2) to guide the strengthening of health systems and improve intervention coverage particularly those interventions facing the most bottlenecks to scale-up (the prevention and management of preterm births, inpatient supportive care of ill and small newborn babies, the management of severe infections, and KMC).

Countries in mortality groups 1 and 2 already have high coverage of services; the number of providers and government funding for health is reasonable. Therefore, the priority is to reach the last 1%, to achieve universal health coverage and strengthen quality of care for all. Countries in higher mortality contexts (groups 3 and 4) face chronic shortages of health workers; hence, they need to focus on improving supply, and introducing strategies to reduce delays in care-seeking to improve demand as well as improving the quality of care while striving for equity in access to services. We also provide specific suggestions based on available evidence from our review of strategies that can be prioritised for each mortality context to strengthen the health-systems building blocks with the most bottlenecks to scale-up—health financing, the health workforce, and service delivery in particular. We emphasise that the strengthening of the supply chain of essential medical products and technologies, as well as health information systems (including the monitoring of coverage, measuring of effect and cost, and improving data gaps) is needed across all mortality contexts. Communities are crucial drivers for health-system efforts to scale up and improve care and need to be involved in all scale-up steps and mortality contexts.[7,21]

Increase funding for newborn babies (health financing)

Increased domestic funding and spending on health are key to long-term sustainability;[79] also essential is to ensure specific budget allocations are made for maternal and newborn care. Government funding is not yet systematically tracked for reproductive, maternal, newborn, and child health; lack of funding allocation and budget lines for newborn care were reported as major bottlenecks by country teams in all of the high-burden countries surveyed. Only 10% of official development assistance for maternal, newborn, and child health in 2010 mentioned "newborn" and only about 4% of the major child health investments actually went to newborn health.[5]

To improve access for the poorest and most vulnerable populations, national and local strategies to reduce out-of-pocket spending on health need to be developed and tracked. Promising strategies that show an effect on improving health outcomes in general (there is no evidence yet on newborn-specific outcomes),[7] include the development and expansion of community-based insurance schemes, voucher schemes, and conditional cash transfers.[80–82] Panels 2, 3, and 4 present examples such as the expansion of social insurance schemes to the poor (Peru) and a stepwise approach to establish free health care with incentives and cash payments (Nepal). Performance-based financing of maternal and newborn care through cash transfers directed at health providers or families or both has been used in several countries including Brazil.[36,72,83] In other countries, such as Rwanda, cash incentives are directed mainly at health facilities.[56] Although whether cash transfers have universal applicability is not yet clear, experience shows that alleviation of the financial burden of seeking care does have an effect on care-seeking and use of maternal and child health services.[72] Irrespective of the strategy chosen to reduce out-of-pocket and catastrophic expenditures on health, important elements include clear guidelines for implementation, efficient and transparent operational management, and the implementation of plans for sustainability.[80–82] Additionally, specific efforts must be made to increase public awareness about the schemes and develop innovative enrolment strategies to reach out to the poorest groups.

	Common bottlenecks	Selected solutions
Leadership and governance		
Policy or strategy implementation	Lack of or outdated national policy, strategy, guidelines, or protocols on newborn interventions (AFG, BGD, COD, IND, KEN, NGA, PAK)	Develop and regularly update policies, guidelines, and protocols on specific newborn interventions (AFG, BGD, COD, IND, KEN, NGA, PAK)
	Policy and programme implementation is weak at lower levels of health care (AFG, COD, IND, KEN, PAK, UGA)	Ensure effective distribution of policies, norms, and guidelines to all health facilities and establish a system to monitor their implementation (AFG, BGD, COD, IND, KEN, NGA, PAK, UGA)
	Lack of situation analysis or no newborn targets defined in country operational plans (IND, KEN, PAK)	Gather baseline data for situation analysis and use to improve newborn health (IND, PAK)
Political support and coordination	Newborn health and survival not prioritised (AFG, COD, IND, KEN, PAK)	Strengthen advocacy: promote an integrated approach—link newborn messages to other initiatives such as HIV/AIDS (UGA)
	Poor leadership and lack of champions for newborn babies (BGA, COD, IND, NGA, PAK)	Develop champions for newborn health—use existing maternal health champions to promote newborn health (NGA)
	Ineffective coordination systems at national and subnational levels leading to lack of engagement of partners in newborn health (AFG, COD, PAK, UGA)	Strengthen coordination mechanisms: assign a focal person at the Ministry of Health (BGD) and at state and district levels (IND)
	Lack of public–private partnerships; private sector using different protocols and guidelines (IND, KEN, PAK)	At subnational level, strengthen hospital management committees to make them fully functional (NGA)
Health financing		
Coverage of financing schemes	Low coverage of health financing schemes—mainly only pilot projects established for specific interventions (BGD, NGA, PAK, UGA)	Expand health insurance schemes to address out-of-pocket payments, with an emphasis on community-based health insurance (NGA, COD); advocate for the inclusion of newborn interventions as part of the free MNCH policy and national health insurance for pregnancy care (NGA); advocate for universal health care and social protection policies (KEN); establish subsidies for newborn care at subnational level (eg, voucher system for provision of transport and emergency referrals) (NGA, KEN); implement income-generating activities (UGA)
Funding or budget allocation	Inadequate funds allocated to maternal and newborn health interventions including commodities (AFG, BGD, COD, IND, KEN, PAK, UGA)	Create a budget line for newborn health in national accounts—increase funds and allocate resources for newborn health interventions and commodities (AFG, BGD, COD, IND, KEN, NGA, PAK, UGA); undertake investment cases for MNCH (KEN); ensure timely flow of funds from districts to health facilities (IND)
	No budget line allocated to newborn interventions in national accounts (BGD, IND, PAK)	
	High out-of-pocket payments and no standardised costs for services (AFG, BGD, COD, IND, KEN, NGA, PAK)	Establish accountability mechanisms and curb under the table payments to service providers (PAK, AFG); establish pool donor funds (UGA)
Health workforce		
Human resource planning	Shortages of staff, poor deployment, and maldistribution between urban and rural areas (AFG, BGD, COD, IND, KEN, NGA, PAK, UGA)	Develop or revise and ensure implementation of policies for staff deployment and recruitment including increasing the number of staff (AFG, BGD, COD, IND, KEN, NGA, PAK, UGA); regularisation of contractual staff and increase in retirement age of health professionals (IND)
	Inadequate or lack of job descriptions (BGD, COD, IND, PAK, UGA)	Clearly define roles and responsibilities of health workers for the provision of newborn care in their job descriptions; midwives and nurses to be authorised to provide more interventions and prescribe some essential maternal and newborn drugs (AFG, BGD, COD, IND, KEN, NGA, PAK, UGA)
	Only restricted categories of higher-level health care providers authorised to provide some interventions and to prescribe specific newborn drugs (COD, IND, PAK, UGA)	
Motivation of staff	Lack of motivation of staff due to poor remuneration or absence of capacity building plans and opportunities (BGD, COD, IND, KEN, NGA, PAK, UGA)	Institutionalise incentives to improve retention of skilled providers in remote and security challenged areas such as improved welfare packages or wages, scholarships, club housing, hardship allowances, pay for performance, and career growth (BGD, NGA, IND, UGA)
	No retention initiatives for skilled staff especially to encourage them to work in rural areas (AFG, BGD, IND, KEN, PAK, UGA)	Develop and test a new bonus payment for midwives based on number of deliveries and with documented postnatal visits (KEN)
Competency or training of staff	Poor skills and low competency of service providers (AFG, BGD, COD, IND, KEN, NGA, PAK, UGA)	Review preservice and in-service training curricula to ensure that priority newborn health interventions are included at all levels of care for all workers involved in maternal and newborn health (AFG, BGD, COD, IND, KEN, NGA, PAK, UGA)
	Lack of competency-based training including preservice and in-service training (AFG, COD, IND, KEN, PAK, UGA)	
Essential medical products and technologies		
Drug policy or registration	Some essential newborn drugs are not registered or included on the national essential medicines list (BGD, IND, PAK, UGA)	Include all essential newborn commodities with their appropriate indications in the national essential medicines list (AFG, BGD, COD, IND, KEN, NGA, PAK, UGA)
Availability of commodities	Essential drugs and supplies not available in health facilities (AFG, BGD, COD, IND, KEN, NGA, PAK, UGA) Commodities frequently out of stock due to poor coordination between national and subnational levels (AFG, BGD, COD, IND, KEN, NGA, PAK, UGA)	Strengthen the national drug supply system (COD, NGA) Work with the UN Commission on Commodities to strengthen logistics and supply chain management (UGA) and implement essential medicines policy (NGA) to ensure availability of essential commodities at the district and health facility levels
Logistics management information systems	Inadequate drug forecasting, quantification, procurement, and tracking systems (AFG, BGD, COD, IND, KEN, PAK, UGA)	Establish functional logistic and supply chain management and procurement systems, including capacity building of health workers (AFG, BGD, COD, IND, KEN, NGA, PAK, UGA) Streamline procurement procedures and implement penalty clauses in case of delay (IND) Strengthen Logistics Management Information Systems (LMIS) through web-based stock register system (BGD)

