Benchmarks to measure readiness to integrate and scale up newborn survival interventions

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Neonatal mortality accounts for 40% of under-five child mortality. Evidence-based interventions exist, but attention to implementation is recent. Nationally representative coverage data for these neonatal interventions are limited; therefore proximal measures of progress toward scale would be valuable for tracking change among countries and over time. We describe the process of selecting a set of benchmarks to assess scale up readiness or the degree to which health systems and national programmes are prepared to deliver interventions for newborn survival. A prioritization and consensus-building process was co-ordinated by the Saving Newborn Lives programme of Save the Children, resulting in selection of 27 benchmarks. These benchmarks are categorized into agenda setting (e.g. having a national newborn survival needs assessment); policy formulation (e.g. the national essential drugs list includes injectable antibiotics at primary care level); and policy implementation (e.g. standards for care of sick newborns exist at district hospital level). Benchmark data were collected by in-country stakeholders teams who filled out a standard form and provided evidence to support each benchmark achieved. Results are presented for nine countries at three time points: 2000, 2005 and 2010. By 2010, substantial improvement was documented in all selected countries, with three countries achieving over 75% of the benchmarks and an additional five countries achieving over 50% of the benchmarks. Progress on benchmark achievement was accelerated after 2005. The policy process was similar in all countries, but did not proceed in a linear fashion. These benchmarks are a novel method to assess readiness to scale up, an important construct along the pathway to scale for newborn care. Similar exercises may also be applicable to other global health issues.

Keywords Maternal and child health, Millennium Development Goals, policy analysis, measurement, health systems, newborn, neonatal survival, scale up

KEY MESSAGES

- Interventions exist to improve neonatal survival, but policy attention is recent and in order to scale up these interventions they need to be integrated within existing health system packages at facility and community level.

- A list of 27 benchmarks was developed to assess status and changes in national readiness to implement newborn care interventions. Achievement of these benchmarks at three time points—2000, 2005 and 2010—was assessed by national teams in nine countries.
Introduction

Meeting the global Millennium Development Goal (MDG) 4 for child survival will be increasingly determined by reducing newborn deaths. Globally, more than 40% of deaths among children under five occur in the first month of life, resulting in 3.1 million deaths each year (UNICEF et al. 2011). This percentage is higher in Asian countries, where the majority of under-five deaths are neonatal. The African region has the slowest rate of reduction for neonatal mortality. Evidence-based interventions exist and, if these reached high coverage, more than two-thirds of the world’s newborn deaths could be prevented (Darmstadt et al. 2005). Yet newborn survival has only recently become a political priority at global level and in some countries (Lawn et al. 2005; Shiffman 2010; Smith and Neupane 2011).

The MDGs have focused increasing attention on maternal, newborn and child survival. The Countdown to 2015 for Maternal, Newborn and Child Health has promoted a focus on the equitable scale up of coverage for evidence-based interventions to address the main causes of death for women, newborns and children. Scale up is defined as ‘deliberate efforts to increase the impact of health service innovations successfully tested in pilot or experimental projects so as to benefit more people and to foster policy and programme development on a lasting basis’ (Simmons and Shiffman 2007; Simmons et al. 2007; WHO and ExpandNet 2009). While remarkable progress has been made in scaling up some more ‘vertical’ interventions, there is slower progress for health system packages (Lawn et al. 2010a; Mangham and Hanson 2010). Few countries have achieved implementation of newborn care interventions at scale, with the exception of high coverage of tetanus toxoid immunization in pregnancy (Lawn et al. 2012).

Several high-impact neonatal interventions lack national coverage data, e.g. Kangaroo Mother Care to improve survival of preterm newborns (Lawn et al. 2010b) or neonatal resuscitation with bag-and-mask for babies who do not breathe at birth (Lee et al. 2011). Therefore, proximal measures of progress toward scale would be valuable for tracking change among countries and over time. The standard evaluation framework applied in this supplement highlights the importance of intermediary markers of health systems change as a critical step towards increasing coverage and reducing deaths (Lawn et al. 2012). However, the question is which indicators can be used as markers of systems’ readiness to scale up?

For large-scale programme implementation, certain prerequisites must be in place, such as credible data on the magnitude and severity of the problem, policy for effective and feasible solutions, frontline workers accessible to the target population and enabled with essential supplies and training, and demand from families to access this care or alter behaviours. Within each country, specific actions are needed to translate the recognition of a given problem into policies and programmes to create the conditions for delivering these services and practices at scale (Shiffman and Smith 2007; Yamey 2011). Actions could include, for example, adoption of a national policy to provide postnatal care closer to home or at home for mothers and babies (WHO et al. 2009), or revisions in midwife curricula to include competency-based training for neonatal resuscitation. To improve newborn survival, a series of high impact interventions need to be integrated into both maternal and child health programmes at community and facility levels. While some interventions may be delivered through a common platform (e.g. Integrated Management of Childhood Illness), others must be adapted to local conditions, especially at community level.

