SCIENCE IN ACTION

Saving the lives of Africa's mothers, newborns, and children

Cameroon Academy of Sciences

Ghana Academy of Arts and Sciences

Kenya National Academy of Sciences

Nigerian Academy of Science

Académie Nationale des Sciences et Techniques du Sénégal

Academy of Science of South Africa

Uganda National Academy of Sciences

Science in action: Saving the lives of Africa's mothers, newborns, and children presents an overview of the current status of maternal, newborn, and child health (MNCH) in sub-Saharan Africa and reports a new analysis of how many lives could be saved if science translated into action through health systems. This publication was prepared for the Fifth Annual Meeting of the African Science Academy Development Initiative (ASADI), hosted by the Ghana Academy of Arts and Sciences on 10-11 November 2009 as part of its 50th anniversary celebration. ASADI is a project funded by The Bill & Melinda Gates Foundation through the United States National Academies to strengthen African academies of sciences in advising their national governments on matters of science and technology. This report includes data for all of sub-Saharan Africa but focuses specifically on the seven countries participating in ASADI.

Statements from Academy Presidents

Ghana Academy of Arts and Sciences	Welcome, Akwaaba! As hosts of the fifth annual meeting for ASADI, we acknowledge the need for improving maternal, newborn, and child health in Africa. Ghana has experienced a reduction in under-five mortality over the past 5 years as well as an increase in skilled attendance at birth, but to get on track for 2015 we value the evidence –based priorities presented in this report. *Reginald Fraser Amonoo, President, Ghana Academy of Arts and Sciences*	161	Number of mothers and children under 5 dying each day
Cameroon Academy of Sciences	The Road Map for maternal and neonatal health in Cameroon engages the participation of all actors to improve survival. Despite insufficient human resources for health, special recruitment for health personnel has been ongoing for the last 4 years. *Samuel Domngang, President, Cameroon Academy of Sciences*	259	
Kenya National Academy of Sciences	To improve the lives of women and children, the Kenyan government recently launched the Kenya Child Survival and Development Strategy 2008-2015 to address gaps and deliver efficient and effective services. The key issue for Kenya is using this strategy to accelerate implementation. *Joseph O. Malo, President, Kenya National Academy of Sciences*	539	
Nigerian Academy of Science	As Africa's largest nation, Nigeria has a major effect on the regional achievement of MDGs 4 and 5. In response, the Nigerian Academy of Science held two workshops, in June 2007 and March 2009, and published reports focused on reducing maternal and child mortality in Nigeria to support the government's effort to reduce unnecessary deaths. *Oye Ibidapo-Obe, President, Nigerian Academy of Science*	3,112	
Académie Nationale des Sciences et Techniques du Sénégal	Based on the principles of quality, necessity, and continuity in healthcare, MNCH is suffering in Senegal from structural and functional affection. The National Academy of Science and Technology of Senegal supports an evidence-based MNCH strategy that is safeguarded through rigorous management, which will resist any political, religious, or party influence. *Souleymane Niang, President, National Academy of Science and Technology of Senegal*	145	
Sciences for Prosperity. Uganda National Academy of Sciences	Saving the critical resource of a nation that is mothers, newborns, and children is paramount. Ugandan scientists are committed to making a significant contribution to MDG 4 and 5 to secure our future through science and its application to save lives. *Paul E. Mugambi, President, Uganda National Academy of Sciences*	543	
Academy of Science of South Africa	We believe that the health needs of South Africa's mothers, newborns, and children would be satisfied by commitment to health service delivery, leadership, stewardship, and equity. As hosts of the ASADI 2010 conference, we hope that progress in reducing preventable deaths for this target population in sub-Saharan African countries will be seen even within this coming year. *Robin Crewe, President, Academy of Science of South Africa*	212	

Main abbreviations

ANC	Antenatal Care
ASADI	African Science Academies Development Initiative
CEmOC	Comprehensive Emergency Obstetric Care
IMCI	Integrated Management of Childhood Illness
KMC	Kangaroo Mother Care
LiST	Lives Saved Tool
MDG	Millennium Development Goal
MMR	Maternal mortality ratio
MNCH	Maternal, Newborn and Child Health
MNC	Maternal, newborn, and child
NMR	Neonatal mortality rate
PMTCT	Prevention of Mother-to-Child Transmission of HIV/AIDS
U5MR	Under-5 mortality rate
WHO	World Health Organization

Key messages

Situation

Sub-Saharan Africa is off-track to achieve the Millennium Development Goals (MDGs) for maternal and child health by 2015. Each year:

- 265,000 mothers die due to complications of pregnancy and childbirth
- 1,243,000 babies die before they reach one month of age
- 3,157,000 children, who survived their first month of life, die before their fifth birthday

This toll of more than 13,000 deaths per day accounts for half of the world's maternal and child deaths. Additionally, 880,000 babies are stillborn and remain uncounted and untracked.[1] The region also carries 90% of the world's malaria deaths, two-thirds of people living with HIV/AIDS globally and 26% of the world's underweight children. Nevertheless, there is clear evidence demonstrating that progress can be achieved even in low-income countries. This evidence, together with the unprecedented new investments in maternal and child health from continental leaders and increasingly from development partners, offers new hope for the future.