(Table 3 continues on next page)

	Common bottlenecks	Selected solutions
(Table continued from previous page)		
Health service delivery		
Service availability	Poor availability of clinical services due to lack of infrastructure or lack of or poor implementation of clinical guidelines and protocols in health facilities (BGD, COD, IND, KEN, PAK, UGA) Poor distribution of newborn services with rural areas being underserved (AFG, BGD, IND, KEN, PAK) Weak referral systems and linkages between levels (community, primary, and referral care) (AFG, COD, IND, KEN, PAK, UGA)	Build health facilities and ensure provision of materials and equipment, staff accommodation, water, and power (COD, UGA, IND, AFG) Institutionalise effective referral system between facilities and communities by involving national union of road transport and telecommunication (NGA), establishing referral facilitators at the facility level (BGD, IND); use technology for movement of vehicles and GPS connectivity (IND); involve the private sector (PAK); use alternative methods such private motorcycles to carry mothers (UGA); fund generation by community and support groups to help cover transport costs of the poorest groups (IND) Strengthen or implement community-based maternal and newborn health outreach services (NGA); establish maternity waiting homes and offer domiciliary care to bring services closer to communities (KEN)
Quality of care	Poor quality of services due to absence of standards, guidelines, and job aids (BGD, COD, IND, KEN, NGA, PAK, UGA) Absence of or weak supervisory, mentoring, and monitoring systems in health facilities (BGD, COD, IND, KEN, NGA, PAK, UGA) Absence of quality improvement mechanisms including audits and regular review of performance in all health facilities (BGD, COD, IND, KEN, PAK, UGA)	Institute and follow standard protocols and guidelines for maternal and newborn care (AFG, BGD, COD, IND, KEN, NGA, PAK, UGA); train and encourage the use of checklists and standard operating procedures (NGA); improve availability of job aids in all health facilities (NGA, KEN); involve private sector in adherence to standard protocols such as the use of the partograph during delivery (NGA, PAK) Establish or strengthen integrated supportive supervision and mentorship at all levels of care (NGA, COD); extend supportive supervision and oversight to private sector providers (NGA) Support accreditation of maternal and newborn health services and private health facilities as per government approved criteria or norms (IND); establish centres of excellence based on practice benchmarks (IND); establish or reinforce maternal and perinatal death audits (AFG, BGD, COD, IND, KEN, NGA, PAK, UGA)
Health information system		
Data collection and reporting	Lack of newborn indicators and appropriate tools for reporting (AFG, BGD, COD, IND, KEN, NGA, PAK) Data from private sector not routinely collected and reported (BGD, COD, IND, NGA, PAK) Poor quality of data collected —data either incomplete or inaccurate (AFG, BGD, COD, IND, KEN, PAK) Community-based data not reported in health management information system (AFG, BGD, COD, IND, KEN, NGA, PAK)	Define and incorporate intervention-specific indicators for newborn babies into the routine health management information system—eg, use of partograph, provision of kangaroo mother care (AFG, BGD, COD, IND, KEN, NGA, PAK, UGA) Establish neonatal registry and ensure disaggregation of data (KEN) Involve private sector in sharing data for key indicators (PAK, NGA, IND) Develop an e-health system using mobile phones to track and follow up postnatal care visits at the community level (UGA); establish a real-time data-capturing mechanism (IND) Institutionalise data quality assurance (NGA), include community-based data in routine health management information system (NGA)
Data monitoring and use	Weak staff capacity for data management and use (interpretation, analysis, and planning) (AFG, BGD, COD, IND, KEN, PAK, UGA) No systems for regular review of data (AFG, BGD, IND, KEN, PAK, UGA)	Institutionalise regular capacity-building effort for health managers and statisticians for analysis of health management information system and interpretation for programmatic action (BGD) Strengthen national health management information system including adoption of technology for better data management (NGA) Ensure routine data review and feedback (AFG, BGD, COD, IND, KEN, NGA, PAK, UGA)
Community ownership and partnership		
Community mobilisation strategy or advocacy	Lack of community mobilisation; materials for information, education, and communication; advocacy; and behaviour change communication strategy with adequate budget for implementation (AFG, BGD, COD, IND, KEN, NGA, PAK, UGA) Insufficient community-based advocacy efforts to increase awareness of the benefits of timely recognition of danger signs for pregnant mothers and newborn babies and the importance of early health-care seeking for ill babies (AFG, BGD, COD, IND, KEN, PAK, UGA)	Establish or strengthen behaviour change communication initiatives including the availability of key messages in local languages (AFG, BGD, COD, IND, KEN, NGA, PAK, UGA) Use media and other outreach tools to communicate messages around newborn health and improving participation (eg, community radio and mobile applications) (NGA), discussion in community forums (IND) Engage communities and leaders in sensitisation meetings such as town hall meetings or focus group discussions (AFG, BGD, COD, IND, KEN, NGA, PAK, UGA)
Community engagement	Suboptimum or lack of involvement of existing community structures in maternal and newborn health issues (AFG, BGD, COD, IND, KEN, NGA, PAK) Lack of male involvement in maternal and newborn health issues (AFG, COD, IND, KEN, PAK, UGA)	Involve community members and leaders in planning and implementation of maternal and newborn health activities (NGA) Use existing community systems, structures, and initiatives to discuss newborn health issues (village health committees, community health committees, traditional leaders) (BGD) Encourage male participation in antenatal care, labour, delivery, and postnatal visit (NGA, COD)
Demand for care	Little knowledge and awareness of newborn care issues, entitlements, and availability of maternal and newborn health services (AFG, BGD, COD, IND, PAK, UGA) Delays in care seeking due to sociocultural barriers (AFG, BGD, IND, KEN, PAK, UGA); lack of transport impeding care-seeking behaviours and referrals (BGD, IND, PAK) Service use is limited by financial barriers including user fees, high out-of pocket expenditure, and high costs of medicine (AFG, IND, KEN, PAK, UGA)	In addition to solutions provided under health financing and service delivery (referral) to increase access to care: empower women through improved health education and information sharing among women and their community members (NGA, PAK) Enforce positive attitudes of health workers (NGA)

