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Akseer, N; Lawn, JE; Keenan, W; Konstantopoulos, A; Cooper, P; Ismail, Z; Thacker, N; Cabral, S; Bhutta, ZA; (2015) Ending preventable newborn deaths in a generation. International journal of gynaecology and obstetrics, 131 Su. S43-S48. ISSN 0020-7292 DOI: <https://doi.org/10.1016/j.ijgo.2015.03.017>

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Contents lists available at ScienceDirect

## International Journal of Gynecology and Obstetrics

journal homepage: www.elsevier.com/locate/ijgo



## REPRODUCTIVE HEALTH

## Ending preventable newborn deaths in a generation



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## ARTICLE INFO

## Keywords:

Newborn death

Stillbirth

MDGs

Mortality prevention

## ABSTRACT

The end of the Millennium Development Goal (MDG) era was marked in 2015, and while maternal and child mortality have been halved, MDG 4 and MDG 5 are off-track at the global level. Reductions in neonatal death rates (age <1 month) lag behind those for post-neonates (age 1–59 months), and stillbirth rates (omitted from the MDGs) have been virtually unchanged. Hence, almost half of under-five deaths are newborns, yet about 80% of these are preventable using cost-effective interventions. The Every Newborn Action Plan has been endorsed by the World Health Assembly and ratified by many stakeholders and donors to reduce neonatal deaths and stillbirths to 10 per 1000 births by 2035. The plan provides an evidence-based framework for scaling up of essential interventions across the continuum of care with the potential to prevent the deaths of approximately three million newborns, mothers, and stillbirths every year. Two million stillbirths and newborns could be saved by care at birth and care of small and sick newborns, giving a triple return on investment at this key time. Commitment, investment, and intentional leadership from global and national stakeholders, including all healthcare professionals, can make these ambitious goals attainable.

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## 1. Introduction

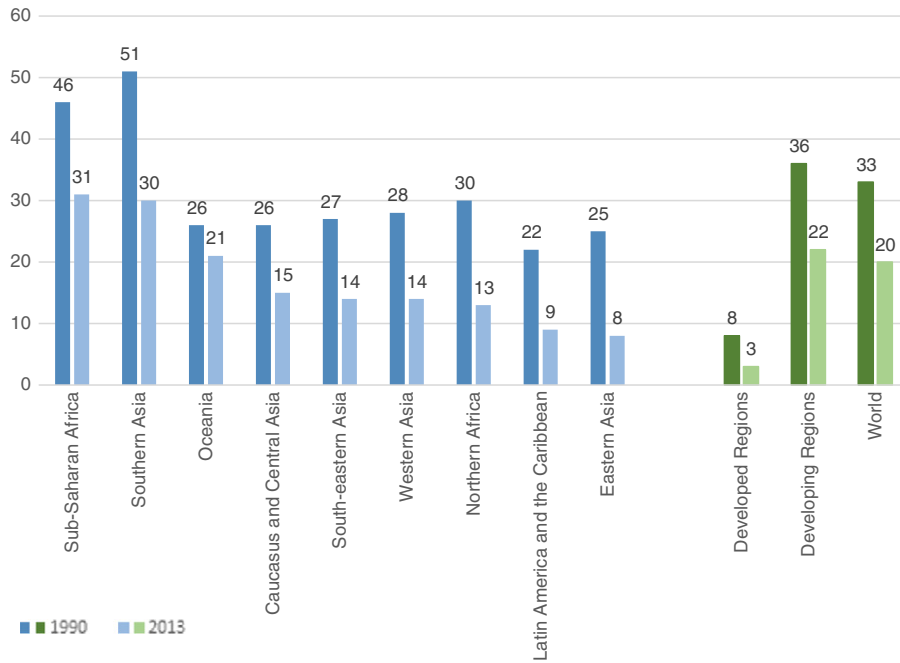
As the Millennium Development Goal (MDG) era ends, the international community applauds the MDG 4 and MDG 5 achievements of reducing maternal and child mortality by 50% since 1990. However, differentials in reduction rates demonstrate that declines in neonatal mortality rates (<28 days) (NMR) have been lagging notably behind those of post-neonates (1–59 months) (Figs. 1 and 2). The rate of death among newborn infants has dropped only 40% from 1990 to 2013, compared with 56% for post-neonatal children (Fig. 2) and 45% for mothers [1]. In the same period, the share of neonatal deaths among under-five deaths increased from 37% to 44%—a trend that is expected to continue as under-five mortality rates (U5MR) continue to decline. Today, approximately 2.8 million children die annually

