



Joy E. Lawn is the director of the Maternal Adolescent Reproductive and Child Health (MARCH) Centre, London School of Hygiene and Tropical Medicine, London WC1E 7HT, UK, and is a senior advisor to Save the Children. E-mail: joy.lawn@lshtm.ac.uk



Mary Kinney is a data and communication specialist for Saving Newborn Lives, a project of Save the Children, Milnerton, South Africa 7441.

Citation:

J. E. Lawn, M. Kinney, Preterm birth: Now the leading cause of child death worldwide. *Sci. Transl. Med.* **6**, 263ed21 (2014).

10.1126/scitranslmed.aaa2563

PRETERM BIRTH

Preterm Birth: Now the Leading Cause of Child Death Worldwide

FOR THE FIRST TIME IN HISTORY, THE WORLD'S NUMBER ONE KILLER OF YOUNG CHILDREN is not an infectious disease but rather is preterm birth. Each year, 1.09 million children under 5 years of age die from direct complications of being born before 37 completed weeks of pregnancy. This means that there are 3000 child deaths each day from causes that include respiratory complications due to lung immaturity, lack of warmth, or lack of feeding support (1). Although infectious diseases remain an unfinished agenda, particularly in Africa, 44% of child deaths worldwide are now in the neonatal period (first 28 days after birth), with more deaths and disability proportionally occurring in the first month. The average child death is moving closer to the time of birth, with 1 million children dying each year during their first day of life (www.thelancet.com/series/everynewborn).

A new analysis of the causes of child mortality from 2000 to 2013 across 194 countries—undertaken by the World Health Organization (WHO), Johns Hopkins Bloomberg School of Public Health, and the London School of Hygiene and Tropical Medicine—reveals that direct complications from preterm birth account for a global total of 965,000 deaths during the neonatal period and an additional 125,000 deaths between the ages of 1 month and 5 years (1). Other major causes of death for children under 5 include pneumonia (938,000 deaths) and intrapartum-related or child-birth complications (720,000 deaths). The shift in epidemiology from childhood deaths due to infections to those with neonatal causes, especially preterm birth, must lead to a new focus in attention and investment on prematurity. World Prematurity Day, held each year on 17 November, focuses direct attention on these disturbing numbers and promotes strategies to prevent preterm birth and to improve care for premature babies.

The highest rates of preterm mortality are in West Africa at ~16 per 1000 live births, particularly in the countries currently being decimated by Ebola, notably Sierra Leone and Liberia, where risks for preterm babies will now be even higher (www.thelancet.com/series/everynewborn). The 10 countries in 2013 with the highest numbers of babies dying from preterm birth complications include India (361,600), Nigeria (98,300), Pakistan (75,000), Democratic Republic of the Congo (40,600), China (37,200), Bangladesh (26,100), Indonesia (25,800), Ethiopia (24,400), Angola (15,900) and Kenya (13,300).

The 10 countries with the highest proportion of under-5 deaths directly resulting from preterm birth are: Macedonia, 51% (ranking 162nd out of 162); Slovenia, 48%; Denmark, 43%; Serbia, 40%; the United Kingdom, 39%; Hungary, 37%; Slovakia and Poland, 35%; and Republic of Korea and Switzerland, 33%. These countries have child mortality about 10-fold lower than West Africa, with success in reducing causes such as infectious diseases, but must now focus efforts on reducing preterm birth and improving care for premature children. In the United States, 28% of under-5 deaths are from direct complications of preterm birth (ranking 141st out of 162), translating to 8100 child deaths each year. However, the United States has the sixth highest number of preterm babies (more than 450,000 born each year),



Fig. 1. Shedding purple light on preterm birth. National monuments around the world are illuminated in purple light in recognition of World Prematurity Day. [The Empire State Building image is a registered trademark of ESRT Empire State Building, L.L.C. (New York City), and is used with permission by March of Dimes Foundation to honor World Prematurity day.]

demonstrating good success in saving lives through care of babies born preterm but limited success so far in preventing preterm births.