AFG=Afghanistan. BGD=Bangladesh. COD=Democratic Republic of the Congo. IND=India. KEN=Kenya. NGA=Nigeria. PAK=Pakistan. UGA=Uganda. MNCH=maternal, newborn, and child health.

Table 3: Common bottlenecks and solutions to scale-up of newborn care

A

All high-burden countries (Afghanistan, Bangladesh, Democratic Republic of the Congo, India, Kenya, Nigeria, Uganda, Pakistan)

Health-system building blocks	Prevention and management of preterm birth	Skilled birth attendance	BEmOC	CEmOC	Basic newborn care	Neonatal resuscitation	Kangaroo mother care	Management of severe infections	Inpatient supportive care for ill and small newborn babies
Leadership and governance	COD, NGA, BGD, IND, PAK	COD, NGA, UGA, BGD, PAK	KEN, UGA, AFG, BGD	KEN, BGD, PAK	KEN, NGA, UGA, AFG, PAK	KEN, NGA, AFG, PAK	KEN, NGA, UGA, AFG, BGD, PAK	NGA, UGA, AFG, PAK	COD, NGA, UGA, AFG, BGD, PAK
Health financing	COD, KEN, NGA, BGD, IND, PAK	COD, KEN, NGA, UGA, AFG, PAK	COD, KEN, NGA, UGA, PAK	COD, KEN, NGA, UGA, BGD, PAK	KEN, NGA, UGA, AFG, PAK	KEN, NGA, UGA, PAK	KEN, NGA, UGA, AFG, BGD, IND, PAK	COD, KEN, NGA, UGA, AFG, PAK	COD, KEN, NGA, UGA, AFG, BGD, PAK
Health workforce	COD, KEN, NGA, IND, PAK	COD, KEN, NGA, UGA, AFG, BGD, PAK	KEN, UGA, BGD, AFG, PAK	COD, KEN, UGA, AFG, BGD, PAK	KEN, NGA, UGA, AFG, PAK	KEN, NGA, UGA, AFG, BGD, PAK	KEN, UGA, AFG, BGD, IND, PAK	COD, KEN, NGA, UGA, AFG, BGD, PAK	COD, KEN, NGA, UGA, AFG, BGD, PAK
Essential medical products and technologies	COD, KEN, NGA, UGA,BGD, IND, PAK	COD, NGA, UGA, PAK	COD, KEN, NGA, UGA, PAK, AFG	COD, KEN, NGA, UGA, AFG, PAK	UGA, AFG, BGD, PAK	KEN, NGA, UGA, AFG, PAK	COD, AFG, BGD, IND, PAK	COD, KEN, NGA, UGA, AFG, BGD, IND, PAK	COD, KEN, NGA, UGA, AFG, PAK
Health service delivery	COD, KEN, NGA, UGA, BGD, IND, PAK	COD, KEN, NGA, UGA, IND, PAK	COD, KEN, NGA, UGA, PAK, BGD, PAK	COD, KEN, NGA, UGA, AFG, BGD, PAK	KEN, NGA, UGA, AFG, PAK	KEN, NGA, UGA, AFG, PAK	KEN, NGA, UGA, AFG, BGD, IND, PAK	COD, NGA, UGA, AFG, PAK	NGA, UGA, AFG, IND, PAK
Health information system	COD, KEN, NGA, UGA, BGD, IND, PAK	KEN, IND, PAK	KEN, NGA, UGA, IND, PAK	COD, KEN, NGA, IND, PAK	KEN, UGA, AFG, PAK	KEN, BGD, IND, PAK	KEN, UGA, AFG, BGD, IND, PAK	COD, KEN, NGA, UGA, AFG, IND, PAK	COD, KEN, NGA, AFG, PAK
Community ownership and partnership	COD, KEN, NGA, BGD, IND, PAK	COD, NGA, AFG, PAK	COD, KEN, NGA, PAK	COD, KEN, NGA, UGA, PAK	KEN, NGA, UGA, AFG, PAK	KEN, NGA, AFG, BGD, PAK	KEN, NGA, AFG, BGD, IND, PAK	COD, NGA, UGA, AFG, BGD, IND, PAK	KEN, NGA, UGA, AFG, BGD, IND, PAK