within the first 28 days of life [2]. Of these, 36% die on first day, 37% within the next six days of life, and 28% between day 7 and day 27 [3]. Even more alarming is that another 2.6 million babies are stillborn every year [4]—a population that has been virtually invisible in the MDG agenda. Stillborn deaths (defined as fetal death at greater than or equal to 1000 g or greater than or equal to 28 weeks of gestation) may be due to similar causes as early neonatal deaths, and each year over one million occur during labor [5]. Maternal and fetal deaths are intrinsically linked; the critical 48-hour window around labor and delivery is when almost half of all stillbirths, maternal, and neonatal deaths occur [5,6], which emphasizes the need for lifesaving integrated intrapartum care for both the mother and child.

The majority of neonatal deaths are from preventable causes such as preterm birth complications (accounting for 36% of neonatal deaths), complications during labor and delivery (23%), and infectious diseases (15% sepsis, 5% pneumonia, 2% tetanus, 1% diarrhea)—trends that are consistent across MDG regions and countries (Fig. 3) [3,7]. Small size at birth—due to preterm birth or small-for-gestational-age (SGA) or both—is the biggest risk factor for more than 80% of neonatal deaths

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**Fig. 1.** Neonatal mortality rate by Millennium Development Goal region, 1990 and 2013 (deaths per 1000 live births). Adapted from: United Nations Inter-agency Group for Child Mortality Estimation [1].

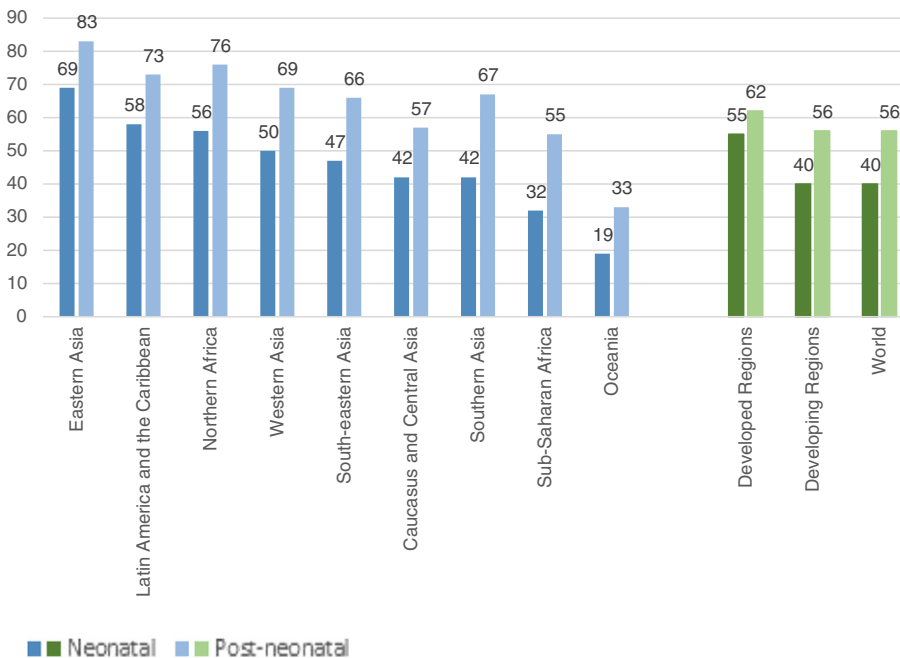
and increases risk of post-neonatal mortality, growth failure, and adult-onset noncommunicable diseases [3]. Additionally, an estimated four million neonates annually have other life-threatening or disabling conditions including intrapartum-related brain injury, severe bacterial infections, or pathological jaundice [3].