Solutions – from science to action

Science has developed many effective health interventions such as medicines, immunisations, insecticide treated bednets, essential equipment for emergency obstetric care, and numerous others. Yet many African governments are currently underutilising existing scientific knowledge to save lives. For example, there is now widespread agreement among health systems researchers that high impact interventions are most effectively and efficiently delivered when integrated into existing health service delivery packages along the continuum of care for mothers, newborns, and children although each country's response will vary depending on local epidemiology, existing coverage, health systems, and community capacity. A scientific approach is needed to identify, monitor, and evaluate the most appropriate interventions for scale up in order to strengthen health systems. Now is the critical time to use data to set priorities and accelerate action.

Accelerated action now based on data and science has the potential to save millions of lives each year and put many African countries on track to reach the Millennium Development Goals for maternal and child survival

Saving 4 million lives each year

If coverage of essential MNCH interventions reached all families in sub-Saharan Africa and everyone received high quality care, nearly 4 million mothers, newborns, and children could be saved each year – avoiding an estimated 85% of deaths. Even a moderate increase in coverage of a few strategically selected interventions has the potential to save thousands of lives. Using nine example countries, this report presents an analysis of potential lives saved and the cost of scaling up interventions based on a modelling approach using the Lives Saved Tool (*LiST*). However, in order to actually save lives, countries will need to radically strengthen their health systems and address health inequities.

Photo credit: Save the Children

Steps to action

Improving health systems and promoting high impact interventions involves everyone and especially requires partnership between scientists and health care providers with government, development partners, policy makers, civil society, and communities. Four key actions include:

1. **Invest and track resources** – Increase funding and accountability for financial promises and fiscal commitments
2. **Implement** – Apply current knowledge to carry out policies and programmes equitably
3. **Innovate** – Develop new research and new technologies and adopt a paradigm shift to implementation science through health systems research
4. **Inform** – Use evidence as a basis for health policy and resource allocation

Progress towards Millennium Development Goals 4 and 5 in Africa

Most African countries, including the seven participating in ASADI, are off track to achieving the MDGs for maternal and child health by 2015. Yet, progress in several low-income countries demonstrates that these goals could still be attained through immediate strategic investments in selected evidence-based interventions together with linked health systems strengthening. Attention and investment for MNCH are increasing but time for achieving success is short. A critical understanding of where and why these deaths occur, and strategic, data-based prioritisation of interventions is essential to accelerate progress.

MDG 4: Reduce the under-five mortality rate (U5MR) by two-thirds by 2015

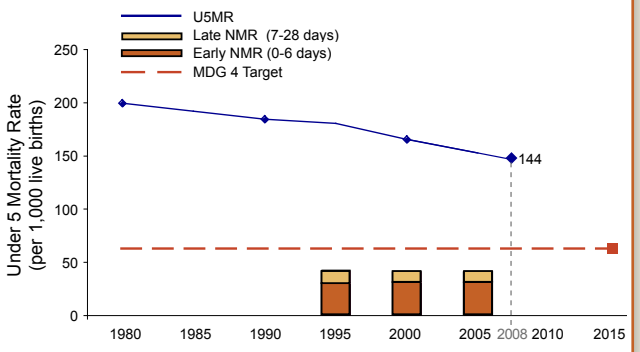
Although some reduction in the U5MR has been achieved, particularly over the last 10 years, on average, the pace of the decline across the region has been too slow for the region to meet MDG 4 (Figure 1). Also, newborn death accounts for one in four child deaths, and the regional average neonatal mortality rate (NMR) - deaths in first 28 days of life - has not measurably reduced. However, five countries in the region are on track for MDG 4 - Cape Verde, Eritrea, Mauritius, Seychelles, and recently, Malawi.[2] Another significant gain in child survival is a dramatic reduction in measles deaths as a result of improved immunisation coverage.

MDG 5: Reduce the maternal mortality ratio (MMR) by three quarters and achieve universal access to reproductive health by 2015

Half of global maternal deaths occur in sub-Saharan Africa. The MMR in the region has remained practically unchanged since 1990, though there are insufficient data to measure trends reliably over time (Figure 2). Forty African countries have very high or high maternal mortality (classified as MMR over 300 deaths per 100,000 live births).[2] A second indicator for MDG 5 monitors skilled attendance at birth. The average coverage of skilled attendance at birth has also shown no change in the last decade.