B

Countries with NMR 15 to <30 deaths per 1000 livebirths (Uganda, Kenya, Bangladesh)

Leadership and governance	BGD	UGA, BGD	KEN, UGA, BGD	KEN, BGD	KEN	KEN	KEN, UGA, BGD	UGA	UGA, BGD
Health financing	KEN, BGD	KEN, UGA	KEN, UGA	KEN, UGA, BGD	KEN, UGA	KEN, UGA	KEN, UGA, BGD	KEN, UGA	KEN, UGA, BGD
Health workforce	KEN	KEN, UGA, BGD	KEN, BGD, UGA	KEN, UGA, BGD	KEN, UGA	KEN, UGA, BGD	KEN, UGA, BGD	KEN, UGA, BGD	KEN, UGA, BGD
Essential medical products and technologies	KEN, BGD	UGA	KEN, UGA	KEN, UGA	UGA, BGD	KEN, UGA	BGD	UGA, BGD	KEN, UGA
Health service delivery	KEN, UGA, BGD	KEN, UGA	KEN, UGA, BGD	KEN, UGA, BGD	KEN, UGA	KEN, UGA	KEN, UGA, BGD	UGA	UGA
Health information system	KEN, UGA, BGD	KEN	KEN, UGA	KEN	KEN, UGA	KEN, BGD	KEN, UGA, BGD	KEN, UGA	KEN
Community ownership and partnership	KEN, BGD	None	KEN	KEN, UGA	KEN, UGA	KEN, BGD	KEN, BGD	UGA, BGD	KEN, UGA, BGD

C

Countries with NMR ≥30 deaths per 1000 livebirths (Nigeria, Democratic Republic of the Congo, Afghanistan, Pakistan, India)

Leadership and governance	COD, NGA, PAK, IND	COD, NGA, PAK	PAK	PAK	COD, NGA, AFG, PAK	COD, NGA, AFG, PAK	NGA, AFG, PAK	NGA, AFG, PAK	COD, NGA, AFG, PAK
Health financing	COD, NGA, PAK, IND	COD, NGA, PAK, IND	COD, NGA, PAK	COD, NGA, PAK	COD, NGA, AFG, PAK	COD, NGA, PAK	NGA, AFG, PAK, IND	COD, NGA, AFG, PAK	COD, NGA, AFG, PAK
Health workforce	COD, NGA, PAK, IND	COD, NGA, AFG, PAK	AFG, PAK	COD, NGA, PAK	COD, NGA, AFG, PAK	COD, NGA, AFG, PAK	AFG, PAK, IND	COD, NGA, AFG, PAK	COD, NGA, AFG, PAK
Essential medical products and technologies	COD, NGA, PAK, IND	COD, NGA, PAK	COD, NGA, PAK, IND	COD, NGA, AFG, PAK, IND	AFG	COD, NGA, AFG, PAK	AFG, PAK, IND	COD, NGA, AFG, PAK	COD, NGA, AFG, PAK
Health service delivery	COD, NGA, PAK, IND	COD, NGA, PAK, IND	COD, NGA, PAK, IND	COD, NGA, AFG, PAK, IND	NGA, AFG	COD, NGA, AFG, PAK, IND	NGA, AFG, PAK, IND	COD, NGA, AFG, PAK	NGA, AFG, PAK, IND
Health information system	COD, NGA, PAK, IND	PAK, IND	NGA, PAK, IND	COD, NGA, PAK, IND	AFG	COD, PAK, IND	AFG, PAK, IND	COD, NGA, AFG, PAK, IND	COD, NGA, AFG, PAK
Community ownership and partnership	COD, NGA, PAK, IND	COD, NGA, AFG, PAK	COD, NGA, PAK	COD, NGA, PAK	NGA, AFG	COD, NGA, AFG, PAK	COD, NGA, AFG, PAK	COD, NGA, AFG, PAK, IND	NGA, AFG, PAK, IND

D

Countries in Africa (Democratic Republic of the Congo, Kenya, Nigeria, Uganda)

Leadership and governance	COD, NGA,	COD, NGA, UGA	KEN, UGA	KEN	KEN, NGA	KEN, NGA	KEN, NGA, UGA	NGA, UGA	COD, NGA, UGA
Health financing	COD, KEN, NGA	COD, KEN, NGA, UGA	COD, KEN, NGA, UGA	COD, KEN, NGA, UGA	KEN, NGA, UGA	KEN, NGA, UGA	KEN, NGA, UGA	COD, KEN, NGA, UGA	COD, KEN, NGA, UGA
Health workforce	COD, KEN, NGA	COD, KEN, NGA, UGA	KEN, UGA	COD, KEN, UGA	KEN, NGA, UGA	KEN, NGA, UGA	KEN, UGA	COD, KEN, NGA, UGA	COD, KEN, NGA, UGA
Essential medical products and technologies	COD, KEN, NGA, UGA	COD, NGA, UGA	COD, KEN, NGA, UGA	COD, KEN, NGA, UGA	UGA	KEN, NGA, UGA	None	COD, NGA, UGA	COD, KEN, NGA, UGA
Health service delivery	COD, KEN, NGA, UGA	COD, KEN, NGA, UGA	COD, KEN, NGA, UGA	COD, KEN, NGA, UGA	KEN, NGA, UGA	KEN, NGA, UGA	KEN, NGA, UGA	COD, NGA, UGA	NGA, UGA
Health information system	COD, KEN, NGA, UGA	KEN	KEN, NGA, UGA	COD, KEN, NGA	KEN, UGA	KEN	KEN, UGA	COD, KEN, NGA, UGA	COD, KEN, NGA
Community ownership and partnership	COD, KEN, NGA	COD, NGA	COD, KEN, NGA, UGA	COD, KEN, NGA, UGA	KEN, NGA, UGA	KEN, NGA	KEN, NGA	COD, NGA, UGA	KEN, NGA, UGA

E

Countries in Asia (Afghanistan, Bangladesh, India, Pakistan)