Impressive global reductions in preventable mortality among women and children mask wide variations between countries and regions. Sub-Saharan Africa and South Asia account for more than 75% of the annual global newborn death burden, and countries in these regions also tend to have the most births and slowest progress in reducing neonatal mortality (Fig. 2). Nine countries had an NMR greater than

or equal to 40 per 1000 live births in 2013, eight of these were in Sub-Saharan Africa [1]. At the current rate, it will be more than a century before babies born in Africa have the same chance of survival as those born in high-resource nations [3].

## 2. An action plan for ending preventable newborn deaths and stillbirths

In light of the reality of over 15 000 deaths each day, global partners and governments have recently committed toward the unfinished agenda of improving newborn survival, health, and preventing stillbirths. In



**Fig. 2.** Decline in neonatal (age <1 month) and post-neonatal (age 1–59 months) mortality rates, by Millennium Development Goal region, 1990–2013 (percent). Adapted from: United Nations Inter-agency Group for Child Mortality Estimation [1].

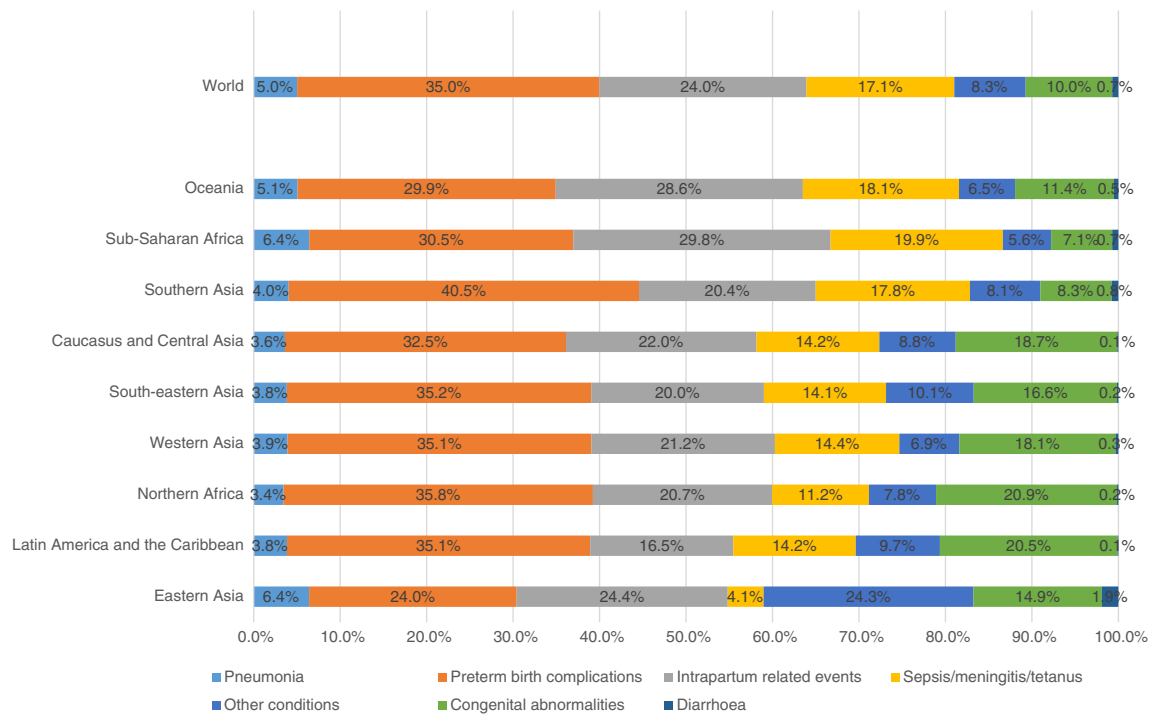


Fig. 3. Neonatal (0–27 days) cause of death by Millennium Development Goal region, 2013 (percent). Source: Liu et al. [7].

accordance with the UN Secretary-Generals' Global Strategy for Women Children's Health [8], the accompanying Every Woman Every Child Initiative, recommendations from the Commission on Information and Accountability for Women's and Children's Health [9] and the United Nations Commission on Life-Saving Commodities for Women and Children [10], an accelerated newborn action plan was conceptualized that would advance existing commitments such as A Promise Renewed (the appeal to end all preventable child deaths) [11] and would work toward universal coverage of maternal, newborn, and child health interventions across the continuum of care.

