PRETERM BIRTH MATTERS

PHOTO: © March of Dimes
Chapter 1
Preterm birth matters
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The numbers

More than 1 in 10 of the world’s babies born in 2010 were born prematurely, making an estimated 15 million preterm births (defined as before 37 weeks of gestation), of which more than 1 million died as a result of their prematurity (Chapter 2) (Blencowe et al., 2012). Prematurity is now the second-leading cause of death in children under 5 years and the single most important cause of death in the critical first month of life (Liu et al., 2012). For the babies who survive, many face a lifetime of significant disability. Given its frequent occurrence, it is likely that most people will experience the challenge, and possible tragedy, of preterm birth at some point in their lives, either directly in their families or indirectly through friends.

Prematurity is an important public health priority in high-income countries.1 However, lack of data on preterm birth at the country level has hampered action in low- and middle-income countries. Born Too Soon presents the first published country-level estimates on preterm birth. These estimates show that prematurity is rising in most countries where data are available (Blencowe et al., 2012). The reasons for the rise in prematurity, especially in the later weeks of pregnancy, are varied and are discussed in later chapters of the report.

The implications of being born too soon extend beyond the neonatal period and throughout the life cycle. Babies who are born before they are physically ready to face the world often require special care and face greater risks of serious health problems, including cerebral palsy, intellectual impairment, chronic lung disease, and vision and hearing loss. This added dimension of lifelong disability exacts a high toll on individuals born preterm, their families and the communities in which they live (Institute of Medicine, 2007).

The global rise in non-communicable diseases (NCDs) such as diabetes and hypertension and their association with an elevated risk of preterm birth also demand increased attention to maternal health, including the antenatal diagnosis and management of NCDs and other conditions known to increase the risk of preterm birth (Chapter 4). Premature babies, in turn, are at greater risk of developing NCDs, like hypertension and diabetes, and other significant health conditions later in life, creating an intergenerational cycle of risk (Hovi et al., 2007). The link between prematurity and an increased risk of NCDs takes on an added public health importance when considering the reported increases in the rates of both worldwide. Currently, 9 million people under the age of 60 years die from NCDs per year, accounting for more than 63% of all deaths, with the greatest burden in Africa and other low-income regions (United Nations General Assembly, 2011).

The Millennium Development Goals and beyond

The substantial decline in high-income countries in maternal, newborn and child deaths in the early and middle 20th century was a public health triumph. Much of this decline was due to improvements in socioeconomic, sanitation and educational conditions and in population health, most notably a reduction in malnutrition and infectious diseases (Howson, 2000; World Bank, 1993). These advances in public health also resulted from strengthened political will prompted by public pressure, often by health professionals, who demanded attention to and investment in the necessary sanitary measures, drugs and technologies that were responsible for the decline in maternal and child mortality in industrialized countries in the 20th century (de Brouwere et al., 1998). Many low- and middle-income countries are now experiencing a similar “health transition,” defined as an “encompassing relationship among demographic, epidemiologic and health changes that collectively and independently have an impact on the health of a population, the financing of health care and the development of health systems” (Mosley et al., 1993).

1. This report uses the World Bank classification of national economies on the basis of gross national income (GNI) per head. Using 2010 GNI figures, the World Bank describes countries as low-income (<$1,005), lower middle-income ($1,006 to $3,975), upper middle-income ($3,976 to 12,275), or high-income (>$12,276) (World Bank, 2012). Low- and middle-income countries are sometimes referred to as developing and high-income economies as industrialized. Although convenient, these terms should not imply that all developing countries are experiencing similar development or that all industrialized countries have reached a preferred or final stage of development (World Bank, 2012).
Recent acceleration in mortality reduction for mothers and for children aged between 1 and 59 months has been driven, in part, by the establishment of the Millennium Development Goal (MDG) framework (UNICEF, 2011; WHO, 2010). Established by 189 member states in 2000 with a target date of 2015 (United Nations General Assembly, 2000), the eight interlinking global goals provide benchmarks by which to measure success (UN, 2011). As such, they have mobilized common action to accelerate progress for the world’s poorest families. These goals put reproductive, maternal, newborn and child health (RMNCH) on the global stage by raising their visibility politically and socially and helped unite the development community in a common framework for action. The need to monitor progress has also led to improved and more frequent use of health metrics and to collaboration and consensus on how to strengthen primary health care systems from community-based interventions to the first referral-level facility at which emergency obstetric care is available (Walley et al., 2008).