Leadership and governance	BGD, IND, PAK	BGD, PAK	BGD, PAK	BGD, PAK	AFG, PAK	AFG, PAK	AFG, BGD, PAK	AFG, PAK	AFG, BGD, PAK
Health financing	BGD, IND, PAK	AFG, PAK	PAK	BGD, PAK	AFG, PAK	PAK	AFG, BGD, IND, PAK	AFG, PAK	AFG, BGD, PAK
Health workforce	IND, PAK	AFG, BGD, PAK	AFG, BGD, PAK	AFG, BGD, PAK	AFG, PAK	AFG, BGD, PAK	AFG, BGD, IND, PAK	AFG, BGD, PAK	AFG, BGD, PAK
Essential medical products and technologies	BGD, IND, PAK	PAK	AFG, PAK	AFG, PAK	AFG, BGD, PAK	AFG, PAK	AFG, BGD, IND, PAK	AFG, BGD, PAK	AFG, PAK
Health service delivery	BGD, IND, PAK	IND, PAK	BGD, IND, PAK	AFG, BGD, PAK	AFG, PAK	AFG, PAK	AFG, BGD, IND, PAK	AFG, PAK	BGD, IND, PAK
Health information system	BGD, IND, PAK	IND, PAK	IND, PAK	IND, PAK	AFG, PAK	BGD, IND, PAK	AFG, BGD, IND, PAK	AFG, IND, PAK	BGD, PAK
Community ownership and partnership	BGD, IND, PAK	AFG, NPL, PAK	PAK	PAK	AFG, PAK	AFG, BGD, PAK	AFG, BGD, IND, PAK	AFG, BGD, IND, PAK	AFG, BGD, IND, NPL

	Prevention and management of preterm birth	KMC	Management of severe infections	Inpatient supportive care for ill and small newborn babies
Health financing				
Coverage of financing schemes; funding or budget allocation	ACS are not part of the free MNCH policy (BGD, IND, NGA, PAK); ACS are not budgeted for by health facilities (COD, IND, KEN, PAK, UGA)	No investment plan for scale-up of KMC (AFG, BGD, COD, KEN, PAK, NGA, UGA); no funds allocated to KMC implementation so high dependency on external funding (AFG, BGD, COD, NGA, PAK)	Lack of free treatment coverage for severe newborn infections at all levels by the government (AFG, KEN, NGA, PAK, UGA); limited funding from donors to implement home-based MNCH programmes that include detection of newborn infections (area-specific) (AFG, KEN, NGA, PAK, UGA)	Insufficient state subsidies and limited funds allocated to specialised care (AFG, BGD, NGA, PAK, UGA); lack of funds for the organisation of the services for ill newborn babies including procurement and distribution of essential drugs (intravenous fluids, oxygen) (AFG, BGD, COD, KEN, NGA, PAK)
Health workforce				
Human resource planning; motivation of staff; competency or training of staff	Only physicians are authorised to prescribe ACS (BGD, COD, IND, KEN, PAK, UGA); limited number of health-care providers can recognise preterm labour and use ACS (NGA, PAK, UGA); no competency training on management of preterm labour and the use of ACS (NGA, PAK, UGA)	No details regarding KMC in health provider job descriptions; shortage of health-care workers able to provide KMC (AFG, BGD, COD, KEN, NGA, PAK, UGA); inadequate training on KMC and feeding of low birthweight babies including nasogastric tube feeding, and support milk banking (AFG, BGD, KEN, NGA, PAK, UGA)	Policy restrictions—community health workers are not authorised to prescribe and administer injectable antibiotics (IND, NGA, PAK); poor motivation and low confidence of community health workers to adequately manage cases of newborn infection (NGA)	No human resources strategy in place to expand in-patient care services to all newborn babies, especially those living in remote areas (BGD, COD); no skilled-based preservice or in-service training package for the management of small and ill newborn babies (AFG, COD, NGA)
Health service delivery				
Service availability; quality of care	ACS administration is limited and only provided in tertiary hospitals (IND, KEN, NGA, UGA); ACS use not included in perinatal death audits (BGD, COD, IND, NGA)	KMC is not institutionalised—it is project-based in some areas (BGD, KEN, NGA, PAK, UGA); health facilities do not have space for KMC and milk banks; lack of community postnatal follow-up for KMC (BGD, KEN, NGA, PAK, UGA); limited number of private hospitals provide KMC services (AFG, BGD, COD, NGA, PAK, UGA)	Absence of job aids for management of severe newborn infection (BGD, COD, IND, KEN, PAK); community volunteer teams are only present in half of districts (KEN, NGA); specific system to promote the adherence to standard treatment guidelines on management of severe newborn infections do not exist or are not adequately functional (BGD, COD, IND, NGA, PAK)	Limited availability of services providing extra care for small, low birthweight, or ill newborn babies (AFG, KEN); lack of dissemination of therapeutic protocols on in-patient care for newborn babies in health facilities (COD, NGA, PAK); perinatal audits done or taking place in some districts only (COD, NGA, PAK); outdated checklists for ensuring quality of inpatient care (COD, NGA, PAK)

AFG=Afghanistan. BGD=Bangladesh. COD=Democratic Republic of the Congo. IND=India. NGA=Nigeria. PAK=Pakistan. UGA=Uganda. ACS=antenatal corticosteroids. MNCH=maternal, newborn, and child health. KMC=kangaroo mother care.

Table 4: Bottlenecks for specific intervention packages

Which health workers are responsible for newborn babies? (health workforce)

The most crucial bottleneck identified is around the availability and distribution of health-care providers with specific skills. In many high-burden countries, which health worker is responsible for the newborn baby is not clear.[67] Even for attended births, the focus of a midwife or obstetrician is most often on the woman and the placenta delivery. For almost all facility births, no attendant is available with the skills to provide essential care for the newborn baby. Previous assumptions that a health worker trained in maternal or child care could automatically take care of a newborn baby, especially one who is ill or preterm, have proven false and might well have held back progress in reduction of neonatal mortality.[6,67] Specific skills and equipment are needed such as the use and availability of ambubags for neonatal resuscitation.[84] Importantly, instilling a sense of urgency is crucial because babies die in minutes.[1] This notion also links to wider social norms regarding the acceptance of newborn deaths, with potential applicability to communities and facilities.[85]

There is an underlying shortage of skilled health workers in many high-burden countries (table 2), with countries in NMR group 4 having only 6·4 physicians, midwives, and nurses per 10000 population. Currently, less than one in six countries with the highest burden of maternal and newborn mortality reach the minimum benchmark of 23 doctors, midwives, and nurses per 10000 population necessary to provide a basic package of care.[14] Severe shortages of midwives exist in at least 38 countries.[15] To achieve universal health coverage, health workers will have to reach every community, including the poorest and hardest to access. Community health worker programmes have been expanded in countries in an attempt to address