Based on epidemiology and evidence of effective interventions, the Every Newborn Action Plan (ENAP) was developed with direct inputs from over 43 governments, 23 global organizations, and more than 2000 individuals, and set a framework to end newborn deaths and stillbirths by 2035 [12]. In May 2014, the World Health Assembly formally endorsed ENAP at its 67th sessions in Geneva. The plan ambitiously envisions "a world in which there are no preventable deaths of newborns or stillbirths, where every pregnancy is wanted, every birth is celebrated, and women, babies and children survive, thrive and reach their full potential" [12]. The two main goals call upon all countries to reach an NMR of 10 or less, and a stillbirth rate of 10 or less per 1000 total births, by 2035, with interim goals for 2020, 2025, and 2030. The plan also proposes targets for coverage of essential reproductive, maternal, newborn, and child health (RMNCH) interventions, and includes an impact framework, milestones, and indicators to measure progress. If the plan is effectively implemented and succeeds in scaling up health coverage during the time of birth, it has the potential to prevent the deaths of approximately three million newborns, mothers, and stillbirths annually [12].

To achieve the overarching vision and goals, ENAP has proposed five strategic objectives:

### (1) Strengthen and invest in care during labor, birth, and the first day and week of life

The critical window after 28 weeks of gestation to the first month of birth is particularly amenable to effective interventions that can not

only improve maternal and fetal survival, but can also promote early childhood interaction and development, including newborn cognitive and psychosocial skills. It is during this period that the largest proportion of stillbirths and maternal and newborn deaths occur [5,6], and these along with complications can be avoided with ensuring high-quality essential care to mother and baby.

### (2) Improve the quality of maternal and newborn care

Evidence suggests that the quality of maternal and child care is sub-optimal in many high-burden countries, even among those with access to health facilities and trained health workers. Facilities are often poorly equipped, and/or lack lifesaving commodities for women and newborns (such as those identified by the United Nations lifesaving commodities [10]), comprehensive emergency obstetric care, and appropriate referral services. The standard of education for physicians, nurses, midwives, and other health workers is often low, and staff shortages and low remuneration lead to poor morale and quality of care. Safeguarding high-quality care and making accessible low-cost high-impact essential interventions and services is key to improvement and reducing inequities.

### (3) Reach every woman and newborn to reduce inequities

Inequalities in access to health services and skilled health workers remain one of the tenacious factors behind high maternal and newborn fatality rates in many countries. Fewer than one in six high burden countries currently meet the minimum threshold of 23 doctors, midwives, and nurses per 10 000 population for healthcare provision [13]. Various factors contribute to the disparities including the high direct and indirect costs incurred by patients and families in seeking care, and poor working conditions/incentives for health workers in remote areas. Reducing inequities necessitates investment in all aspects of the health system including the workforce, infrastructure, commodities and supplies, service delivery, health information systems, financing and importantly, good leadership and governance.

#### (4) Harness the power of parents, families, and communities

Parents and families are at the forefront of providing care for the newborn and child, and men (as decision-makers in maternal and newborn care-seeking behavior) can have a particularly important role in improving maternal and child health. In low-income countries, nearly 50% of mothers have no access to skilled attendants at birth, and more than 70% of deliveries that take place outside a health facility receive no newborn or maternal postnatal care [14]. Families and communities must be empowered to be aware of maternal and newborn health issues, adopt a healthy lifestyle, and secure health services when required. Essential actions for this objective include influencing attitudes and behavior using media, mass communication strategies, education of communities regarding home healthcare provision, capacity building of community and health centers to access marginalized areas, developing targeted strategies and plans based on systematic analysis of barriers to maternal and newborn care, and ensuring sustainable demand for healthcare services.

