RESULTS FOR DEVELOPMENT

# How to close the gap on MDGs 4 & 5 in Africa:

*Evidence to inform policy options*

**March 2014**

*A report for the World Bank*


Prepared by:

RESULTS FOR DEVELOPMENT INSTITUTE, WASHINGTON DC

*Shan Soe-Lin*

*Tae Min Kim*

*Milan Thomas*

*Julian Schweitzer*

*Robert Hecht*

Written in collaboration with:

*Olusoji Adeyi*

*Netsanet Workie*

WORLD BANK, WASHINGTON DC

## Executive Summary

The Millennium Development Goals (MDGs) have galvanized efforts to overcome the greatest obstacles to human development. However, progress towards MDGs 4 & 5 has been uneven, particularly in Sub-Saharan Africa which accounts for 3.5 million maternal and child deaths per year – representing half of the world's burden of mortality for these groups[1].

In the remaining 21 months before the December 2015 MDG deadline, a renewed and focused effort can accelerate progress toward the maternal and child mortality goals. Much evidence has been generated over the past decade about the essential interventions that must be delivered along the continuum of care to save the lives of mothers and children[2,3]. Less is known, however, about *how* these essential interventions can be rapidly and sustainably scaled up in the two year timeframe remaining for the MDGs, taking into account the variation in policies, demographics, governance structures, management capacity, and health system strength across Sub-Saharan African countries. To inform policy options, we summarize available evidence on delivery platforms that are rapidly scalable which have been shown to be effective in increasing coverage of services and can save lives.

We define delivery platforms as combinations of policy and resource choices which can result in large-scale coverage increases of equitable services. Examples of these policy and resource platforms include: mass immunization and other campaigns, community-based services, public-private partnerships, innovative financing mechanisms, and financial incentives. When effectively implemented, these delivery platforms reduce physical and financial barriers to access for consumers by influencing supply and demand. We confine ourselves in this note to delivery platforms within the health sector. Other interventions in, for example, girls' education, clean water and sanitation, rural electrification and reduction in household pollution can have large effects and need to be considered alongside health interventions[4].

Our analysis draws on evidence from national and sub-national health programs which have been scaled up rapidly, rigorous meta-analyses, Cochrane reviews, large commissioned reports including the forthcoming PMNCH "Success Factors" study[5], and interviews with experts from global organizations, academia, and NGOs. From this broad evidence base, we arrive at the following findings:

A. The countries that are on track to meet both MDGs 4 & 5 took different paths – there is no one combination of platforms or elements which guarantees success. The actions of these fast track countries were commonly anchored by a commitment to deliver a selective set of interventions through a limited combination of delivery platforms that were effective in reducing financial and physical barriers to access.

B. Rigorous evidence on delivery platforms is available for the following five areas: (1) mass campaigns; (2) EmOC access investments; (3) community-based delivery strategies; (4) vertically integrated programs; (5) public-private partnerships. They are not mutually exclusive; indeed, various combinations of these platforms have been used by successful countries. As an example, Niger deployed items 1, 3 and 4 for a limited number of high-impact services and achieved dramatic reductions in child mortality.

C. There is also encouraging evidence surrounding additional delivery platforms including incentives, results-based financing, and private sector service delivery. These are promising approaches and merit further exploration in combination with learning from implementation research. In addition, successful experiences surrounding market-based approaches to commodities delivery suggest that alternatives to the current centrally-procured and delivered models should also be considered.

The available evidence suggests a few strong candidates for delivery platforms which can accelerate access to and use of services and technologies in countries with large gaps to close to meet MDGs 4 & 5. These include mass campaigns, EmOC access investments, construction and use of maternal waiting homes, and strengthening of health outposts and supply chains. Although jumpstarting investment in these platforms will not necessarily result in full achievement of the MDG goals by 2015, many lives can be saved in the immediate term via these delivery platforms.

However, investing in these quick wins alone will not be sustainable without multiple essential medium-term (3-5 year) investments including: frontline health workers, financial incentives like vouchers and results-based financing, vertical integration, improved supply chain management of medical goods and commodities, and making better use of private sector capacity. These delivery platforms take longer to implement and scale, but in the right combinations will lead to more durable and sustainable outcomes.

In conclusion, there are opportunities for accelerated progress in the remaining months before the 2015 deadline through investments in quick-win platforms. In addition, investments that take longer to plan and implement can also yield substantial gains in the immediate post-2015 period and ensure sustainability. Overall, this is an agenda for urgent and focused action by committed governments and concerned development partners based on evidence from the literature and experience from successful countries. Our findings provide the basis for cautious but informed optimism on what can be achieved immediately and in the medium-term through the combined efforts and commitment at the national and global levels including ministries of health and finance as well as local and international development partners.

## Definitions

***Community Health Worker:*** ***Paid members*** of the community, who are a ***formal component*** of the health system, and ***empowered to deliver drugs*** and interventions. By our definition, CHWs act as an extension of the formal health system, are adequately trained and supplied according to standards, and are supervised by their referral health center to deliver curative treatments in addition to performing active case finding and outreach services.

***Countdown Countries:*** The 75 countries that bear 95% of the global maternal and child mortality burden.

***Delivery Platform***: Combinations of policy and resource choices that can result in large-scale coverage increases of equitable services. Examples of these policy and resource platforms include: mass immunization and other campaigns, community-based services, public-private partnerships, innovative financing mechanisms, and incentives

***High-Burden:*** The 10 highest-burden countries for maternal and child mortality: Nigeria, Democratic Republic of the Congo, Ethiopia, Angola, Kenya, Uganda, Tanzania, Niger, Sudan and Mozambique.

***Large-Scale:*** Affecting national or significant sub-national populations.

***Promising Evidence:*** Existence of several robust examples of significant impact on increased coverage for which rigorous reviews have not yet been able to confirm direct causality conclusively.

***Strong Interventions:*** Interventions that are supported by a strong evidence base, preferably on a national scale, and effective at increasing coverage and quality of services. Proven interventions are also cost-effective.

***Strong Platforms:*** Mechanisms for delivery and financing which successfully increase coverage and utilization, supported by a strong evidence base, preferably on a national or sub-national scale.

***Rapid Scale-Up:*** Interventions which could feasibly be scaled in an 18-24 month time period.

***Strong Evidence:*** Confirmation of causality by rigorous meta-analyses or systematic reviews

***Success Factor Countries:*** Countries that are on track as of 2012 to meet their MDG 4 & 5 goals. These countries include Peru, Egypt, Rwanda, Ethiopia, Nepal, Bangladesh, Laos, Cambodia, Vietnam and China.

## Abbreviations

ACTs – Artemisinin-based Combination Therapy
AMFm – Affordable Medicines Facility - malaria
ANC – Antenatal Care
ANC+ – Antenatal Care plus intermittent preventative treatment of malaria
APOC – African Programme for Onchocerciasis Control
ARV – Anti-Retroviral drugs
CCT – Community Cash Transfers
CHERG – Child Health Epidemiology Reference Group
CHW – Community Health Worker
CIDA – Canadian International Development Agency
ComDT – Community-Directed Treatment network
DFID – Department for International Development
DOTS – Directly Observed Treatment, Short-Course
DRC – Democratic Republic of the Congo
DTP3 – Diphtheria-Tetanus-Pertussis vaccine
EmOC – Emergency Obstetric Care
EPI – Expanded Program on Immunization
FCHV – Female Community Health Volunteer
HMIS – Health Management Information System
HRITF – Health Results Innovation Trust Fund
ICDDR, B – International Center for Diarrheal Disease Research, Bangladesh
ICCM – Integrated Community Case Management
IFM – Innovative financing mechanisms
IMCI – Integrated Management of Childhood Illness
IPTp – Intermittent Preventive Treatment of malaria in pregnancy
ITN – Insecticide Treated Nets
MCH – Maternal and Child Health
MDG – Millennium Development Goals
MDG 4 – Reduce by 2/3 the under-5 mortality rate, between 1990 and 2015
MDG 5 – Reduce by 3/4, the maternal mortality ratio between 1990 and 2015
NGO – Non-Governmental Organizations.

NORAD – Norwegian Agency for Development Cooperation
OCP – Onchocerciasis Control Programme
ORS – Oral Rehydration Salts
PEPFAR – President's Emergency Plan for AIDS Relief
PIH – Partners in Health
PMNCH – The Partnership for Maternal, Newborn and Child Health
PPP – Public-private partnerships
RBF – Results-based Financing
RCTs – Randomized control trials
REMO – Rapid epidemiological mapping of onchocerciasis
SIAs – Supplementary immunization activities
SSA – Sub-Saharan Africa
SUZY – Scaling-Up of zinc in early childhood
TFR – Total Fertility Rate
UHC – Universal Health Coverage
UNDP – United Nations Development Programme
WHO – World Health Organization

## Table of Contents

# 1. Introduction

Given the global commitment to MDGs 4 & 5, the relatively short window remaining before the 2015 deadline, and the strong body of evidence regarding which technologies and services are most effective in saving lives, we have examined options for how rapid progress could be accelerated and which delivery platforms could be used to achieve this progress with a focus on Africa. An implicit assumption of our report is that the global community will be willing to commit additional resources in the coming months to support a final and aggressive push towards meeting the health-related MDGs, which could save many lives in the near-term (if they are convinced that this is feasible). It was beyond the scope of this report to estimate the additional costs.

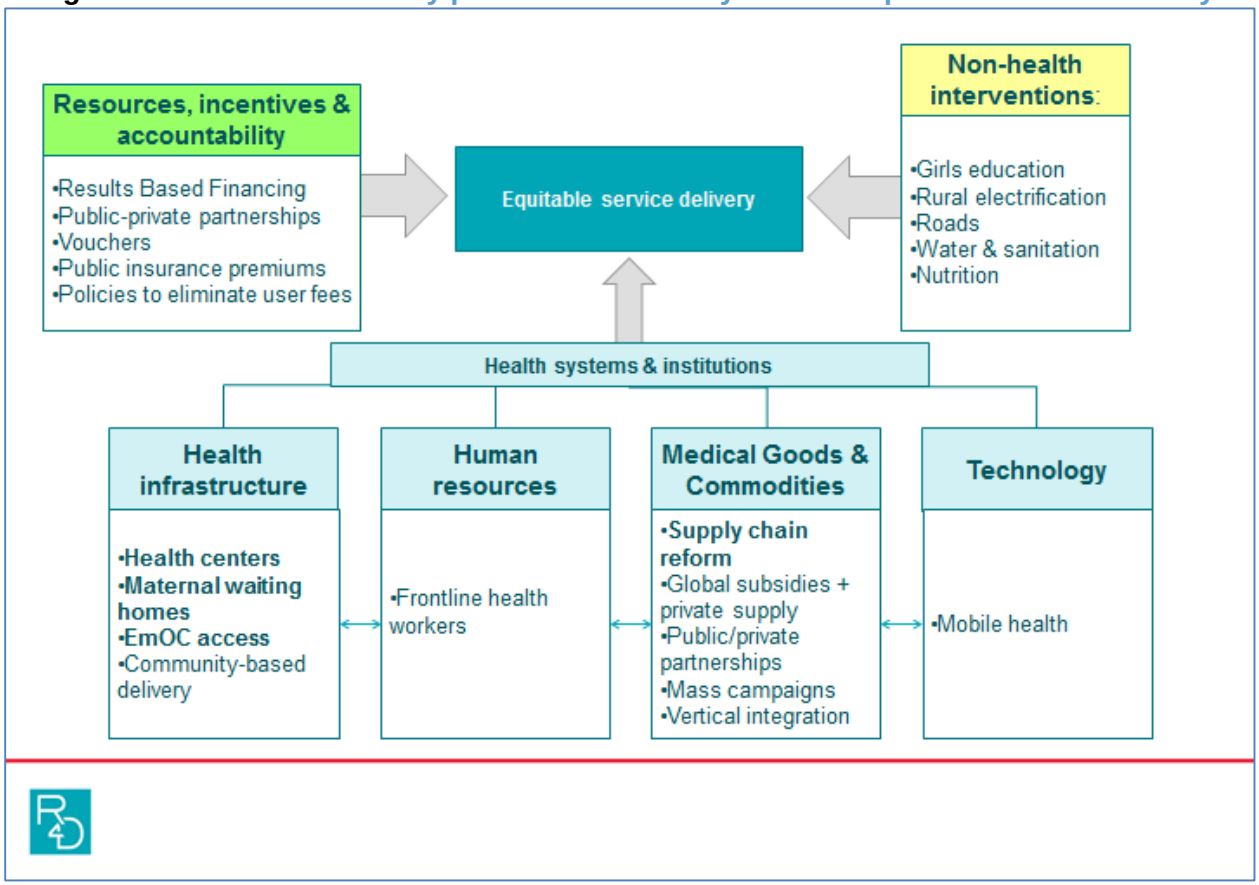
We define delivery platforms as combinations of policy and resource choices which can result in large-scale coverage increases of equitably-distributed services. Examples of these policy and resource platforms include: mass immunization and other campaigns, community-based services, public-private partnerships, innovative financing mechanisms, and incentives. When effective, these delivery platforms reduce physical and financial barriers to consumer access by influencing the demand for health services and the supply response of service providers. High-performing countries have used varying combinations of these delivery platforms, often involving mass campaigns and frontline health workers, to provide coverage while simultaneously strengthening their health system.

**Figure 1** depicts illustrative delivery platforms derived from the WHO building blocks[6], which in different combinations and dependent on context are necessary to drive widespread and equitable service delivery. It is important to note that this Figure does not describe all possible delivery platforms, but instead a number of platforms for which there is either strong or promising[a] evidence of large-scale impact on increasing service coverage.

[a] Strong evidence denotes confirmation by rigorous meta-analyses, or systematic reviews. Promising evidence includes platforms where several robust examples exist of significant impact on increasing coverage, but for which rigorous reviews have not yet been able to confirm direct causality.