Figure 1: Grading according to the number of countries that reported very major or significant health-system bottlenecks for each MNH intervention
Health systems areas reported as very major or significant bottlenecks for each MNH intervention by (A) all eight high-burden countries (Afghanistan, Bangladesh, Democratic Republic of the Congo, India, Kenya, Nigeria, Uganda, Pakistan), (B) countries with NMR 15 to <30 deaths per 1000 livebirths (Uganda, Kenya, Bangladesh), (C) countries with NMR ≥30 deaths per 1000 livebirths (Nigeria, Democratic Republic of the Congo, Afghanistan, Pakistan, India), (D) countries in Africa, and (E) countries in Asia. MNH=maternal and newborn health. NMR=neonatal mortality rate. BEmOC=basic emergency obstetric care. CEmOC=comprehensive emergency obstetric care. AFG=Afghanistan. BGD=Bangladesh. COD=Democratic Republic of the Congo. IND=India. KEN=Kenya. NGA=Nigeria. PAK=Pakistan. UGA=Uganda. In (A), green=1–3 countries, orange=4–5 countries, red=6–8 countries. In (B), green=≤1 country, orange=2 countries, red=3 countries. In (C), green=≤1 country, orange=2–3 countries, red=4–5 countries. In (D) and (E), green=≤1 country, orange=2 countries, red=3–4 countries.

this gap; however, they have also faced considerable challenges.[86] During the past decade, in an effort to address the chronic shortage of health workers, some countries (Brazil, Ghana, and Mexico) have implemented progressive policies and programmes to increase the numbers and distribution of skilled providers,[87] including Malawi (panel 2). Delegation of tasks from one cadre to another is a strategy that has been successfully adopted in several countries to increase access to life-saving care including caesarean sections and KMC.[88,89] More consistent efforts are needed across countries to train additional health-care professionals and put strategies in place to retain them.[90] Motivational factors for health workers might be country-specific, but financial incentives, career development, and

Panel 2: Country case study—Malawi

Generation of high-level commitment for newborn health

Between 2000 and 2010, Malawi achieved substantial progress in incorporating newborn health into national policies, programmes, agendas, and implementation guidelines.[29] A pivotal moment for policy change occurred in 2005 with the integration of newborn health into the national plan, Road Map for Accelerating Reduction of Maternal and Newborn Mortality and Morbidity in Malawi, which was linked to the sector-wide approach and cost implementation plan.[30] High-level attention to newborn health enabled an effective small group of technical champions working with the Ministry of Health to ensure the inclusion of specific newborn care interventions, such as facility-based kangaroo mother care (KMC) and an integrated community-based package, into wider health policies, programmes, and preservice training.[30] The newborn sub-working group of the Safe Motherhood Taskforce has met routinely since 2007[26] and has recently been formalised to strengthen the coordination across reproductive, maternal, newborn, and child health mechanisms.

Increasing availability of health-care providers

The national Emergency Human Resource Programme (2004–09) resulted in a 66% increase in health worker density, although it was developed and resourced mainly through donors.[31] This programme increased the number of local students admitted to preservice health institutions and increased staffing levels through financial and non-financial incentives. In an effort to bring together multiple guidelines and training materials, the primary in-service curriculum for facility-based providers was harmonised into one manual, the Integrated Maternal and Neonatal package. Malawi's health surveillance assistants, who have provided a range of services in communities for more than 40 years, began integrating maternal and newborn outreach services into their portfolios in 2007. Malawi is also currently introducing the community midwifery technician cadre, which when fully deployed is expected to improve human resource coverage in primary health facilities.

Expansion of community-based maternal and newborn care

Malawi has successfully implemented KMC,[32,33] through the adoption of national guidelines, publication of a training manual and visual materials, and incorporation of these in the registered nurse midwifery curriculum. By 2011, KMC reached at least 121 health-care facilities, almost all hospitals in Malawi. The community-based maternal and neonatal care package, developed in 2007, is now integrated into a community package that includes community case management of childhood illness, family planning, and community mobilisation, which is being piloted in 15 districts. In 2009, the training manual on community-based maternal and neonatal care for health surveillance assistants was revised to incorporate ambulatory and community KMC to ensure follow-up of babies in the community. Community mobilisation efforts promoted through women's groups and local safe motherhood committees have proven to be effective in promotion of facility births.[34]

Panel 3: Country case study—Peru

Expansion of health insurance to poor groups

In 2002 the Peruvian Government introduced the Comprehensive Health Insurance Scheme (SIS),[40,41] which includes free access to basic health care for children younger than 5 years as well as for pregnant women while giving priority to vulnerable populations living in extreme poverty. The proportion of SIS insured people in rural areas progressed from 24·7% in 2004 to 73% in 2011.[40] Efforts to reduce the equity gap were remarkable, with an increase in coverage of maternal and newborn health interventions among the poorest populations and those living in rural areas.[42] Peru has integrated various social inclusion programmes such as conditional cash transfers (JUNTOS),[43] emphasising their cross-cutting nature, and thus the need to ensure the participation of multiple public and private sectors in their implementation. Accordingly, health financing is focused on implementation of interventions related to public health problems identified through wide consultation processes, and it follows a results-based budgeting, which emphasises monitoring of progress in coverage and effect indicators related to reproductive, maternal, newborn, and child health.[44,45]

Implementation of comprehensive policies to improve service delivery

Peru implemented actions aimed at strengthening the quality of public sector management so as to explicitly link financial investments with results for priority health interventions increasing efficiency and equity.[46] Universal health coverage (AUS) in Peru emphasises primary health care as well as health-system strengthening.[47,48] An important approach that could have contributed to improved child and neonatal survival was the shift from vertical programmes (acute respiratory infections, acute diarrhoeal disease, immunisations) to integrated programmes such as the Integrated Management of Childhood Illnesses. A later adaptation included a neonatal care component,[49] and more recently (2008 onward) a cross-cutting Articulated Child Nutrition Programme, with particular emphasis on children younger than 3 years,[44] and Strategic Maternal-Neonatal Health Programme,[45] which focuses on increasing coverage of emergency obstetric and comprehensive neonatal care at the national level. This programme has incorporated components such as combination of training, supportive supervision, team work (skills mix), adherence to evidence-based guidelines, and rights-based and culturally adapted care of pregnancy and delivery.[50,51] Evidence shows that, during the past decade, there has been a continuous decrease in NMR[52] that correlates significantly with increased coverage of priority packages of care (p<0·001): four antenatal care visits (–0·95), skilled birth attendance (–0·94), and caesarean section (–0·88) as well as neonatal health interventions (p<0·001), early initiation of breastfeeding (–0·89) and postnatal care for newborns (–0·80) and hospital-based newborn care.[53]

