Neonatal Survival 4

Neonatal survival: a call for action

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To achieve the Millennium Development Goal for child survival (MDG-4), neonatal deaths need to be prevented. Previous papers in this series have presented the size of the problem, discussed cost-effective interventions, and outlined a systematic approach to overcoming health-system constraints to scaling up. We address issues related to improving neonatal survival. Countries should not wait to initiate action. Success is possible in low-income countries and without highly developed technology. Effective, low-cost interventions exist, but are not present in programmes. Specific efforts are needed by safe motherhood and child survival programmes. Improved availability of skilled care during childbirth and family/community-based care through postnatal home visits will benefit mothers and their newborn babies. Incorporation of management of neonatal illness into the integrated management of childhood illness initiative (IMCI) will improve child survival. Engagement of the community and promotion of demand for care are crucial. To halve neonatal mortality between 2000 and 2015 should be one of the targets of MDG-4. Development, implementation, and monitoring of national action plans for neonatal survival is a priority. We estimate the running costs of the selected packages at 90% coverage in the 75 countries with the highest mortality rates to be US$4·1 billion a year, in addition to current expenditures of $2·0 billion. About 30% of this money would be for interventions that have specific benefit for the newborn child; the remaining 70% will also benefit mothers and older children, and substantially reduce rates of stillbirths. The cost per neonatal death averted is estimated at $2100 (range $1700–3100). Maternal, neonatal, and child health receive little funding relative to the large numbers of deaths. International donors and leaders of developing countries should be held accountable for meeting their commitments and increasing resources.

Many policymakers and health professionals are unaware that more than 10 000 newborn babies die every day, mostly from preventable causes. The Millennium Development Goal for child survival (MDG-4)—to reduce childhood mortality by two-thirds between 1990 and 2015—will not be met without substantial reductions in neonatal mortality.[1] Low-cost interventions could reduce neonatal mortality by up to 70% if provided universally.[2] Although these interventions are inexpensive and feasible, their coverage rates are extremely low in the highest-mortality settings. Overcoming health-system constraints to provide such interventions at scale is possible, and practical examples of how countries can do so have been described within this series.[3]

Here, we address common misconceptions that have restricted implementation of interventions to improve neonatal health in many low-income countries (panel 1). We discuss national and global action needed to improve neonatal survival, and show the estimated cost associated with the packages proposed. Saving lives of newborn children is affordable, but depends on political commitment and leadership at national and international levels.

Common myths and misconceptions corrected

No country can afford not to address neonatal deaths. Neonatal mortality accounts for a high proportion of deaths among children aged younger than 5 years;[1] 38% globally and 24–56% at regional level. Waiting to introduce neonatal interventions will not only delay reducing neonatal deaths; many interventions, such as exclusive breastfeeding and improved care of low birthweight infants, also contribute to reductions in post-neonatal mortality and in rates of acute and chronic illness in children.[2] Furthermore, scaling up the interventions with the highest effect on neonatal deaths will reduce maternal deaths, resulting in progress towards MDG-4 and MDG-5.[3]

Success is possible in low-income countries without access to high technology. High-income countries have reduced neonatal mortality rates (NMRs) to an average of four per 1000 livebirths. By contrast, the overall NMR in middle-income and low-income countries (where 99% of neonatal deaths happen) is 33.[1] Can these countries reduce neonatal mortality without intensive care technology and in the absence of great improvement in income? The experience of countries that have reduced neonatal mortality successfully over the past century tells us the answer is a resounding yes. Reductions in neonatal mortality in developed countries preceded the introduction of expensive neonatal intensive care. In England, for example, the NMR fell from more than 30 in 1940 to ten in 1975, a reduction linked to the introduction of free antenatal care, improved care during labour, and availability of antibiotics.[4] In Sweden, perinatal mortality declined at the end of the 19th century by 15–32% in those who used midwives for home deliveries.[5] The training of midwives at that time, working largely in community settings, emphasised keeping the baby warm, neonatal

resuscitation with tactile stimulation, daily cord care, early breastfeeding, and the use of aseptic techniques.[6]