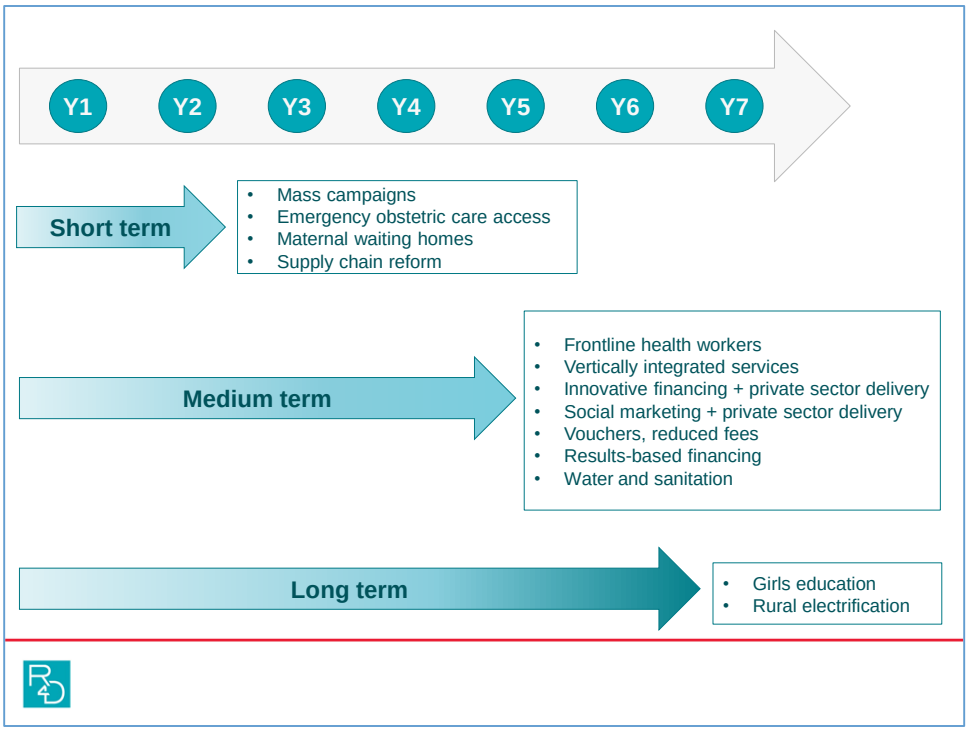
Although this report will confine its discussion to health-platforms, it is important to keep in mind that there are a number of interventions outside the health sector like girls' education, sanitation, rural electrification, and nutrition that have also been found to have significant impacts on health. Delivery platforms in **bold** denote those which can achieve impact in less than 2 years when conditions are optimized.

**Figure 1:** Illustrative delivery platforms necessary to drive equitable service delivery




We have structured the report to first describe the evidence regarding the strong and promising platforms shown in **Figure 1** independent of the time required for implementation. The discussion of evidence is then followed by analysis of the timeframes required for planning and implementation. Although there are good indications from high-performing countries that combinations of platforms can be successful when implemented and managed correctly, the hard reality is that the majority of these platforms cannot be planned and implemented in just 20 months. With the exception of a few platforms such as mass campaigns, improving access to emergency obstetric services (EmOC), and continuing to strengthen health centers and reforming supply chains, the remaining platforms require a timeframe between 3-5 years to fully bear fruit. The timelines for expected impact are detailed in **Figure 2** below.

**Figure 2:** Timeline for impact of selected delivery platforms




Despite these limitations, we conclude that countries with large gaps to close in order to meet their MDG goals could still accelerate progress by implementing a tandem approach of immediately deploying some of the strong platforms that can deliver rapid results while continuing to invest in and strengthen the platforms that take longer to build and which will form the core of a durable and sustainable health system.

The strength of evidence and timeframes for implementation are summarized in **Table 1** below:

**Table 1: Summary of evidence and timeframe for impact for delivery platforms discussed in report**

| | Short-term time to impact (2 years) | Medium-term time to impact (3-5 years) |
|---|---|---|
| **Strong evidence** | • Mass campaigns<br>• Supply chain reform | • Frontline health workers<br>• Vertical integration<br>• Vouchers/CCTs<br>• Public insurance |
| **Promising evidence** | • Construction and use of maternal waiting homes<br>• Ambulance referral strengthening | • Mobile health<br>• Private sector delivery<br>• Elimination of user fees<br>• Results-based financing |

## 2. Experience from successful countries

Despite the intensive global effort to achieve the health-related MDG goals, only 10 countries[b] are currently on-track to meet both their MDG 4 & 5 goals by 2015[7]. Interestingly, these 10 countries described in the PMNCH "Success Factor" studies all had very different starting contextual advantages and disadvantages, yet were still able to rapidly reduce maternal and child mortality. We will examine evidence from rigorous studies on these 10 countries, as well as our own analysis of a subset that have made recent accelerated progress in either maternal or child mortality, to arrive at recommendations on platforms which can be adopted by high-burden countries to capture similar success in short-to-medium timeframes.

The Success Factors study, undertaken by the Partnership for Newborn, Maternal and Child Health, performed an exhaustive and rigorous statistical analysis of trends across 144 low- and middle-income countries over the past 20 years, to try to identify key factors employed by the fast track countries to meet their MDG goals[4,5].

[b] Countries on-track to achieve **both** MDG 4 & 5 goals include: Peru, Egypt, Rwanda, Ethiopia, Nepal, Bangladesh, Laos, Cambodia, Vietnam & China

The authors concluded that the 10 highest performing countries employed a variety of strategies depending on country context. However, there were some strategies across key policy domains common to all successful countries, which included: significant investments in health, employing value for money strategies, targeting interventions and strengthening systems, and making key health related investments outside of the health sector including girls' education, rural electrification, water and sanitation.

Our own analysis of a number of high-performing countries (including Bangladesh, Malawi, Nepal, Niger, and Rwanda) that are on a fast-track for either or both MDGs 4 & 5 arrived at similar conclusions. There was no one path, or common combination of particular delivery platforms, that was a guarantee of success. However, we found that these successful countries did share a common focus on selectively delivering a few key interventions, often through mass campaigns, and also worked to quickly reduce physical and financial barriers to access through various delivery platforms as summarized in **Table 2**. More detailed examinations of each country's successful strategy can be found in **Annex B**.

The combination of evidence from these studies suggests that effective strategies to rapidly reduce maternal and child mortality rates will have to be implemented through a combination of delivery platforms customized to each country's particular context and challenges. In addition, the diversity of fast track countries (including Bangladesh, Nepal, and Rwanda, countries which might have seemed like unlikely success stories at the outset of the MDG effort given the magnitude of their starting health challenges) suggests that success is indeed possible regardless of the degree of starting challenges, provided that the right combinations of delivery platforms are effectively deployed.

**Table 2: Summary of short- and medium-term delivery platforms deployed by high-performing countries**[8]

| Country | MDG 4 status | MDG 5 status | Delivery platforms deployed |
|---|---|---|---|
| **Niger** | **On track** | **Accelerated progress** | Mass campaigns, health center strengthening, frontline workers |
| **Rwanda** | **On track** | **On track** | RBF, insurance premiums, frontline health workers |
| **Malawi** | **On track** | **Accelerated progress** | EmOC access, frontline workers, essential care packages |
| **Bangladesh** | **On track** | **On track** | Frontline workers, vouchers, mass campaigns |
| **Nepal** | **On track** | **On track** | Mass campaigns, frontline workers, vouchers |

## 3. Evidence on strong delivery platforms, some of which can be scaled up quickly

In the following section we provide a discussion of delivery platforms that have high impact on increasing coverage of essential services as supported by rigorous evidence. They are outlined below in **Table 3**. This is a short list, reflecting the generally limited body of evidence surrounding implementation and pointing to the broad need to expand data collection and analysis of the impact of delivery mechanisms.

**Table 3:** Summary of strength of evidence and impact of strong delivery platforms

| Delivery platform | Strength of evidence/impact | Source |
|---|---|---|
| **Mass campaigns** | Strong - Can double proportion of fully vaccinated children. | WHO, systematic reviews[9,10] |
| **Frontline health workers** | Strong - Can increase uptake of immunization, breastfeeding promotion, and diagnosis and treatment of selected infectious diseases. | Cochrane reviews, other systematic reviews[11–14] |
| **Vertical integration** | APOC: Eliminated onchocerciasis in 10/11 countries, and covered 30M people. Other examples include bednets, immunization. | WHO, systematic reviews[15,16] |
| **Innovative financing mechanisms and private sector delivery** | Global co-payment has reduced cost by 80% to private importers and subsidized 300M ACT treatments in 8 countries in AMFm. Significant increases in availability and affordability at retail level within 6-15 months. | Independent evaluation[17] |
| **Vouchers/CCTs** | Strong – Increases utilization; mortality reduction dependent on availability of quality services | Meta analyses, systematic reviews, project reports[18,19] |
| **Public insurance schemes** | Strong – Various forms of health insurance shown to increase utilization and coverage in Africa and Asia. | WHO systematic review[20] |

### Mass campaigns for delivery of life-saving interventions like vaccinations and bednets:

Childhood vaccination is widely recognized as an essential lifesaving intervention with well-proven benefits[21]. Despite the widely accepted importance of vaccination and global progress made in the last decade, immunization coverage rates are still short of targets and are plateauing, or even decreasing, in many parts of the world[22].

Furthermore, although strengthening routine immunization efforts at health centers has been ongoing for several decades, uptake of vaccinations through routine immunization platforms has been highly variable [23].

In order to supplement routine vaccination efforts, mass campaigns have been effective in increasing coverage through supplementary immunization activities (SIAs). SIAs aim to immunize a large population over a short period of time and are often conducted outside of the normal healthcare setting through targeted outreach. SIAs have been demonstrated to be effective in widely increasing coverage of vaccinations against typhoid, measles[24,25], polio[26], HPV[27,28] and cholera[10] across many different country settings.

Despite some identified issues[c], SIAs have been credited with many of the gains against child mortality made by Niger, Bangladesh and Nepal, and have also been effective even in conflict settings like DR Congo[25]. SIAs are also increasingly being used to quickly deliver multiple interventions like vitamin A supplementation and screening for severe malnutrition, alongside immunization delivery[29]. Successful SIAs require coordination, involvement of frontline health workers, social promotion, and strong management to achieve impact. Further, they have been found to be most useful when introducing a new vaccine[28] as well as in reaching people who are congregated in areas with little access to health infrastructure[9]. Carefully designed and executed SIAs can deliver rapid gains in the short-term while routine immunization efforts are strengthened.

**Extending the reach of the health system through community-based services:**

The concept of CHWs is not new, and lay health workers have been used in a variety of ways dating back to the inception of China's Barefoot Doctor rural health program in the 1920s. Systematic reviews have found mixed results regarding the effectiveness of CHWs in reducing child and maternal mortality[30,14].

[c] Experience in South Africa with SIAs against measles integrated with Vitamin A supplements and oral polio vaccine found that while the campaigns were effective in increasing measles coverage, the campaign itself was associated with significant decreases of the total number of fully-immunized children, contraceptive use, antenatal visits, and routine immunization coverage[120,121], perhaps due to diversion of resources and disruption of routine child and maternal services[120].

However, direct comparison of CHW programs is difficult, when each program varies significantly in design and implementation.

From the literature[31,32,33], it is clear that CHW programs can be highly effective in increasing coverage of essential interventions and reducing mortality when CHWs are:

1. Professionalized and integrated into their target health center
2. Continuously trained, supervised and monitored by their target health center
3. Compensated (versus volunteer) through pay-for-performance mechanisms
4. Providing services to their clients free of charge
5. Empowered to carry and dispense drugs, and are adequately supplied
6. Responsible for active case-finding and outreach

CHW programs have been less effective when any one of these essential features has been absent[34]. When used appropriately, CHWs are able to diagnose and treat malaria, pneumonia, and severe malnutrition in the community as effectively as medical professionals at the health centers[35–37]. CHWs are also effective in promoting family planning, increasing exclusive breastfeeding practices, and ensuring adherence to treatment regimens like DOTS and ARVs at the community level[19].

The effectiveness of CHWs is diminished, however, when national policies confine the health workers' responsibilities to only advocacy and limit the ability of CHWs to diagnose and treat their patients. Overcoming this obstacle may require negotiations with medical associations and unions. Inadequate supplies and insufficient training/supervision erode community trust and limit the potential power of a well-functioning CHW workforce, even when strong policies empowering CHWs to diagnose and treat are in place.

Integration into the formal health system, with strong supervision by health center management, is also critical. Impact assessments have found greater effectiveness when CHWs formed strong linkages and referral services to health centers[30] .

Pay-for-performance and compensation are essential components of a fully powered CHW program[38,39], and there is abundant evidence which indicates that compensated CHW programs achieve higher coverage rates and perform better than a volunteer workforce[40]. Pay-for-performance mechanisms incentivize the essential active case-finding functions of the CHW and have been shown to increase ANC attendance and vaccination coverage[31].

CHW programs can be a versatile extension of the health system, and are currently under-used or not well-designed in many of the high-burden countries. Table 4 shows that the implementation status of integrated community case management (ICCM), which is delivered through CHW delivery platforms, is generally low and under-utilized in high-burden countries like Nigeria, DR Congo, and Uganda.

Countries with better coverage rates, and larger paid CHW workforces (like Ethiopia, Malawi and Niger) are making faster progress. High-burden countries have much room to strengthen CHW delivery platforms by increasing payment to incentivize performance and retention, and also scaling up the workforce.

**Table 4: Implementation status of ICCM in select countries**[40]

| | Tanzania | Malawi | Ethiopia | Uganda | Niger | Mozambique | Kenya | Nigeria | DR Congo |
|---|---|---|---|---|---|---|---|---|---|
| **<5 mortality rate (2005-2010)** | -7.3 | -7.1 | -7.0 | -6.3 | -6.2 | -5.08 | -4.1 | -3.5 | -2.1 |
| **ICCM coverage** | <15% | 50-79% Went to scale in 2011 | 60% coverage with HEWs | 24/112 districts national launch, 2010 | 100% Went to scale in 2011 | 11/128 launch 2010 | 2/8 provinces, Launch 2012 | 2/36 states, launch 2013 | 2% |
| **Compen-sation** | Volunteer | Paid | Paid | Volunteer | Paid | Volunteer | Paid | Mixed | Volunteer |
| **Activities** | Mainly outreach; limited malaria treatment | ICCM | Outreach, education, malaria treatment | ICCM | ICCM | ICCM | Outreach, education, malaria treatment | ICCM | ICCM |

Below average | Average | High-performing

CHW programs require a great deal of coordination, management, and training capacity as well as the presence of well-equipped health facilities and supply chains to function as a fully-powered extension of the health system. In settings where governance capacity is weaker, CHW programs managed by NGOs may be the preferred option as has been achieved elsewhere on both small and large scales[38,41,42].

There may be some fatigue among the global health community, given the number of CHW initiatives that have been launched in the past 3 decades and the mixed results that have resulted from the investments[30].