Hence, there is no ‘one size fits all’ solution and a context-specific data-driven process is recommended (Knippenberg et al. 2005), starting with immediate opportunities to integrate newborn care within other programmes that are receiving major investments. Some governments have outlined national plans for newborn survival at scale (Mbonye et al. 2012; Rubayet et al. 2012; Pradhan et al. 2012). However, achieving scale is a complex and typically non-linear process, and standard measures along the continuum are needed to assess progress. In this paper, implementation at ‘scale’ refers to implementation at the national level. However, in some countries, such as Nigeria and India, this could refer to state or regional level implementation.

Scale up readiness can be understood with reference to the ‘stages heuristic’ of the public policy process (Brewer and De Leon 1983). Public policy scholars have outlined four phases of this process. The first phase, agenda-setting, is the issue-sorting stage where a handful of the hundreds of problems that exist gain the attention of social actors and national decision-makers. Policy formulation, the second phase, refers to deliberation surrounding policy alternatives, and the enactment of authoritative decisions concerning which of these to adopt. Policy implementation, the third phase, involves the execution of policy. Finally, evaluation concerns the assessment of policy impact. The stages heuristic has been criticized for being overly linear and ignoring the extent to which these phases are fused (Sabatier 2007); nevertheless many scholars find it a useful simplification of the policy process.

Understood in terms of the stages heuristic, scale up readiness concerns the extent to which agenda-setting, policy formulation and early implementation activities have been advanced in a given country, setting the stage for full-scale implementation of interventions, or packages of interventions, to improve newborn survival. This construct of readiness, or the ability of a system to adapt and plan to alter the current status at various levels, attempts to define and measure progress along the continuum in the stages heuristic (Beer and Walton 1987; Wanberg and Banas 2000; Holt et al. 2009). Global health initiatives have struggled to implement changes at scale, which requires long-term sustainable change in complex systems.
Measures along the continuum, such as readiness, are important proxies to assess progress.

The objective of this paper is to describe a methodology utilizing a set of benchmarks that measure scale up readiness, in terms of the degree to which the policy, health system and programmes of a given country are prepared to deliver newborn care interventions, or packages, at scale. We detail the development and process of collecting these benchmarks, present findings from nine varied high-burden countries measured at three time points across a 10-year period (2000, 2005, 2010), and posit applicability of this method to other global health initiatives.

Methods

Development of the benchmarks

Save the Children’s Saving Newborn Lives (SNL) programme is a global initiative funded by the Bill & Melinda Gates Foundation. It is working to improve neonatal survival in 18 countries that account for approximately two-thirds of global newborn deaths. Saving Newborn Lives operates by providing catalytic inputs to develop, test, evaluate and introduce new, adapted or existing effective, evidence-based newborn care interventions at scale. The Scale-up Readiness Benchmarks were developed by Saving Newborn Lives in its second phase, between 2005 and 2011, with inputs from a wide range of partners.

A review of the literature on scale up was conducted in addition to assessing other global health programmes and initiatives. We searched the PubMed database and grey literature for references related to scale up of health programmes, as well as those specific to newborn survival (Gericke et al. 2003; Greenhalgh et al. 2004; Gericke et al. 2005; Knippenberg et al. 2005; Cooley and Kohl 2006; IBP Consortium 2007; Simmons and Shiffman 2007; WHO and ExpandNet 2009; George et al. 2010). We also reviewed documents from Countdown to 2015 for Maternal, Newborn and Child Health (Countdown to 2015 2005), the Partnership for Maternal, Newborn and Child Health, the Maternal and Child Health Integrated Program (WHO 2011), and the integrated Community Case Management initiative.

Based on the literature, input from technical and policy experts, and experience of Saving Newborn Lives country and regional staff, 42 potential benchmarks, some with multiple sub-components, were selected relating to various factors and stages of system readiness for improving newborn survival and scaling up specific interventions. Target interventions were based on The Lancet Neonatal Survival series (Darmstadt et al. 2005) and focus on assessing system readiness for: antenatal and childbirth care; immediate newborn care (thermal care, breastfeeding, and clean delivery); neonatal resuscitation; Kangaroo Mother Care for management of low birthweight and premature babies; neonatal infection case management; and community-based pregnancy and postnatal care. A parallel process was conducted to select benchmarks that denote financial commitment. Thirteen technical experts in global health financing quantitatively ranked eight potential financial benchmarks (Supplementary Data Web Annex E). The two highest ranked options were: (1) Reproductive, maternal, newborn and child health expenditure per child under five and per woman aged 19–49, and (2) Costed implementation plan for maternal, newborn and child health is available. The first is recommended by the Commission on Information and Accountability for Women’s and Children’s Health (Working Group on Accountability for Resources 2011), and the second is routinely tracked by Countdown to 2015 (Cavagnero et al. 2008). We have assumed that these benchmarks are pre-conditions to delivering newborn interventions at scale in most settings.

