

- 3 Office of the United Nations High Commissioner for Human Rights. The Universal Declaration of Human Rights, 1948, Article 25. Geneva: United Nations, 1997.
- 4 Office of the United Nations High Commissioner for Human Rights. Convention on the rights of the child: General Assembly resolution 44/25. Article 24, Nov 20, 1989: <http://www.unhcr.ch/html/menu3/b/k2crc.htm> (accessed Jan 25, 2005).
- 5 Knippenberg R, Lawn JE, Darmstadt GL, et al. Systematic scaling up of neonatal care in countries. *Lancet* 2005: <http://image.thelancet.com/extras/1164web.pdf>
- 6 AbouZhar C, Wardlaw T. Maternal mortality in 2000: estimates developed by WHO, UNICEF and UNFPA. 1–39. Geneva: WHO, 2003: http://www.who.int/reproductive-health/publications/maternal_mortality_2000/mme.pdf (accessed on Jan 31, 2005).
- 7 UNICEF. The state of the world's children, 2004: girls, education and development. New York: UNICEF, 2004: http://www.unicef.org/sowc04/sowc04_contents.html (accessed on Jan 25, 2005).
- 8 Lawn JE, Cousens S, Zupan J, for the *Lancet* Neonatal Survival Steering Group. 4 million neonatal deaths: When? Where? Why? *Lancet* 2005: <http://image.thelancet.com/extras/1073web.pdf>
- 9 Zupan J, Aahman E. Perinatal mortality for the year 2000: estimates developed by WHO. Geneva: WHO, 2005.
- 10 Save the Children. State of the world's newborns. Washington, DC: Save the Children. 2000: http://www.savethechildren.org/publications/newborns_report.pdf (accessed on Jan 25, 2005).
- 11 Gwatkin D, Bhuiya A, Victora C. Making health systems more equitable. *Lancet* 2004; **364**: 1273–80.
- 12 Rosenfield A, Maine D. Maternal mortality—a neglected tragedy. Where is the M in MCH? *Lancet* 1985; **2**: 83–85.
- 13 Inter-Agency Group for Safe Motherhood. The safe motherhood action agenda: priorities for the next decade; report on the safe motherhood technical consultation, 18–23 October 1997. Colombo, Sri Lanka, and New York: Family Care International, 1997: http://www.safemotherhood.org/resources/pdf/e_action_agenda.PDF (accessed Feb 1, 2005).
- 14 Tinker A, Ransom, E. Healthy mothers and healthy newborns: the vital link. Washington, DC: Population Reference Bureau and Save the Children, 2002: http://www.prb.org/pdf/HealthyMothers_Eng.pdf (accessed on Jan 25, 2005).
- 15 Bellagio Study Group on Child Survival. Knowledge into action for child survival. *Lancet* 2003; **362**: 323–27.
- 16 Healthy Newborn Partnership. HNP annual meeting, Ethiopia—Addis Ababa declaration for global newborn health. Washington, DC: Save the Children, April 12, 2004: <http://www.healthynewborns.com/content/article/detail/537> (accessed on Jan 25, 2005).
- 17 World Health Organization. Making pregnancy safer: the critical role of the skilled attendant. A joint statement by WHO, ICM and FIGO. Geneva: WHO, 2004: http://www.who.int/reproductive-health/publications/2004/skilled_attendant.pdf (accessed on Jan 25, 2005).
- 18 Martines J, Paul VK, Bhutta ZA, et al. Neonatal survival: a call to action. *Lancet* 2005: <http://image.thelancet.com/extras/1216web.pdf>
- 19 World Health Organization. The World Health Report 2005: making every mother and child count. Geneva: World Health Organization (in press).
- 20 Darmstadt GL, Bhutta ZA, Cousens S, Adam T, Walker N, de Bernis L. Evidence-based, cost-effective interventions that matter: how many newborn babies can we save and at what cost? *Lancet* 2005: <http://image.thelancet.com/extras/05art1217web.pdf>

Lancet 2004; **364**: 399–401

Why are 4 million newborn babies dying each year?

In the summer of 2003, *The Lancet* published five articles on child survival, written by the Bellagio Child Survival Group.^{1–7} These publications have had tangible

effects (panel 1). A Global Partnership for Child Survival secretariat is being established to assist the development and implementation of plans to reduce child deaths in 42 countries that account for 90% of deaths in those younger than 5 years of age.¹ Two national meetings, in Ethiopia and Cambodia, have been held to discuss strategies for implementing the interventions outlined in the Bellagio child-survival series. Other countries are revising their child health and survival programmes.