However, there is increasing evidence and realization that strengthening health centers alone is not enough to ensure widespread coverage of essential interventions, especially when low care-seeking behavior by parents, particularly with regards to pneumonia, malaria and diarrhea treatment, persists even with treatment made freely available at health centers [43,44]. Active case-finding by CHWs has been shown to provide a crucial link in order to shorten the time to treatment for these illnesses thus increasing child survival[38].

CHWs are often one of the few ways to extend the reach of the health system to remote and isolated populations. In addition, the activity of CHWs is vital to support other delivery systems described in this report, including mass campaigns and other vertical programs. The WHO estimates that CHWs are present in at least 22 African countries[45], but policies governing their tasks and responsibilities, and the design of each program varies greatly[46]. Strengthening of existing CHW programs, in order to align with the six principles of successful CHW programs as described above, can lead to rapid progress by making better use of existing resources.

**Community-Directed Vertically Integrated Strategies:**

The highly successful APOC (African Programme for Onchocerciasis Control) campaign succeeded in largely controlling river-blindness. Through the combination of an innovative and unique partnership with Merck (who donated the Mectizan treatment), effective use of rapid epidemiological mapping of onchocerciasis, sustained focus by all stakeholders including the World Bank, the WHO and other partners over two decades, and participation by the affected communities themselves in 19 countries, an at-risk population of 150 million people are now protected from river-blindness and 40,000 new cases are prevented every year[15].

The APOC program has pioneered a strategy of community-directed treatment which has been a large factor in the program's success. Over 100,000 communities in the 19 affected countries have been mobilized into a community-directed treatment network (ComDT), taking full responsibility for developing the strategy of comprehensive drug distribution, from selection of a local distributor to adaptation of the delivery itself to local culture and conditions. Treatments have to be reapplied annually, and the community-directed strategy has been highly effective in increasing coverage rates every subsequent year[15], including in remote populations[47].

The success of the APOC program offers lessons on how community-directed treatment strategies and vertically-integrated programming can be successful in contexts outside of onchocerciasis control and can benefit overall health system strengthening.
The ComDT system has since been leveraged as a successful entry point for other community-directed interventions in remote communities which have limited access to existing health systems[48].

Some countries have used the ComDT network as a conduit for the expansion of selected primary healthcare services through the APOC coordinators, who are often the only health workers who are able to reach every village[49]. The APOC program also has focused on strengthening African management capacity, training thousands of government workers.

The distribution network created by APOC, as well as other vertically-integrated programs with similar reach[d], provide a framework that can be integrated with and increase coverage of other key interventions including malaria control, maternal and child health interventions, and nutrition and immunization[16]. For example, a multi-country study found that home management of malaria, coupled with outreach by the APOC ComDT network resulted in a doubling of children being treated for malaria[50,51]. Similarly, the same study found that possession and use of long-lasting, insecticide-treated bednets was twice as high in communities implementing APOC's community-directed intervention than in control communities[51].

**Innovative financing mechanisms and private sector delivery:**

The Affordable Medicines Facility–-malaria (AMFm) was launched across 8 countries in 2010 to expand access to artemisinin-based combination therapies (ACT). In some malaria-endemic countries, over 60% of patients seek care through private sector channels which may sell cheaper older-generation chloroquine anti-malarials (which are increasingly ineffective due to growing resistance) and artemisinin monotherapies (which increase the risk of resistance). AMFm was designed as a public-private partnership to provide a global subsidy to ACT manufacturers and guarantee a market for bulk orders, which was anticipated to lower the price for the end-user and thus "crowd out" the less effective and otherwise cheaper treatment options.
The program was also supported by mass public education and marketing campaigns to increase demand for the AMFm products.

[d] Other similar ongoing vertical programs for neglected tropical diseases in Africa include: Schistosomiasis Control Initiative, Partnership for Parasite Control, International Trachoma Initiative, Global Alliance to Eliminate Lymphatic Filiariasis, WHO Programme to Eliminate Sleeping Sickness[50]

To date, AMFm has subsidized over 300 million ACT treatments, financed by $336 million from UNITAID, DFID, CIDA, and the Bill and Melinda Gates Foundation. Independent project evaluations determined that the AMFm approach was successful in rapidly improving availability, price, and market share of ACTs, and that delivery through the private sector was highly effective[17]. However, critics cite the lack of evidence that the increased use of ACTs had an effect on reducing malaria mortality, especially since malaria diagnostics were not used as a pre-requisite for ACT dispensing. In addition, the very short time-frame of the program of 2 years may have limited its measurable impact. Although AMFm has not been able to demonstrate an effect on reducing malaria mortality, the architecture of the program offers insights into how quickly the private sector can be mobilized and also the speed with which price and availability of essential health commodities can be influenced by global co-payment mechanisms. Given the well-known inefficiencies in publically-run drug procurement and distribution systems[52], the management of pharmaceutical supply and delivery systems is ripe for improvement[53].

### Vouchers/Conditional Cash Transfers:

Vouchers are designed to provide financial incentives to increase uptake of health services. Voucher programs typically involve distribution of coupons to target demographic groups (e.g. poor pregnant women in the case of maternal health voucher programs) which can be exchanged at the community or clinical level for health services. Vouchers directly alleviate the financial burden associated with care-seeking, and thus increase uptake of health services. Successful voucher programs give consumers greater choice in selecting providers, and can also improve provider behavior as a result.

The evidence of voucher programs' positive impact on utilization is strong[19] and applicable across a variety of settings. A review of 15 studies of 7 voucher programs for reproductive health services in developing countries finds positive impacts of vouchers on service utilization, but noted that success can be hindered by geographic barriers (i.e. contexts where the non-monetary costs of accessing care are very high)[54]. However, it is unclear whether the impact of vouchers can extend beyond utilization to affect mortality. Evidence from 24 studies on 16 health voucher programs found mixed evidence on the impact of vouchers when looking at other health outcomes[55]. Thus although there is strong evidence that vouchers can increase the uptake of essential maternal and child health services, voucher programs are likely to be successful in reducing maternal and child deaths only in settings where there are significant financial barriers to access and where services of adequate quality exist.

In addition to increasing utilization of maternal health services, vouchers have been used to increase bednet ownership and use. Tanzania has made its voucher program (TNVS) a primary policy delivery platform for 7 years. It has been estimated that 90% of eligible beneficiaries are reached and 80% of vouchers are redeemed[18].

Tanzania's bednet voucher program success has been supported by strong coordination between partners, manufacturers, and public and private delivery systems. In contrast, Ghana also began planning for a voucher-based distribution system for bednets, but was not able to advance the program past the pilot phase, mainly due to competition from parallel delivery strategies funded by different donors and failure to fully engage the private sector[18].

These two contrasting examples demonstrate that vouchers can be highly effective in increasing bednet ownership and use, provided that governments and all partners can be aligned in support of a common national approach.

### Broad public insurance schemes

There is emerging evidence that a broad, ideally population-wide, pre-payment system for health services, especially under some form of public health insurance or government-mandated scheme, can be a powerful platform for expanding coverage[56] and increasing utilization of key interventions that can help to lower maternal and child deaths[57].

There are numerous examples where public insurance has increased coverage for target populations. Rwanda has successfully used its *Mutuelles* community-based insurance scheme to increase coverage of maternal and child health services and to also provide protection against catastrophic health payments. A quantitative impact evaluation found that the *Mutuelles* program successfully increased utilization and the financial protection offered by the program contributed to a major decrease in maternal, infant, and child mortality achieved by Rwanda during the same time period[58].

Similarly, Mexico's *Seguro Popular* (Popular Health Insurance) has also been credited with increasing coverage of skilled birth attendance and antenatal care within its first two years[59] and had resulted in positive impacts on maternal mortality and reduction of inequality[60]. Further, Ghana's national health insurance scheme has been found to significantly increase utilization of key maternal services and promote care-seeking behavior[61,62]. A recent WHO systematic review of low- and middle-income countries in Africa and Asia found strong evidence that social- and community-based health insurance schemes were strongly associated with increasing utilization and providing financial protection.[20]

Although evidence is strong that health insurance schemes can contribute significantly to increasing coverage for target populations, including the women and children at risk under MDGs 4 & 5, the schemes must be designed appropriately with consideration for their ability to sustainably contribute to the universal health coverage objectives of the country[63]. Adequate funding, robust managerial capacity, and high level political support are critical for the success of such universal financing platforms.

Some evidence exists to suggest that countries that have made significant progress in coverage did so by starting deliberately with the hardest to reach and most disadvantaged groups first[64].

## 4. Evidence from promising platforms

In the following section, we provide discussion of promising platforms which have demonstrated high impact in certain settings and contexts. This list is not meant to be exhaustive of all the possible delivery platforms, but instead is exhaustive of platforms where impact evidence, illustrative diversity, and applicability to LMIC country settings exists.

**Table 5: Summary of strength of evidence and impact of promising short- and medium-term delivery platforms**

| Delivery platform | Strength of evidence/impact | Source |
|---|---|---|
| **Maternal waiting homes** | Promising - Cuba, Honduras, Malawi, Nigeria, Zimbabwe, Ethiopia studies found MWH reduced complications and mortality. Cochrane reviews inconclusive due to lack of RCTs. | Primary sources, Cochrane reviews[65–69] |
| **Strengthening of ambulance referral** | Promising - Evidence of high impact on increasing coverage and access to EmOC services. No RCT. | Systematic reviews, primary sources |
| **Social marketing and private sector delivery** | SUZY project - Has doubled the proportion of children receiving zinc treatment, and increased awareness, but gains were not sustained | Project evaluations[70] |
| **Elimination of user fees** | Promising - Evidence that removal of fees increases utilization. Lost revenue from fees must be replaced. Risks of under-the-counter payments. | Systematic reviews[38,71,72] |
| **RBF** | Promising - Has improved the quality of care. Mixed effects on utilization in Rwanda. Impact of other PBF programs pending. | Project evaluations[73] |

### Maternal waiting homes:

The main direct causes of maternal mortality can be prevented with early detection of at-risk mothers, and treatment of complications during and directly after birth. Poor utilization of maternal health services, and resulting high mortality, is primarily due to physical and financial barriers to access to skilled care[67].

Women with high-risk pregnancies or living far away from facilities can benefit the most from maternal waiting home use[68]. These homes, constructed close to hospitals or health centers providing skilled birth attendant services and emergency obstetric care, have been used in many countries to reduce maternal mortality, including countries as diverse as Cambodia[74], Ethiopia[69], Lesotho[41], Malawi[75], Zambia[65] and Zimbabwe[66]. Numerous cohort studies have found positive associations between maternal waiting home use and reductions in maternal and neonatal mortality[41,65,66,68]. However, an extensive Cochrane review was unable to determine, conclusively, whether maternal waiting homes were effective, due to the insufficiency of well-controlled trials.

From the body of evidence that does exist about maternal waiting homes, several key factors have been identified that are associated with positive utilization of the facilities. Data from multiple cluster survey studies indicate that the quality of the waiting home itself, including availability of food, cooking fuel, safety and transport, are important factors influencing the likelihood of mothers to use the facilities[67]. Community mobilization strategies are important to increase awareness and the care-seeking behavior of expectant mothers to use the services[76]. In addition, financial barriers must be overcome for mothers to make regular use of the service. Even if maternal waiting home services are offered for free, there are still direct and indirect costs for mothers leaving their homes and associated family responsibilities[67]. Vouchers and other financial incentives can be effective in overcoming these financial barriers[77].

Despite the lack of randomized control trials, maternal waiting homes are promising investments, and should be considered, particularly in contexts where there are large populations of women in remote areas.

### Strengthening of ambulance referral systems for EmOC access:

Although strengthening EmOC services are vital for saving maternal lives, ensuring that women can access the services is equally as crucial. Numerous primary studies have shown that strengthening ambulance referral services (including motorcycle and bicycle ambulances) has had significant impact on increasing access and utilization of lifesaving EmOC services and has dramatically lowered maternal mortality. For instance, a study conducted by MSF in Burundi found that strengthening an ambulance referral network dramatically increased coverage of complicated obstetric services and caesarean sections[78].

Similarly, motorcycle referral services were also found to increase access to EmOC services in rural Malawi[79]. Organized ambulance services have been cited as contributing to mortality reductions in Honduras, Sri Lanka and Malaysia[80].

Despite promising primary evidence, however, systematic reviews of ambulance referrals have not been conducted. Thus, this platform can only be considered promising at this point.

**Social marketing and private sector delivery:**

The capacity of the private sector to produce, procure, and deliver essential health commodities is often overlooked. The experience of the SUZY (Scaling-Up of Zinc in Early Childhood) project offers lessons in how pharmaceutical manufacturers and private sector providers can be incentivized to produce and deliver commodities with low profit margins like Oral Rehydration Salts (ORS) and Zinc as well as how quickly awareness can be increased and behavior change can be achieved through mass campaigns.

Treatment with zinc in conjunction with ORS has been shown to effectively reduce the severity and duration of diarrheal episodes and can reduce overall diarrheal deaths by 50%[70]. In 2004, the WHO revised its clinical guidelines to include zinc as part of routine childhood diarrhea management[81]. In order to rapidly scale-up use of zinc, the SUZY project was developed as an ambitious private-public partnership between the Bangladesh research institute ICDDR,B, pharmaceutical manufacturer ACME laboratories, and the mass communication organization Dhansiri Media Production House and funded by the Bill and Melinda Gates Foundation. These organizations worked in conjunction with the Bangladesh MOH to revise national policy to allow zinc to be offered over-the-counter.

A national mass campaign was initiated to educate mothers about the benefits of zinc, and ACME laboratories initiated training programs through their drug representatives to educate private sector providers. These combined efforts resulted in sale of over $5M of zinc blister packs in the first year, exceeding the initial targets[82]. The mass campaign was also found to be effective in rapidly increasing awareness of the benefits of zinc from <5% at baseline to 90% after two years, in both city and rural environments[70,81].

Disappointingly, this high and sustained increase in awareness did not result in a proportional sustained increase in zinc use. The proportion of children receiving zinc treatment increased rapidly from 5% to between 20-30% in two years, but has since plateaued. Nevertheless, the SUZY project offers important lessons in how awareness can be rapidly increased through well-constructed mass campaigns and how the private sector can be a successful alternative to public sector delivery of commodities. In addition, SUZY also highlights the fact that raising awareness alone is insufficient to achieve lasting behavior change.
The lessons of SUZY are now being applied by the Nigerian government and CHAI as part of the government's Saving One Million Lives Campaign, also by harnessing the capacity of the private sector[83].

