

# THE EXECUTIVE SUMMARY OF THE LANCET NEONATAL SURVIVAL SERIES



## THE PROBLEM OF NEWBORN DEATHS<sup>1</sup>

Each year, 4 million babies die in the first four weeks of life—the neonatal period. That is more than 10,000 deaths a day. Most of these deaths are unrecorded and remain invisible to all but the families who grieve their loss rather than celebrate a new life. Virtually all (99 percent) occur in low- and middle-income countries, yet most research, publications, and funding focus on high-tech care for the 1 percent of deaths that occur in rich countries. The Lancet Neonatal Survival Series provides new, systematic, global estimates of the causes of these 4 million deaths. New analysis shows that nearly 3 million newborn deaths could be prevented annually by improving access to the low-cost, low-tech interventions that are not currently reaching those most in need.

The fourth Millennium Development Goal (MDG-4) calls for a two-thirds reduction in death

rates for children under the age of 5 by 2015. Almost 40 percent of these deaths occur in the neonatal period. MDG-4 will not be met without substantial reductions in neonatal mortality, especially in Africa and South Asia, where two-thirds of all neonatal deaths occur and the least progress in reducing neonatal deaths has been made.

The greatest risk of death is at the very beginning of life: three-quarters of all neonatal deaths (3 million) occur within one week of birth, and at least 1 million babies die on their first day of life. Many of the world's 4 million stillbirths and 500,000 maternal deaths also occur close to the time of birth. More than half of these babies die after a home birth and without any health care. To date, child survival programmes in the developing world have tended to focus on pneumonia, diarrhoea, malaria, and vaccine-preventable conditions, which mainly cause deaths *after* the first month of life. In addition, safe motherhood programmes have focused primarily on the mother. Prevention of newborn deaths has been lost between child survival and safe moth-

### **Panel 1: Key messages from *The Lancet Neonatal Survival Series***

Every year, 4 million babies die in the first month of life—most in developing countries from causes that are rare in rich countries. The Millennium Development Goal for reducing child deaths cannot be met unless we do more to reduce neonatal deaths, especially in Africa and South Asia.

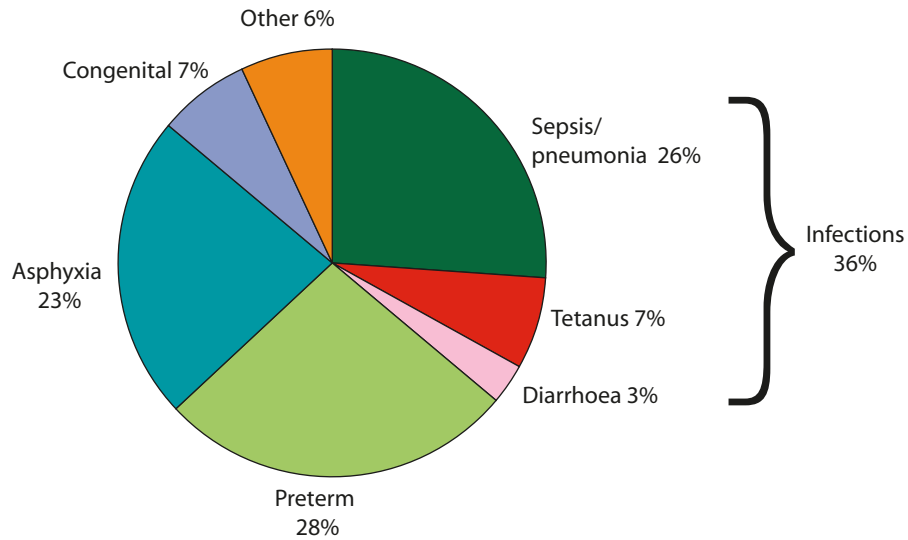
Almost 3 million of the 4 million babies who die each year can be saved with low-tech, low-cost interventions. These interventions, which would also help save the lives of mothers and prevent stillbirths, are not reaching those most in need.

These interventions could be provided to 90 percent of women and babies in poor countries by spending only US\$1

extra per inhabitant per year. About 70 percent of this spending would also benefit mothers and older children.