A computer-based Benchmark Achievement tool was developed (Supplementary Data Web Annex B). We adjudged the achievement of the benchmarks by noting ‘Yes’ (achieved), ‘Partial’ (partially achieved) and ‘No’ (not achieved), mirroring the approach of the Countdown to 2015 Technical Working Group on Health System and Policy Indicators (Cavagnero et al. 2008). This system is currently the international standard for assessing change in the health system and policy realm. Standard definitions were developed for each of the benchmarks and incorporated into a questionnaire form. We pilot-tested this form with an initial 42 benchmarks in five countries, and based on the results, refined the questions. Based on this process and wider consultation, the list of 42 benchmarks was then reduced to 27 (Supplementary Data Web Annex A). Table 1 details the process of benchmark development and Box 1 describes how the selected benchmarks were prioritized.

SNL also developed a standard Policy and Programme Timeline instrument to capture changes between 2000 and 2010 in key policy, research and programme achievements for newborn health, including contextual factors (Lawn et al. 2012). When completed, this timeline outlined the major decisions and actions that influenced newborn survival at national level according to key in-country stakeholders, including Ministry of Health officials.

A process was undertaken in 15 of the 18 SNL countries to complete the Benchmark Achievement tool by SNL Programme staff. In nine countries, a more intensive process was initiated, where a series of stakeholder consultations was conducted to review and gain consensus on the benchmark scoring at each time period as well as the Policy and Programme Timeline. These nine countries, Bangladesh, Bolivia, Ethiopia, Malawi, Mali, Nepal, Pakistan, Tanzania and Uganda, were selected based on (1) high burden of neonatal mortality; (2) capacity of in-country staff; (3) availability of funding; and (4) health system structure around facility- and community-based interventions for newborn survival. In Nigeria and India, it was not possible to assess readiness for scale up at the national level given decentralization and variability among states. In Indonesia, Vietnam, Mozambique and Afghanistan, stakeholder meetings were not convened due to lack of funding.

The nine intensive countries followed a similar process to complete the readiness benchmarks. First, Saving Newborn Lives Programme staff scored the benchmarks on the Benchmark Achievement tool and completed the Policy and Programme timeline. Then, a stakeholder meeting (or series of meetings) and one-on-one interviews were convened to review and modify the timeline using a standard process and list of questions (see Lawn et al. 2012). Benchmark scores were then refined, based on the outcomes of this process. The national stakeholder consultations and one-on-one interviews were facilitated by a Save the Children staff person and included a
The collection and verification of the benchmarks was a time-consuming process. SNL programme staff spent on average 1 to 2 days to complete the benchmark tool, then between 2 and 5 days in consultation with external stakeholders to fill out the Policy and Programme Timeline and rescore the benchmarks based on feedback. Verification of supporting documents took between 1 and 2 days for each country, with follow up and discussion required to reach consensus on inconsistencies.

Data sources and analysis
Once data were collected by in-country teams (Supplementary Data Web Annex D) and verified by out-of-country reviewers through document review (Supplementary Data Web Annex C), several analyses were conducted. First, changes in benchmarks over time for all nine countries were assessed. Then benchmarks were divided into three categories using the ‘stages heuristic’ policy process, including: (1) agenda-setting; (2) policy formulation; and (3) policy implementation. The benchmarks included in each of these categories are listed in Table 2. Third, we analysed how newborn health policies evolved over time to address the major causes of newborn death, e.g. birth asphyxia, sepsis and low birth weight/prematurity. Benchmarks were also analysed for frequency of attainment as well as year of achievement.