Every year 4.4 million children die, including 1.2 million newborns, in sub-Saharan Africa

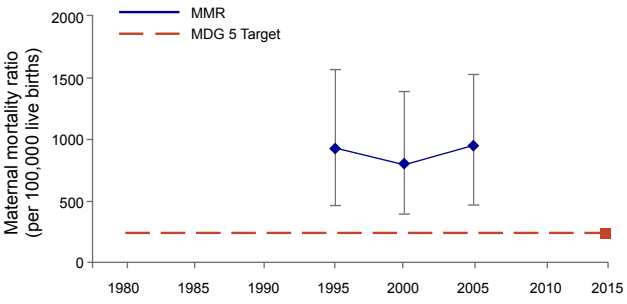
Figure 1: Progress towards MDG 4 for newborn and child survival in sub-Saharan Africa



Sources: Opportunities for Africa's Newborns, 2006 and updated for 2008 with data from www.childinfo.org

Every year 265,000 mothers die of pregnancy-related causes in sub-Saharan Africa

Figure 2: Progress towards MDG 5 for maternal survival in sub-Saharan Africa



Source: www.childinfo.org
The range lines indicate the uncertainty bounds of the data

MDGs 4 and 5 in Africa – Are we at a turning point?

Despite negative publicity about Africa, progress is being made towards saving the lives of mothers, newborns, and children. Eritrea has achieved an average annual rate reduction for U5MR of 4% since 1990 despite having one of the lowest gross national income per capita in the world. Malawi, Tanzania, Ghana, and others had stagnant U5MR in the 1990s but have experienced up to a 30% decline in U5MR since 2000. Benin and Burkina Faso have registered increases in skilled birth attendance in the past 10 years.[4] Ghana has also achieved an increase in skilled birth attendance, which is associated with a policy of free medical care for pregnant women announced by the President in May 2008 and implemented through the National Health Insurance Scheme.

Strategic investments over the next five years will be crucial in order to accelerate progress in many countries. Fortunately there are a number of continent-wide plans and commitments in place including an investment case for child survival and health-related MDGs which was presented by UN partners at an African Union meeting in 2005.[5] Donor investment for MNCH is also increasing with funds for child health having increased by 63% and maternal and newborn health by 66% from 2003 to 2006.[6]

How many die?

Every year in sub-Saharan Africa 4.4 million children, including 1.2 million newborns, and 265,000 mothers die. This amounts to 13,000 deaths per day or almost 9 deaths every minute. Table 1 provides the most recent numbers and rates of death in the seven countries participating in ASADI, which account for 36% of maternal and 40% of child deaths in sub-Saharan Africa. Nigeria alone, as the most populous country in the region, accounts for a quarter of deaths in sub-Saharan Africa. On average, countries in West and Central Africa have higher rates for maternal mortality and under-five mortality than Eastern and Southern African countries. An additional and closely linked loss is the 880,000 stillbirths that occur each year - yet these deaths remain invisible in MDG tracking.

Table 1: Maternal, neonatal, and child mortality rates and annual deaths in sub-Saharan Africa

Countries	Adjusted Maternal Mortality Ratio (2005⁺)	Annual no. of maternal deaths	Neonatal mortality rate (2004^)	Annual no. of neonatal deaths	Under 5 mortality rate (2008^)	Annual no. of under-5 deaths
Cameroon	1000	5,700	30	21,000	131	89,000
Ghana	560	3,800	30*	23,000	76	55,000
Kenya	560	7,700	34	51,000	128	189,000
Nigeria	1100	59,000	47	283,000	186	1,077,000
Senegal	980	4,100	35	16,000	108	49,000
South Africa	400	4,300	17	19,000	67	73,000
Uganda	550	8,100	30	44,000	135	190,000
Sub-Saharan Africa	***920¤***	***265,000***	***41¤***	***1,243,000***	***144***	***4,400,000***

⁺ per 100,000 live births; ^ per 1,000 live births
Source: Data from *State of the World's Children* 2010,[7] unless otherwise noted. ¤*State of the World's Children* 2009,[2] *Ghana Demographic and Health Survey 2008[8]

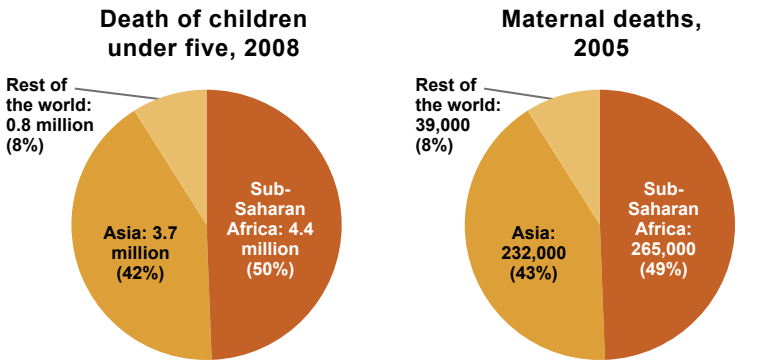
Where do they die?

Sub-Saharan Africa accounts for 11% of the world's population yet suffers half of the world's maternal, newborn, and child deaths (Figure 3). All but one of the 20 countries with the highest U5MR and MMR globally are in sub-Saharan Africa.

Countries that experience conflict and natural disasters generally have higher risk of maternal, newborn, and child death due to unstable institutions and weak health systems. Most of the 10 countries in sub-Saharan Africa with the highest death rates have seen recent conflict.