NMRs are generally inversely correlated with the gross domestic product (purchasing power parity) per person (GDP [PPP]/person) of a country, however, several low-income countries have achieved low NMRs despite limited resources, including Honduras, Indonesia, Moldova, Nicaragua, Sri Lanka, and Vietnam (figure 1). Sri Lanka, by way of example, has a population of 20 million with a GDP(PPP) per person of US$3470, though 6·6% of the population live on an income of less than $1 a day. Public expenditure on education and health is 1·3% and 1·8% of GDP, respectively. The female literacy rate is high at 90%. Figure 2[7] shows the NMR in Sri Lanka between 1950 and 2000. The first neonatal intensive care unit opened in mid-1980s in Colombo when the NMR was already less than 20. In 1999, there were just 40 incubators and five neonatal intensive care units in the country. The great decline in neonatal mortality shown was not due, therefore, to the availability of high technology facilities, but was the result of sustained inputs into and use of primary care services and facilities in the government sector. Starting in 1931 health services for rural communities in Sri Lanka received special attention. Midwives were posted to the rural areas to provide both home and institutional care. By 1996, there was one midwife per 3000–5000 population. Outreach antenatal care is provided by these midwives, with antenatal coverage of almost 100% in 1999. In 1996, 86% of deliveries were in government hospitals—where services are free—attended by a cadre of 2500 skilled hospital midwives. There is also equitable and easy access to health care facilities throughout Sri Lanka. The average distance from every house to a health facility is 1·4 km, and from smaller hospitals to the more advanced hospitals is only about 5 km. Government health facilities are used by both the poor and the rich, and efforts have been made to maintain a high quality of service.[7]

Effective low-cost interventions are available. Simple low-cost interventions, notably tetanus toxoid vaccination, exclusive breastfeeding, kangaroo mother care for low birthweight infants, and antibiotics for neonatal infections do reduce mortality. Packages of such interventions can be delivered through facility-based services, population outreach, and also family-community strategies.[2,3]

Community-based interventions can save newborn babies. Worldwide, about half of births take place without

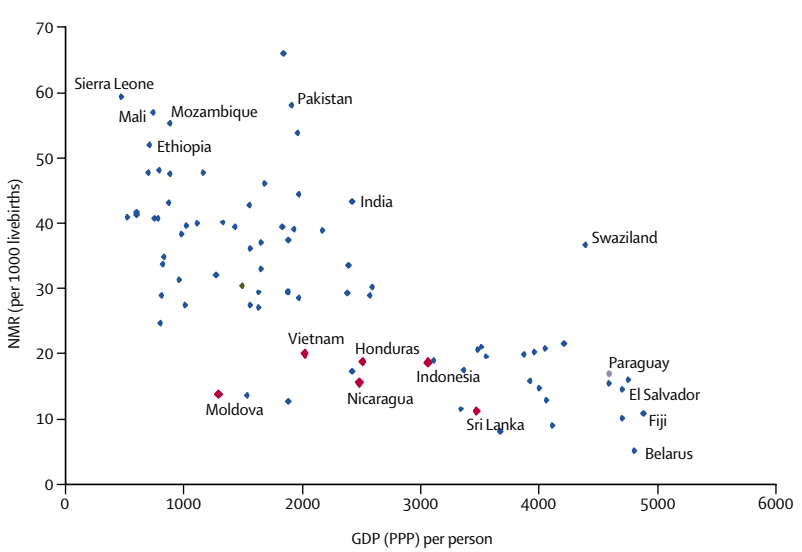

Figure 1: **Correlation between GDP (PPP) per person and NMR in countries with GDP (PPP) per person up to US$5000**
GDP data from World Bank database for 2000 (http://www.worldbank.org/data/wdi2000).

Panel 1: **Myths and misconceptions**

- Countries or programmes should wait until post-neonatal deaths are reduced before addressing neonatal mortality
  Fact: Neonatal mortality accounts for 38% of deaths in children aged younger than 5 years. Neonatal interventions, such as exclusive breastfeeding and improved care of low birthweight infants will reduce post-neonatal mortality in addition to neonatal mortality
- Only developed countries with high GDP have succeeded in reducing neonatal mortality
  Fact: Countries such as Honduras, Indonesia, Moldova, Nicaragua, Sri Lanka, and Vietnam have reduced neonatal mortality despite having fairly low GDPs (figure 1)
- High-tech interventions, such as neonatal intensive care units, are needed to reduce neonatal mortality
  Fact: Most countries with a low NMR achieved substantial reductions in neonatal mortality (to an NMR of about 15 per 1000) before neonatal intensive care became widely available
- There are few effective, low-cost interventions
  Fact: Several low-cost interventions are effective in reducing mortality, including tetanus toxoid vaccination, exclusive breastfeeding, kangaroo mother care for low birthweight infants, and antibiotics for neonatal infections
- Only facility-based, professional care can save newborn babies
  Fact: There is convincing evidence that neonatal mortality can be greatly reduced by community-based interventions delivered through non-midwife community health workers
- Neonatal-specific interventions are not needed, since current safe motherhood and child survival strategies are sufficient to reduce deaths of newborn babies
  Fact: Although maternal care is essential for neonatal survival, there are several specific neonatal care interventions that can reduce neonatal deaths and should be systematically included within the relevant programmes. There has been insufficient attention paid to neonatal health in both maternal and child health programmes