Results
Changes in benchmarks over time: 2000 to 2010
For the nine countries assessed, achievement of benchmarks increased over time, with evidence of rapid change in some countries especially after 2005 (Figure 1). In 2000, the nine countries had achieved between 0% and 15% of the benchmarks. By 2005, progress had been made in Bangladesh, Mali and Bolivia with about half of the benchmarks completed. Between 2005 and 2010, Malawi, Uganda, Tanzania, Nepal and Pakistan made substantial progress, and by 2010, three countries (Nepal, Pakistan and Bolivia) had achieved about 80% of the benchmarks, while other countries, with the exception of Ethiopia, had achieved over half of the benchmarks. While Mali and Bangladesh made progress between 2000 and 2005, less progress was made between 2005 and 2010, which differs from the pattern seen in other countries where progress accelerated after 2005.
Given the burden of collecting data for 42 benchmarks, we sought to define a short-list of ‘sentinel’ benchmarks considered to be most critical for implementation at scale. We conducted a prioritization exercise to rate each benchmark on two criteria adapted from the Delphi policy literature: importance and feasibility of measurement (Turoff 2002). Importance was defined as ‘Is this benchmark a critical step along the pathway to implement evidence-based newborn interventions at scale?’ Feasibility of measurement was defined as ‘How feasible is it to accurately measure this benchmark in a standardized way across countries?’
Respondents scored each benchmark using a three-point scale (0 to 2) if they felt qualified to respond. Blank responses were excluded from the analysis. Thirty per cent of the 100 technical experts polled responded. Responses were entered into an Excel spreadsheet and average (unweighted) scores were calculated. A cut-off of ≥1.70 was applied based on distribution of the average scores. Using this cut-off, 13 benchmarks were retained for the importance criterion, 11 for the feasibility of measurement criterion, and 11 benchmarks retained overall (Table 1).

Save the Children convened a consultation with global health scale up experts in April 2011 to present the benchmarks, the methodology for collecting the data and the findings from the prioritization exercise. Participants included representatives from development partners, United Nations agencies, and donor organizations with expertise in maternal and newborn programming, as well as physicians, academics and policy experts. Based on discussions at this meeting, the list of benchmarks was reduced to 27. The group decided that it was premature to identify a smaller set of ‘sentinel’ benchmarks until additional data linking the benchmarks to changes in health system coverage and outcomes could be collected.

Highest ranking benchmarks in the prioritization process (score of ≥1.70) by importance and measurement criteria

<table>
<thead>
<tr>
<th>Importance (n=13)</th>
<th>Measurement (n=11)</th>
<th>Total (n=11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborn care integrated into other health programmes</td>
<td>National needs assessment for newborn health conducted</td>
<td>National needs assessment for newborn health conducted</td>
</tr>
<tr>
<td>Midwives authorized to perform neonatal resuscitation</td>
<td>Existence of a convening mechanism for newborn health issues</td>
<td>Midwives authorized to perform neonatal resuscitation</td>
</tr>
<tr>
<td>Midwives authorized to perform key maternal and newborn interventions</td>
<td>National newborn policy endorsed</td>
<td>Midwives authorized to perform neonatal resuscitation</td>
</tr>
<tr>
<td>Primary level cadres authorized to administer injectable antibiotics for newborn infections</td>
<td>Integrated Management of Childhood Illness algorithm adapted to include the first week of life</td>
<td>Primary level cadres authorized to administer injectable antibiotics for newborn infections</td>
</tr>
<tr>
<td>Primary level cadres authorized to perform neonatal resuscitation</td>
<td>National newborn policy includes community-based treatment of neonatal infections</td>
<td>Primary level cadres authorized to perform neonatal resuscitation</td>
</tr>
<tr>
<td>In-service newborn care training materials developed for community-based cadres</td>
<td>Midwives authorized to perform neonatal resuscitation</td>
<td>Newborn indicators included in national health information systems</td>
</tr>
<tr>
<td>In-service newborn care training materials developed for facility-based cadres</td>
<td>Primary level cadres authorized to administer injectable antibiotics for newborn infections</td>
<td>Newborn indicators included in national surveys</td>
</tr>
<tr>
<td>Pre-service newborn care education materials developed for facility-based cadres</td>
<td>Primary level cadres authorized to perform neonatal resuscitation</td>
<td>Focal person for newborn health established within the Ministry of Health</td>
</tr>
<tr>
<td>Cadre for home-based newborn care identified</td>
<td>National targets to track newborn health established</td>
<td>National targets to track newborn health established</td>
</tr>
<tr>
<td>Newborn care integrated into job description for facility-based cadres</td>
<td>National targets to track newborn health established</td>
<td>National targets to track newborn health established</td>
</tr>
<tr>
<td>Referral sites for newborn care strengthened</td>
<td>National targets to track newborn health established</td>
<td>National targets to track newborn health established</td>
</tr>
<tr>
<td>Newborn indicators included in national health information systems</td>
<td>Newborn indicators included in national surveys</td>
<td>Newborn indicators included in national surveys</td>
</tr>
<tr>
<td>Newborn indicators included in national surveys</td>
<td>Focal person for newborn health established within the Ministry of Health</td>
<td>Focal person for newborn health established within the Ministry of Health</td>
</tr>
</tbody>
</table>
Table 2 Categories of Scale-up Readiness Benchmarks