The place where people live within a country also affects their health and access to health care. Mortality is consistently lower in urban areas than it is in rural areas with rural communities often having poorer access to health care. However, access to quality health care for the growing proportion of urban poor is an increasing challenge.

Figure 3: Global distribution of maternal and child deaths



Source: www.childinfo.org

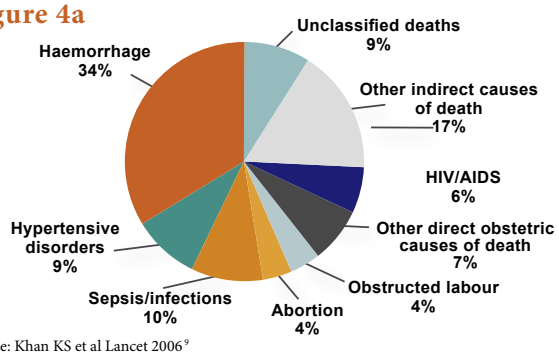
Photo credit: Save the Children

Why do they die?

Why do African mothers die?

More than half of maternal deaths in Africa are due to direct obstetric complications, which occur around the time of childbirth: haemorrhage, hypertensive disease, sepsis/infection and prolonged labour. Non-pregnancy related infections, such as HIV/AIDS and pneumonia, account for 23% of all deaths.[9]

Figure 4a

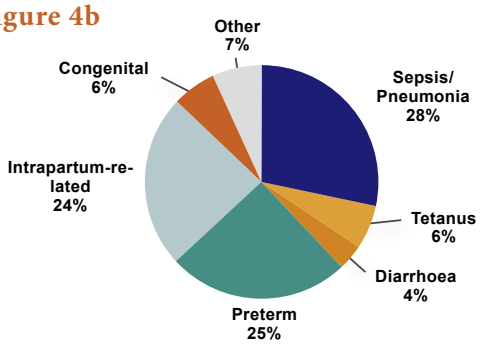


Source: Khan KS et al Lancet 2006[9]

Why do African newborns die?

One quarter of under-five deaths in Africa are in the first month of life and this proportion is increasing. Infections, including sepsis/pneumonia, tetanus and diarrhoea, intrapartum-related ("birth asphyxia"), and preterm births account for 88% of all newborn deaths. Up to 90% of newborns who die are low birthweight (<2500g) with preterm babies at highest risk.

Figure 4b

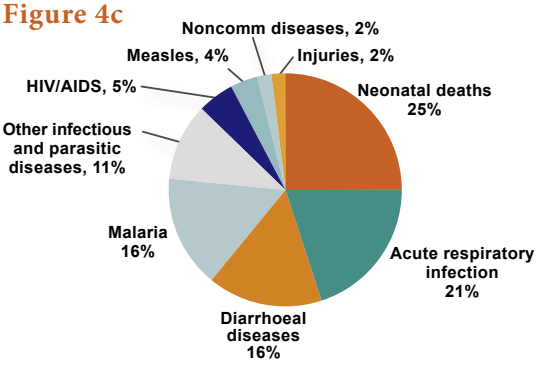


Source: Opportunities for Africa's Newborns, 2006[2]

Why do African children under five die?

After the first month of life, two thirds of child deaths in Africa are due to pneumonia, diarrhoea and malaria. Malnutrition is also important as it increases the risk of children dying from infections. The cause of death profile varies between countries. For example, even though HIV/AIDS accounts for approximately 5% of child deaths in the region overall, more than half of child deaths are due to HIV/AIDS in South Africa.[10]

Figure 4c



Source: The Global Burden of Disease: 2004 update, 2008[10]

The big five health challenges for mothers, newborns, and children in sub-Saharan Africa

1. Pregnancy and childbirth complications: More than half of maternal deaths take place within one day of birth,[11] approximately one third of stillbirths occur during labour,[1] and nearly half of all newborn deaths are on the first day of life.[12]

2. Newborn illness: One in four child deaths are newborns. Preterm babies have a much greater risk of dying; many die from lack of simple care such as warmth, feeding, hygiene, and early treatment of infections.

3. Childhood infections: Nearly 50% of child deaths are caused by pneumonia, diarrhoea, and malaria, which are preventable and also very feasible to treat.[10]

4. HIV/AIDS: With two-thirds of the global HIV/AIDS population living in Africa, HIV/AIDS accounts for 6% of maternal deaths and 5% of under-five deaths.[10]

5. Malnutrition: Maternal anaemia, iodine deficiency, and poor quality diet are associated with higher maternal mortality and higher incidence of stillbirths and congenital abnormalities.[13] Over 31 million African children are underweight, and nutritional risk factors, including vitamin A and zinc deficiencies, and sub-optimal breastfeeding, contribute to more than one-third of child deaths.[13]

Social determinants increase the risk of ill health for mothers, newborns, and children

In addition to the direct causes of maternal, newborn, and child (MNC) deaths, social science research highlights non-health factors, or social determinants of heath that undermine the survival of mothers, newborns, and children. A 2008 World Health Organization (WHO) report on social determinants of health argues that the health gaps can be closed in a generation by intersectoral actions such as expanding educational programmes and improving living and working conditions, such as improving access to clean water and adequate sanitation[14]. Specific health education for families and mothers-to-be are key components to MNCH. Shifting harmful norms, such as ending female genital mutilation, are also critical for improving MNCH outcomes[15].