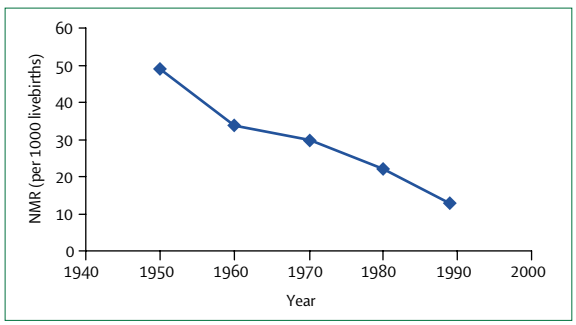

Figure 2: NMR in Sri Lanka between 1950 and 2000[7]

skilled care; in the poorest quintile of many developing countries, 90% of mothers deliver babies at home without a skilled health professional present.[8] The first-line providers are usually family members or a traditional birth attendant, and the mother's confinement at home is often dictated by a combination of poverty and societal and cultural factors—eg, a lack of female empowerment. The importance of reaching these poor families through a combination of approaches should be emphasised.[3] Results of community effectiveness trials of breastfeeding promotion through peer counsellors and women's groups indicate impressive increases in exclusive breastfeeding rates and reductions in morbidity—eg, diarrhoea.[9–11] The provision of home-based neonatal care by community health workers, and community mobilisation for improving maternal and neonatal care through women's groups, have resulted in impressive reductions in neonatal mortality.[12,13]

Continuum of care for newborn babies

To address neonatal mortality, interventions need to extend from pregnancy, through childbirth and the neonatal period, and beyond. Such interventions do not reach those most in need, and the services that are delivered are often not coordinated along the continuum of care. There are many reasons for this gap in services—which particularly affects the newborn baby—including the perceived competition between maternal and child health programmes. In the early 1980s, the mother was often treated merely as an intervention to improve child survival, and the call to recognise the mother in maternal and child health[14] was warranted. However, the newborn baby has now fallen through the cracks between safe motherhood programmes that focus on the mother and child survival strategies, which have prioritised conditions that affect children older than 1 month. The MDGs and other attempts to rejuvenate maternal and child health make 2005 a year of opportunity to move on from previous conflicts by giving explicit attention to the newborn baby.

Although the mother-baby dyad is the focal point for safe motherhood programmes, there has been little focus on primary neonatal care. During the past decade, safe motherhood programmes have stopped emphasising the risk approach and training of traditional birth attendants, and have begun concentrating on safe pregnancy and delivery initiatives through skilled birth attendants.[15] Family-community care has been restricted to the promotion of timely use of health services. Although family-community care is effective in reducing neonatal deaths in weak health systems, clinical care is necessary to maximise effect on NMR and especially to reduce maternal mortality. Both family-community and facility-based care have important parts to play, and existing contacts can be used for their delivery.

The high coverage of antenatal care contact, even by women in the lowest wealth quintiles in developing and transitional countries,[3,8] can be used to deliver interventions essential for newborn babies, such as tetanus toxoid vaccination, promoting exclusive breastfeeding, and counselling for birth preparedness. Scaling up of emergency obstetric care and sick neonatal care can be combined. Postpartum care should encompass both the mother and the baby. Guidelines for integrated management of pregnancy and childbirth (IMPAC) identify opportunities for assimilating maternal and neonatal care (http://www.who.int/reproductive-health/NMBH/index.htm).

Child health programmes have also given low prominence to neonatal health. The WHO/UNICEF strategy integrated management of childhood illness (IMCI) has been widely implemented as the main approach for addressing child health in health systems. There is a general consensus that IMCI is important for child survival programmes.[16] However, the generic IMCI case-management guidelines do not include the first week of life—the period of highest risk for child mortality. Although most of the postnatal interventions for neonatal care can be readily integrated into IMCI algorithms, a mere expansion of the algorithms is not enough. IMCI depends on the sick child being brought to a health facility. This factor limits coverage, since many neonatal deaths happen at home without contact with health services. Every newborn child should be reached and receive essential care in the first days of life.[2] An IMCI strategy that incorporates essential postnatal care of all neonates through a home contact and appropriate treatment of illness could contribute greatly to neonatal survival.