### Policies to eliminate user fees:

A review of 16 studies on user fee modification for low- and middle-income countries found that reducing or removing user fees increased utilization of some healthcare services. In these studies, preventative and curative healthcare service utilization increased in response to user fee reduction, but the size of the impact ranged widely from very small to large, and there were even some cases of negative unintended consequences for preventative services and service quality[84]. The authors note that most of the 16 studies were of poor quality. However, there is evidence of fee removal being associated with improvements increasing utilization of services in Uganda[85] and Mali[38] and in treating maternal complications and providing medical care for children in Sierra Leone[86] . So the link between eliminating such fees and increasing access to and uptake of key maternal and child health services seems to be a promising one worth pursuing and monitoring in low- and middle-income African countries seeking to close the gap in MDGs 4 & 5.

### Results-based financing:

Results based financing (RBF, alternatively referred to as "performance-based incentives" or "pay-for-performance") for health refers to any arrangement in which health system financing is conditional on achievement of pre-determined results (World Bank e-Institute 2011). The conditional funds can be transferred to users (e.g. expectant mothers for accessing pre-natal care) or providers of services (e.g. clinics on the basis of measurable gains in immunizing children). The theory of change behind RBF is that by offering incentives to perform and shifting focus from inputs to results, RBF strengthens core health systems.

Over the past decade, this financing instrument has garnered increasing interest as a way of raising the impact of funding in resource-limited settings. Much of the application of RBF so far has been to maternal and child health[87]. Since 2007, the World Bank Health Results Innovation Trust Fund (HRITF) has expanded to support RBF efforts in 23 participating countries, in conjunction with mainstream IDA financing. The Trust is expected to expand to 7 more countries in the near future (rbfhealth.org, 2013).

RBF is cited as a source of Rwanda's success in curbing maternal and child mortality over the past decade. Rwanda is one of the few countries for which rigorous evidence on the impact of RBF exists. An evaluation capitalizes on the roll-out method of Rwanda's Pay for Performance program, which is based on 14 maternal and child health indicators and that generated a quasi-experimental setting in which the effects of the RBF could be isolated[73].

The authors find significant positive impacts of RBF roll-out on institutional delivery, preventative care visits for young children, and quality of pre-natal care[88].

RBF has also been credited with the success of increasing coverage of maternal health services in Zimbabwe. In the 14 months since the launch of the program, high-risk referrals and 4+ ANC visits have greatly increased in centers implementing the RBF program, compared to centers without RBF mechanisms. Quality scores also improved. Similarly, RBF has been credited with increasing coverage and reducing mortality in Burundi[58].

The RBF Portfolio Review report on Burundi found an association between the program's launch and increases in ANC utilization, skilled birth attendance, and contraception prevalence, as well as notable increases in service quality; however, the report also identified a troubling increase in child health indicators, especially regarding TB, diarrhea, and acute respiratory infections in the same time period. Further, although transaction costs for the program were low (~13%), financial sustainability is an ongoing concern as the program has accumulated an $8 million deficit.

In sum, the evidence base on the effectiveness of RBF is very promising, but not sufficient for sweeping recommendations on its applicability in different settings. Most experience to date is based on pilots rather than scale-up. Often, RBF programs are implemented in conjunction with other programs, making it difficult to determine RBF's direct impact on the observed outcomes.

Four formal evaluations of RBF programs suggest that financial incentives for health care users and providers may be effective in the short-term for impacting simple and measurable behavioral variables, but it is too soon to determine how well they foster long-term development of health systems [89].

## 5. Recommendations for action in the short-term

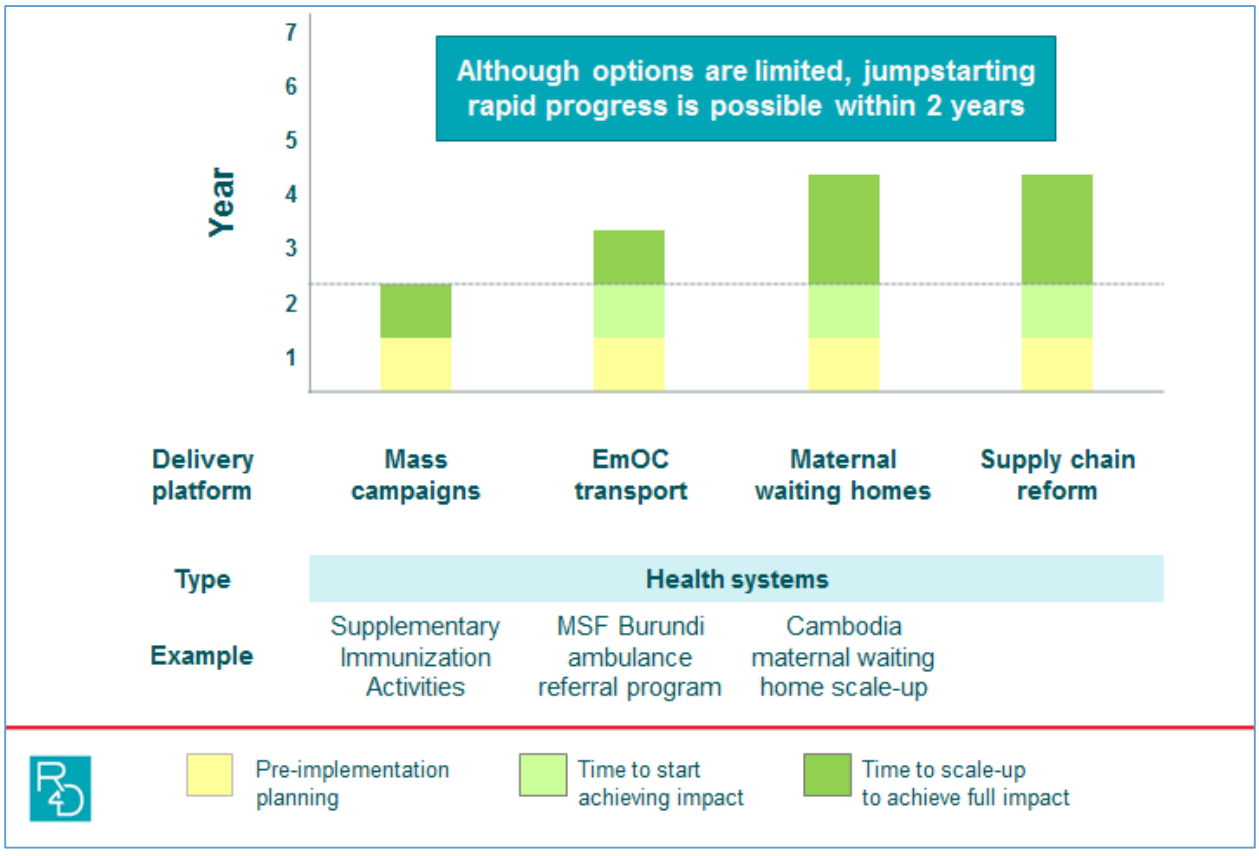
Given the body of evidence on strong and promising platforms as described in sections 3 and 4, there is the key question about which of these platforms can be expected to be rapidly scalable and increase coverage within 2 years, based on past experiences. The short list of platforms meeting this time-bound criterion is described in **Table 6** below.

Mass campaigns, EmOC transport, and the building of maternal waiting homes are all powerful delivery platforms which can yield results within 2 years. Mass campaigns have been shown to be highly effective strategies for rapidly increasing coverage of bednets and vaccinations. Investments in EmOC transport and referral systems and the construction of maternal waiting homes are also highly effective and quick-acting platforms connecting mothers in remote locations to existing facility-based EmOC services.

As discussed earlier in section 2, similar short-term delivery platforms were deployed with success in fast-track countries in tandem with longer-term strategies. For instance, Niger and Nepal used mass campaigns to extend vaccination and vitamin A coverage to large numbers of rural children who would not otherwise have been able to access these interventions. The construction of maternal waiting homes and strengthening of ambulance referrals has also been credited with reducing maternal mortality in Burundi, Sierra Leone[90], Uganda, and Zambia[91].

These platforms are rapidly scalable and can deliver significant results in 2 years, but it is important to recognize that they are not sufficient by themselves to secure a durable and sustainable health system. Rather, these platforms are an essential starting place to be deployed in tandem with efforts to strengthen and develop longer-lasting platforms across the health system. For instance, although there is strong evidence that mass immunization campaigns can result in immediate and large-scale gains in vaccination coverage and reduction of childhood mortality, immunizations alone will not reduce neonatal mortality, which remains stubbornly high even in countries which have made rapid progress against child mortality overall.

**Table 6:** Platforms that can yield benefits in the near-term



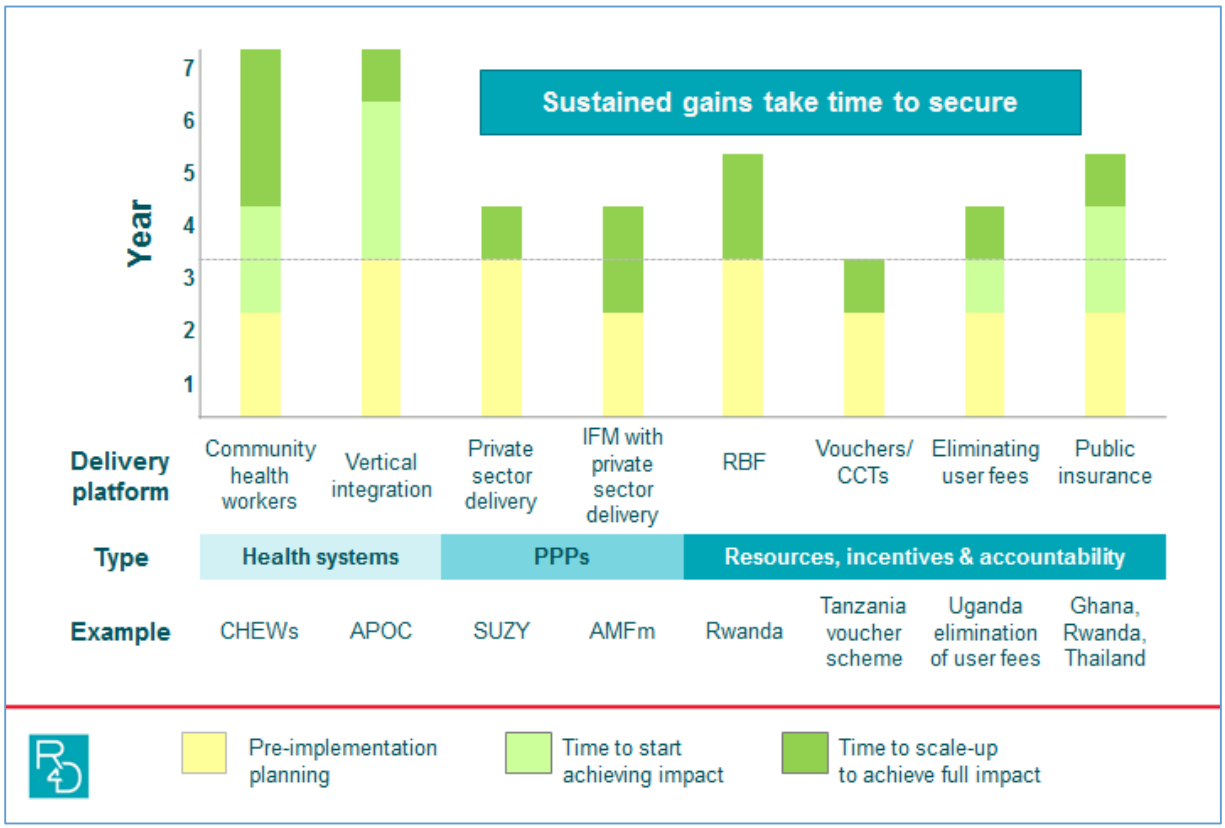
## 6. Recommendations for action in the medium-term

The list of platforms which have been shown to deliver results in the medium-term (3-5 years) is longer and more diverse than the immediate-gain platforms discussed in section 5 and encompasses platforms covering service delivery, PPPs, and incentives. The selective use and deployment of these medium-term platforms can form the basis of a longer and more sustainable health systems strengthening strategy.

Customization of delivery platform selection is crucial, as evidence from the Success Factors study as well individual high-performing country experiences shows that there is no one singular path to success[5]. Although there are factors strongly associated with high performance against maternal and child mortality goals both inside and outside of the health sector[4], countries with vastly different starting contextual advantages and disadvantages were still able to achieve results through deployment of combinations of delivery platforms tailored to overcome their particular systemic bottlenecks.
Consequently, high-burden countries now trying to achieve similar rapid reductions of maternal and child mortality should consider which of these medium-term platforms could be successfully deployed in its national setting.

The timescales as depicted in **Table 7** are estimates based on past experiences. It is possible that some of the platforms on the cusp of 2-3 year impact returns, such as vouchers, policies to eliminate user fees, and perhaps even RBF could be launched more rapidly before the MDG deadline of December 2015 (if there is strong commitment from policymakers, adequate financial mobilization, and focused and effective management of rapid implementation).