Deaths from preterm birth complications are now more obvious even in low- and middle-income countries because of remarkable progress in addressing child mortality globally. Deaths of children under 5 worldwide have declined dramatically from 76 deaths per 1000 live births in 2000 to 46 deaths per 1000 live births in 2013, an overall annual reduction of 3.9% (2). Investment during this period increased due to the United Nations (UN) Millennium Development Goals. Almost half of this reduction is a result of the massive progress made against deaths from infections in young children (aged 1 to 59 months), with annual reduction rates as follows: measles (13%), AIDS/HIV (6%), diarrhea (6%), pneumonia (5%), and malaria (4.5%). In contrast, under-5 child deaths from preterm birth complications have been reduced by only 2% annually (1).

Major investments to tackle childhood illnesses through, for example, vaccines, bed nets for malaria, antibiotics, and antimalarial and HIV treatments have advanced a revolution in child survival but have had only a small impact on newborn health, particularly for premature babies (www.thelancet.com/series/everynewborn). Compounding the problem, the global annual preterm birth rate—currently, more than 1 in 10 babies, or 15.1 million babies

who are born too soon—has continued to increase (3). In high-income countries, half of this increase in preterm births can be explained through older maternal age, assisted reproductive technologies, non-indicated Cesarean sections, and increased maternal risk factors, such as hypertension and obesity. However, much remains poorly understood, and the risk factors in low-income settings are totally different (for example, infections during pregnancy, including malaria, and a heavy workload in the fields for pregnant women).

These data mark a transition in child survival. The ongoing fight against infectious diseases demonstrates that we can be successful if we start to invest in prevention and care for preterm birth. Different medical and public health approaches are needed, including an emphasis on family planning and prevention of maternal infections.

Improved newborn care, even without neonatal intensive care facilities—most notably through breastfeeding, providing warmth, and preventing and treating infections—would avert more than two-thirds of all deaths from preterm birth complications worldwide. Kangaroo Mother Care, a technique where the baby is held skin-to-skin on the mother's chest, is a feasible and cost-effective way to prevent hundreds of thousands of preterm newborn deaths. Given that more than half of the world's births are now in middle-income countries, and the proportion of births in facilities is increasing, the use of technologies such as simplified devices for Continuous Positive Airways Pressure (CPAP) ventilation is becoming more feasible on a wide scale. The Born Too Soon report and supplement clearly outlines the approaches required and how to integrate these into varying health care contexts (4).

Given that preterm birth affects rich and poor families alike everywhere, World Prematurity Day is gathering traction with each subsequent year. In 2013, World Prematurity Day reached 1.4 billion people via radio, TV, print, Internet, and social media, with events in more than 60 countries including illumination of national monuments around the world with purple light (Figs. 1 and 2). 2014 has been a pivotal year for the world's newborns, with the launch of the Every Newborn action plan (www.everynewborn.org), co-led by the WHO and UNICEF and supported by more than 60 partner organizations. The Every Newborn action plan provides a roadmap for change and an action platform focusing on care at the time of birth for small and sick newborns. Following endorsement at the World Health Assembly in May 2014, there has been ongoing momentum in high-burden countries, with



Fig. 2. The color purple. The Bosphorus Bridge in Istanbul, Turkey, is illuminated in purple light to honor World Prematurity Day.

Ghana, Indonesia, India, and Pakistan, among others, already launching newborn action plans tailored to national needs and resources. More than 40 commitments to the Every Woman, Every Child initiative, launched 4 years ago by the UN Secretary General to rapidly advance UN Millennium Development Goals 4 and 5, have been declared by a broad range of donors and partners, including the Islamic Development Bank, Johnson & Johnson, and Phillips along with five new government commitments. Specific maternal and newborn mortality and stillbirth targets, together with improved metrics and accountability linked to the post-2015 UN goals, will also be critical. This year, more than 200 countries, nongovernment organizations, UN agencies, and medical and health organizations are expected to participate in World Prematurity Day.