Although many countries have adapted the IMCI protocols to provide facility-based neonatal care, India's IMNCI (integrated management of neonatal and childhood illness) strategy, which will be implemented nationally, has added the provision of home visits to facility-based interventions (table).[17,18] Of the 26 million infants born in India, more than a million die before age 1 month. Recognition by the government of the importance of neonatal health to achieve further reduction in child mortality has led the national adaptation committee on IMCI to increase attention paid

	Generic IMCI	India's IMNCI
Scope		
Includes 0-6 days of life (early neonatal period)	No	Yes
Target providers		
Facility-based providers, such as physicians	Yes	Yes
Community-based providers (auxiliary nurse-midwives or anganwadi workers)	No	Yes
Training programme		
Training time—newborn baby and young infant	About 20%	50%
Sequence of training	First the child (2 months to 5 years) module, then the young infant (7 days to 2 months) module	First the newborn and young infant (0–2 months) module, then the child (2 months to 5 years) module
Training for doing home visits for postnatal care of newborn baby	No	Yes
Implementation		
Facility based application	Yes	Yes
Community based application (three home contacts within first 10 days)	No	Yes

Table: **Differences between generic IMCI and India's IMNCI**

to neonatal care and to add a community-component for routine care of all newborn children to the initiative. Outreach health workers (the auxiliary nurse-midwives) and community nutrition and child development workers (anganwadi workers) are mandated to visit all neonates at home three times within the first 10 days, starting soon after birth, to provide home-based preventive care/health promotion and to detect neonates with sickness requiring referral. Extra contacts are proposed for low birthweight babies. These visits will also be used to provide post-partum care to the mother, with an add-on algorithm.

The cost of including N (neonatal) in IMCI in clinical care is estimated at less than 10 cents per person, given the existence of traditional IMCI programmes. Training of additional health and nutrition workers (two per 1000) and provision of home visits is estimated to cost 22 cents per person. An assessment of the effectiveness of IMNCI will be initiated in 2005 as a collaborative effort of a national research non-governmental organisation, the Government of India, and WHO.

Actions to improve neonatal survival

Plan for national improvement of neonatal survival

The challenge of neonatal survival is unlikely to be addressed successfully by the creation of a new vertical programme. Newborn infants should be protected and cared for by interventions that form part of maternal and child health programmes. A neonatal health policy and planning framework based on this principle is available and is being used by several countries (http://www.who.int/child-adolescent-health/). The Government of Nepal has developed a national neonatal health strategy plan through a consultative process, involving representatives from such diverse backgrounds as neonatology, safe motherhood, and community mobilisation.[19] In India, planning for neonatal health was undertaken as an integral part of maternal, neonatal, child, and adolescent health planning for the second phase of the reproductive and child health programme.

Strengthen political will and community ownership

Money alone is not enough, as evidenced by countries with fairly high GDPs that still have high NMRs, such as Namibia and Swaziland. Ideally both governments and communities should be committed to programmes, but in reality one or both sides might be weak; in such situations, those who campaign for neonatal health or professional organisations should take responsibility for moving the agenda forward.

To improve community engagement and mobilisation, three opportunities could be explored within a short time frame. First, there is a clear global commitment among development partners to invest more in incorporating community-based approaches into maternal and child health programmes. Scaling up would not depend on the development of new cadres of workers, and existing programmes can be built on or adapted to include this work. With the information explosion in many parts of the world, these strategies should also include a mechanism to provide health messages through the mass media at much lower costs than is currently possible. Second, there is no reason why community mobilisation should be managed by already over-burdened and under-resourced ministries of health. Ministries of women's development and local governments can be brought to the planning table and encouraged to make reproductive and neonatal health a key component of their programmes. Third, thousands of civic society organisations have practised participatory approaches towards development in all sectors, and many would be able to implement a more focused health component to their work with guidelines developed in pilot programmes.