**Table 7:** Platforms that can yield benefits in the medium-term (3-5 years)

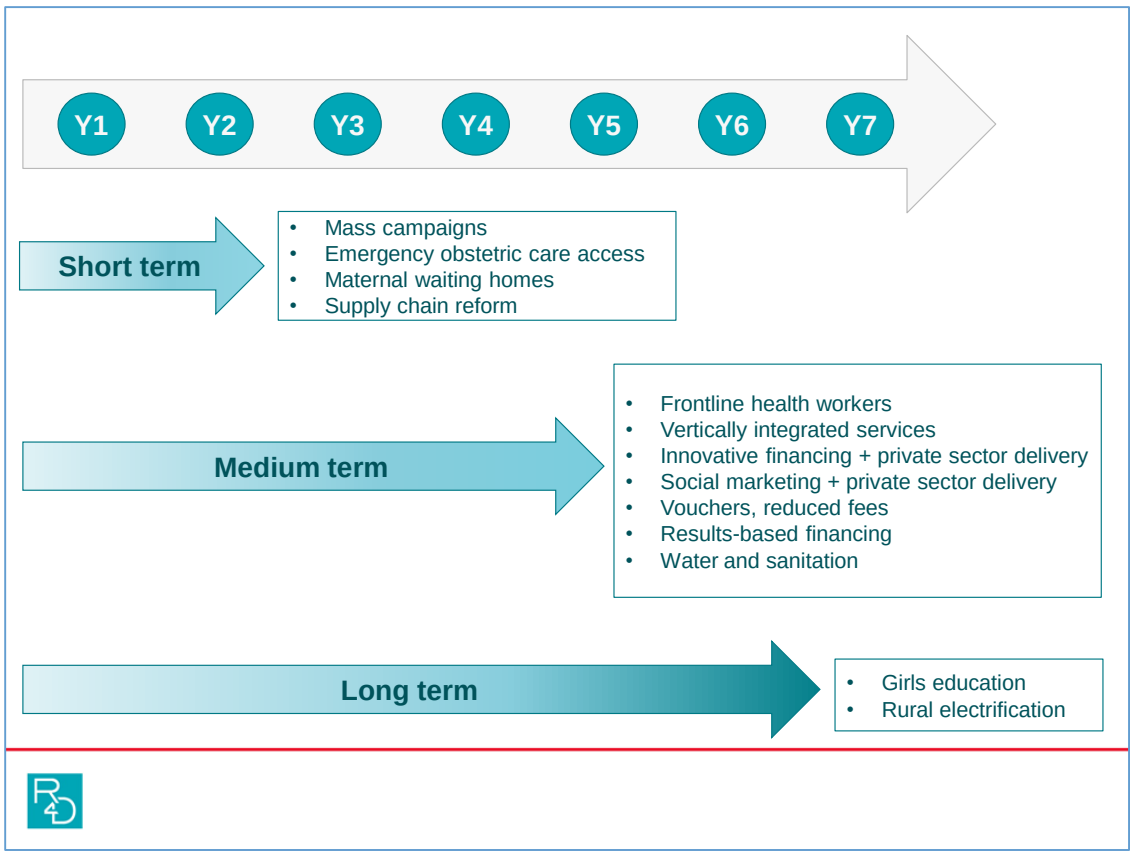



## 7. Conclusions

Options are limited for what countries can do to make rapid progress against maternal and child mortality before 2015; however, evidence described in this report describes the delivery platforms available that can be rapidly scaled to increase coverage and utilization of essential services and lead to reductions in maternal and child mortality.

These platforms include: mass campaigns, strengthening access to EmOC via ambulance referrals, and construction and use of maternal waiting homes. Although these immediate-gain platforms can drive significant reductions in maternal and child mortality in the short run, these platforms need to be accompanied by medium-term actions to build a health system capable of sustaining high coverage rates of equitable and high-quality services. In addition, although we deliberately limited our discussion to health sector platforms, there are additional medium- and long-term platforms outside the health sector, including investments in rural electrification, nutrition, infrastructure, and girls' education which also are supported by strong evidence as having significant impact on mortality reduction. **Figure 3** describes the timeframe for expected impact for short-, medium- and long-term delivery platforms.

**Figure 3:** Timeline for impact from deployment of short, medium and long-term delivery platforms




Experience from the 10 countries on-track to meet their MDG 4 & 5 goals provides perhaps the strongest evidence that rapid success is indeed possible, despite significant challenges at the outset. At the beginning of the MDG effort, Rwanda and Nepal were perhaps in a group of countries expected to be least likely to make major strides against maternal and child mortality given their high degree of poverty, lack of resources, and governance issues. However, these countries overcame a host of challenges by being selective about the interventions they chose to deliver and by investing in highly effective delivery platforms like mass campaigns to deliver vaccinations and bednets which yielded results quickly. Importantly, these successful countries also invested in tandem platforms, like frontline health workers and platforms to reduce physical and financial barriers, which are likely to continue to bear fruit in the medium- to long-term.

**Table 8** summarizes key short- and medium-term platforms used by successful countries and potential strategies which high-burden countries could adopt based on similar contexts.

**Table 8: Potential successful country "mirrors" which high-burden countries could emulate**

| High-performing country (population) | Context | Key components of strategy and delivery platforms used | Potential application |
|---|---|---|---|
| **Bangladesh** (154.7M) | • Large population, vulnerable to natural disasters, weak governance<br>• Expanding middle class, and increasing proportion of women in the workforce, which rapidly reduced TFR | • Prioritized coverage of low-cost interventions such as ORS and vaccinations<br>• Expanded delivery of essential interventions through large NGO CHW platform (BRAC) | Nigeria – similarities shared with Bangladesh include: large population, rapid urban growth, and limited public capacity to deliver essential services |
| **Nepal** (27.5M) | • Large rural population in remote areas, critically low human resources and lack of facilities<br>• Post-conflict | • Investment and training in community-based skilled birth attendants<br>• Widespread coverage of low-cost interventions<br>• Free access to delivery care | Post-conflict and fragile countries such as Angola, Sudan and DRC, that are also struggling with low human resources and lack of quality facilities |
| **Rwanda** (11.5M) | • Small population, strong governance capacity<br>• Post-conflict | • Integrated community-based delivery of low-cost interventions with large cadre of CHWs<br>• Free access to care<br>• Investment in data, monitoring and accountability mechanisms | Despite its unique context and the unusual strength of its governance capacity and structure, Rwanda's steady and focused implementation of its strategy offers broad lessons to all countries |
| **Niger** (17.2M) | • Impoverished country, critically low human resources and lack of facilities | • Focus on delivery platforms and interventions that didn't require a health system<br>• Mass campaigns and CHWs | Post-conflict and fragile countries such as Angola, Sudan and DRC, that are also struggling with critically low human resources and lack of quality facilities |

In summary, there are large opportunities for progress in the remaining months before the 2015 deadline through investments in quick-win platforms. In addition, delivery platforms that take longer to plan and implement can also yield substantial gains in the immediate post-2015 period, and can ensure sustainability. Overall, our analysis offers an agenda for

urgent and focused action by committed governments and concerned development partners based on evidence and experience. Our findings provide the basis for cautious but informed optimism on what can be achieved immediately and in the medium-term through the combined efforts of governments and development partners at national and global levels.

# Annex:

## A. Background:

*Progress against MDGs 4 & 5 is slow*

Although under-5 and maternal mortality rates have been declining globally over the past two decades, the majority of Sub-Saharan African countries are making insufficient progress toward their MDG goals. Two-thirds of the overall maternal and child mortality burden in Sub-Saharan Africa is concentrated in just 10 countries (**Table 9**). Although a few notable countries in this group are making faster-than-average progress (Ethiopia, Tanzania and Niger), the majority of these high-burden countries are reducing maternal and child mortality too slowly to reach the MDGs by 2015 (**Table 10**).

**Table 9: Thousands of child and maternal deaths per year in high-burden countries in Sub-Saharan Africa (2010)**[92]

| 2010 | <5 deaths[92] (0-5y) | Infant[92] Deaths (0-1y) | Neonatal Deaths (0-28 days)[92] | Maternal Deaths[93] |
|---|---|---|---|---|
| Nigeria | 847.2 | 229.7 | 248.9 | 40.7 |
| DRC | 398.0 | 140.0 | 100.9 | 15.7 |
| Ethiopia | 261.7 | 67.2 | 85.2 | 9.1 |
| Tanzania | 139.9 | 54.1 | 46.3 | 8.8 |
| Niger | 114.9 | 32.7 | 23.8 | 4.6 |
| Mozambique | 102.2 | 43.9 | 29.4 | 4.4 |
| Uganda | 100.1 | 35.2 | 34.9 | 4.8 |
| Sudan | 92.6 | 29.0 | 36.0 | 10.6 |
| Kenya | 92.4 | 32.2 | 35.6 | 5.6 |
| Angola | 65.3 | 21.1 | 19.0 | 3.6 |
| Total for 10 highest burden countries | 2,214.3 | 685.1 | 660.0 | 107.9 |
| Rest of SSA | 1,101.1 | 362.9 | 362.9 | 55.0 |

**Table 10: Average rate of recent decline for maternal and child mortality in highest-burden countries in SSA**[94]

| High-burden country | Average rate of decline (2005-2010) | |
|---|---|---|
| | Maternal mortality | Under-5 mortality |
| Ethiopia | -7.3% | -7.1% |
| Angola | -7.1% | -2.3% |
| Uganda | -5.9% | -6.3% |
| Tanzania | -5.5% | -7.3% |
| Nigeria | -5.1% | -3.5% |
| Mozambique | -4.9% | -5.1% |
| DRC | -3.9% | -1.9% |
| Niger | -3.9% | -6.2% |
| Sudan | -1.8% | -2.9% |
| Rest of SSA | -4.5% | -4.1% |

*Even with rapid acceleration, high-burden countries will not be able to meet their MDG 4 & 5 goals by 2015*

Even if high-burden countries were suddenly able to match the fastest recorded 5-year rates of reduction for maternal mortality (Botswana at -13.5% per year)[94] and child mortality (Rwanda at -9.8% per year)[94] – which is not necessarily a realistic assumption -- most of these countries would still require far more than 2 years to meet MDG 4 & 5 goals (see **Table 11**). Since they are unlikely to match the fastest rates recorded, it will, in fact, take them even longer to attain their MDG goals.

**Table 11: Years needed for high-burden countries to achieve MDG goals, applying maximum observed rate of reduction**

| Country | Years needed to achieve MDG 2015 goals, at most rapid rate[5] | |
|---|---|---|
| | MDG 4 | MDG 5 |
| DRC | 9 | 6 |
| Angola | 8 | 3 |
| Kenya | 8 | 9 |
| Nigeria | 5 | 6 |
| Sudan | 5 | 8 |
| Uganda | 2 | 5 |
| Mozambique | 2 | 5 |
| Niger | 1 | 5 |
| Ethiopia | 0 | 3 |
| Tanzania | 0 | 5 |

*The majority of child and maternal deaths are caused by diseases and other factors which are preventable*

Although the focus of this report is on delivery platforms that can be rapidly scaled, we present here a very brief discussion of the major causes of maternal and child deaths, as the choices of delivery platforms are informed by the interventions that need to be delivered against these causes. As shown in **Figures 4 & 5**, the major causes of maternal and child deaths are largely preventable. In the case of maternal deaths, the total number can be reduced by increasing access to family planning; the remaining maternal deaths can be largely avoided through access to EmOC services and ANC. The majority of child deaths are avoidable through access to preventive care, nutrition, lifesaving commodities and vaccinations. Improving access to intrapartum care, in addition to EmOC will also prevent many unnecessary neonatal deaths[95].

**Figure 4:** Sub-Saharan estimates of causes of maternal death[96]

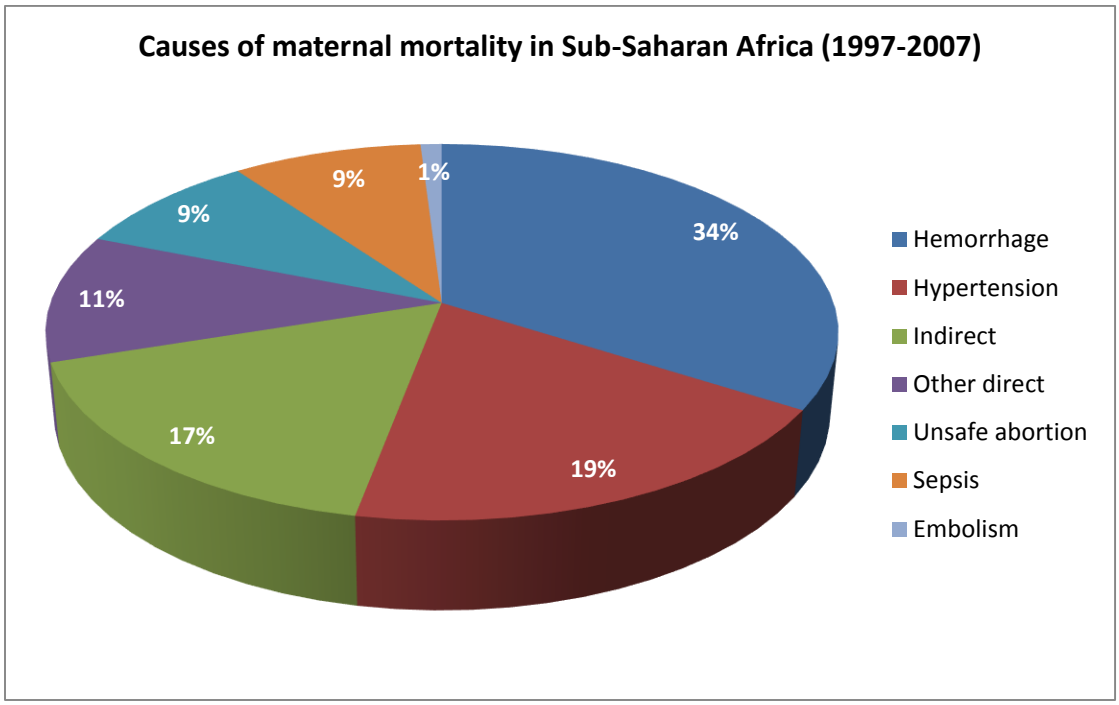
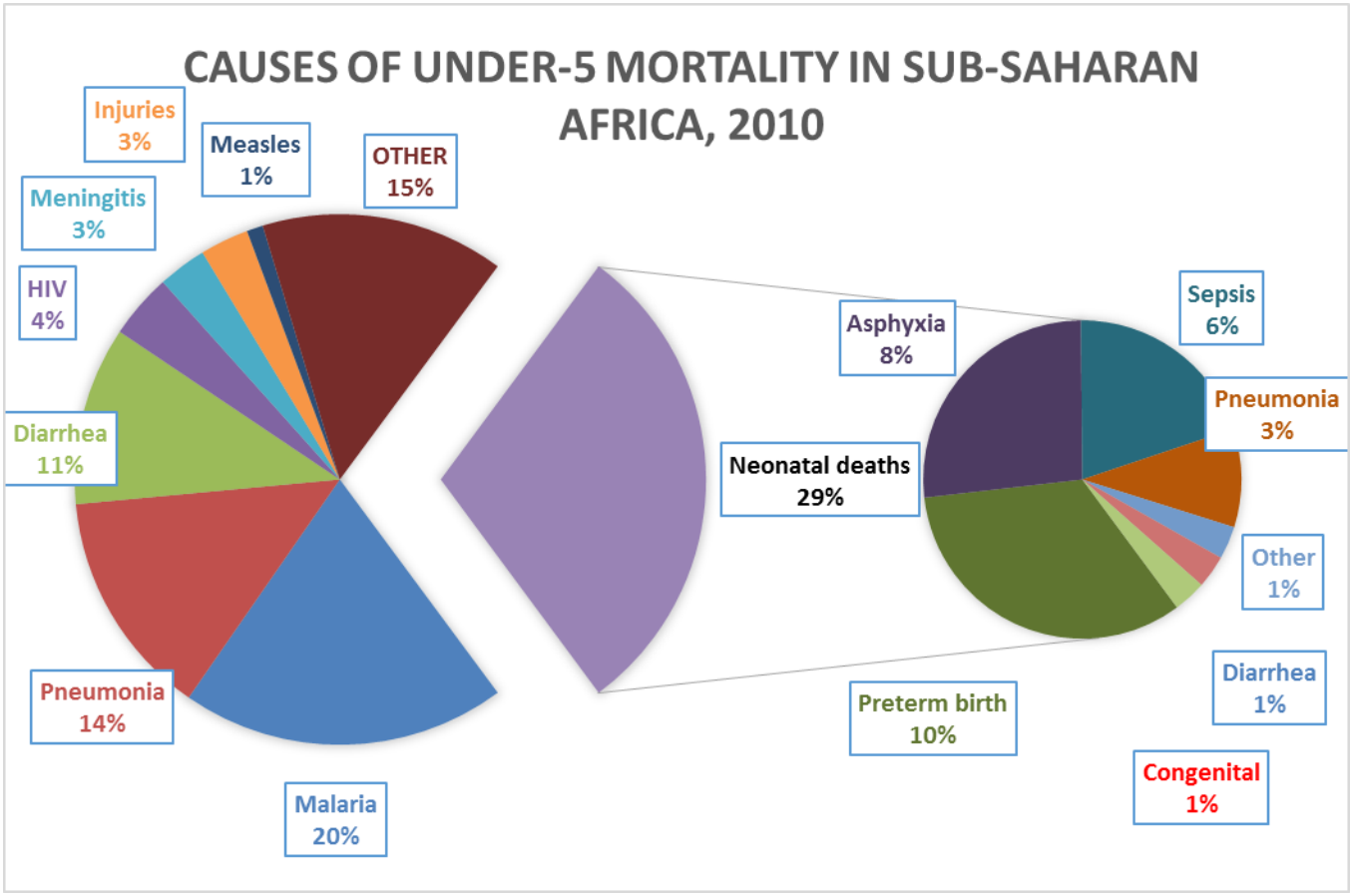