MDG 4 calls for a reduction in the under-5 mortality rate by two-thirds between 1990 and 2015 and MDG 5 for a reduction in the maternal mortality ratio by three-quarters during the same period. Even with the visibility and increased progress that MDGs 4 and 5 have brought to maternal and child survival, the rate of decline for mortality reductions remains insufficient to reach the set targets, particularly in sub-Saharan Africa and South Asia (Figure 1.1). For example, only 35 developing countries are currently on track to achieve the MDG 4 target in 2015 (UNICEF, 2011). One important barrier to progress on MDG 4 has been the failure to reduce neonatal deaths and deaths from its single most important cause, prematurity (Lawn et al., 2009). Child survival programs have primarily focused on important causes of death after the first 4 weeks of life such as pneumonia, diarrhea, malaria and vaccine-preventable conditions (Martines et al., 2005), resulting in a decline in under-5 mortality rates. While important, the concomitant lack of attention to important

![Figure 1.1: MDG 4 Progress](image)

![Figure 1.2: How the Millennium Development Goals Link to Prevention and Care of Preterm Births](image)

Note: With thanks to Boston Consulting Group for assistance on this figure.
causes of neonatal mortality like preterm birth (the single largest cause of neonatal mortality, contributing to 35% of neonatal deaths) has resulted in neonatal deaths becoming an increasing proportion of under-5 deaths (from 37% in 1990 to 40% in 2010), and demonstrating a slower rate of decline than that for under-5 deaths (Figure 1.1) (Lawn et al., 2012; Oestergaard et al., 2011). The actions in this report, if implemented quickly, will accelerate the reduction of neonatal deaths. In addition, they will benefit women directly by helping their babies survive, but also indirectly since the solutions for newborns, and especially preterm newborns, are intimately linked to maternal health and care.

The actions outlined in this report are importantly linked to all eight MDGs (Figure 1.2). This underlines a key theme of the report, namely, that to be effective, the proposed actions cannot exist in isolation by creating a new program of “prematurity care and prevention.” Rather, they will require the engagement of organizations and expertise, not only from across the RMNCH spectrum, but also from

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**Box 1.1: Myths and Misconceptions**

**Myth 1:** Preterm birth is not a significant public health problem in low- and middle-income countries.

**Fact.** Until recently, higher-level health policy-makers in many low- and middle-income countries have not prioritized preterm birth as a health problem partly despite mortality data being available since 2005. One challenge has been the lack of data showing the national toll of prematurity and associated disabilities. It was not until 2009 that the first global and regional rates of preterm birth were published by the World Health Organization (WHO) and the March of Dimes (March of Dimes, 2009; Beck et al., 2010). New estimates presented in this report show that the global total of preterm birth is even higher than reported in 2009.

**Myth 2:** Effective care of the high-risk mother and premature newborn requires the same costly, high-technology interventions that are common in high-income countries, but is beyond the national health budgets of low- and middle-income countries.

**Fact.** As Chapter 5 demonstrates, there exists a range of low-cost interventions such as Kangaroo Mother Care and antenatal corticosteroids that, if fully implemented, could immediately and substantially reduce prematurity-related death and disability in high-burden countries. High-income countries such as the United States and the United Kingdom experienced significant reductions in neonatal mortality before the introduction of neonatal intensive care units, through a combination of public health campaigns, dissemination of antimicrobials, and basic thermal care and respiratory support. In low-resource settings, therefore, immediate and significant progress can be made in preventing deaths related to complications from preterm birth with similar cost-effective interventions and improved public health services.

**Myth 3:** The solutions to prevent preterm birth are known; all that is needed is the scale up of these solutions to reach all mothers.

**Fact.** Very little is known about the causes and mechanisms of preterm birth, and without this knowledge, preterm birth will continue. Before pregnancy, some solutions are known to prevent preterm birth such as family planning, especially for girls in regions with high rates of adolescent pregnancy; yet there are few other effective prevention strategies available for clinicians, policy-makers and program managers (Chapter 3). Once a woman is pregnant, most of the interventions to prevent preterm birth only delay onset, turning an early preterm birth into a late preterm birth. Much more knowledge is needed to address the solution and reach a point where preterm birth is prevented.

**Myth 4:** Programs’ attention to care and, where possible, prevention of prematurity will draw funding away from other high-priority RMNCH interventions.

**Fact.** The actions outlined in Chapter 6 are both feasible and affordable in financially constrained environments and have a cascade of beneficial effects on the health of women, mothers and newborns, in addition to reducing the rate of preterm birth and the mortality and disability associated with prematurity.
non-health sectors such as education. In addition, they must be firmly embedded in existing frameworks for action and accountability, most notably the United Nations’ Every Woman, Every Child (see below). Such engagement, in turn, will serve to accelerate progress towards all eight MDGs and have an effect beyond improving maternal, newborn and child survival.