<table>
<thead>
<tr>
<th>Agenda setting (n = 6)</th>
<th>Policy formulation (n = 13)</th>
<th>Policy implementation (n = 8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>National needs assessment for newborn health conducted</td>
<td>National newborn policy endorsed</td>
<td>Cadre identified for home-based newborn care</td>
</tr>
<tr>
<td>Local evidence generated for newborn survival</td>
<td>Newborn policy integrated into other health policies or strategies</td>
<td>In-service newborn care training materials for community-based cadres</td>
</tr>
<tr>
<td>Local evidence disseminated on newborn survival</td>
<td>National behaviour change communication strategy</td>
<td>In-service newborn care training materials for facility-based cadres</td>
</tr>
<tr>
<td>Existence of a convening mechanism for newborn health issues</td>
<td>Essential drug list includes injectable antibiotics for primary level care</td>
<td>Pre-service newborn care education for community-based cadres</td>
</tr>
<tr>
<td>Focal person for newborn health in Ministry of Health</td>
<td>Midwives authorized to perform neonatal resuscitation</td>
<td>Pre-service newborn care education for facility-based cadres</td>
</tr>
<tr>
<td>Key maternal and newborn indicators included in national surveys</td>
<td>Community-based cadres authorized to administer injectable antibiotics for newborn infections</td>
<td>Supervision system for maternal, newborn and child health established at primary health centre level</td>
</tr>
<tr>
<td></td>
<td>Primary level cadres authorized to administer injectable antibiotics for newborn infections</td>
<td>Protocol or standard for district hospital care of sick newborns in place</td>
</tr>
<tr>
<td></td>
<td>Community-based cadres authorized to perform neonatal resuscitation</td>
<td>Integrated Management of Childhood Illness algorithm adapted to include the first week of life</td>
</tr>
<tr>
<td></td>
<td>Primary level cadres authorized to perform neonatal resuscitation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Key maternal and newborn indicators included in national health information systems</td>
<td></td>
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<tr>
<td></td>
<td>National targets to track newborn health established</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reproductive, maternal, newborn and child health expenditure per child under five and per woman aged 19–49</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Costed implementation plan for maternal, newborn and child health</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1 Number of Scale-up Readiness Benchmarks achieved by year and by country. Note: There are no data for the financial benchmark ‘Reproductive, maternal, newborn and child health expenditure per child under five and woman aged 19–49’. 
Changes in benchmarks by phase in the policy process

By 2010, countries had made the most progress in agenda setting compared with the other categories. Bangladesh, Nepal, Pakistan and Uganda had each achieved all agenda-setting benchmarks. Bolivia and Mali had also made substantial progress, with over 80% of benchmarks achieved in this category. In terms of policy formulation, Bolivia, Nepal, Pakistan, Tanzania and Mali had achieved around 70% or more of benchmarks by 2010. Progress on policy implementation varied, ranging from 88% of benchmarks achieved in Nepal, Pakistan and Bolivia to 38% of benchmarks in Bangladesh, Uganda, Tanzania and Mali (Figure 2).

Overall, in each country, a national newborn policy or strategy was endorsed or adopted by the Ministry of Health between 2000 and 2005; however, the elements included in this policy varied greatly. As evidence and experience advanced, these elements were broadened. For example, initial newborn policies mentioned the importance of newborn health and one or two key interventions (often focused on some elements of immediate newborn care and early breastfeeding) (Box 2). Other important elements of newborn care, such as home-based postnatal visits and Kangaroo Mother Care, were added later.

Frequency of benchmarks achieved

In the nine countries, the benchmarks that were most commonly achieved are presented in Table 3. In all countries, a national needs assessment was conducted and a convening mechanism was established to advance newborn health policy and programmes, either as a group that focused solely around newborn health or a wider body that also addressed safe motherhood and/or child health. Most of these nine countries were generating and disseminating local evidence for newborn health. All had a national policy for newborn health, either as a stand-alone document or integrated within maternal and/or child health policies. Countries were at various stages of identifying cadres to deliver newborn services as well as developing in-service training curricula and pre-service education for both community- and facility-based cadres.

Ensuring that appropriate drugs, equipment and supplies for newborns are included on the national essential drug and supplies lists is ongoing, with about half of the countries achieving this benchmark (Mali, Ethiopia, Uganda, Pakistan and Bolivia). All countries have adopted Integrated Management of Childhood Illness (IMCI), which includes a guideline for referral of sick newborns, but the implementation of this policy varied among countries. Strengthening of health systems in terms of supervision is a slower process, and five of the nine countries had achieved this by 2010. However, the majority of countries had a district-level protocol for care of a sick newborn in place. In addition, monitoring of coverage of newborn health programmes through health management information systems is slow, with achievement in only three countries (Nepal, Uganda, Tanzania); this process is underway in the six other countries.