#### (5) Count every newborn: Measurement, program tracking, and accountability

The availability of vital statistics is essential to accountability, planning and evaluation, and to the designing of effective policies and strategies for women and newborns. However, such registries are nonexistent in many countries and existing systems are seriously deficient in many high burden countries [15]. Often systems are only partly active, and/or not all deaths are counted, or global recommendations on who to count are not adhered to. Of the 137 million births in 2012 globally, nearly all neonatal deaths and stillbirths went unregistered [3]. Some essential actions for scale-up include implementing comprehensive birth and death registration systems, certification, appropriate recording of birth outcomes in vital registration databases, monitoring neonatal morbidity outcomes to plan intensive care programs, mobilizing the government and community members to promote public participation in data collection, and collaborating with the private sector to improve the quality of existing vital registration systems.

The aspiring targets as set by the ENAP will necessitate countries to accelerate progress to double or more of current trends, particularly among the high burden nations. Those that have reached their targets should continue to reduce death and disability and close subnational equity gaps to ensure that no-one is left behind [12]. Through the lens of effective country leadership, human rights, equity, integration, accountability, and innovation, these ambitious targets and objectives can be achieved with high-quality and seamless cover of essential interventions across the continuum of care.

### 3. Interventions that work

Averting preventable deaths entails a lifecycle approach to care, which includes scale-up of interventions and spans the preconception, prenatal, intrapartum, and immediate postnatal periods, and links to child health care (Fig. 4). At the periphery of the continuum, the use of preconception interventions such as delaying age at first pregnancy, meeting unmet need for family planning, birth spacing, and enhancement of pregnancy nutrition status have all been related to improved maternal, fetal, and neonatal health outcomes [16]. Bhutta et al. [17] systematically reviewed interventions across the continuum of care and various delivery platforms, and then modelled the effect and cost of scale-up in the 75 high-burden MDG Countdown countries. It was estimated that use of family planning services could reduce child deaths by 47% and stillbirths by 64%. Routine prenatal and postnatal care for women and their newborns including home visits and support for breastfeeding is also important for longer term health and nutrition.

Interventions around the time of birth can prevent more than 1.5 million maternal and newborn deaths and stillbirths by 2025. The most important interventions include skilled care and emergency obstetric care (including the specifics for stillbirths and neonatal mortality reduction such as management of preterm labor care, including prenatal corticosteroids, intrapartum fetal monitoring, etc), immediate care for every newborn including cord care (delayed cord clamping, hygienic care), breastfeeding support, thermal protection for every newborn, and newborn resuscitation if required [17].

Focusing on small or sick newborns could achieve the next highest impact; interventions that reduce infection risk, thermal stress, and delayed/poor nutrition have the potential to prevent almost 600 000 newborn deaths by 2025. Much of this impact is possible in facilities without intensive care, with the most important being care of preterm neonates including Kangaroo mother care as an entry point and adjunct to more comprehensive neonatal care, such as respiratory support, prevention/management of neonatal sepsis, and prevention/management of neonatal jaundice and of neonatal encephalopathy after intrapartum hypoxia [17].

While facility-based care has the highest impact, achieving high and equitable coverage and healthy home behaviors requires community approaches such as women's groups and home visits. In hard to reach contexts, specific curative care such as neonatal sepsis case management remains an important option [17].

#### 4. How many lives can be saved and at what cost?

Meeting Every Newborn targets will necessitate accelerated scale-up of the most effective care targeting major causes of newborn deaths. Closure of the quality gap through the provision of effective care for all women and newborn babies that are already being delivered in facilities could prevent an estimated 113 000 maternal deaths, 531 000 stillbirths, and 1.3 million neonatal deaths annually by 2020 at an estimated running cost of US \$4.5 billion per year (US \$0.9 per person) [17]. Increased coverage of preconception, prenatal, intrapartum, and postnatal interventions by 2025 could avert 71% of neonatal deaths (1.9 million [range 1.6–2.1 million]), 33% of stillbirths (0.82 million [0.60–0.93 million]), and 51% of maternal deaths (0.16 million [0.14–0.17 million]) per year (Fig. 5). These reductions can be achieved at an annual incremental running cost of US \$5.65 billion (US \$1.15 per person), which amounts to US \$1928 for each life saved, when combining stillbirths, neonatal, and maternal deaths. This analysis underlines the importance of counting newborn deaths and stillbirths rather than maternal deaths alone, making the investment in care at birth highly cost-effective. Most (82%) of this effect is attributable to facility-based care which, although more expensive than community-based strategies, improves the likelihood of survival. The analysis also indicates that available interventions can reduce the three most common causes of neonatal mortality—preterm, intrapartum, and infection-related deaths—by 58%, 79%, and 84%, respectively.