Ensure adequate human resources

Human resources for health are in crisis.[20] The global health workforce gap is one of the most formidable barriers to progress towards the health-related MDGs.[21,22] There is a staggering void between the need for and access to skilled attendants;[3] although most countries might increase the output of midwives within their existing training capacities, there will still be a need for increased resources to improve training quality and employment capacity, and to create incentives for people to work in poor rural settings. Skilled health professionals are moving to countries with a perceived higher standard of living, creating what has been referred to as a carousel of movement.[23] To address this internal and external brain-drain, a personnel planning and management system that ensures satisfactory terms of employment, appropriate training, supportive supervision, and career pathways is needed. Internationally, mechanisms should be established to mitigate the adverse effect on developing countries of the loss of health personnel through migration,

including means for the receiving countries to support the strengthening of health systems, in particular human resources development, in the countries of origin of the workers.[24]

Strengthening the neonatal care component in the preservice education of health-care providers is of paramount importance. Neonatal care skills in newly educated physicians, midwives, nurses, and other health workers are often inadequate. Improved preservice education is likely to be more sustainable than inservice training and will eventually reduce the need for inservice training activities. When midwifery and medical training policies are developed and reviewed, failure to add or strengthen neonatal care components is a missed opportunity to save lives at little additional cost.

Resources for implementation of plan

The costs presented in the second paper of this series[2] for providing universal packages for neonatal health in 75 countries with high NMRs at 90% coverage are low compared with the running costs of other global programmes. For example, the cost of prevention of mother-to-child transmission of HIV is $3·80 per woman screened.[25] In view of the potential for preventing 1·5–3 million neonatal deaths and considerably reducing the 0·52 million maternal deaths, $0·96 per person of specific marginal cost is small. The total per-person cost is $1·42, of which only 0·47 cents are for interventions that have specific benefit to the newborn child; the remaining $0·95 would also benefit mothers and older children.[2] To provide neonatal health packages at 90% coverage $4·1 billion per year is estimated to be needed in addition to the $2·0 billion being spent currently, giving a total of $6.1 billion. These estimates are only for the running costs—the service delivery time, supervision, and expenditure on specific equipment and drugs. However, they do not include the investment costs to reach coverage at scale, notably facilities and personnel. Estimates for providing the additional midwives needed in the 75 countries are up to $1 per person per year, depending on initial coverage, amounting to an additional $830 million globally. The total costs might therefore be considerably higher than the estimates provided by Darmstadt and colleagues,[2] depending on the health systems in different countries, but this investment will improve a broad range of health services. For example, for the same interventions, but including investment costs, Ethiopia is estimated to need $10 per person, whereas the corresponding figure for Madagascar and Gujarat, India, is $5.[3]

With the universal package of interventions, the cost per neonatal death averted is estimated at $2100 (range $1700–3100)—ie, total running costs of interventions divided by number of neonatal deaths averted by them. We calculated ranges with the lowest, mid-point, and highest estimate of effectiveness of the interventions.[2]

Where will resources come from?

Households are the prime source of health-care financing in most low-income countries, and costs for emergency maternal and neonatal care are often unanticipated and catastrophic. Such out-of-pocket expenditures by poor households contribute to increasing poverty and inequity.[21]

More resources than at present can and should be mobilised from both development partners and national governments. Many governments of donor and low-income countries have made commitments and signed declarations with respect to increasing funding for health in developing countries. These good intentions have not always translated into increased funding, however, and the money that is made available is often distributed on the basis of political priorities rather than the highest burden or the most cost-effective interventions. The overseas development aid of three-quarters of donor countries fell far short of their commitment of 0·7% of their gross national income (GNI) in 2003 (figure 3).[26] Of the countries that account for the bulk of the 4 million newborn deaths per year, 41 fall in the most heavily indebted category; debt reduction packages have been approved for only 27 of them.[27] Donor funding for maternal, neonatal, and child health is pitifully low in view of the number of deaths, the human rights imperative, and the fact that extremely cost-effective interventions exist. A substantial increase in donor funding for neonatal health is required—not merely a reallocation of overseas development aid for health. A major challenge for external funding is to ensure a process, which supports, rather than distorts, national priorities. Transparency in the allocation and tracking of resources is essential to this process.

Moreover, many developing countries have not achieved degrees of public-health expenditure anywhere near the target in the Abuja declaration, which was adopted at the Organisation of African Unity's special summit on AIDS in 2001. It included a pledge that 15% of national budgets would be allocated to health spending (figure 4).[28,29] Despite poor health status in several countries in south Asia, there is exorbitant spending on maintaining huge conventional armies and developing nuclear arsenals.[30] Reallocation of national resources to development, especially health and education, is essential.

How will funds get to where they are needed?

If external resources are to be made available to those countries in greatest need, there must be adequate mechanisms to ensure these new resources reach the appropriate ministries of health and ultimately the populations in need. Furthermore, there should be support for a policy framework that will ensure evidence-based and participatory decision making.