Only six of the nine countries have identified a cadre to conduct home-based postnatal visits for the newborn: Nepal, Bolivia, Uganda, Ethiopia, Pakistan and Malawi. In Tanzania and Mali, identification and training of this cadre is in process, but had not yet been initiated in Bangladesh. At the primary health centre level (the lowest level facility), the majority of countries have authorized both injections for newborns to treat sepsis and newborn resuscitation. By contrast, few countries allow community-based providers to treat newborn sepsis and/or resuscitate newborns.

Figure 2 Proportion of Scale-up Readiness Benchmarks achieved (n = 27) in 2010 by category and by country  Note: See Table 1 for a list of benchmarks by category.
Box 2 Policy evolution for newborn survival interventions over time

Each country team was asked about the inclusion of selected newborn interventions in a national health policy or strategy in 2000, 2005 and 2010. These benchmarks were recorded according to the same criteria of ‘Yes’, ‘Partial’ and ‘No’ over the three time periods. The interventions considered were: (1) home visits for newborn care within 2 days of delivery and three visits within the first week of life; (2) immediate newborn care including thermal care, breastfeeding, and hygienic care; (3) facility-based Kangaroo Mother Care; and (4) community-based treatment of newborn infection.

Overall, each country reported a national health policy or strategy that included newborn interventions that was endorsed or adopted by the Ministry of Health between 2000 and 2005. However, in many countries, this overall policy did not include all of the elements listed above, but merely mentioned the importance of newborn health and one or two key interventions (often elements of immediate newborn care and early breastfeeding). In Bangladesh and Bolivia, the national newborn policy was endorsed at two separate time points due to changes in governments. Over time, most country policies were revised to include additional elements for newborn survival.

Adoption of postnatal home visits occurred later in all countries. Nepal adopted this practice in 2007, before the Joint Statement was released. Bangladesh, Pakistan and Uganda adopted these recommendations in 2009 and 2010. Bolivia included one postnatal care (PNC) home visit in the first week of life (not three) in its 2010 policy revision, and Malawi revised its policy in 2008 to include the first PNC home visit within 2 days after birth (as opposed to within 3 days). Mali has recently endorsed a policy for home-based PNC visits, and is in the process of creating a cadre of community-based workers to deliver this intervention. In Tanzania and Ethiopia, this process is underway.

In sub-Saharan Africa, all countries included in this analysis had Kangaroo Mother Care policies (Mali, 2008; Tanzania, 2008; Uganda, 2010; Ethiopia, 2005; Malawi, 2005). However, implementation varied significantly by country. In Asian countries in this analysis, Nepal reported a Kangaroo Mother Care policy (2007), as well as Bolivia in South America (2004).

National policies endorsing community-based management of newborn infection are rare, with the exception of Nepal. Operations research efforts are underway in Bangladesh and Pakistan to assess the feasibility of this activity at wide scale. In Bolivia, auxiliary nurses are authorized to provide a first dose of antibiotics and refer, but this policy has not yet been implemented. In Mali and Malawi, policies are in process to authorize community-based cadres to provide a first dose and refer. In Ethiopia, community-based health workers can treat pneumonia for children aged 2–59 months, and a research study is underway to assess the feasibility of identifying and treating neonatal sepsis at the community level. In both Tanzania and Uganda, community-based treatment is not recommended within the current policy environment. In Uganda, community-based workers are currently being trained to identify cases of neonatal sepsis and refer for treatment as part of the roll out of the Integrated Community Case Management programme. As newborn health programmes are rolled out at increasing pace, it will be important to improve national data and coverage and also document the quality of those interventions as well as the process of integration with other programmes, such as Safe Motherhood, Integrated Management of Childhood Illness and Community Case Management.

Table 3 Frequency of achievement of Scale-up Readiness Benchmarks, 2010

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>No. of countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completion of national needs assessment</td>
<td>9</td>
</tr>
<tr>
<td>Endorsement of national newborn health policy</td>
<td>9</td>
</tr>
<tr>
<td>IMCI guidelines adapted to include first week of life</td>
<td>9</td>
</tr>
<tr>
<td>Existence of convening mechanisms</td>
<td>8*</td>
</tr>
<tr>
<td>Integration into other health programmes</td>
<td>8</td>
</tr>
<tr>
<td>Focal person for newborn health in the Ministry of Health</td>
<td>8</td>
</tr>
<tr>
<td>Authorization for cadres at primary health centres to provide injectable antibiotics</td>
<td>7</td>
</tr>
<tr>
<td>Authorization for cadres at primary health centres to perform neonatal resuscitation</td>
<td>7</td>
</tr>
<tr>
<td>National behaviour change communication strategy</td>
<td>7</td>
</tr>
<tr>
<td>Dissemination of local evidence</td>
<td>7</td>
</tr>
<tr>
<td>Authorization for midwives to perform neonatal resuscitation</td>
<td>7</td>
</tr>
<tr>
<td>District-level protocol/standard for management of sick newborn in place</td>
<td>7</td>
</tr>
</tbody>
</table>

Note: *Ethiopia established a convening mechanism in 2005, but this group was not functional and the ranking was changed to ‘Partial’ in 2010.