> Poverty and inequity are underlying causes for many maternal, newborn, and child deaths.

Poverty, education, and gender

Poverty and inequity are underlying causes for many MNC deaths. Nearly 99% of global maternal and newborn deaths occur in low- and middle-income countries[12] and maternal mortality is more than twice as high in the poorest households compared with the least poor households.[11] Poverty undermines MNCH through numerous pathways including: increasing the risk of illness and undernutrition through poor diet, inadequate housing and sanitation, and reducing care-seeking and access to health care services. Gender discrimination, low education levels, and a lack of empowerment prevents women from seeking care and making the best choices for themselves and their children's health, which results in critical delays and unnecessary deaths.

Conflict, disaster, and poor governance

Complex emergencies present considerable challenges for MNCH. These situations are often marked by a lack of equipment and supplies, poor referral systems, and a worsening condition of health facilities, loss of human resources for health and deteriorating transportation networks. Corruption, authoritarian regimes, weak institutions, and limited freedoms can inhibit access to effective care for mothers, newborns, and children. Conversely, good governance is linked to systematic progress towards comprehensive and effective health systems.

Photo credit: UNHCR/S. Mann. Sudan.

Financial barriers

The cost of health care is unaffordable for many families in sub-Saharan Africa. User fees and cost-sharing arrangements can be a major barrier to accessing health services, especially for the poor. Other economic barriers include: informal fees, the cost of medicines and tests not supplied in public health facilities, the cost of not working during hospitalisation, as well as travel, food and accommodation. Although fee removal may benefit poor families, because it often increases health service utilisation, removal of fees requires careful planning and management as well as support by other policy measures to ensure that health facility funding needs are met through sources other than user fees. Ghana, South Africa and Uganda have all experienced some success in user fee protection for MNCH services.

Using health system packages to deliver life-saving care

Research suggests that single or vertical interventions, such as an immunisation or bednets to prevent malaria can reduce mortality; yet a more sustainable solution is to integrate effective interventions and delivery strategies within existing health system packages. Bridging the artificial divide between vertical approaches, which focus on specific disease priorities and interventions, and horizontal ones, which aim to strengthen the overall structure and functions of the health system may increase efficiency of delivery and build a results-focused health system.[16] There is increasing evidence to suggest that when MNCH interventions are packaged and provided through various service delivery modes tailored to suit existing health systems, cost-effectiveness is enhanced and available human resources are maximised.[17]

The continuum of care is a core organising principle for health systems that emphasises seamless linkages between health care packages across time and through various service delivery strategies. An effective continuum of care addresses the needs of mother, newborn, and child throughout the life cycle, wherever care is provided: at home, primary care level and district and regional hospitals.

Figure 5 presents a schematic matrix of the following eight basic health packages that are present in almost every health system:

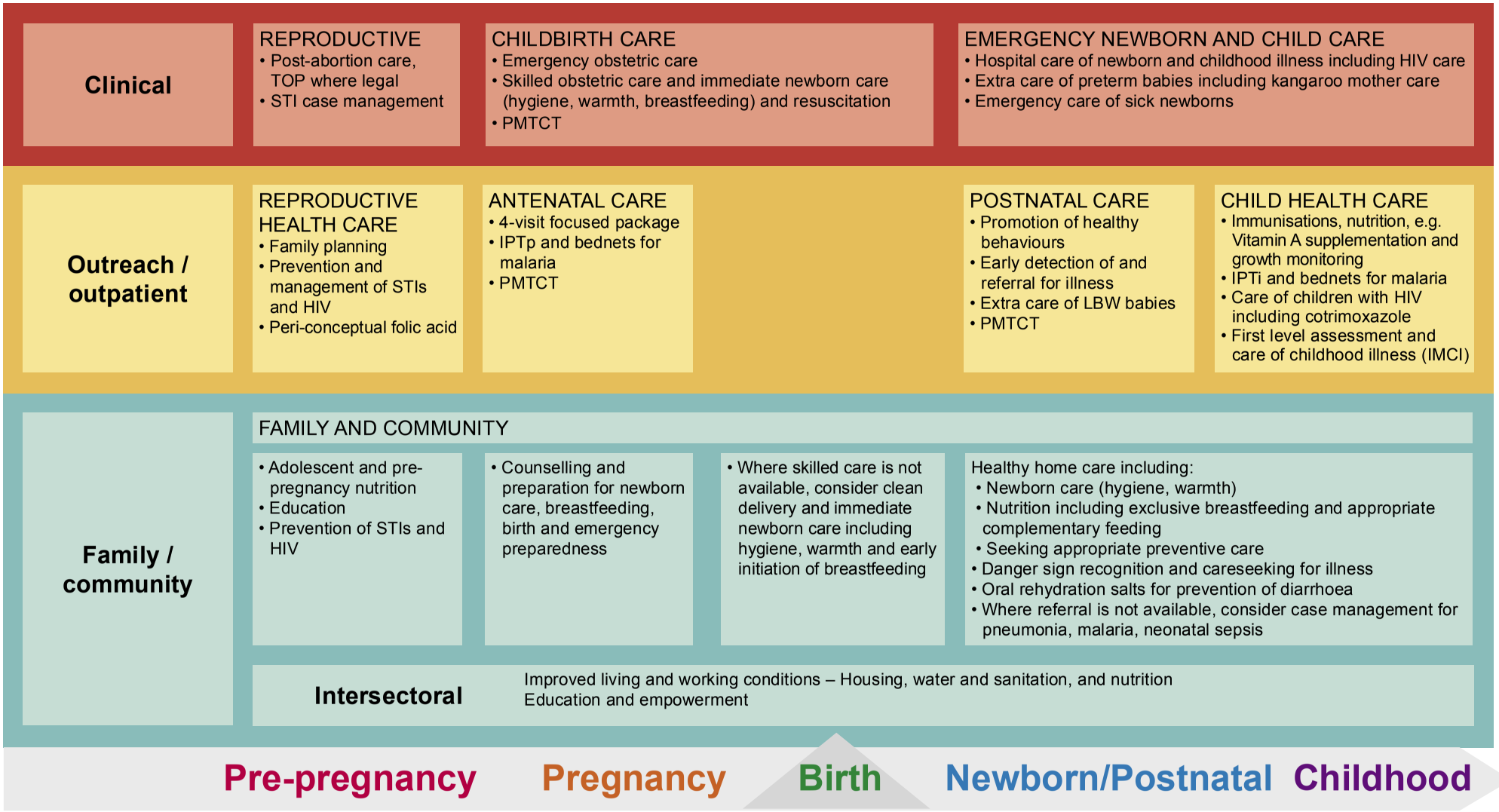
1. Reproductive health clinical care package
2. Reproductive health packages delivered through outpatient and outreach services
3. Antenatal care package delivered through outpatient or outreach service
4. Childbirth clinical care package
5. Postnatal care package delivered through outpatient or outreach service
6. Newborn baby and child clinical care package
7. Child health package delivered through outpatient or outreach service
8. Family and community care package

> An effective continuum of care addresses the needs of mother, newborn, and child throughout the life cycle, wherever care is provided: at home, primary care level, and district and regional hospitals. This is the core of an effective health system.

A functioning continuum of care for MNCH relies on these integrated health packages to deliver a range of high impact interventions. While these packages may exist in nearly all settings, developing countries cannot possibly scale-up and implement all MNCH interventions at once. Packages can be comprised of specific interventions aimed at addressing a particular outcome or proven intervention, and then become integrated and packaged according to local needs and capacity. The relative strength of those elements that affect the functionality of health systems – human resource capacity, health-facility infrastructure, supply systems, financial resources, government stewardship, district-level management, and monitoring – will also determine the rate of scale up for MNCH within the continuum of care.

Photo credits: Save the Children

Figure 5: Integrated maternal, newborn, and child health packages



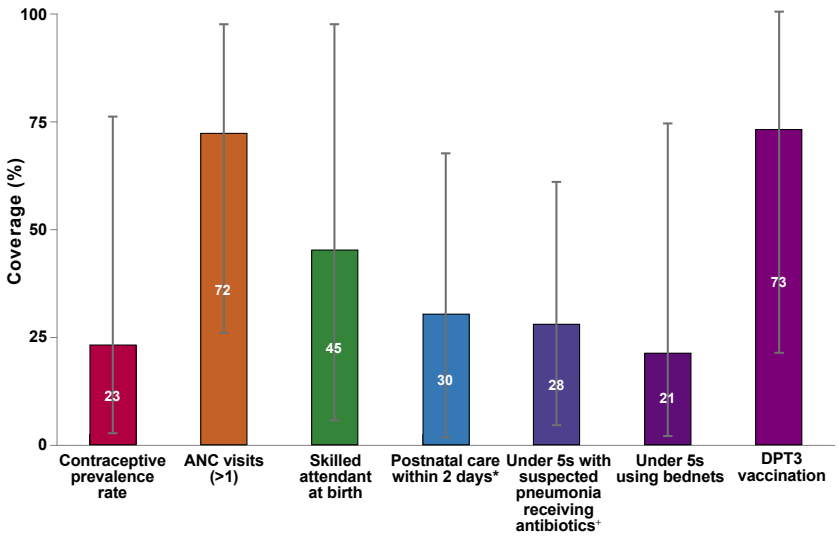
Source: Adapted from Kerber KJ, Lawn JE et al Lancet, 2007[17]

Notes: HIV=Human Immunodeficiency Syndrome; IMCI=Integrated Management of Childhood Illness; IPTp/i=Intermittent Preventive Treatment in Pregnancy/Infants; PMTCT=Prevention of Mother-to-Child Transmission for HIV; STI=Sexually Transmitted Infection; TOP=Termination of Pregnancy.