One option would be to create a new global fund for maternal, neonatal, and child health, similar to the

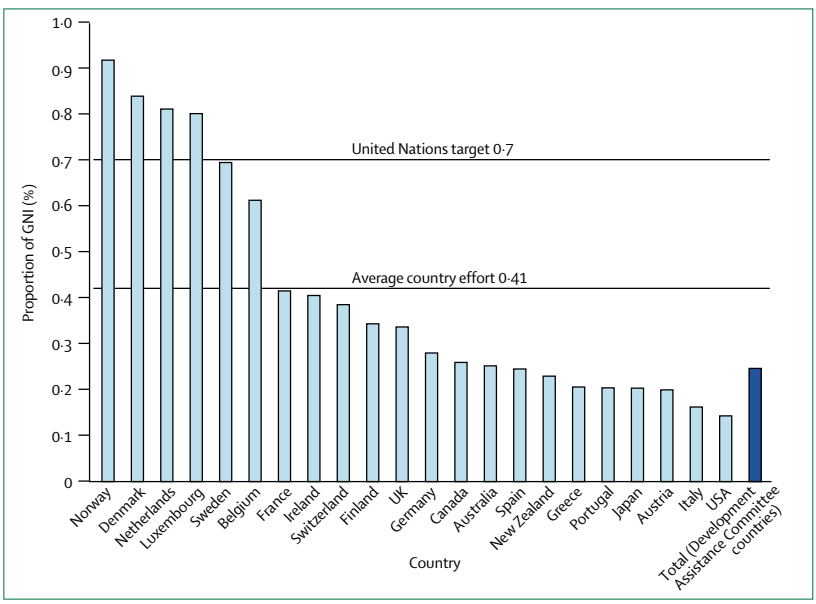

Figure 3: **Net overseas development aid as a proportion of GNI compared with the commitment of 0·7% by donor countries for 2003**[26]

Global Fund for tuberculosis, HIV/AIDS, and malaria and the global alliance for vaccines and immunisation. These initiatives are high profile and attract considerable resources, but involve a strongly vertical approach with global control, great managerial costs, and high reporting loads for over-stretched ministries of health.

A second option would be to expand the mandate of these global funds and other vertical funding mechanisms to include integrated programme approaches—eg, IMCI, IMPAC—and to support broad health-system needs. As such, resources would be available for disease-specific interventions as well as health-systems' development, with a longer time-frame than most vertical programmes usually allow.[31] Funding would be based on country-specific needs as well as the quality of the proposed programmes.

A third option would be to avoid the creation of such funds altogether, and instead make the resources available at country-level through donor convergence. This convergence would imply interested donors coming together with national authorities in strategy development and planning, with the aim of having one