Timing and patterns of achieving benchmarks

In most countries, the first benchmark(s) to be achieved were those related to authorizing providers at primary health centres to give injectable antibiotics to sick newborns (7/9) and to resuscitate (7/9) newborns not breathing on their own at birth. These benchmarks were often in place prior to 2000.

In six of the nine countries, the newborn health national needs assessment was completed between 2000 and 2002. Two countries, Uganda and Tanzania, completed this assessment in 2008 and 2009, respectively. In Ethiopia, a national child health situation analysis was conducted in 2003–04 which included newborn components. Within 1 and 3 years of the national needs assessment, research was initiated to test newborn health packages, and mechanisms for convening newborn health stakeholders were established in all nine countries. In three countries, Ethiopia, Uganda and Tanzania, research studies are still underway. Within an average of 3 years after the national needs assessment, Ministries of Health in seven of the nine countries had adopted a national policy for newborn health. In the remaining two countries, Uganda and Tanzania, policies were established before a needs assessment was completed. Soon after the policy was adopted, it was integrated into other health programmes (on average 1 to 3 years later). The exception is Bangladesh, where integration of national newborn policies into other health programmes is in process.
Typically, in-service training materials for community-based and facility-based health workers were developed after a national policy addressing newborn health was endorsed. However, in Pakistan, these materials were developed prior to national policy adoption (Khan et al. 2012). In Tanzania and Uganda, the development of training materials was not initiated until 2010. All nine countries have adapted Integrated Management of Childhood Illness to include the first week of life, including referral guidelines for sick newborns. Five countries reported a supervisory system for maternal, newborn and child health at the primary level, and seven reported having a district-level package for care of a sick newborn in place. Similarly, national monitoring of newborn indicators through target-setting is in progress, with six countries having set targets for newborn survival between 1 and 8 years after the national policy was endorsed (Bangladesh, Nepal, Pakistan, Uganda, Tanzania and Ethiopia).

Discussion

This benchmarking methodology allows quantitative assessment of policy, system and programme readiness to scale up newborn health packages over time and among countries. In the nine countries where we applied the methodology, remarkable progress has been made in readiness to scale up newborn health programmes in the last decade.

In most countries, progress appears to have accelerated since 2005. In Uganda and Tanzania, national needs assessments were not conducted until 2008 and 2009, respectively; however, both countries had achieved close to 60% of the total benchmarks by 2010, a similar number to Bangladesh and Malawi, where national needs assessments were conducted in 2001 and 2002, respectively (Rubayet et al. 2012; Zimba et al. 2012). The pressure to achieve MDGs by 2015 combined with availability of global evidence, such as The Lancet newborn survival series in 2005 and the subsequent multi-agency publication Opportunities for Africa’s Newborns (Lawn et al. 2006), may have contributed to this acceleration. The ability to build on experience from other countries and South-to-South learning may also have contributed. A similar finding was observed for countries adopting policies to prevent malaria during pregnancy; countries in West Africa were able to finalize and adopt policies more quickly based on learning and experience from East Africa (Newman et al. 2006).

Contextual factors clearly affect the ability to achieve readiness to scale up newborn health interventions. The structure and use of the health system influence which benchmarks are achieved, with regional variations evident. For example, in Asian countries, where the majority of births take place at home, high-impact interventions, such as treatment of newborn infections and resuscitation, were more likely to be implemented at the community level by community-based providers. In most African settings, where at least half of births take place in health facilities, strengthening of primary level facilities was the focus. It is essential to continue to assess the context of the health system and adaptation processes accordingly. For example, in Nepal, where 72% of births are at home (MOHP et al. 2011), resuscitation of babies not breathing at birth is currently part of the community-based newborn care package. However, in Malawi, Tanzania and Uganda, national endorsement of this intervention is unlikely since half or more of births already take place at a health facility and the emphasis is on increasing and improving care in health facilities. In addition, the current global recommendation is not for routine scale up of community-based neonatal resuscitation, but to consider this in some contexts (Lee et al. 2011). As the proportion of facility deliveries increases in Nepal (from 18% in 2006 to 28% in 2011) (MOHP et al. 2011), strengthening neonatal resuscitation at primary health centre levels will become more important. This illustrates the necessity of continuous monitoring of specific benchmarks over time and adapting policies and national programmes based on the changing context.