Current coverage of care

In order to provide the best care and save the most lives, both coverage and quality of services need to be high. Ensuring high coverage of care means reaching every mother, newborn, and child with targeted interventions. Providing quality care means doing the right thing right, at the right time. The goal is to achieve universal coverage and high quality for all essential MNCH packages.

Figure 6: Coverage along the continuum of care for maternal, newborn, and child health



Source: State of the World's Children 2009[2] and Demographic and Health Surveys (2005-2008).[18]
*Postnatal care data for 10 countries. +Under-fives with suspected pneumonia receiving antibiotics data for 18 countries.
The bars signify the range between countries with the lowest and highest coverage.

Current coverage for seven of the eight basic service delivery packages for MNCH in sub-Saharan Africa varies widely across the continuum of care, as demonstrated in Figure 6. Currently, there are no routine data available for the reproductive health clinical care package. The eight basic packages consist of multiple interventions, however the data shows the median coverage of the contact points for the package (e.g. antenatal care and skilled attendance) or one representative indicator per package.

Birth and the first days of life are the time of greatest risk for mothers and their children.

MNCH coverage data gaps

Successful health programming relies on evidence to understand the scale of the problem, implement appropriate solutions, determine the effects of action, and monitor progress. Without reliable baseline data, the true burden of ill health can go unrecognised and one cannot gauge the effectiveness of an intervention. There is a lack of up-to-date and reliable MNCH data particularly around the content and quality of care provided at birth and during the postnatal period, and assessing if mothers and newborns receive specific high impact interventions. Similarly there is little known about the care received by ill newborns and children, such as coverage of Kangaroo Mother Care (KMC) and case management of illness. This could be improved with an expanded household survey module and corroborated with health facility assessments.

Currently, most coverage data comes from household surveys such as Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS) which are conducted only every three to five years. Health Management Information Systems in most African countries are not able to provide consistent and high quality health data. The use of a limited number of sentinel surveillance sites provides an opportunity to improve the quality of data collection for health and the use of data for rational decision-making. A concentration of resources in a network of nationally representative sites may provide more complete and reliable information, such as the Sample Registration System in India.[19]

Each birth and death should be counted and accounted for yet over 19 million births go unregistered each year in sub-Saharan Africa.[2] The registration of births, deaths, and causes of death is a human right as well as necessary for appropriate health system planning and management. The lack of vital registration systems in Africa and poor documentation of births and deaths is an ongoing challenge. Countries participating in ASADI are home to an estimated seven million unregistered births. Thus there is an urgent need for high quality vital registration and data collection systems to be put into place and adequately supported and maintained.

Critical gaps in coverage

Coverage gap: Does care reach everyone?

Services that can be scheduled – notably antenatal care and immunisation – tend to have relatively high coverage. While those services requiring 24-hour curative services such as skilled attendance and emergency obstetric care, and case management for pneumonia, diarrhoea, and malaria to do have much lower coverage and require a health systems approach to increase access to care. Birth and the first days of life are the time of greatest risk for mothers and newborns. However, coverage for skilled attendance at birth is much lower and routine postnatal care coverage is unacceptably low, partly because this is a recently recognised package.[20] Critical interventions such as contraception and postnatal care are possible through outreach but have not been given consistent policy priority.

Equity gap: Who receives care and who does not?

Equity gaps are hidden by national averages, masking disparities between rich and poor, public and private health sectors, provinces or districts, and among rural, urban, and peri-urban populations. Even for some primary health interventions such as immunisations, coverage is lower for poorer families. For clinical, curative care, the gap between access to care for rich and poor households is much wider. For example skilled attendance during childbirth in the countries participating in ASADI is 3-4 times more likely for the richer families than the poorer families (Table 2). Increased investment in improved access to care and targeting the poorest and hardest to reach areas must be systematically improved to reach underserved families, particularly during childbirth and the critical early postnatal period.

Table 2: Equity Gap - Skilled Birth Attendance (%)

	Coverage for poorest families	Coverage for wealthiest families
Cameroon	29	95
Ghana	24	95
Kenya	17	75
Nigeria	13	85
Senegal	20	89
South Africa	68	98
Uganda	28	77