Recognition of preterm birth as a public health problem
Preterm births have been accorded a high public health priority in high-income countries due, in part, to champions among medical professionals and the power of affected parents. In high-income countries, improved care of the premature baby led to the development of neonatology as a discrete medical sub-specialty and the establishment of neonatal intensive care units (Chapter 5). The high prevalence and costs of prematurity have captured the attention of policy-makers and have demanded attention in many high-income countries. In the United States, for example, nearly 12 out of every 100 babies born in 2010 were premature, and this rate has increased by 30% since 1981 (NCHS, 2011). In addition, the annual societal economic cost in 2005 (medical, educational and lost productivity combined) associated with preterm birth in the United States was at least $26.2 billion. During that same year, the average first-year medical costs, including both inpatient and outpatient care, were about 10 times greater for preterm ($32,325) than for term infants ($3,325). The average length of stay was nine times as long for a preterm newborn (13 days), compared with a baby born at term (1.5 days) (Institute of Medicine, 2007). While health plans paid the majority of total allowed costs, out-of-pocket expenses were substantial and significantly higher for premature and low-birthweight newborns, compared with newborns with uncomplicated births (March of Dimes, 2012).

In low- and middle-income countries, there are common myths and misconceptions that have restricted attention and the implementation of interventions to prevent preterm birth and improve the survival and outcome of premature babies (Box 1.1).

Context for this report
With the establishment of the MDGs and recent global efforts such as Every Woman, Every Child launched by UN Secretary General Ban Ki-moon in support of the Global Strategy for Women’s and Children’s Health, there is growing urgency worldwide to improve health across the RMNCH continuum of care (Box 1.2). There also is a growing consensus on what needs to be done, as evidenced by the report on essential packages of interventions for preconception and antenatal and postnatal care (PMNCH, 2011). Over the past decade, the problem of newborn survival has also begun to receive greater attention globally in an increased volume of publications and meetings, with a major step forward being the 2005 The Lancet Neonatal Survival Series, which presented the first national estimates of the cause of 4 million neonatal deaths and also highlighted the importance of preterm birth (Lawn et al., 2005). However, despite the large burden, the availability of cost-effective

Box 1.2: Every Woman, Every Child
Launched by UN Secretary-General Ban Ki-moon during the United Nations Millennium Development Goals Summit in September 2010, Every Woman Every Child aims to save the lives of 16 million women and children by 2015. It is an unprecedented global movement that mobilizes and intensifies international and national action by governments, multilaterals, the private sector and civil society to address the major health challenges facing women and children around the world. The effort puts into action the UN Secretary-General’s Global Strategy for Women’s and Children’s Health, which presents a roadmap on how to enhance financing, strengthen policy and improve service on the ground for the most vulnerable women and children.

The Every Woman, Every Child strategy has mobilized over 200 commitments from national governments, non-governmental organizations (NGOs) and the private sector. The establishment of the Commission on Information and Accountability for Women’s and Children’s Health has led to a proposed transparent method for tracking these commitments, and will also track the commitments made for preterm birth. In addition, the Commission on Life-saving Commodities includes several high-impact medicines and technology to reduce the burden of preterm birth (see Chapter 6).
solutions and some increase in program funding, a recent global analysis suggests that newborn survival will remain vulnerable on the global agenda without the high-level engagement of policy-makers and adequate funding and without specific attention to the problem of preterm birth (Shiffman, 2010).

Global attention to preterm birth has recently increased. Global and regional estimates of preterm birth were released by the WHO Department of Reproductive Health Research (RHR) in 2008 (Beck et al., 2010) and presented in the 2009 March of Dimes White Paper on Preterm Birth (March of Dimes, 2009). These estimates suggested approximately 13 million preterm births in 2005. Media coverage reached more than 600 million people and triggered a commentary in The Lancet calling for increased international attention to the problem of preterm birth (“The global burden of preterm birth,” 2009). Other key events were the establishment in 2004 of the International Preterm Birth Collaborative (PREBIC, 2010), The Lancet Series on preterm birth in 2008 (Goldenberg et al., 2008), and the launch of the Global Alliance to Prevent Prematurity and Stillbirth (GAPPS) in 2009 (Lawn et al., 2010).

With leadership from global experts and big organizations, Born Too Soon: The Global Action Report on Preterm Birth was needed to document the severe toll of preterm birth for each country as well as identify the next steps that stakeholders — including policy-makers, professional organizations, the donor community, NGOs, parent groups, researchers and the media — could take to accelerate international efforts to reduce this toll. The report benefited from a broad coalition of organizations and individuals that contributed importantly to the review and the strengthening of the report’s findings and actions.