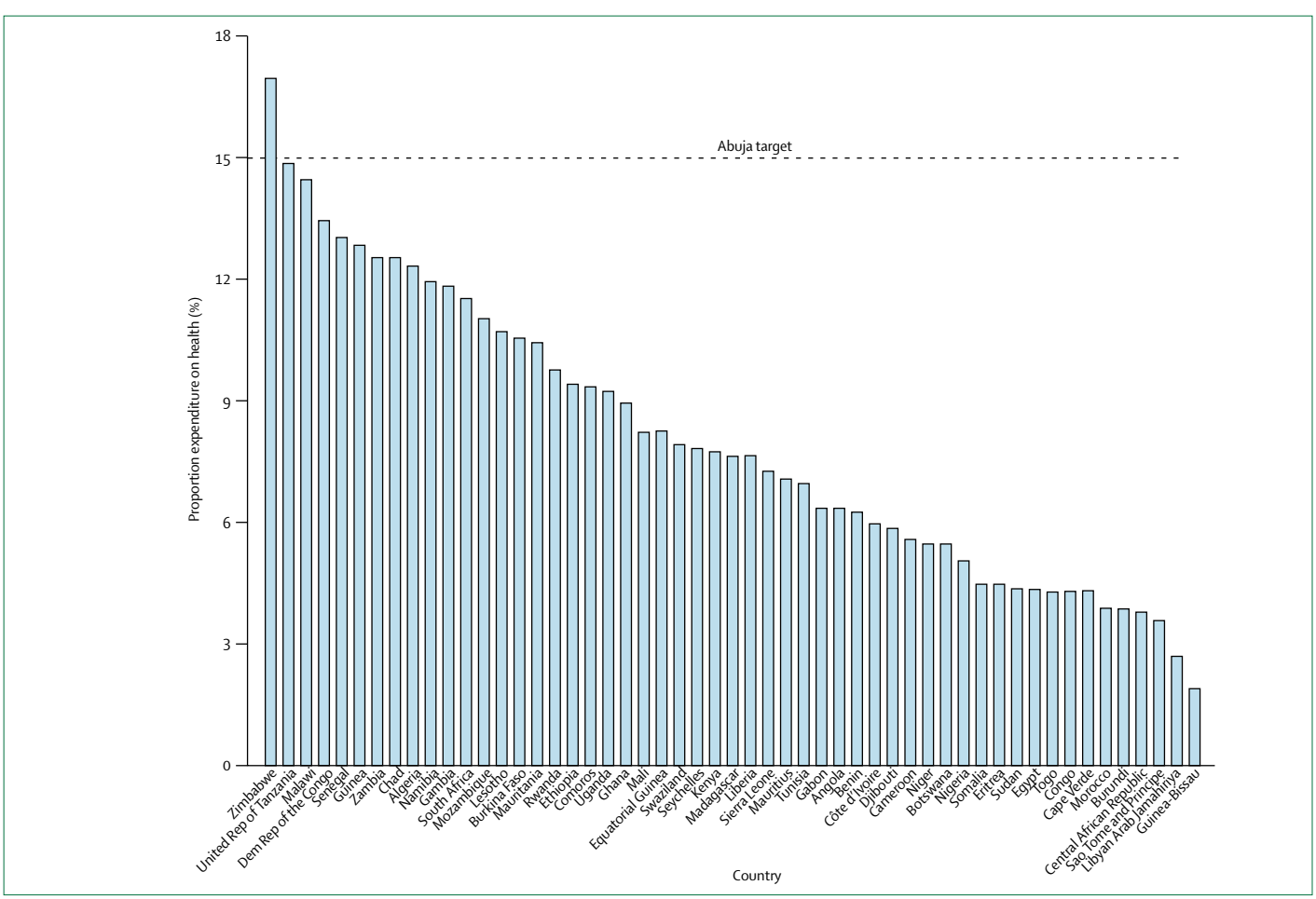

Figure 4: **Public expenditure on health as proportion of general government expenditure in African countries, 1998, compared with Abuja target of 15%**[28,29]
Adapted from reference 29 by permission of UNAIDS.

national plan, one budget, and one monitoring mechanism. This approach, being used by the Child Survival Partnership, allows for greater flexibility and decision-making at the country level. The strategy also implies a process that actively involves decision makers in recognising the need to reduce the burden of neonatal morbidity and mortality, determinants of poor maternal and neonatal care, and requisite health-system strategies. This recognition, coupled with informed decision making, is essential for encouraging national ownership of any strategy to reduce neonatal deaths, and for the generation of political will.

How will accountability be ensured?

The availability of resources is an important issue. However, equally important are issues related to commodity procurement and distribution, technical know-how on delivering interventions, and human-resource management.[20] For governments to increase and improve spending on neonatal health services, accountability in budgeting, planning, and implementation is necessary. Too often the chain of public service delivery is broken and, though budgets are allocated, funds do not reach the intended beneficiaries. For example, for every $1 allocated for non-wage public health expenditure in Ghana in 2000, only 20 cents reached the health facilities.[32] For public funding to work for neonatal care, it should be accompanied by a clear performance agreement framework, transparency, and strict measures to address systematic corruption in health systems. Accountability within dysfunctional health systems must be substantially increased and linked to community engagement in the planning and monitoring framework—ie, concerted action from the national political and policy leadership in ascertaining and achieving specific targets for neonatal survival is needed.

At the international level, greater accountability could be promoted by use of mechanisms developed in association with the Child Survival Partnership, Partnership for Safe Motherhood and Newborn Health, and the Healthy Newborn Partnership. These could include assessing the progress in neonatal health at the planned biennial conferences on child survival, the first of which will be held in December, 2005.[33]

Monitoring of progress

Sound decisions by policymakers in defining programme priorities and in implementation of strategies depend on availability of reliable information. Poor countries have the highest NMRs, yet have the least information on deaths, including their causes and distribution.[34] This lack of information contributes both to non-recognition of the number of neonatal deaths and inadequate resource allocation and planning for care of newborn children. Panel 2[35] proposes indicators on which information should be obtained to measure progress in neonatal health. This information should be obtained at national and sub-national levels, and should be grouped by socioeconomic status, ethnic origin, and sex.