Investing in skilled care, especially during childbirth, is important, but this will take time. Interim approaches are available that will save up to almost 40 percent of newborn lives in community settings whilst health systems are being strengthened. Some low-income countries succeeded in reducing neonatal death rates by more than half during the 1990s.

Leaders of poor countries must be held accountable for their promises to spend more and spend it better to protect their most vulnerable citizens. Leaders of rich countries, donors, and United Nations agencies must also be held accountable for their promises to increase funding and enable progress in the highest-mortality settings.



**Figure 1:** Causes of death in the first month of life<sup>1</sup>

**Source:** Lawn, Cousens, Wilczynska and the CHERG neonatal group. Based on vital registration data for 45 countries (96,797 neonatal deaths) and estimates for 147 countries using models based on the vital registration data and on 56 studies (29 countries, 13,685 neonatal deaths).

erhood programmes. This series builds on the Bellagio Child Survival Series, which identifies the need for more information and action for newborn health as a key to child survival.

### CAUSES OF DEATH

The term “neonatal” describes a time period, not a cause of death. Preventing neonatal deaths will require a variety of strategies to address specific causes of death. The three major causes of neonatal deaths worldwide are infections, including tetanus, sepsis, pneumonia, and diarrhoea (36 percent); prematurity (28 percent); and birth asphyxia or problems related to childbirth complications (23 percent). (See Figure 1.)

Infections are the major cause of death after the first week of life. Most of these infection-related deaths could be prevented if all mothers and their babies had access to simple preventive measures and treatments. A quarter of a million babies continue to die each year from neonatal tetanus—a condition that can be prevented by giving a pregnant woman two 20-cent injections. Tetanus toxoid immunisation is one of the most cost-effective health interventions. Elimination of neonatal tetanus deaths is eminently achievable if the political will to do so exists. In addition, the majority of babies with sepsis and pneumonia can be saved with antibiotic treatment.

A high proportion of neonatal deaths (60 percent - 80 percent) occur in babies with low birth weight (less than 2,500 grams), many of whom are born prematurely. Most of these deaths could be avoided with simple preventive care such as warmth and breastfeeding plus early treatment of infections. Only a small minority require costly intensive care.

Preventing deaths from birth asphyxia requires improved care during childbirth, including obstetric care plus birth attendants who have the ability to resuscitate newborns at birth.

One reason for the lack of progress in reducing newborn deaths globally has been the mistaken notion that expensive, high-tech approaches are