Panel 4: Country case study—Nepal

Dynamic leadership
High-level political leadership together with effective partner coordination have been drivers of change for newborn health in Nepal. In 2002, the Prime Minister launched the first national newborn situation analysis consequently generating widespread media and public attention for the issue. 2 years later, in 2004, the Family and Child Health Divisions of the Ministry of Health and Population developed a national newborn-specific strategy.[26] Active technical working groups formed by the Ministry of Health and Population with participation from professional societies advanced the newborn agenda through national-level forums and policy changes.[28] A long history of community research for maternal, newborn, and child health in Nepal has fostered strong relationships between researchers, government officials, and medical professionals and tendencies for research to be translated to policy and practice, allowing the rapid uptake of innovations and new technologies for reproductive, maternal, newborn, and child health in the community.[35]

Expansion of social insurance schemes
The Maternity Incentive Scheme (later called the Safe Delivery Incentive Programme) was initiated in 2005 and included fee exemptions at facilities in poorer districts only and incentive payments to women and health workers in other areas. The programme has been successful in shifting behaviour and increasing skilled care at birth (13% increase).[36] The next major shift introduced incrementally since 2006, was a more general move towards free essential health care; starting from free emergency and inpatient care for specific disadvantaged populations in district hospitals and primary health-care

centres in 2006 to free care to all at health posts and primary health-care centres in 2007, and at all district hospitals in 2009. In Nepal, the free delivery policy (called Aama Surakshya Karyakram) includes universal free delivery services, launched in 2009, and a continuation of the Safe Delivery Incentive Programme, providing cash payments to women who deliver in facilities and incentive payments for health workers who undertake home deliveries.[35] Monitoring results 1 year after the Aama policy was launched show an increase in institutional deliveries (19% increase).[36]

Improving skills of community-based health-care workers
A comprehensive community-based package for newborn health including the Birth Preparedness Package and Community-Based Newborn Care Programme (CB-NCP), developed in 2007, was integrated into maternal and child health programmes. The role of female community health volunteers was expanded to include components of newborn care and referrals of ill newborn babies[37] and provision of the CB-NCP package. Training and behaviour change materials were developed in 2008 and implementation of CB-NCP began in ten pilot districts in 2009.[35,38] The CB-NCP programme trains health-care workers at all levels of care and female community health visitors in programme districts to improve their skills in integrated case management of newborn babies. Mothers' groups and community leaders are mobilised to improve newborn care practices at the same time health-care facilities are made capable to provide improved newborn care. Results from the 2011 Nepal Demographic and Health Survey (NDHS) data show a positive effect of CB-NCP on neonatal mortality rate in the ten pilot districts.[39]

management issues are universal.[91] Achievement of universal health care will depend not only on the availability of adequate numbers of health workers, but also on the distribution, skill mix,[92] quality, and performance of the available health workforce.[90,93]

These skilled providers need adequate supplies of essential medicines and commodities to provide quality services. In 2013, the UN Commission on Life-Saving Commodities for Women's and Children's Health identified an initial list of 13 overlooked life-saving commodities, which included maternal and newborn commodities integral to the delivery of the high-effect intervention packages. These commodities, if more widely accessed and properly used, could save the lives of more than 6 million women and children by 2015.[94] The Commission also made ten recommendations that focus on the need for improved global and local markets, innovative financing, quality strengthening, regulatory efficiency, improved national delivery of commodities, and better integration of private sector and consumer needs.

Close the quality gap (health service delivery)
Health service delivery solutions need to focus on improving efficiency and quality in delivery of

services,[21,95] since increasing coverage alone will not necessarily lead to the desired outcomes or effect. Achievement of equity in the provision of care is imperative; the high rates of mortality and morbidity in women and newborn babies in poor and marginalised populations are due to poor quality of care.[95,96] Perinatal audits have proven to be a useful mechanism to improve the quality of care and to decrease perinatal mortality, particularly in high-income countries but also in low-income and middle-income countries.[97] This strategy was proposed as a solution to improve quality of service delivery by all our country workshop teams (table 3). However, the effect of audits depends on the ability to close the audit loop by identifying and implementing appropriate solutions to the problems identified, as well as continuously evaluating and refining the audit review process. In high NMR settings, where many births still occur at home, it is also important to ensure that community audits and social autopsies are integrally linked with facility-based audits and social mobilisation efforts.[85] The more widespread experience of implementing maternal death audits at scale can provide useful lessons for the establishment and scale-up of perinatal audits.[97] Supervision, audit feedback, and