Panel 2: **Indicators for measuring progress**[35]

- NMR
- Coverage of antenatal care and tetanus toxoid vaccination
- Skilled care at birth
- Exclusive breastfeeding: proportion of newborn babies breastfed within 1 h of delivery; proportion of infants exclusively breastfed at 1 month and 6 months of age
- Postnatal care visit within 3 days of birth
- Proportion of births registered

Demographic and health surveys and multiple indicator cluster surveys (MICS) present opportunities for the collection of such country-representative information. These data are complemented in some countries with vital registration systems of high coverage. The health metrics network initiative is a welcome step to generate coherent information to guide progress towards the health-related MDGs, especially in developing countries.[36] Given the importance of neonatal health to reaching child mortality targets, vital registration should be strengthened and selected neonatal care and survival indicators included in all major surveys and routine health-systems' data.

Support for research

The development of interventions and implementation of guidelines depends on the availability of evidence of effectiveness of interventions in diverse settings. Research on intervention delivery strategies and health systems is a priority for achieving universal coverage of effective health interventions. As indicated at the recent World Summit for Health Research,[37] addressing these priorities will depend on a combination of national investments and political commitment, as well as global support for health-systems' research. Panel 3 identifies important gaps in our knowledge about neonatal survival as noted in this series.

A call to action

The child survival revolution of the 1980s and the early 1990s was associated with a reduction in deaths in children younger than age 5 years from 117 per 1000 livebirths in 1980 to 93 per 1000 in 1990.[38] This success was largely achieved by addressing mortality after the neonatal period with interventions such as immunisation and oral rehydration therapy, which could be delivered effectively through vertical and selective programmes even in low-income and middle-income countries.[39] The more difficult challenge of addressing the residual post-neonatal mortality and the core of neonatal deaths depends on interventions that span the continuum through the antenatal, intrapartum, and

Panel 3: Key research priorities for delivery of interventions for neonatal health[1–3]

- Improve information
  - Develop simplified case definitions for causes of deaths of newborn babies
  - Assess the performance of a standard verbal autopsy method and process
  - Design and test methods for maternal-perinatal audit in health systems
  - Improve measurement of morbidity and disability outcomes after neonatal complications
  - Refine programme indicators for maternal and neonatal health
- Assess interventions
  - Measure the effect and cost of packages of interventions for neonatal care in various health-system settings (eg, community-based extra care of babies with low birthweight, including kangaroo mother care)
  - Answer priority scientific questions about the prevention and treatment of infections, birth asphyxia, and preterm birth
- Strengthen implementation
  - Test new approaches to reach underserved populations, especially with intrapartum/early postnatal care (eg, using different cadres of workers, linking communities and the formal health system, equitable models to finance maternal and neonatal health care)
  - Measure the benefit and marginal cost of adding neonatal interventions to existing programmes (eg, HIV/AIDS, safe motherhood, IMCI)
  - Improve understanding and develop further community mobilisation and engagement strategies to promote behaviour change and creation of demand for health care
- Translate policy into action
  - Develop approaches to measure funding flows for implementation and research in neonatal health
  - Identify factors associated with successful implementation of national plans

postnatal periods. Millions of newborn lives could be saved with low-cost interventions provided they could be implemented in primary care settings. Most countries with high neonatal mortality could scale up many of these interventions in the short term, while putting in place longer-term strategies essential to strengthening the health system and achieving sustainable improvements in neonatal health outcomes. The global commitment to reduce mortality in children younger than age 5 years by two-thirds between 1990 and 2015 (MDG-4) is an unprecedented opportunity to reduce neonatal mortality. Now is the time to translate these policy imperatives into programmatic endeavours, to turn statements of intent into actions, and to generate the political will to address the problem. We call for the following actions:

At the national level

- By the end of 2005, set and publish national targets for the reduction of neonatal mortality, to be achieved by 2015.
- By the end of 2007, produce and publish a plan of action to reach the set neonatal survival targets to be implemented within maternal health and child survival programmes. This plan should be based on situation analyses, including a defined baseline NMR, be evidence-based, and specify strategies to reach the poorest families.
- Finance the implementation of the plan by identifying and mobilising internal resources, seeking supplementary external support where necessary.
- Implement the plan with defined targets and timelines.
- Monitor progress and publish results regularly.

At the international level

- Include NMR as an indicator for MDG-4, with a target of 50% reduction in NMR between 2000 and 2015.
- Leverage resources to meet the additional needs identified ($0·96 per person) 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 of national governments, international agencies, and non-governmental organisations in meeting their commitments to action for neonatal survival.

We invite readers to respond by advocating and bringing about change within their institutions, communities, and countries.

Lancet Neonatal Survival Steering Team
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Conflict of interest statement
We declare that we have no conflict of interest.

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