*N. Behring-Chisholm for WHO*

**Figure 2:** A mother grieves the death of her baby—one of the 4 million who die in the first month of life each year.

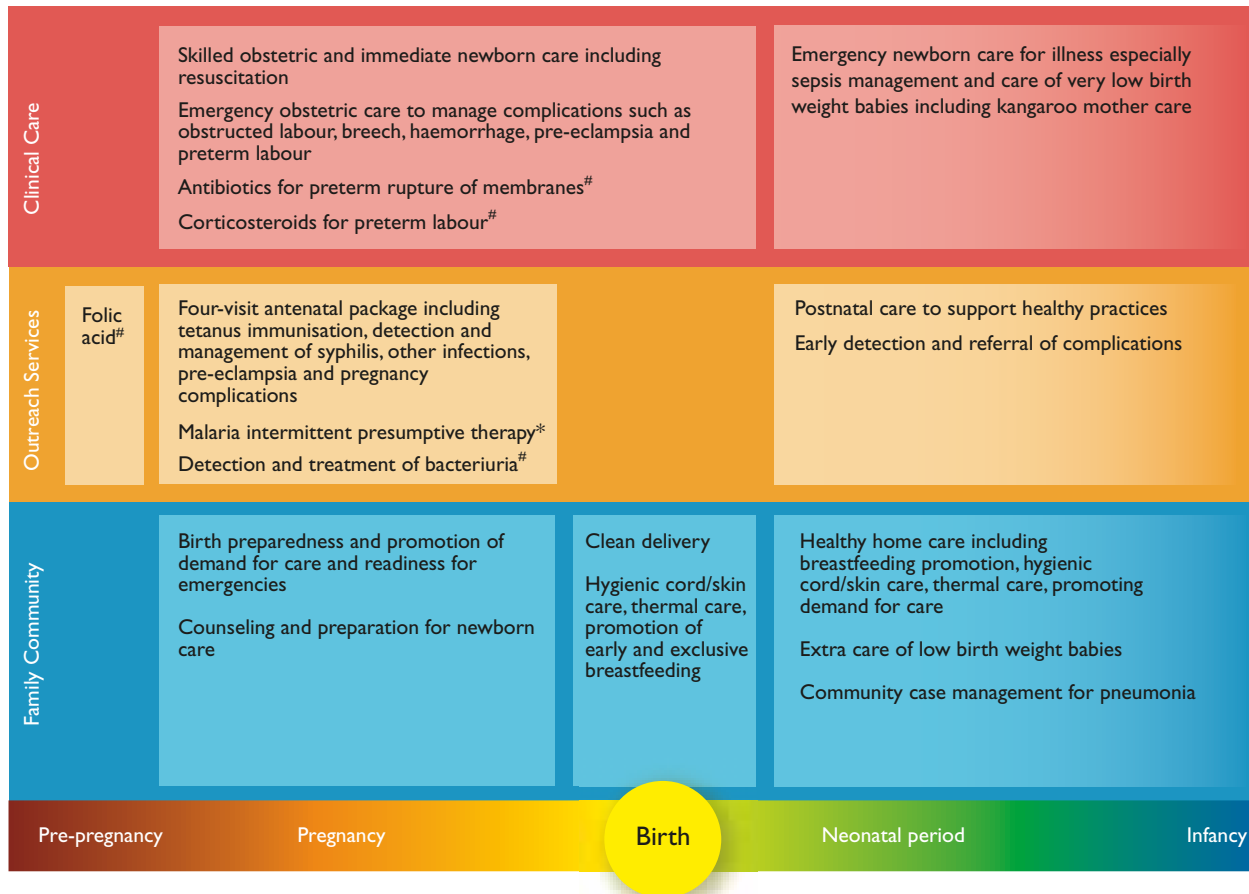
necessary. In fact, many countries achieved low neonatal mortality rates before such care was available. In the United Kingdom, for example, neonatal intensive care only became available after the neonatal mortality rate had been reduced to 15 per 1000 live births—a third of the average neonatal mortality rate in Africa today.

## DELIVERING SOLUTIONS WHERE MOST NEW-BORN BABIES DIE<sup>2</sup>

Low-cost, low-tech interventions that can save the lives of newborns are available, but they are not reaching those most in need. Analytical work

for this series identified 16 interventions that reduce neonatal deaths, none of which involve expensive drugs or complex technology. Exclusive breastfeeding, simple extra care for low-birth-weight babies, and antibiotics for neonatal infections are a few examples. Figure 3 shows the continuum of care through pregnancy, birth, and the postnatal period into infancy. Each intervention shown is extremely cost-effective, and by packaging these interventions together and linking them with other programmes in the health system, costs can be further reduced. Results from analyses show that it is more cost effective to address newborn health within existing maternal health and child survival programmes than through a separate “vertical” programme focusing only on the newborn.

Between 41 percent and 72 percent of neona-



**Figure 3:** High-impact, simple interventions to save newborn lives within the continuum of maternal and child health care

<sup>\*</sup>Situational interventions necessary in certain settings, such as high malaria prevalence

<sup>#</sup> Additional interventions for settings with stronger health systems and lower mortality

**Note:** This figure includes 16 interventions with proven efficacy in reducing neonatal mortality. Other important interventions are delivered during this time period, but are not shown here as their primary effect is not on neonatal deaths (e.g. prevention of mother-to-child transmission of HIV). For some of the listed interventions the service delivery mode may vary between different settings.

**Panel 2: Steps to develop and implement newborn health strategies, within the continuum of maternal, neonatal and child health**

**Step 1:** Assess the situation and create a policy environment conducive to newborn health

Assess the situation

Advocate for action

**Step 2:** Achieve optimum newborn care within the constraints of the current situation

Start with outreach and/or family-community care if the health system is not strong

Identify and address missed opportunities within the formal health care system

Coordinate between programmes relevant to newborn health including safe motherhood, child survival, HIV/AIDS, malaria, etc.