**The continuum of care for mothers, newborns and children**

The report has been structured to reflect the continuum of care, a core organizing principle for health systems, which emphasizes the delivery of health care packages across time and through service delivery levels. An effective continuum of care addresses the health needs of the adolescent or woman before, during and after her pregnancy, as well as the care of the newborn and child throughout the life cycle, wherever care is provided (Kerber et al., 2007). Figure 1.3 shows the continuum of care by time of caregiving, throughout the life cycle, from adolescence into pregnancy and birth and then through the neonatal and post-neonatal periods and childhood; and place of caregiving, that is, households, communities and health facilities (Kerber et al., 2007). Providing RMNCH services through the continuum of care approach has proven cost-effective, and there is evidence that this finding holds for the prevention and treatment of prematurity as well (Adam et al., 2005; Atrash et al., 2006; de Graft-Johnson et al., 2006; Kerber et al., 2007; Sepulveda et al., 2006).
The report chapters are presented in order of time of caregiving (preconception, Chapter 3, during pregnancy and birth, Chapter 4, and in the postnatal period for the preterm baby, Chapter 5). In each chapter the place of caregiving — at home, at the primary care level and in district and regional hospitals — is discussed.

**The promise of change**

While the causes and multiple events during pregnancy that result in a preterm birth remain a subject of increasingly vigorous research, there are available interventions which, if scaled up and delivered through integrated packages across the RMNCH continuum of care, would contribute to a modest reduction in preterm birth rates but would have a major impact on reducing mortality and disability in premature babies, helping women and their vulnerable babies to survive and thrive.

The report offers hope in its review of the evidence for these interventions and robust actions deriving from these that key actors can take, individually and together, to ensure delivery of the best possible care to all women before and during pregnancy, at birth and to all preterm babies and their mothers and families, wherever they live. In addition, it points to areas of research that require increased attention, funding and collaboration among partners in the governmental and nongovernmental, including the private, sectors.

Finally and importantly, the report offers promise by presenting actions that require mobilization across all constituencies (see Chapter 6). Indeed, it is the many partners identified on the cover of this report with their diversity of expertise, experience and affiliation who represent the core strength of this report. Their contributions and the commitments captured here for each of the constituencies identified in the Every Woman, Every Child framework for accountability will help ensure that the report’s actions are acted upon quickly and sustained over the long term.
My wife, Chris, was 24 weeks pregnant with our second child. She was getting ready to go to her office in Mount Kisco, NY, one morning, when she noticed a blood spot. We called the doctor, thinking she would reassure us that it was “no big deal.” To our surprise, she urged us to come straight to the hospital where a quick exam confirmed that premature labor had begun. My wife was told that she might have the baby that day. If not, she’d be in the hospital for the rest of the pregnancy. We were stunned: it was November 16, and the baby wasn’t due until Valentine’s Day.

An ambulance took Chris to Westchester Medical Center for delivery. This center had a Level 3 Neonatal Intensive Care Unit with highly-trained staff and the best facilities medical science has to offer, and it was considered the best place to deliver a high-risk baby. A few hours later, our daughter, Mallory was born, very tiny in her incubator, but very much alive. Doctors said she had about a 25% chance of survival. Over the next 16 days, she overcame many obstacles. My wife began pumping breast milk for the baby, and our hopes grew of having a daughter, as well as a sister for our five-year-old son, Sam.

One day later, our dreams dissolved. Mallory developed necrotizing enterocolitis, an intestinal infection, and we were called urgently to the hospital. When we got there, the doctors told us that there was nothing further they could do. This incredible medical team that had done so much to help our daughter survive her first 16 days was at a standstill. We held our daughter in our arms for a few more hours until her little heart stopped beating. Then we shed our tears, said goodbye and went home to tell our little boy he wouldn’t have a sister.

On the way home in the car, we felt that we wanted to fight back somehow, so that other parents wouldn’t have to go through the incredibly painful experience of losing a baby. We asked friends and family to donate in Mallory’s name to organizations fighting for the prevention of preterm birth and were astounded by their generosity and outpouring of support. As we learned more about prematurity and how common it is, we realized that preterm birth is an event that touches most families at some point in time, either directly, as we experienced, or indirectly through the experiences of extended family or friends. And we realized that living in the richest country in the world with the best medical care offers no protection against losing a child.

Chris and I feel this report is a milestone for all families and families-to-be worldwide, whether we live in the North or South, in an industrialized or developing country. We hope that the report will elevate prematurity on the world health agenda as this is desperately needed. Most importantly, we hope that it will offer a critical next step in the building of a dialogue that improves understanding of prematurity and its causes, leads to change and saves lives.
15 MILLION PRETERM BIRTHS