**Figure 5:** Sub-Saharan estimates of causes of child death[96]




*Median coverage of key interventions is low in high-burden countries*

Delivery platforms must be able to overcome bottlenecks and close coverage gaps in order to be effective in reducing mortality. **Figure 6** shows that current coverage rates across the continuum of care in the 75 Countdown countries (which account for 95% of the maternal and under-5 child mortality burden) are low and also vary widely[3]. Numerous bottleneck analyses and the country Millennium Acceleration Framework reports developed with support of UNDP identify common obstacles accounting for these widespread gaps in coverage, including supply chain shortages, human resource constraints, lack of physical access to facilities, and requirement for out-of-pocket payments. Delivery platforms, particularly those which overcome physical and financial barriers can increase coverage rates.

**Figure 6:** Intervention coverage across the continuum of care in Countdown countries[3]

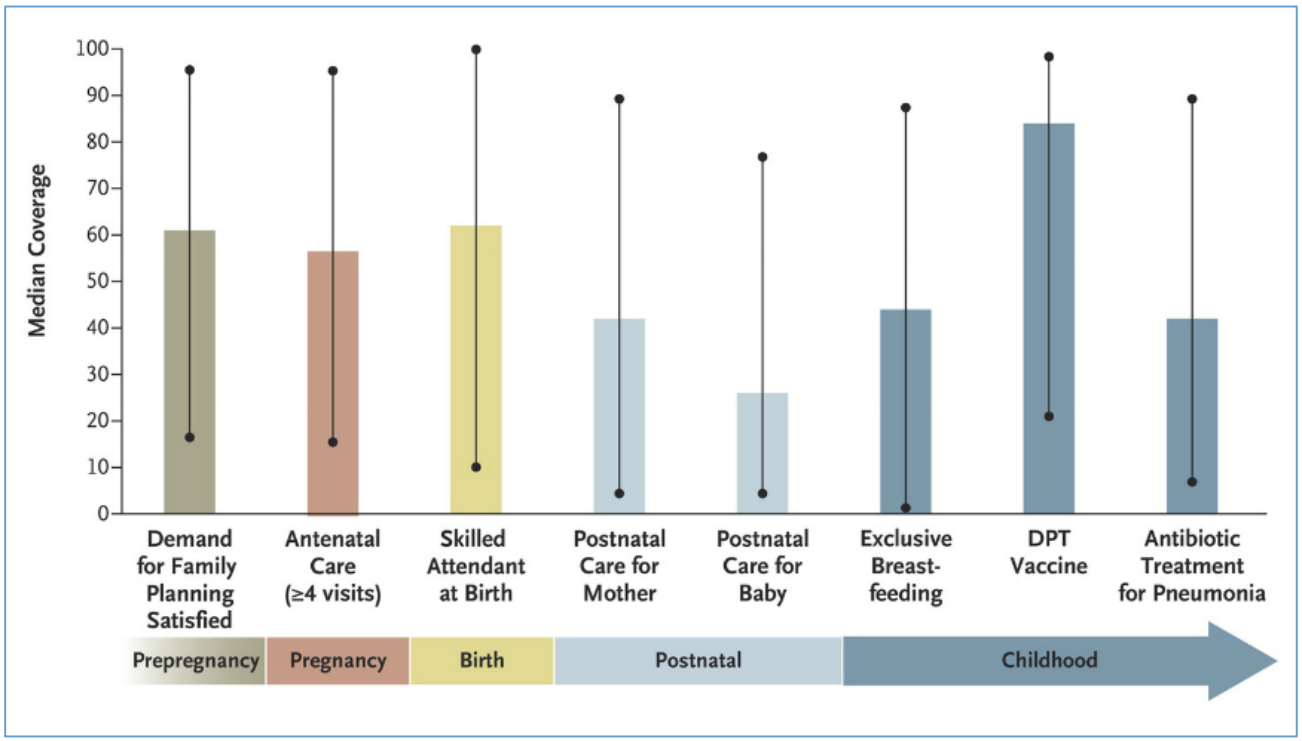



**Table 12** (below) shows the gaps in the continuum of care for the 10 highest-burden countries in SSA relative to the averages for the 75 Countdown countries. ANC visits and vitamin A supplementation are relatively well-covered in the highest-burden SSA countries relative to the rest of countries in the Countdown group. Not surprisingly, the highest-burden countries, including Nigeria and Ethiopia, have coverage gaps that are much larger than the rest of the Countdown countries, especially for childhood interventions. Tanzania and Uganda have smaller coverage gaps than the Countdown average for many of the indicators and, correspondingly, are seeing a faster rate of decline in mortality reduction rates (**Table 10**).

**Table 12:** % Gaps in continuum of care for highest-burden countries in SSA[3,96]

| Ranked in ascending order of child mortality burden | Pre-pregnancy | Pregnancy | Birth | Childhood | | | | |
|---|---|---|---|---|---|---|---|---|
| | Demand for family planning satisfied (%) | ANC (>1 visit) (%) | Skilled attendant at birth (%) | Children sleeping under ITNs (%) | DTP3 immunization (%) | Vitamin A supplementation (%) | Care-seeking for pneumonia (%) | Diarrhea treatment (ORS) (%) |
| **Mozambique** | NA | 92 | 55 | 23 | 76 | 100 | 52 | 46 |
| **Sudan** | 24 | 56 | 23 | 28 | 93 | NA | 56 | 22 |
| **Niger** | NA | 46 | NA | 64 | 75 | 95 | 51 | 18 |
| **Tanzania** | 58 | 88 | 49 | 64 | 90 | 97 | 71 | 44 |
| **Uganda** | 47 | 94 | 57 | 33 | 82 | 60 | 79 | 40 |
| **Kenya** | 64 | 92 | 44 | 47 | 88 | NA | 56 | 39 |
| **Angola** | NA | 80 | 47 | 18 | 86 | 55 | NA | 40 |
| **Ethiopia** | 53 | 34 | 10 | 33 | 51 | 71 | 27 | 26 |
| **DRC** | 42 | 88 | 80 | 38 | 70 | 98 | 40 | 26 |
| **Nigeria** | 43 | 58 | 39 | 29 | 47 | 73 | 45 | 26 |
| **Countdown country average** | 57 | 77 | 62 | 42 | 81 | 74 | 55 | 37 |
| | | | | | | **Legend** | **Below Countdown average** | **Above Countdown average** |

## B. Summaries of high-performing country approaches to reducing maternal and child mortality

**Niger**[97]:

Niger has made rapid reductions in child mortality which have far outpaced the rates of mortality decline in neighboring West-African countries. During 1998-2009, annual child mortality rates were reduced by an average of 5.1%, compared to an average of 1.5% for neighboring Benin, Burkina Faso, Chad, Mali and Nigeria during the same time period.

*Countdown to 2015* commissioned a study to analyze how Niger achieved its success and found that, despite its status as one of the world's poorest countries (186/187 on the World Bank's Human Development Index), Niger was still able to achieve rapid progress on child mortality through a systematic focus on expanding coverage to essential interventions by scaling up community-based delivery approaches, and reducing financial barriers to access[97].

How Niger scaled-up and expanded coverage to targeted interventions:

1. Mass campaigns
   High coverage for ITNs, measles, and vitamin A supplementation was achieved via mass campaigns.

2. Targeted interventions against malnutrition
   A network of nutritional rehabilitation centers was built for both the inpatient and outpatient management of malnutrition. CHW screening for acute malnutrition increased utilization of the rehabilitation centers[98]. Targeted cash transfers were also implemented to respond to the nutrition crisis in 2005-2006[97].

3. Reducing financial and physical barriers to access
   Niger committed to providing free universal access to primary health care services for pregnant women and children, with particular focus on achieving high coverage of interventions to reduce malaria, pneumonia, diarrhea and measles. Health posts and health centers were also strengthened, in conjunction with improved supply chains for essential commodities. A cadre of CHWs were trained, functionally integrated within the health centers, and empowered to deliver treatment for the main causes of child deaths. Utilization was monitored with data from the Niger health information system.

The simultaneous implementation of these three strategies against the greatest burdens of disease was able to achieve large gains in coverage of essential interventions; however, it is important to note that scaling up of the component elements took 5-6 years starting in 2000, with the greatest gains in coverage being achieved in the last 3 years (2006-2009).

**Rwanda**[42,99]:

Rwanda has made the most impressive gains in reducing maternal and child mortality, and is on-track to achieve its MDG 4 & 5 goals by 2015. Many in the global health community believe the Rwandan experience is a unique, stand-alone case with few applicable lessons for others due to the country's small size and unusual strength of governance. However, it is important to remember that Rwanda was a failed state in 1994, post-genocide, with some of the worst health outcomes and a health system that was in ruins. Rwanda's path from last-to-first contains many important lessons for other countries that are starting from positions of greater strength than where Rwanda was 20 years ago.

How Rwanda scaled-up and expanded coverage to targeted interventions:

1. Integration of disease-control programs against the greatest burdens of disease
   Rwanda's strategy is anchored around the integration of AIDS, tuberculosis, and malaria care, and is built upon vertical program funding from the Global Fund and PEPFAR. Rwanda was also among the first countries to integrate rotavirus, pneumococcal and HPV vaccines into the national immunization system, and achieved high rates of coverage.

2. Reducing financial and physical barriers to care
   Rwanda has made a commitment to achieving UHC, and has effectively done so through the national community-based insurance scheme *mutuelles de santé*, which covers 90.6% of the population. Premiums are subsidized for the poor by the Global Fund and other partners, and premiums are tiered for the remaining income groups[58,100,101].

   Physical access to care was improved by training a cadre of 45,000 CHWs to provide integrated community-based care for malaria, pneumonia and diarrheal disease in addition to promoting family planning, ANC, immunizations and accompanying referrals to health centers and hospitals. CHWs were instrumental in overcoming the acute shortage of human resources for health post-genocide and while other skilled professionals were being trained.

3. Using data and financing mechanisms to improve accountability and efficiency
   Inequity was identified as a major contributing factor of the genocide, and since then, the government of Rwanda has prioritized transparency, accountability, and evidence-based policy making in all of its activities[42]. Rwanda has been an early adopter of data management innovations, including TRACnet (online management information system), RapidSMS (mobile phone-based system connecting CHWs to health centers), and OpenMRS (open source electronic medical records system). These systems allow for monitoring of utilization and quality and responsiveness to "hotspots"[42] and can be adopted in resource-challenged settings[102–106].

   Performance-based financing mechanisms have also successfully increased utilization for MCH services by incentivizing prevention activities by CHWs, health centers and district hospitals.

**Malawi**[75,107]:

Malawi is currently on-track to meet its child mortality MDG goals and has also made significant strides in reducing maternal mortality (after alarming increases during the 1990s), despite acute human resource shortages. Malawi has achieved much of its success through extensive reliance on community health workers, as well as strong monitoring and evaluation of utilization and impact.

How Malawi scaled-up and expanded coverage to targeted interventions:

1. Emergency scale-up of human resources[108]
   6-year program launched in 2004 to address the severe human resource shortage caused by the HIV epidemic and brain drain. Donor-based support from DFID, NORAD and the Global Fund provided support for improved retention of 11 priority cadres of health workers, including doctors, nurses and HSAs. The number of doctors increased from 43 to 241, and nurses from 3,456 to 7,000 in 5 years (2004-2009).

2. Reducing physical and financial barriers to access
   Malawi has invested heavily in health surveillance assistants, HSAs, which provide a vital link between the community and the health centers. HSAs are embedded in the MOH and are salaried civil servants. HSAs are responsible for ICCM, family planning, TB sputum collection, and delivery of maternal, newborn and child care packages. HSAs also provide immunizations services weekly at health centers and conduct monthly outreach campaigns as well.

   ARTs are provided for free, through the public health services. Basic service packages are also offered for free at health centers.

3. Prioritization of integrated care delivery of maternal, child and newborn care packages, ICCM, and rapid scale-up of PMTCT
   Malawi was an early adopter of ICCM, which was launched in 2000 and went to scale in 2011. Facilities providing PMTCT has been scaled up rapidly from 34 facilities in 2004 to 367 facilities in 2007. PMTCT coverage has risen from 7% in 2005 to 45% in 2010.

**Bangladesh**[109,110]**:**

Bangladesh will meet both its MDG 4 & 5 goals early, despite its large population, modest economic growth, and governance challenges. When compared to India, Bangladesh has made greater gains in development despite slower economic growth in the last 20 years. Bangladesh is an example of what can be achieved through steady and persistent, but not rapid, focus on expanding coverage to low-cost interventions delivered through community platforms and large NGOs in the absence of strong governance capacity.