**Step 3:** Systematically scale up newborn care

Strengthen supply

Improve demand

**Step 4:** Monitor coverage and measure impact and cost

tal deaths could be prevented each year if these interventions were provided effectively where they are needed most. Up to 3 million babies are dying unnecessarily each year; an enormous number of lives could and should be saved. Phasing the implementation of programmes could save lives now, while also promoting the development of a stronger health system over time. Unfortunately, short-term funding cycles do not promote longer-term development. Strengthening family-community and outreach services, including health education to improve home care practices and preventive services such as tetanus immunization, can be done relatively quickly and can reduce neonatal deaths by 20 percent—40 percent. High coverage of clinical care, including skilled maternal and immediate newborn care, emergency obstetric care, and emergency newborn care, is needed to achieve the larger reductions in child mortality required to meet MDG-4. Although high coverage of clinical care will take longer to achieve for family-community and outreach services, this must be an important long-term goal.

Postnatal care and intrapartum care both have the potential to save 20 percent—40 percent of newborn lives, but postnatal care costs about half the amount of skilled care during childbirth. To date, postnatal care for mothers and newborns has received relatively little emphasis in public health

programmes, with only a tiny minority of mothers and babies in high-mortality settings receiving postnatal care. Although the effect of antenatal care on mortality is lower than intrapartum and postnatal care, coverage is relatively high and more equitable, presenting opportunities to reach women with higher-quality care.

Care at birth and in the first days of life not only saves the lives of mothers and newborns, but also reduces serious complications that may have long-term effects. Moreover, birth is an important time to introduce healthy behaviours—a window of opportunity to save lives and promote lasting health.

## PROGRESS IS SLOW, ESPECIALLY IN REACHING POOR FAMILIES<sup>3</sup>

Real progress in reducing deaths will require higher coverage with key interventions that reach mothers and babies at the time of greatest risk, in the highest mortality countries. Currently, only about half of women worldwide deliver with a skilled attendant. The variation between countries is extreme, ranging from 5 percent to 99 percent. Skilled attendance and institutional delivery rates are lowest in countries with the highest neonatal mortality rates. In sub-Saharan Africa, less than 40 percent of women deliver with skilled care; in South Asia, the figure is less than 30 percent. Latin America and Southeast Asia are making rapid strides in increasing coverage, but at the current rate of progress in Africa, the average skilled attendant coverage in the year 2015 will still be less than 50 percent.

Even within poor countries, the poorest have a much higher risk of dying and a lower chance of receiving care. In sub-Saharan African and South Asian countries, rich women are much more likely than poor women to have a skilled attendant at birth. For example, in Ethiopia, a quarter of pregnant women in the highest income group use skilled care at delivery, compared to 1 percent of the poorest. If all the babies in sub-Saharan Africa and in three South Asian countries (India, Bangladesh, and Nepal) had the same risk of dying as their richer fellow citizens, then 750,000 babies would be saved every year.<sup>1</sup>

## SUCCESSFUL COUNTRY PROGRAMMES<sup>3</sup>

The success of some low-income countries in reducing neonatal mortality shows that newborn deaths can be reduced, even with limited resources. For example, Sri Lanka, Indonesia, Honduras, and Botswana all reduced neonatal mortality by around half during the 1990s, despite low gross national products per capita. A key feature of their success was sustained political commitment at the highest level of government, resulting in the provision of high-quality, primary maternal and newborn care services.

Although the reduction of newborn deaths represents both a human rights imperative and an essential step to reaching MDG commitments, few countries with a large burden of neonatal mortality have a newborn health strategy. Progress in countries that is driven by countries, is crucial and requires the development, implementation, and monitoring of national action plans for newborn survival, within the context of maternal and child health and sector-wide planning. The government of Nepal recently developed a national Newborn Health Strategy Plan through a consultative

process involving representatives from diverse backgrounds, such as neonatology, safe motherhood, and community mobilization. In India, planning for newborn health was undertaken as an integral part of maternal, newborn, child, and adolescent health planning for the second phase of the national Reproductive and Child Health programme. In Ethiopia, newborn care strategies are being integrated into plans for a new programme of community-based health care. In Madagascar, newborn care is receiving substantial new funding and attention in the context of a regular review of health expenditures and reforms.