Prematurity is gradually moving up the global agenda. For example, the U.S. Agency for International Development announced a 5-year, \$9 million program called Every Preemie-SCALE, to expand evidence-based, underutilized interventions for care of preterm babies in 24 priority African and Asian countries. A number of donors are investing in research consortia to better understand and prevent preterm birth, with more than 200 researchers involved and a total of more than \$250 million committed, including through The Global Coalition to Advance Preterm Birth Research, the March of Dimes Campaign to End Premature Birth, University of California at San Francisco's (UCSF) Preterm Birth Initiative (PTBi), and research led by the Global Alliance to Prevent Prematurity and Stillbirth. However, much of this research is focused on discovery science about prevention and delay of preterm births and may not address risks and solutions for low-income settings (5).

On World Prematurity Day 2014, we call upon academics, agencies, governments, and parents to act on these data, recognize the world's new leading cause of child death, and ensure that science is translated into action for the world's smallest and most vulnerable humans.

– Joy E. Lawn and Mary Kinney

1. Liu, S. Oza, D. Hogan, J. Perin, I. Rudan, J. E. Lawn, S. Cousens, C. Mathers, R. E. Black, Global, regional, and national causes of child mortality in 2000–13, with projections to inform post-2015 priorities: An updated systematic analysis. *Lancet* 10.1016/S0140-6736(14)61698-6 (2014).
2. UN Inter-agency Group for Child Mortality Estimation (IGME), Levels and trends in child mortality: Report 2014 (UNICEF, New York, USA, 2014).
3. H. Blencowe, S. Cousens, M. Z. Oestergaard, D. Chou, A. B. Moller, R. Narwal, A. Adler, C. Vera Garcia, S. Rohde, L. Say, J. E. Lawn, National, regional, and worldwide estimates of preterm birth rates in the year 2010 with time trends since 1990 for selected countries: A systematic analysis and implications. *Lancet* **379**, 2162–2172 (2012).
4. J. E. Lawn, M. V. Kinney, J. M. Belizan, E. M. Mason, L. McDougall, J. Larson, E. Lackritz, I. K. Friberg, C. P. Howson, Born Too Soon Preterm Birth Action Group, Born too soon: Accelerating actions for prevention and care of 15 million newborns born too soon. *Reprod. Health* **10** (suppl. 1), S6 (2013).
5. E. M. Lackritz, C. B. Wilson, A. E. Guttmacher, J. L. Howse, C. M. Engmann, C. E. Rubens, E. M. Mason, L. J. Muglia, M. G. Gravett, R. L. Goldenberg, J. C. Murray, C. Y. Spong, J. L. Simpson, Preterm Birth Research Priority Setting Group, A solution pathway for preterm birth: Accelerating a priority research agenda. *The Lancet Global Health* **1**, e328–e330 (2013).

Science Translational Medicine

Preterm Birth: Now the Leading Cause of Child Death Worldwide

Joy E. Lawn and Mary Kinney

Sci Transl Med **6**, 263ed21263ed21.
DOI: 10.1126/scitranslmed.aaa2563

ARTICLE TOOLS	http://stm.sciencemag.org/content/6/263/263ed21
RELATED CONTENT	http://stm.sciencemag.org/content/scitransmed/7/319/319fs51.full http://stm.sciencemag.org/content/scitransmed/7/319/319ra204.full http://stm.sciencemag.org/content/scitransmed/8/364/364ra154.full http://stke.sciencemag.org/content/sigtrans/8/400/fs19.full http://stke.sciencemag.org/content/sigtrans/8/391/ra85.full http://stke.sciencemag.org/content/sigtrans/8/391/pc21.full
REFERENCES	This article cites 4 articles, 0 of which you can access for free http://stm.sciencemag.org/content/6/263/263ed21#BIBL
PERMISSIONS	http://www.sciencemag.org/help/reprints-and-permissions

Use of this article is subject to the [Terms of Service](#)

Science Translational Medicine (ISSN 1946-6242) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. The title *Science Translational Medicine* is a registered trademark of AAAS.

Copyright © 2014, American Association for the Advancement of Science