The time around labor and birth, plus the first week, is the most critical for maternal and newborn death and stillbirths, and for child disability. Intervening at this time is not only crucial for reducing deaths but also for decreasing the risk of life-long morbidities. Investments to scale-up coverage of care would have a triple return on investment as three million additional lives would be saved each year at an additional nominal cost of US \$1.15 per person [17].

#### 5. The way forward and what healthcare professionals can do together

The ENAP provides an evidence-based roadmap toward care for every woman, and a healthy start for every newborn baby, with a right to be counted, survive, and thrive to their fullest potential. Its implementation will need concerted effort and support by pediatricians



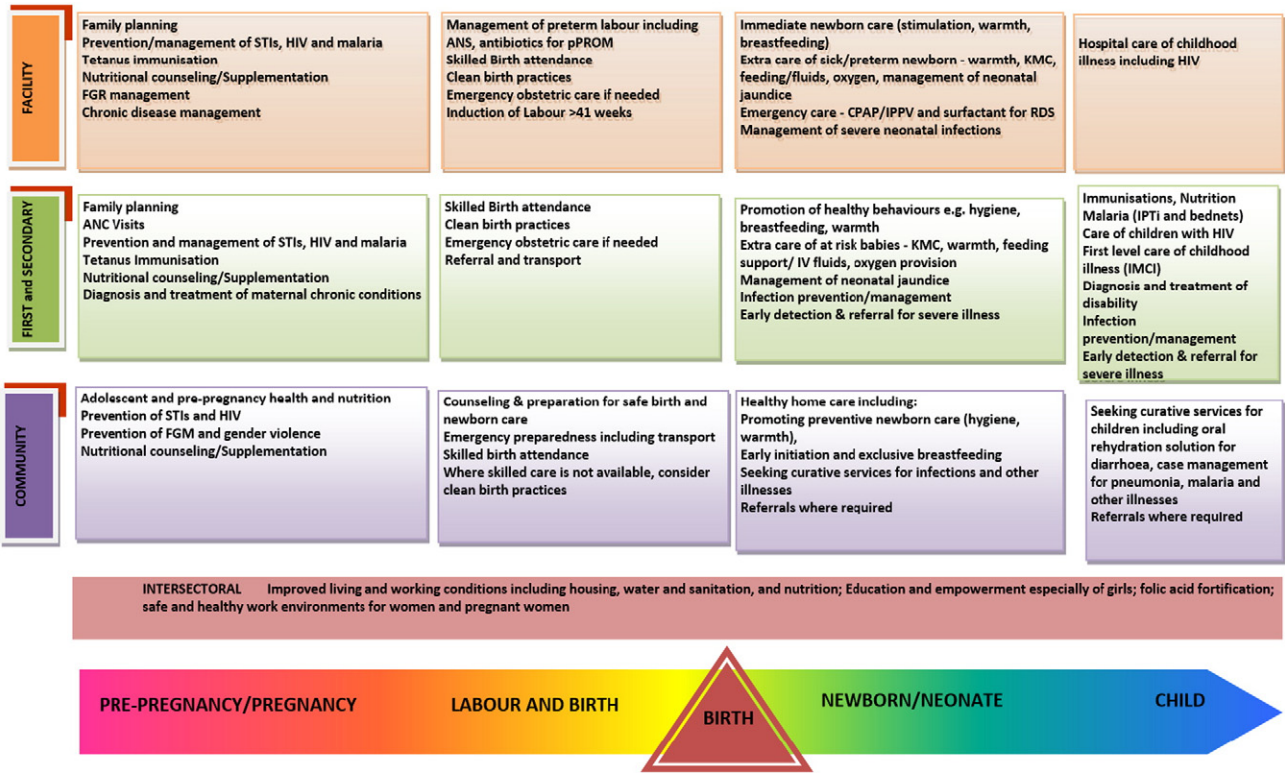


Fig. 4. Intervention packages by level of care. Adapted with permission from Bhutta et al. [17].

worldwide, for which the International Pediatric Association will provide full support.