There is no “one-size-fits-all” solution. Variation exists between and even within countries. The numbers and causes of neonatal deaths, the capacity of the health system, and the obstacles faced all differ, as do the degree of support from policymakers and the availability of resources. To scale up newborn care to achieve universal coverage, two interlinked processes are required: a systematic, data-driven decision-making process and a participatory, rights-based policy process that ensures support from key stakeholders. (See Panel 2.)

Sixty million women deliver without skilled care every year. Reducing the risks these mothers and their newborns face requires approaches that can be implemented now. Even with a weak health system, it is possible to achieve measurable mortality reduction by applying a phased approach that starts with family and community care, while at the same time investing in the longer-term strengthening of clinical care services. Reaching poor families and communities with services often involves taking the services to them, a method used in tetanus immunization campaigns and community-based management of pneumonia with oral antibiotics.

Missed opportunities exist within current health systems. In sub-Saharan Africa, for example, almost 60 percent of women attend at least two antenatal clinic visits, yet only 42 percent receive the necessary two injections of tetanus toxoid; for a small marginal cost, a high benefit could be achieved. Newborn care must be integrated into existing programmes, particularly safe motherhood and child survival programmes. Until recently, global guidelines for Integrated Management of Childhood Illness (IMCI) did not include care of newborns in the first week of life. The drive to add this has been led by country demand. India has renamed IMCI as Integrated Management of Neonatal and Childhood Illness (IMNCI) by adding



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**Figure 4:** Vietnamese mother and baby

an 'N' for neonatal. Likewise, guidelines for emergency obstetric care services can be coupled with emergency neonatal care so that the two are developed simultaneously—increasing cost-effectiveness for both mothers and babies. In countries where skilled attendants are available, core competencies for both essential and sick newborn care should be part of their training. The marginal cost of adding neonatal resuscitation training, equipment, refresher courses, and supervision for midwives is estimated at less than \$.02 per capita per year.

Strengthening maternal and newborn clinical care is challenging but necessary if more babies, and particularly more mothers, are to be saved. The obstacles to the supply of and demand for care must be identified and systematically overcome, with significant investment in increasing the number of midwives and improving access to emergency obstetric and neonatal care. Purposeful protection of the poor from user fees is necessary. Involving and empowering communities—not merely targeting them—is a cornerstone of success. Women's groups are a largely untapped channel for change. Monitoring progress and impact is essential to refining strategies and ensuring that the mortality and services gap for the poor is being reduced.

## THE PRICE TAG<sup>2,4</sup>

The additional cost of maintaining recommended newborn health interventions at 90 percent coverage in the 75 countries with the highest mortality rates is estimated to be US\$4.1 billion per year, on top of the current spending of US\$2.0 billion. About 30 percent of the cost is for interventions specifically for newborns, while the remaining 70 percent is for interventions that would also benefit mothers and older children. The total of new spending per capita is only \$0.96. This estimate includes personnel time and all the specific programme costs—such as medicines, supplies, and maintenance of facilities—but does not include the investment costs of building new hospitals or increasing the numbers of midwives and doctors. The required investment varies dramatically across countries. In countries with weaker health systems, it would cost US\$5-10 per capita per year to strengthen all maternal and child health packages. These countries would certainly require external financial support. Investing in saving the lives of newborns and strengthening the continuum of

care through pregnancy, birth, and the postnatal period will also help reduce the 515,000 maternal deaths and the 4 million stillbirths estimated to occur each year, and provide a foundation for infant and child health.

## ACCOUNTABILITY FOR NATIONAL AND GLOBAL COMMITMENTS<sup>4,5,6</sup>

Funding for maternal, neonatal, and child health is shamefully low given the burden of deaths, the human rights imperative, and the fact that extremely cost-effective interventions are available. Both international donors and leaders in developing countries must be held accountable for

### **Panel 3: Actions required to save newborn lives**

#### **At the national level:**

Set and publish national targets for the reduction of neonatal mortality by the end of 2005, to be achieved by 2015

Produce and publish a plan of action to reach the set neonatal survival targets by the end of 2007

Create a plan that is based on evidence and situation analyses, including a defined baseline neonatal mortality rate, and specifies strategies to reach the poorest families

Implement the plan within maternal health and child survival programmes, with defined targets and timelines

Finance implementation by identifying and mobilizing internal resources, and seeking supplementary external support wherever necessary