How Bangladesh scaled-up and expanded coverage to targeted interventions:

1. Prioritization of essential low-cost health interventions
   Expanding coverage to family planning, and the resulting decrease in fertility rate, has been cited as having the greatest impact on Bangladesh's development trajectory and maternal mortality reduction. Contraceptive prevalence rate has been increased from 8-60% since 1975. The prioritization of ORS, vitamin A supplementation, and widespread measles vaccination coverage rates have also been credited in the steep decline in child mortality[111].

2. Reducing barriers to physical and financial access
   In addition to effectively prioritizing low-cost interventions against the highest disease burden, Bangladesh increased access by leveraging a large cadre of community health workers. To cope with weak governance and initial low service delivery capacity, the local NGO BRAC evolved as the only effective service delivery platform. BRAC now operates essentially as a parallel health delivery platform and is the largest NGO in the world. (It is estimated that ¾'s of Bangladeshis have benefited from BRAC[109].) BRAC operates a cadre of 100,000 CHWs who perform active case finding and have been instrumental in expanding coverage to low-cost interventions like ORS. Bangladesh's ORS coverage rate of 77% is the highest in the world[97], and deaths from diarrhea are correspondingly lower than in Sub-Saharan Africa. Demand-side financing approaches have also been implemented and found to be effective in increasing coverage of skilled birth attendance. The Bangladeshi government has instituted a voucher scheme directed at poor women to incentivize facility births and offers cash incentives for completing 3 ANC visits, providing routine delivery and EmOC free of charge, and also covering some food and medicine costs for the family. This program has been found to significantly increase institutional deliveries and postnatal care visits, especially by the poor[112].

3. Integrating service delivery against greatest burden of disease
   Bangladesh also has made effective use of low-cost interventions by adopting an IMCI strategy in 1998 and integrating community case management of childhood illnesses through community health worker platforms. Integration of care has resulted in ICCM coverage of 395/482 sub-districts, with increased use of exclusive breastfeeding and reduced stunting. Coverage of vitamin A supplementation has also been increased by integration with National Immunization days for polio vaccination[112].

**Nepal:**

Nepal has managed to be on-track for achieving MDG goals 4 & 5, despite widespread poverty, and low skilled-birth attendance rates. Nepal's experience is indicative of what can still be achieved in settings with very low skilled human resources and weak governance capacity in a post-conflict setting[113]. Consequently, Nepal's context is highly relevant for some of the high-burden countries who are facing similar challenges.

How Nepal scaled-up and expanded coverage to targeted interventions:

1. Prioritizing essential low-cost interventions
   Nepal has prioritized distribution of vitamin A (credited with a 50% reduction in <5 mortality between 1995-2000)[113] and widespread access to family planning. Contraceptives are made available at all government facilities and through community health workers. Misoprostol is being scaled up for distribution by FCHVs to reduce the risk of post-partum hemmorhage[114]. Although controversial, Nepal legalized and expanded access to abortion, which has dramatically reduced mortality from unsafe abortions [115].

2. Reducing financial and physical barriers to access
   Given the large rural population with reduced access to facilities, Nepal has pragmatically prioritized the delivery of essential interventions through community-based care[116]. Nepal has rapidly grown its community health worker cadre (who initially started as volunteers, but who are now being trained in more tasks) and is strengthening training of skilled birth attendants. Although facility births have been increasing steadily since 2001 (12-36% by 2011), the majority of Nepalese mothers still give birth at home, and Nepal has chosen to make these home births safer. EmOC facilities are also being strengthened in parallel, which is credited for the gradual increase in facility births[117].

   Mass campaigns have been used successfully to prioritize vitamin A coverage (associated with 50% reduction in child mortality)[113] and immunizations which have eradicated polio and neonatal tetanus.

   Financial barriers to access are also reduced in Nepal through cash incentives which are targeted towards poor women to encourage utilization of ANC, facility delivery and postnatal care.

3. Integrating service delivery against greatest burden of disease
   Nepal has made effective use of widespread implementation of ICCM, which has been associated with a 28% reduction in under-5 mortality[118]. Other essential interventions are being bundled into national packages like the National Newborn Care Package which is being scaled up across the country[116]. Nepal also uses national HMIS to track utilization and inform planning[119].

## C. Table of experts interviewed

| Last Name | First Name | Organization | Title |
|---|---|---|---|
| **Austin** | Anne | Harvard School of Public Health | Deputy Director of Research and Education |
| **Bhutta** | Zulfiqar | University of Toronto | Professor, Department of Nutritional Sciences |
| **Black** | Robert | Johns Hopkins School of Public Health | Director for the Institute of International Programs |
| **Bryce** | Jennifer | Johns Hopkins School of Public Health | Senior Scientist |
| **Buj** | Valentina | UNICEF | Malaria Health Specialist |
| **Cash** | Richard | Harvard School of Public Health | Senior Lecturer, Department of Global Health and Population |
| **Drobac** | Peter | Partners in Health | Country Director, Rwanda |
| **Engmann** | Cyril | Bill and Melinda Gates Foundation | Senior Program Officer, Neonatal Health |
| **Frost** | Laura | Global Health Insights LLC | Partner |
| **Houdek** | Jason | Clinton Health Access Imitative | Deputy Director, Essential Medicines |
| **Jamison** | Dean | University of Washington | Professor of Development Economics |
| **Johnson** | Ari | Project Muso | Co-Founder, Co-Executive Director |
| **Levin** | Carol | University of Washington | Clinical Associate Professor, Global Health |
| **Mason** | Elizabeth | World Health Organization | Director, Department of Maternal, Newborn, Child and Adolescent Health |
| **Mukherjee** | Joia | Partners in Health | Chief Medical Officer |
| **Mutasa** | Ronald | World Bank | Health, Nutrition and Population Unit (AFTHE) |
| **Peters** | David | Johns Hopkins School of Public Health | Chair, Department of International Health |
| **Presern** | Carol | World Health Organization | Executive Director, PMNCH |
| **Schwarz** | Dan | Nyaya Health | Executive Director |
| **Soucat** | Agnes | African Development Bank | Director of Human Development |
| **Villeneuve** | Pascal | UNICEF | Country Director, Bangladesh |
| **Vledder** | Monique | World Bank | Senior Health Specialist and Program Manager |
| **Yamey** | Gavin | University of California, San Francisco | Lead, Evidence to Policy Initiative-Global Health Group |

## Works cited:


1. Kinney, M. V. *et al.* Sub-Saharan Africa's mothers, newborns, and children: Where and why do they die? *PLoS Med.* **7,** (2010).

2. Bhutta, Z. a *et al.* Evidence-based interventions for improvement of maternal and child nutrition: what can be done and at what cost? *Lancet* **382,** 452–77 (2013).

3. Bhutta, Z. a & Black, R. E. Global maternal, newborn, and child health--so near and yet so far. *N. Engl. J. Med.* **369,** 2226–35 (2013).

4. Frost, L. & Pratt, B. A. A Qualitative Evidence Synthesis of Factors Contributing to the Reductions of Maternal and Child Mortality in Low-Income and Middle-Income Countries. (2012).

5. The Partnership for Maternal Newborn & Child Health & the WHO. *Success Factors in Women's and Children's Health - Pathways to Progress. Study Overview and Guide for Country Multistakeholder Review*. 27 (2014).

6. WPRO | The WHO Health Systems Framework. at <http://www.wpro.who.int/health_services/health_systems_framework/en/>

7. *2013 Accountability Report - Countdown to 2015*. at <http://www.countdown2015mnch.org/reports-and-articles/2013-report>

8. Walker, N., Yenokyan, G., Friberg, I. K. & Bryce, J. Patterns in coverage of maternal, newborn, and child health interventions: projections of neonatal and under-5 mortality to 2035. *Lancet* **382,** 1029–38 (2013).

9. Dietz, V. & Cutts, F. The use of mass campaigns in the expanded program on immunization: a review of reported advantages and disadvantages. *Int. J. Health Serv.* **27,** 767–90 (1997).

10. Schaetti, C. *et al.* Improving community coverage of oral cholera mass vaccination campaigns: lessons learned in Zanzibar. *PLoS One* **7,** e41527 (2012).

11. Gilmore, B. & McAuliffe, E. Effectiveness of community health workers delivering preventive interventions for maternal and child health in low- and middle-income countries: a systematic review. *BMC Public Health* **13,** 847 (2013).

12. Herman, A. A. Community health workers and integrated primary health care teams in the 21st century. *J. Ambul. Care Manage.* **34,** 354–61

13. Pallas, S. W. *et al.* Community health workers in low- and middle-income countries: what do we know about scaling up and sustainability? *Am. J. Public Health* **103,** e74–82 (2013).

14. Glenton, C. *et al.* Barriers and facilitators to the implementation of lay health worker programmes to improve access to maternal and child health: qualitative evidence synthesis. *Cochrane Database Syst. Rev.* **2,** CD010414 (2013).

15. Sékétéli, A. *et al.* The achievements and challenges of the African Programme for Onchocerciasis Control (APOC). *Ann. Trop. Med. Parasitol.* **96,** 15–28 (2002).

16. Homeida, M. *et al.* APOC's strategy of community-directed treatment with ivermectin (CDTI) and its potential for providing additional health services to the poorest populations. African Programme for Onchocerciasis Control. *Ann. Trop. Med. Parasitol.* **96 Suppl 1,** S93–S104 (2002).

17. Tougher, S. *et al.* Effect of the Affordable Medicines Facility--malaria (AMFm) on the availability, price, and market share of quality-assured artemisinin-based combination therapies in seven countries: a before-and-after analysis of outlet survey data. *Lancet* **380,** 1916–26 (2012).

18. De Savigny, D. *et al.* Introducing vouchers for malaria prevention in Ghana and Tanzania: context and adoption of innovation in health systems. *Health Policy Plan.* **27 Suppl 4,** iv32–43 (2012).

19. Jehan, K., Sidney, K., Smith, H. & de Costa, A. Improving access to maternity services: an overview of cash transfer and voucher schemes in South Asia. *Reprod. Health Matters* **20,** 142–54 (2012).

20. Spaan, E. *et al.* WHO | The impact of health insurance in Africa and Asia: a systematic review. *Bull. World Health Organ.* **90,** 685–692 (2012).

21. WHO | Vaccination greatly reduces disease, disability, death and inequity worldwide. at <http://www.who.int/bulletin/volumes/86/2/07-040089/en/>

22. Duclos, P., Okwo-Bele, J.-M., Gacic-Dobo, M. & Cherian, T. Global immunization: status, progress, challenges and future. *BMC Int. Health Hum. Rights* **9 Suppl 1,** S2 (2009).

23. Kagina, B. M. *et al.* The use of supplementary immunisation activities to improve uptake of current and future vaccines in low-income and middle-income countries: a systematic review protocol. *BMJ Open* **4,** e004429 (2014).

24. Vijayaraghavan, M. *et al.* Measles supplemental immunization activities improve measles vaccine coverage and equity: Evidence from Kenya, 2002. *Health Policy* **83,** 27–36 (2007).

25. Brown, P. *Eliminating Measles in Southern Africa*. (2004).

26. Sutter, R. W. & Maher, C. Mass vaccination campaigns for polio eradication: an essential strategy for success. *Curr. Top. Microbiol. Immunol.* **304,** 195–220 (2006).

27. Brotherton, J. M. L. *et al.* Early effect of the HPV vaccination programme on cervical abnormalities in Victoria, Australia: an ecological study. *Lancet* **377,** 2085–92 (2011).

28. Binagwaho, A. *et al.* Achieving high coverage in Rwanda's national human papillomavirus vaccination programme. *Bull. World Health Organ.* **90,** 623–8 (2012).

29. Palmer, A. C., Diaz, T., Noordam, A. C. & Dalmiya, N. Evolution of the child health day strategy for the integrated delivery of child health and nutrition services. *Food Nutr. Bull.* **34,** 412–9 (2013).

30. Zulfiqar A. Bhutta, Zohra S. Lassi, G. P. and L. H. *Global Experience of Community Health Workers for Delivery of Health Related Millennium Development Goals :* 377 (2010).

31. Perry, H. & Zulliger, R. *HOW E FFECTIVE ARE COMMUNITY HEALTH WORKERS ?* 84 (2012).

32. Singh, P. *One Million Community Health Workers*. 104 (2012).

33. Ricca, J., Kureshy, N., Leban, K., Prosnitz, D. & Ryan, L. Community-based intervention packages facilitated by NGOs demonstrate plausible evidence for child mortality impact. *Health Policy Plan.* (2013). doi:10.1093/heapol/czt005

34. Bryce, J. *et al.* The Accelerated Child Survival and Development programme in west Africa: a retrospective evaluation. *Lancet* **375,** 572–582 (2010).

35. Kalyango, J. N. *et al.* Performance of community health workers under integrated community case management of childhood illnesses in eastern Uganda. *Malar. J.* **11,** 282 (2012).

36. Lehmann, U. & Sanders, D. *Community health workers: What do we know about them?* 34 (2007).

37. Unicef, W. H. O. *WHO / UNICEF JOINT STATEMENT Integrated Community Case Management An equity-focused strategy to improve access to essential treatment services for children*. 8 (2012).

38. Johnson, A. D. *et al.* Assessing Early Access to Care and Child Survival during a Health System Strengthening Intervention in Mali: A Repeated Cross Sectional Survey. *PLoS One* **8,** e81304 (2013).

39. Chowdury, T. (BRAC). Pay for performance of CHW: BRAC's experience. (2009).

40. George, A. *et al.* Community health workers providing government community case management for child survival in sub-Saharan Africa: who are they and what are they expected to do? *Am. J. Trop. Med. Hyg.* **87,** 85–91 (2012).

41. Satti, H. *et al.* Comprehensive approach to improving maternal health and achieving MDG 5: Report from the mountains of Lesotho. *PLoS One* **7,** (2012).

42. Drobac, P. C. *et al.* Comprehensive and integrated district health systems strengthening: the Rwanda Population Health Implementation and Training (PHIT) Partnership. *BMC Health Serv. Res.* **13 Suppl 2,** S5 (2013).

43. Källander, K. *et al.* Delayed care seeking for fatal pneumonia in children aged under five years in Uganda: a case-series study. *Bull. World Health Organ.* **86,** 332–338 (2008).

44. Diaz, T. *et al.* Healthcare seeking for diarrhoea, malaria and pneumonia among children in four poor rural districts in Sierra Leone in the context of free health care: results of a cross-sectional survey. *BMC Public Health* **13,** 157 (2013).