Although the Bellagio series has had an important effect in the child-survival arena, a major gap in information and action remains about deaths in the first 4 weeks of life—the neonatal period. The second half of the 20th century witnessed a remarkable reduction in child mortality, with a **halving of the risk of death before the age of 5 years**. Most of this reduction, however, has been because of **lives saved after the first 4 weeks of life, with little reduction in the risk of death in the neonatal period for most babies worldwide**. Neonatal deaths, estimated at nearly 4 million annually, now account for **36% of deaths worldwide in children aged under 5 years**. Millennium Development Goal 4 (MDG-4), regarding child survival, stipulates a reduction of two-thirds in deaths in

Panel 1: Bellagio child-survival series, 1 year on

Global level

- Formation of Global Partnership for Child Survival
- Increased commitment to child survival from major agencies and donors
- Decision to focus World Health Report and World Health Day 2005 on maternal and child health

National level

- National stakeholders' meetings to be held in countries with where child mortality is high
- Meetings held in Ethiopia and Cambodia, and planning for revised Child Survival strategies in India and Pakistan

Child-health research

- Ongoing work costing interventions in the Bellagio child-survival series
- New epidemiological information from systematic review of neonatal causes of death
- Increased priority for research on approaches to increase coverage with key child-survival interventions

Panel 2: Prioritising interventions to reduce child deaths in Ethiopia

Ethiopia, where almost half a million children die each year, was the venue for the first National Child Survival planning meeting linked to the new Global Partnership for Child Survival. In April, 2004, the Ethiopian Government led discussions involving multiple stakeholders. The starting point for the development of a national child-survival strategy was to consider potential interventions from the 23 listed in the second paper of the Bellagio child-survival series. Neonatal deaths account for almost 30% of under-5 mortality in Ethiopia, some 135 000 deaths. Tetanus toxoid immunisation, if increased to 90% coverage, could avert about 5–10% of current neonatal deaths. Other strategies under consideration included promotion of clean delivery, exclusive breastfeeding, and control of temperature.

However, several interventions relating to neonatal survival, which were in the Bellagio series, such as antenatal steroids and neonatal resuscitation, were not considered feasible in the Ethiopian setting. These interventions depend on the availability of a skilled attendant, and only 5% of Ethiopian women deliver with skilled care. This situation is a reality facing many countries around the world.

children aged under 5 years, from 95 per 1000 in 1990 to 31 per 1000 in 2015. Given that the current global neonatal mortality rate is estimated to be 31 per 1000 livebirths,⁸ a substantial reduction in neonatal deaths will be required to meet MDG-4. Reduction of neonatal deaths should become a major public-health priority.

There are various reasons why the health of newborn babies has been neglected despite the huge number of deaths. Most neonatal deaths are unseen and undocumented. In rich countries childbirth is accompanied by a fanfare, but in many poorer countries childbirth is accompanied by apprehension for the mother and baby who may remain hidden at home with limited access to care. Often the baby is unnamed until 1 or even 6 weeks has passed, reflecting a sense of fatalism and cultural acceptance of high mortality. Unfortunately, neonatal deaths also have low visibility on the global agenda; many global agencies do not mention any causes of neonatal death on their lists of major “child killers”.

Another barrier to action is the perceived complexity of reducing neonatal deaths. In industrialised countries care of newborn babies is associated with intensive technological approaches. In northern European countries it was not the introduction of neonatal

intensive care in the early 1980s that produced the greatest mortality reduction. In England the neonatal mortality rate fell from over 30 per 1000 livebirths in 1940 to 10 per 1000 in 1979.⁹ This fall coincided with the introduction of free antenatal care, improved care in childbirth, and the availability of antibiotics. Some developing countries, such as Sri Lanka, have also been able to improve neonatal health by investing in similar strategies.¹⁰ However, this is not the case in much of the developing world.

Interventions to reduce neonatal deaths belong in two health-system programmes: maternal-health programmes covering pregnancy, childbirth, and early neonatal care; and child-health programmes, which move on through infancy into childhood. Addressing neonatal mortality requires a continuity between these elements of care, which is lacking in many settings with care for the neonate often receiving little attention in either maternal or child-health programmes. The greatest gap in care often falls during the critical first week of life when most neonatal and maternal deaths occur, often at home and with no contact with the formal health-care system. In addition, behaviours such as breastfeeding, which influence survival after the neonatal period, are started in the first days of life, yet contact with the health system during this important period is often non-existent.