Focus of strategies for scaling up		Equity and quality		Equity, quality, and supply	Equity, quality, supply, and demand
		Quality: improve quality of facility services for all mothers and newborn babies, reduce medicalisation of childbirth, improve the follow-up to support disabilities, and monitor long-term outcomes **Equity:** identify the most marginalised and vulnerable groups and set specific plans to reach them		**Supply:** increase number and competency of skilled providers, improve infrastructure and number of health facilities, strengthen outreach services, strengthen commodities supply chain, identify and address missed opportunities for facility births, and strengthen home-facility linkages (plus **group 1 and 2 strategies**)	**Demand:** mobilise communities to seek and use skilled care, strengthen community-based service delivery, improve referral between the community and facility (plus **group 1, 2, and 3 strategies**)
Steps to scale-up	**Health-systems building block**	**Group 1, NMR <5 deaths per 1000 livebirths**	**Group 2, NMR 5 to <15 deaths per 1000 livebirths**	**Group 3, NMR 15 to <30 deaths per 1000 livebirths**	**Group 4, NMR ≥30 deaths per 1000 livebirths**
Step 1: Assess the situation, determine priorities based on analyses, develop leadership	Leadership and governance	• Increase the visibility of newborn issues in the context of RMNCH, engage stakeholders at all levels of care to raise awareness, ensure a coordinated convening group linked to Ministry of Health, cultivate champions • Sharpen national plans and strategies, develop and promote evidence-based policies, and ensure adequate funding of key programmes			
Step 2: Seize opportunities within the constraints of the existing health situation	Health financing	• Increase investment in family-friendly care including infrastructure and technology in tertiary or specialised care centres • Ensure financial protection for women and newborn babies needing emergency care		• Increase government spending for health, allocate budget lines for newborn care, and seize opportunities to leverage additional resources from existing RMNCH initiatives • Implement and expand pro-poor legislation and strategies (eg, vouchers, community-based health insurance schemes, reimbursement of transport costs) and remove user fees	
	Health workforce	• Increase efficiency and maintain skills and competencies (CME, workshops, in-service supervision, distance learning, reward system) of qualified health-care providers at all levels of care	• Expand and maintain nursing and midwifery skills and competencies for maternal-newborn care and ensure long-term availability of skilled health workers, especially in remote and rural areas • Establish learning centres at regional hospitals (eg, for KMC) to improve quality and efficiency	• Increase availability of nursing and midwifery skills and competencies for obstetric and newborn interventions (neonatal resuscitation, KMC, safe oxygen management and breastfeeding support) through preservice and in-service training, attraction and retention schemes, skill mix and task-shifting strategies, especially in rural and remote areas • Increase availability of specialists (eg, obstetricians and neonatologists) in district and referral hospitals	• Strengthen the role of community providers and families to implement clean birth practices, appropriate hygiene, and basic newborn care • Strengthen and support community providers through regular supervisory visits and strengthen linkages with health facilities • Implement national HR strategies that provide incentives to increase availability, attract and retain skilled providers (continuous training, task shifting, compulsory service in rural areas, pay increase, etc)
Step 3: Systematically scale up care	Health service delivery	• Reach universal coverage of high-quality care for all newborn babies including those who are preterm or ill, or both—use innovative approaches to reach the most marginalised groups • Improve follow-up mechanisms for newborn babies in need of long-term quality care		• Address missed opportunities for facilities births—improve EmOC and resuscitation • Educate and engage communities to increase early demand for quality skilled care, and specific healthy behaviours (leaders, male involvement, women's groups, etc) • Build partnerships to strengthen linkages and referral systems between communities and primary health-care facilities to reduce access delays • Implement strategies to increase quality of care: availability of standards in health facilities, ensuring supervision and mentoring of health workers, maintaining patient-centred care, and introducing maternal and perinatal audits • Strengthen IMNCI and routine postnatal care to ensure early detection of danger signs and improve case management of neonatal infections by skilled providers • Increase MNH outreach services including ANC, coverage of tetanus toxoid, IMCI, routine postnatal care (including extra care for small babies), and family planning • Adapt KMC to the local context • Address unhealthy birth practices, consider social marketing of clean birth kits	
		• Sustain long-term care and follow-up of premature babies with complications and early identification of impairment and disabilities	• Focus on quality ANC services to increase identification and treatment of women with pre-eclampsia and appropriate prevention of preterm labour • Expand quality of care through perinatal audits	• Increase coverage of CEmOC and emergency neonatal care at least in district hospitals • Establish NICUs to increase extra care for small and ill babies • Adapt KMC to the local context	• Increase coverage of CEmOC and emergency neonatal care at least at referral level • Establish NICUs to increase extra care for small and ill babies • Strengthen newborn component within iCCM/C-IMCI to scale up community-case management of neonatal sepsis in hard-to-reach areas with restricted access to health facilities
	Essential medical products and technologies	Strengthening procurement and supply chain for essential commodities			
Step 4: Monitor coverage, measure effect and cost, improve data gaps	Health information systems	Improve data collection, reporting, and use to improve service delivery Improve birth registration, improve collation of cause of death data (in facilities and communities), institute surveillance for key newborn interventions (eg, survey modules for KMC)			

(Leftmost vertical label spanning rows: Community ownership and partnership)

motivation of health-care providers can also improve service quality and provider performance.[98] There is no magic bullet to improving the quality of health-care services; interventions to improve quality depend on the identification of underlying reasons for the problems and definition of improvements based on set benchmarks.

The Every Newborn Action Plan proposes a mother-baby friendly initiative that will combine effective quality improvement methodology into a package and establish a set of global standards as a key strategy to reach every mother and newborn baby with high-quality care. The Baby Friendly Hospital Initiative[99] was successful in raising awareness and improving breastfeeding practices and rates.[100,101] Lessons learned need to be applied to ensure that the new global mother-baby friendly initiative will integrate service delivery for mothers and newborn babies, cut across programmes (including HIV, nutrition, water and sanitation, communication for development) and initiatives (including A Promise Renewed, Scaling Up Nutrition, and the Global Strategy for the Elimination of Mother to Child Transmission of HIV, among others).[1,5] The mother-baby friendly initiative will mobilise countries and partners to close the quality gap by improving facility-based care for women and babies while strengthening the linkages with communities. The focus will be on the delivery of high-effect interventions during the crucial periods of labour, childbirth, and the first week of life. Improvement of the quality of facility-based intervention packages for women around the time of childbirth as well as for newborn babies by ensuring that 90% of facility births receive the evidence-based intervention packages by 2020 could prevent around 113 000 maternal deaths, 531 000 stillbirths, and 1·325 million neonatal deaths.[7]

Conclusion

Improvement of birth outcomes is fundamental to the post-2015 agenda for both economic and health system development, with care for the small baby being the most sensitive test of universal health coverage and quality of care.[102] The Every Newborn Series and action plan goals for the reduction of stillbirths and neonatal mortality and A Promise Renewed goals for child survival cannot be met without increased focus on neonatal outcomes.[1,21] Achievement of these goals will need a country-led, data-driven process to assess and sharpen national health plans. Countries must seize opportunities to systematically scale up care to reach every woman and newborn baby,

particularly addressing the equity and quality gaps for care around the time of birth. Equitable access to high-quality, respectful care is a human right. To achieve the basic human right to survival, especially for small and ill babies, and a woman's right to survival for both herself and her baby, needs a shift in norms to the universal resolve that no woman or baby should die needlessly. To translate this shift into reality needs more investment, more medicines, and more health workers, including midwives and nurses with the skills and autonomy to provide the right care for every woman and every newborn baby.

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Figure 2: **Phasing of strategies to address identified bottlenecks**
Adapted from Knippenberg and colleagues[17] and Lawn and colleagues.[67] NMR=neonatal mortality rate. RMNCH=reproductive, maternal, newborn, and child health. CME=continuing medical education. KMC=kangaroo mother care. HR=human resources. EmOC=emergency obstetric care. IMNCI=integrated management of neonatal and childhood illnesses. MNH=maternal and newborn health. ANC=antenatal care. IMCI=integrated management of childhood illness. CEmOC=comprehensive emergency obstetric care. NICU=neonatal intensive-care unit. iCCM/C-IMCI=community-based integrated management of childhood illness.

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