45. Disaggregated data: Community and traditional health workers - Data by country. at <http://apps.who.int/gho/data/node.main.HWF6?lang=en&showonly=HWF>

46. Earth Institute & Columbia University. *One Million Community Health Workers - a Technical Task Force Report*. 104 (2012).

47. Aranda-Jan, C. B., Mohutsiwa-Dibe, N. & Loukanova, S. Systematic review on what works, what does not work and why of implementation of mobile health (mHealth) projects in Africa. *BMC Public Health* **14,** 188 (2014).

48. Molyneux, D. H., Hotez, P. J. & Fenwick, A. "Rapid-impact interventions": how a policy of integrated control for Africa's neglected tropical diseases could benefit the poor. *PLoS Med.* **2,** e336 (2005).

49. Hopkins, A. D. Mectizan delivery systems and cost recovery in the Central African Republic. *Ann Trop Med Parasitol* **92 Suppl 1,** S97–100 (1998).

50. Molyneux, D. H. *et al.* Neglected tropical diseases and the Global Fund. *Lancet* **373,** 296–7 (2009).

51. *Community-directed interventions for major health problems in Africa: a multi-country study: final report*.

52. Dowling, P. Healthcare Supply Chains in Developing Countries: Situational Analysis. in *People that Deliv.* 28 (2011).

53. Watson, N. & McCord, J. *Alternative Public Health Supply Chains: Reconsidering the Role of the Central Medical Store*. (2013).

54. Bellows, N. M., Bellows, B. W. & Warren, C. Systematic Review: The use of vouchers for reproductive health services in developing countries: systematic review. *Trop. Med. Int. Heal.* **16,** 84–96 (2011).

55. Brody, C. M., Bellows, N. & Campbell, M. No Title. *Glob. Public Health* **8,** 363–388 (2013).

56. Lagomarsino, G., Garabrant, A., Adyas, A., Muga, R. & Otoo, N. Moving towards universal health coverage: health insurance reforms in nine developing countries in Africa and Asia. *Lancet* **380,** 933–43 (2012).

57. Quick, J., Jay, J. & Langer, A. Improving Women's Health through Universal Health Coverage. *PLoS Med.* **11,** e1001580 (2014).

58. Lu, C. *et al.* Towards universal health coverage: An evaluation of Rwanda Mutuelles in its first eight years. *PLoS One* **7,** e39282 (2012).

59. Gakidou, E. *et al.* Assessing the effect of the 2001-06 Mexican health reform: an interim report card. *Lancet* **368,** 1920–35 (2006).

60. Frenk, J., Gómez-Dantés, O. & Langer, A. A comprehensive approach to women's health: lessons from the Mexican health reform. *BMC Womens. Health* **12,** 42 (2012).

61. Blanchet, N. J., Fink, G. & Osei-Akoto, I. The effect of Ghana's National Health Insurance Scheme on health care utilisation. *Ghana Med. J.* **46,** 76–84 (2012).

62. Mensah, J., Oppong, J. R. & Schmidt, C. M. Ghana's National Health Insurance Scheme in the context of the health MDGs: an empirical evaluation using propensity score matching. *Health Econ.* **19 Suppl,** 95–106 (2010).

63. Kutzin, J. WHO | Anything goes on the path to universal health coverage? No. *Bull. World Health Organ.* **90,** 867–868 (2012).

64. Gwatkin, D. R. & Ergo, A. Universal health coverage: friend or foe of health equity? *Lancet* **377,** 2160–1 (2011).

65. Van Lonkhuijzen, L., Stegeman, M., Nyirongo, R. & van Roosmalen, J. Use of maternity waiting home in rural Zambia. *Afr. J. Reprod. Health* **7,** 32–6 (2003).

66. Chandramohan, D., Cutts, F. & Millard, P. The effect of stay in a maternity waiting home on perinatal mortality in rural Zimbabwe. *J. Trop. Med. Hyg.* **98,** 261–7 (1995).

67. L, van L., J, S. & J, van R. Maternity waiting facilities for improving maternal and neonatal outcomes in low-resource countries. (2012). at <http://summaries.cochrane.org/CD006759/maternity-waiting-facilities-for-improving-maternal-and-neonatal-outcomes-in-low-resource-countries>

68. Chandramohan, D., Cutts, F. & Chandra, R. Effects of a maternity waiting home on adverse maternal outcomes and the validity of antenatal risk screening. *Int. J. Gynecol. Obstet.* **46,** 279–284 (1994).

69. Gaym, A., Pearson, L. & Soe, K. W. W. Maternity waiting homes in Ethiopia--three decades experience. *Ethiop. Med. J.* **50,** 209–19 (2012).

70. Larson, C. P., Koehlmoos, T. P. & Sack, D. A. Scaling up zinc treatment of childhood diarrhoea in Bangladesh: theoretical and practical considerations guiding the SUZY Project. *Health Policy Plan.* **27,** 102–14 (2012).

71. Dzakpasu, S., Powell-Jackson, T. & Campbell, O. M. R. Impact of user fees on maternal health service utilization and related health outcomes: a systematic review. *Health Policy Plan.* czs142–(2013). doi:10.1093/heapol/czs142

72. Ponsar, F. *et al.* Abolishing user fees for children and pregnant women trebled uptake of malaria-related interventions in Kangaba, Mali. *Health Policy Plan.* **26 Suppl 2,** ii72–83 (2011).

73. Basinga, P. *et al.* Effect on maternal and child health services in Rwanda of payment to primary health-care providers for performance: an impact evaluation. *Lancet* **377,** 1421–1428 (2011).

74. Cambodia Ministry of Health. *National Guideline on Waiting Home*. 20 (2010). at <http://www.moh.gov.kh/files/mch/Guideline on Maternity Waiting Home.pdf>

75. Zimba, E. *et al.* Newborn survival in Malawi: a decade of change and future implications. *Health Policy Plan.* **27 Suppl 3,** iii88–103 (2012).

76. Nabudere, H., Asiimwe, D. & Amandua, J. Improving access to skilled attendance at delivery: a policy brief for Uganda. *Int. J. Technol. Assess. Health Care* **29,** 207–11 (2013).

77. *Improving Access to Skilled Attendence at Delivery. An evidence brief for policy.* (World Health Organization, 2012). at <http://www.who.int/evidence/sure/policybriefs/en/>

78. Tayler-Smith, K. *et al.* An ambulance referral network improves access to emergency obstetric and neonatal care in a district of rural Burundi with high maternal mortality. *Trop. Med. Int. Health* **18,** 993–1001 (2013).

79. Hofman, J. J., Dzimadzi, C., Lungu, K., Ratsma, E. Y. & Hussein, J. Motorcycle ambulances for referral of obstetric emergencies in rural Malawi: do they reduce delay and what do they cost? *Int. J. Gynaecol. Obstet.* **102,** 191–7 (2008).

80. Koblinsky, M. A. [editor]*Campbell, O. I. A. F. M. L. G. R. M. J. C.-B. A. Reducing maternal mortality - learning from Bolivia, China, Egypt, Honduras, Indonesia, Jamaica, and Zimbabwe. 1–152 (2003). at <http://documents.worldbank.org/curated/en/2003/04/2360798/reducing-maternal-mortality-learning-bolivia-china-egypt-honduras-indonesia-jamaica-zimbabwe>

81. Larson, C. P., Saha, U. R. & Nazrul, H. Impact monitoring of the national scale up of zinc treatment for childhood diarrhea in Bangladesh: repeat ecologic surveys. *PLoS Med.* **6,** e1000175 (2009).

82. Mosites, E. *et al. Bangladesh Zinc Case Study*. 15 (2012).

83. Press Release: Chelsea Clinton and CHAI support the Government of Nigeria's Saving One Million Lives launch | Clinton Foundation. at <http://www.clintonfoundation.org/main/news-and-media/press-releases-and-statements/press-release-chelsea-clinton-and-chai-support-the-government-of-nigeria-saving-one-million-lives.html>

84. Lagarde, M. & Palmer, N. The impact of user fees on access to health services in low- and middle-income countries. *Cochrane Database Syst. Rev.* CD009094 (2011). doi:10.1002/14651858.CD009094

85. Xu, K. *et al. The elimination of user fees in Uganda: impact on utilization and catastrophic health expenditures*. 25 (2005).

86. Experts' Meeting on Maternal, Newborn and Child Health, Addis Ababa, 24-26 April 2013 | CARMMA. at <http://www.carmma.org/event/experts-meeting-maternal-newborn-and-child-health-addis-ababa-24-26-april-2013>

87. Beane, C. R., Hobbs, S. H. & Thirumurthy, H. Exploring the potential for using results-based financing to address non-communicable diseases in low- and middle-income countries. *BMC Public Health* **13,** 92 (2013).

88. Basinga, P., Gertler, P. J. & Vermeersch, C. M. J. Paying Primary Health Care Centers for Performance in Rwanda. (2010).

89. Oxman, A. & Fretheim, A. *An overview of research on the effects of results-based financing*. (2008).

90. Burundi and Sierra Leone: Access to emergency care significantly reduces maternal mortality | Médecins Sans Frontières (MSF) International. at <http://www.msf.org/article/burundi-and-sierra-leone-access-emergency-care-significantly-reduces-maternal-mortality>

91. Kruk, M. E. *External Evaluation of Saving Mothers , Giving Life*. 72 (2013).

92. Wang, H. *et al.* Age-specific and sex-specific mortality in 187 countries, 1970-2010: A systematic analysis for the Global Burden of Disease Study 2010. *Lancet* **380,** 2071–2094 (2012).

93. Department of Economic and Social Affairs, P. D. *World Fertility Data 2012*. (2013).

94. WHO, UNICEF, UNFPA & The World Bank. *Trends in Maternal Mortality : 1990 to 2010*. *Organization* **32,** 1–55 (2012).

95. Lawn, J. E. *et al.* Newborn survival: a multi-country analysis of a decade of change. *Health Policy Plan.* **27 Suppl 3,** iii6–28 (2012).

96. Requejo, Jennifer, Bryce, J. & Victora, C. *Building a Future for Women and Children The 2012 Report*. 228 (2012).

97. Amouzou, A., Habi, O. & Bensaïd, K. Reduction in child mortality in Niger: a Countdown to 2015 country case study. *Lancet* **380,** 1169–1178 (2012).

98. Coen, B. UNICEF - At a glance: Niger - In facing nutrition crisis, the Niger benefits from lessons learned. at <http://www.unicef.org/nutrition/niger_65904.html>

99. Farmer, P. E. *et al.* Reduced premature mortality in Rwanda: lessons from success. *Bmj* **346,** f65–f65 (2013).

100. Sekabaraga, C., Diop, F. & Soucat, A. Can innovative health financing policies increase access to MDG-related services? Evidence from Rwanda. *Health Policy Plan.* **26 Suppl 2,** ii52–62 (2011).

101. Saksena, P., Antunes, A. F., Xu, K., Musango, L. & Carrin, G. Mutual health insurance in Rwanda: Evidence on access to care and financial risk protection. *Health Policy (New. York).* **99,** 203–209 (2011).

102. Allen, C. *et al.* Experience in implementing the OpenMRS medical record system to support HIV treatment in Rwanda. *Stud. Health Technol. Inform.* **129,** 382–386 (2007).

103. Wolfe, B. A. *et al.* The OpenMRS system: collaborating toward an open source EMR for developing countries. *AMIA Annu. Symp. Proc.* 1146 (2006). doi:86273 [pii]

104. Mamlin, B. W. *et al.* Cooking up an open source EMR for developing countries: OpenMRS - a recipe for successful collaboration. *AMIA Annu. Symp. Proc.* 529–533 (2006). doi:86578 [pii]

105. *TRACnet Rwanda: fighting pandemics through information technology*. *http://www.un.org* (2012).

106. Ngabo, F. *et al.* Designing and Implementing an Innovative SMS-based alert system (RapidSMS-MCH) to monitor pregnancy and reduce maternal and child deaths in Rwanda. *Pan Afr. Med. J.* **13,** 31 (2012).

107. Nsona, H. *et al.* Scaling up integrated community case management of childhood illness: update from Malawi. *Am. J. Trop. Med. Hyg.* **87,** 54–60 (2012).

108. Ergo, A., Shahi, N. & Rashidi, T. *Malawi Case Study*. (2010).

109. Dhaka Maniganj and Shibaloy District. The path through the fields. *The Econimist* **Nov 3rd,** 1–8 (2012).

110. Richard Cash, HSPH, M. R. C. *From one to many - scaling up health programs in low income countries*. 276 (The University Press Limited, Bangladesh, 2011).

111. Rubayet, S. *et al.* Newborn survival in Bangladesh: a decade of change and future implications. *Health Policy Plan.* **27 Suppl 3,** iii40–56 (2012).

112. Hatt, L. (Abt A. *Economic evaluation of demand-side financing program for maternal health in Bangladesh*. 176 (2010).

113. Development), J. G. (Center for G. *Reducing Child Mortality With Vitamin A in Nepal*. 2–8 (1993).

114. Rajbhandari, S. *et al. Expanding uterotonic protection following childbirth through community-based distribution of misoprostol: operations research study in Nepal. Int. J. Gynaecol. Obstet.* **108,** 282–288 (2010).

115. Samandari, G., Wolf, M., Basnett, I., Hyman, A. & Andersen, K. Implementation of legal abortion in Nepal: a model for rapid scale-up of high-quality care. *Reprod. Health* **9,** 7 (2012).

116. Pradhan, Y. V *et al.* Newborn survival in Nepal: a decade of change and future implications. *Health Policy Plan.* **27 Suppl 3,** iii57–71 (2012).

117. Rana, T. G. *et al.* Strengthening emergency obstetric care in Nepal: The Women's Right to Life and Health Project (WRLHP). *Int. J. Gynecol. Obstet.* **98,** 271–7 (2007).

118. Pandey, M. R., Daulaire, N. M., Starbuck, E. S., Houston, R. M. & McPherson, K. Reduction in total under-five mortality in western Nepal through community-based antimicrobial treatment of pneumonia. *Lancet* **338,** 993–997 (1991).

119. Bhandari, a, Gordon, M. & Shakya, G. Reducing maternal mortality in Nepal. *BJOG* **118 Suppl ,** 26–30 (2011).

120. Verguet, S. *et al.* Impact of supplemental immunisation activity (SIA) campaigns on health systems: findings from South Africa. *J. Epidemiol. Community Health* **67,** 947–52 (2013).

121. Verguet, S. *et al.* Measles control in Sub-Saharan Africa: South Africa as a case study. *Vaccine* **30,** 1594–600 (2012).