Although the Bellagio child-survival series has had a salutary effect in drawing attention to child survival, strengthening health systems was not a major focus of the series.¹¹ Functioning maternal and neonatal health systems caring for the dyad of mother and child during pregnancy, childbirth, and in the early neonatal period are essential if neonatal (and maternal) mortality are to be reduced. Neonatal health cannot be separated from maternal health. In addition to strengthening of health systems, approaches to promote demand for care are also needed.

Without information about a wider choice of interventions to reduce neonatal mortality and approaches to incorporate these into health systems,¹² the national plans for child survival in countries with the highest mortality will probably include limited action to address neonatal deaths (panel 2). Existing and new evidence on health impact has not been linked to data on cost and feasibility or to programmatic models for implementation within health systems. Most

publications relate to highly technical neonatal care for the 2% of neonatal deaths in rich countries. Over three-quarters of neonatal deaths occur in south Asia and sub-Saharan Africa, yet a skilled attendant is present in less than a third of all deliveries in these regions—the least care for those who need it most. **In Ethiopia, 5% of women currently deliver with a skilled attendant. For all deliveries in Ethiopia to have a skilled attendant, a substantial increase in the number of midwives is needed. How can this be achieved?** In the meantime, what can be done to reduce neonatal deaths in such settings in the short term while contributing to the building of a stronger health-care-delivery system?

In the spring of 2005, *The Lancet* will publish a series of papers focusing on neonatal survival, coinciding with the release of the World Health Report 2005, on the theme of maternal and child health. The series will link epidemiological information with systematic reviews of interventions¹³ to assess the cost and potential effect of scaling up interventions within existing programmes. By making widely available the epidemiological information regarding the time, place, and causes of neonatal deaths, we hope to increase the visibility of the neonate in policy and programme planning. Barriers to the implementation of interventions within health systems will be discussed, with focus on reaching the poorest settings. Gaps in action and in knowledge will be highlighted.

The Lancet encourages submission of original research articles to accompany the series on neonatal survival. Manuscripts should be submitted to *The Lancet* by Oct 31, 2004, and should follow the standard journal format for original research papers.¹⁴ Priority will be given to papers that present evidence relating to interventions to reduce neonatal deaths in resource-poor settings. We hope that these articles, alongside the series, will encourage increased interest and investment in neonatal health.

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- 1 Black RE, Morris SS, Bryce J. Where and why are 10 million children dying every year? *Lancet* 2003; **361**: 2226–34.
- 2 Jones G, Steketee RW, Black RE, Bhutta ZA, Morris SS. How many child deaths can we prevent this year? *Lancet* 2003; **362**: 65–71.
- 3 Bryce J, el Arifeen S, Pariyo G, Lanata C, Gwatkin D, Habicht JP. Reducing child mortality: can public health deliver? *Lancet* 2003; **362**: 159–64.
- 4 Victora CG, Wagstaff A, Schellenberg JA, Gwatkin D, Claeson M, Habicht JP. Applying an equity lens to child health and mortality: more of the same is not enough. *Lancet* 2003; **362**: 233–41.
- 5 Claeson M, Gillespie D, Mshinda H, Troedsson H, Victoria CG. Knowledge into action for child survival. *Lancet* 2003; **362**: 323–27.
- 6 Venis S. Child survival. *Lancet* 2003; **361**: 2172.
- 7 Lee JW. Child survival: a global health challenge. *Lancet* 2003; **362**: 262.
- 8 Saving Newborn Lives. The state of the world's newborns: a report from Saving Newborn Lives. Washington DC: Save the Children, 2001: 1–44. http://www.savethechildren.org/publications/newborns_report.pdf (accessed July 1, 2004).
- 9 MacFarlane, A, Johnson, A, and Mugford, M. Epidemiology. In: Rennie JM, Robertson NRC, eds. Textbook of neonatology, 3rd edn. Cambridge: Churchill Livingstone, 2001: 3–33.
- 10 Bhutta ZA, De Silva H, Awasthi S, Gupta I, Hussain SM, Manandhar D, Salam MA. Maternal and child health: is South Asia ready for change? *BMJ* 2004; **328**: 816–19.
- 11 Bhutta ZA. Beyond Bellagio: addressing the challenge of sustainable child health in developing countries. *Arch Dis Child* 2004; **89**: 483–87.
- 12 Editorial. Kickstarting the revolution in health-systems research. *Lancet* 2004; **363**: 1745.
- 13 Bhutta ZA, Darmstadt GL, Ransom EI, Starrs AM, Tinker A. Basing newborn and maternal health policies on evidence. In: Shaping policy for maternal and newborn health. Baltimore, MD: JHPIEGO, 2003: 5–12.
- 14 *The Lancet*. Information for authors. <http://www.thelancet.com/authorinfo> (accessed July 22, 2004).