Monitor progress and publish results regularly

#### **At the international level:**

Include the neonatal mortality rate as an indicator for MDG-4

Set a goal of reducing the neonatal mortality rate by 50 percent between 2000 and 2015

Leverage resources to meet the additional needs identified (US\$1.50 per capita) to achieve high coverage of interventions for neonatal survival within maternal health and child survival programmes, and promote donor convergence at the country level

Improve funding for the development and support of health systems, especially for delivering interventions in primary care and community settings

Promote greater accountability among national governments, international agencies, and NGOs in meeting their commitments to action for newborn survival, including partnerships and the *Rolling Conference on Child Survival*

their commitments to increasing resources. Most donor countries give a much lower proportion of GDP to international aid than they have promised. For example, the U.S. gives 0.14 percent of GDP (target 0.7 percent), the lowest of the industrialised countries. Most low-income countries spend a lower proportion on health than they promised in the 2000 Abuja declaration, with some exceptions.

Increasing resources is the responsibility of both rich and poor countries. Even if the governments of the poorest countries spend more, significant new outside funding will be required to save the lives of mothers, newborns, and children. But a major challenge for external funding is ensuring a process that supports, rather than distorts, national priorities. An additional challenge is ensuring that the poor benefit from increased resources. Donor resources will go further if they are pooled at the national level, instead of being implemented by individual programmes. This requires that donors, national decision makers, and other stakeholders such as professional organizations and non-governmental organizations (NGOs) come together to develop a national plan. It also requires simplified funding and monitoring mechanisms. The workloads of already hard-pressed governments are often increased by the multiple reports that must be filed for multiple donor agencies and global funds. Donor convergence—like that promoted by the partnerships for safe motherhood, newborn health, and child survival—allows for greater flexibility and better decision making at the country level. The inclusive partnership, as well as other mechanisms like the *Rolling Conference on Child Survival* (13-14 December 2005, London), can promote greater accountability for the actions required at the national and international levels.<sup>7</sup>

The global commitment to achieving the MDGs provides an unprecedented opportunity to reduce child and maternal mortality (goals 4 and 5, respectively). Improved newborn survival is essential to achieving MDG-4, but is also closely linked to MDG-5, since maternal and newborn health and health care are so intertwined. Given that neonatal deaths account for 24 percent—56 percent of deaths of children under 5 across the regions of the world, no region can afford to defer action. Once communities and decision makers see newborn and maternal deaths as a problem, public ownership of the problem and progress will be more likely. It is time to generate the political will and financial resources needed to save the lives of

3 million babies who die simply because they are born without the low-tech, low-cost care that is their first right. It is time for action. It is time for a new beginning. ■

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“IF WE NOW CONTINUE TO FAIL CHILDREN UNDER THREAT, WE WILL BE DELIVERING A VERDICT OF WANTON INHUMANITY AGAINST OURSELVES. WE WILL BE A KNOWING PARTY TO AN ENTIRELY PREVENTABLE MASS DESTRUCTION OF HUMAN LIFE.”<sup>6</sup>

**Richard Horton, Editor, *The Lancet***

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#### **Panel 4: The Lancet Neonatal Survival Series—Information for Action**

The goal of The Lancet Neonatal Survival Series is to provide information to inform global policy and a framework for practical action in countries so that proven interventions reach the families in greatest need.

New information regarding neonatal deaths includes where and why newborns die, and an analysis of the effectiveness and costs of newborn care interventions. Three case studies estimate the cost and effect of different approaches to reduce newborn deaths within national health systems. Action steps at the national and international levels are proposed.

This series follows the Bellagio Child Survival Series and includes analyses produced through a year of teamwork by a varied group of academics, agencies, and non-governmental organizations. Many international health and development agencies including World Health Organization, UNICEF, the World Bank, and Save the Children, contributed to the production of the series, along with individuals from the U.K., U.S.A., Asia, and Africa.

The full articles are available free of charge at [www.thelancet.com](http://www.thelancet.com).

**References** (free online access at [http://www.thelancet.com/journal/vol365/iss9465/full/llan.365.9465.neonatal\\_survival\\_series.32704.1](http://www.thelancet.com/journal/vol365/iss9465/full/llan.365.9465.neonatal_survival_series.32704.1))

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### **Acknowledgments**

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