The achievement of some benchmarks is variable over time and can reverse. For example, in Ethiopia, a technical working group for child survival, including the newborn, was formed in 2005, but by 2010 was not meeting on a regular basis. The ranking therefore changed from ‘Yes’ to ‘Partial’ between 2005 and 2010. This potential reversal in countries was captured by collecting data over three time points; however, reversals may have happened between these time points that were not captured. For example, in Bangladesh, in 2004, the national policy was revised to include newborn survival. However, in 2006, newborn interventions were not included in the national health plan, which was then revised in the 2010 draft health plan. In 2005 and 2010 the responses were both ‘Yes’ for this benchmark, even though there was a reversal in 2006.

Other factors are also important, but vary by context and were not feasible to capture using this method, including the role of national champions for newborn survival, the political connections of individuals and their networks, as well as the presence of a strong civil society and influence from community groups. These factors can be captured via in-depth qualitative or social networking methods, and insights are also given through the story-telling methods associated with the Policy and Programme Timeline (Lawn et al. 2012). The benchmarks may need to be modified, in particular for fragile nations where the linkage of policy to implementation is especially challenging; this deserves more attention.

In this paper, countries were at various stages of ‘readiness’ based on what had been achieved by 2010. In some countries, ensuring newborn survival was on the national agenda preceded policy formulation and implementation (i.e. Bangladesh, Nepal, Pakistan and Uganda), while in other countries, policy formulation and implementation preceded agenda-setting (i.e. Malawi and Ethiopia). This finding reinforces the arguments of critics of the stages heuristic who point out that the policy process rarely proceeds in a purely linear fashion. Nevertheless, the stages heuristic helps us identify critical actions that have and have not been taken to inform next steps. In Ethiopia, for instance, it is possible that unless wider consensus-building agenda-setting is undertaken, it may make little difference that national policies have been formally adopted.

There are limitations and challenges in measurement and interpretation of these benchmark achievements. Data were collected retrospectively, so they may be subject to recall bias. Involvement of various stakeholders as well as extensive document review were undertaken to limit this bias, but documents were only reviewed to verify the ‘Yes’ responses, and there was no systematic process to verify ‘No’ or ‘Partial’ responses. In addition, we were not able to review all documents due to
unavailability of some documents and language barriers. One challenge is the level of effort required by country teams and by support staff to verify documents, though effort would be expected to be reduced with a more refined tool and if the number of benchmarks were reduced. As experience grows with the use of this benchmark survey tool, further refinements of the definitions for each benchmark will be important to ensure comparability across countries/regions. In addition, we collected the benchmarks in countries with a Saving Newborn Lives programme whose objective was in part to capture factors that the benchmarks measure, which may limit the generalizability of the findings. Collection of these benchmarks in non-Saving Newborn Lives countries is an important next step.

A crucial question is whether or not achievement of these Scale-up Readiness Benchmarks accurately predicts the likelihood of achieving coverage and impact of newborn health interventions at scale. According to the findings, Nepal, Pakistan and Bolivia should be poised to make the most progress. In Nepal, Malawi and Uganda scale up of a community-based newborn care package in particular is in process (Box 2). It is unlikely that all benchmarks are equally necessary for scale up. Further evaluation is therefore required to assess which benchmarks are most essential to have in place to promote and sustain implementation at scale, and whether these will translate into coverage change and mortality reduction, as proposed in our evaluation framework (Lawn et al. 2012). We also need to strengthen efforts to track the reach and strength of implementation.

The benchmarks and methodology outlined in this paper could be adapted, tested, collected and verified in a comparable research endeavour to assess feasibility in other global health initiatives such as maternal health, malaria, HIV/AIDS, tobacco control and others. One of the limitations of these benchmarks for newborn survival is the inability to assess their validity in predicting scale up, as few countries have yet implemented newborn interventions, or packages of interventions, at scale. Other global initiatives are more mature and have been implemented at scale in some countries. By adapting and testing these benchmarks in other global health initiatives, this relationship could be validated.

Conclusion
Measuring readiness for scaling up newborn care is of increasing global health importance. We have reported a new approach, using readiness benchmarks. This process provides a semi-quantitative method for tracking change in readiness to scale up over time and allows for examining variation among countries. Further evaluation will be important to ascertain validity of the benchmarks that are most related to accelerated changes in coverage of neonatal interventions and in newborn survival. We invite other practitioners to adapt this method and apply this construct of readiness as an intermediate measure of scale up to other global health initiatives.

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Conflict of interest
None declared.

Supplementary Data
Supplementary data are available at Health Policy and Planning Online.
BENCHMARKS TO MEASURE SCALE UP OF NEWBORN CARE