The implementation of the ENAP will require several important paradigm shifts: (1) intensification of political attention and

leadership; (2) promotion of parent voice, supporting women, families, and communities to speak up for their newborn babies and to challenge social norms that accept these deaths as inevitable; (3) investment for an effect on mortality outcome as well as harmonization of funding;

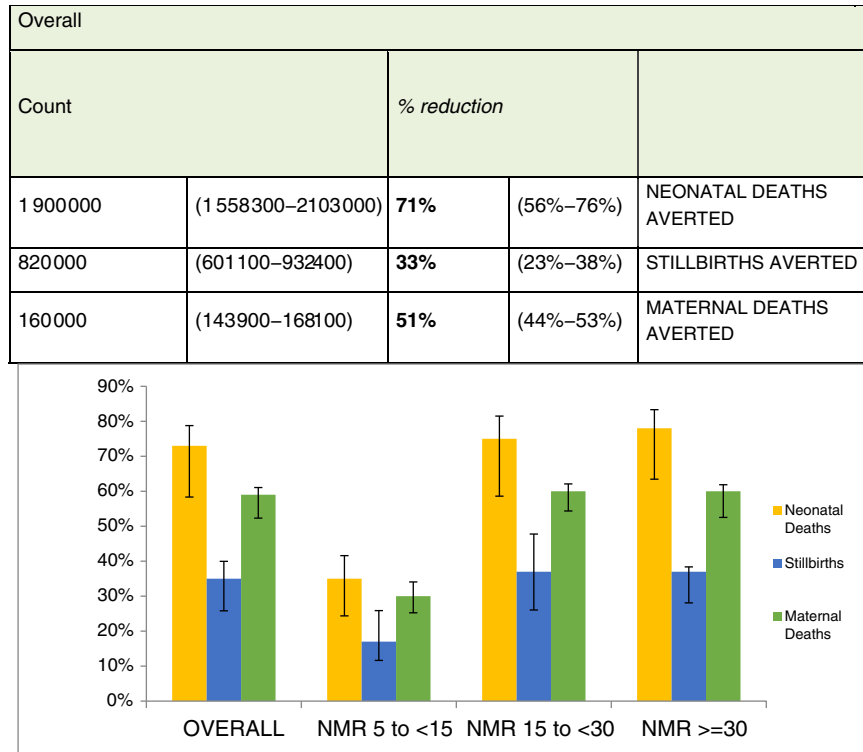


Fig. 5. Effect of scale-up of interventions on averting stillbirths and neonatal and maternal deaths by the year 2025 from base year 2012. Adapted with permission from Bhutta et al. [17].

(4) implementation at scale, with particular attention to increasing health worker numbers and skills with attention to high-quality child-birth care for newborn babies as well as mothers and children; and (5) evaluation, tracking coverage of priority interventions and packages of care with clear accountability to accelerate progress and reach the poorest groups [18,19]. In addition, there is a clear need to improve the quality of care for mothers and newborns in health systems everywhere.

All of these actions need multiple partners. We the leaders of the International Pediatric Association, representing 139 countries and over 100 000 pediatricians worldwide, feel truly invigorated by the opportunity to contribute to this process. At the closing of the MDG period, we believe that newborn survival and health are critical to achieving the aspirations of sustainable development in the post-2015 era. We have a special opportunity of joining hands with our partners, members of the obstetric community represented by FIGO, as well as midwives and nurses represented by the International Confederation of Midwives and the Council of International Neonatal Nurses, respectively. The task will not be easy and we will face constraints, both in terms of human capacity and material resources. However, together with healthcare workers in every country, we have the opportunity to complete the unfinished agenda of the MDGs and give every newborn a healthy start.

### Acknowledgments

We would like to acknowledge the Every Newborn Lancet series executive summary authors from which this review has been largely adapted.

### Conflict of interest

The authors confirm that they have no conflicts of interest.

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