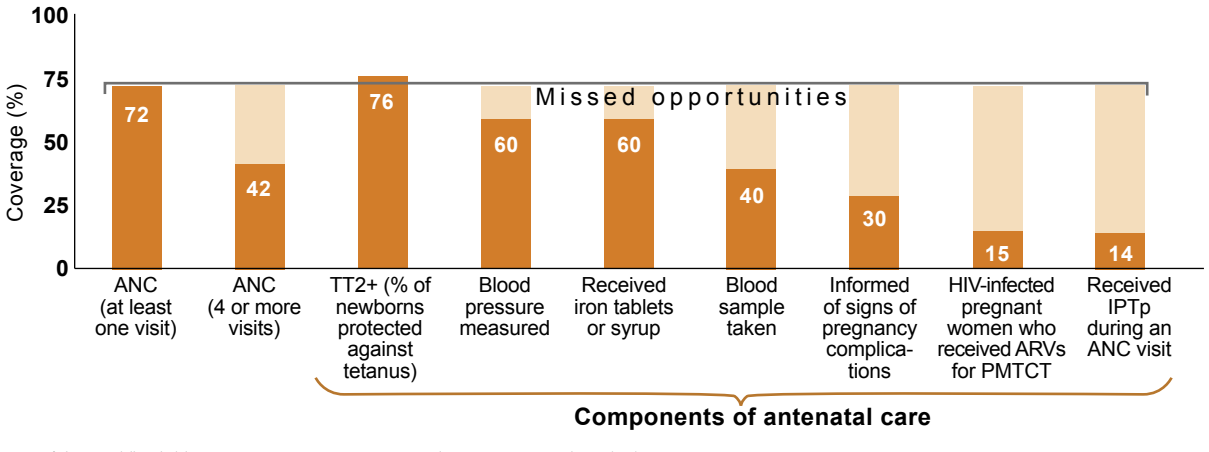
Source: whosis.org, data from 1998-2008 household surveys[18]

Photo credit: Save the Children

Quality gap: How often is the right care provided at the right time?

The quality gap is the difference between the coverage of the basic package and prompt and appropriate care. Quality service provision requires the availability of people with the right skills and the essential equipment and drugs. Increasing coverage of care alone is not enough – quality must improve and remain high in order to maintain demand for health services. For example, Figure 7 shows that even though coverage of one antenatal visit is high on average in the region, far fewer women receive the full range of evidence-based interventions during pregnancy, missing key opportunities to save lives. Gaps in data to measure quality of care also affect the ability to see and reduce such quality gaps.

Figure 7: Missed opportunities to save lives and promote health through antenatal care in sub-Saharan Africa



Sources: State of the World's Children 2009,[2] most recent DHS,[18] and UNAIDS Second Stocktaking Report 2008.[21]

How many lives would be saved if well-known scientific advances reached all families in Africa?

> Almost 4 million African women, newborns, and children need not die each year if already well known interventions reached 90% of families.

Coverage, equity, and quality gaps inform governments and health policy makers where care is lacking, but they do not necessarily help determine the most effective course of action or where investment would save the most lives. Science has given us interventions that work – and now new advances in statistical modelling allow us to estimate how many lives could be saved if interventions were scaled up to high or even to moderate coverage levels. This modelling tool, called the Lives Saved Tool (*LiST*) has been developed by a network of researchers, and uses the following inputs: data on country-specific mortality rates, cause of death, and the impact of certain interventions at different levels of coverage (more details are provided in Box 1).

To determine how many lives would be saved if well-known scientific advances reached all families in sub-Saharan Africa, a team of experts undertook an extensive analysis for this report using *LiST*. They considered how many lives could be saved if 90% coverage of essential MNCH services was achieved in countries in six years. Using nine example countries, the team also did an in-depth analysis on how many lives would be saved if coverage levels for selected interventions and for all essential MNCH interventions were increased to more pragmatic or achievable levels in two years.

For the analysis, countries were divided into three categories of "health system context" - low, middle, and high based on skilled attendance at birth of less than 30%, between 30 and 60% and greater than 60%. Even though comprehensive care includes a complex array of indicators, skilled birth attendance has previously been used as a marker of health system access and was used in this analysis to distinguish between categories of health system context. It also correlates strongly with institutional deliveries.[22] Table 3 shows 42 sub-Saharan African countries separated into the three categories and presents the total number of births and deaths as well as average mortality rates in each context. Since the plurality of countries in sub-Saharan Africa fall in the middle range of 30% to 60% skilled attendance at birth, this category has the most births, deaths, and lives saved.

The results of this analysis indicate that almost 4 million African women, newborns, and children need not die each year if already well known interventions reached 90% of families – an estimated 85% of deaths that could be avoided. Countries in low and middle health system context have greater potential to save more lives because there is more room to scale up interventions when starting from low or moderate coverage. However, even in the countries with the strongest health systems, almost one million lives could be saved if these high impact interventions were scaled up.

Table 3: The situation and lives saved for sub-Saharan African countries grouped according to level of skilled attendance at birth

	Coverage of skilled attendance at birth:			TOTAL numbers for all countries
	Countries with <30% coverage	Countries with 30-60% coverage	Countries with >60% coverage	
	3 countries plus Northern Nigeria[a]	25 countries	13 countries plus Southern Nigeria[b]	42 countries
CURRENT SITUATION:				
Annual number of births	7,077,000	14,244,000	8,956,000	30,277,000
Maternal Mortality Ratio (average)	943	992	654	920
Neonatal Mortality Rate (average)	40	44	35	41
Under-5 Mortality Rate (average)	157	149	107	144
Total number of annual MNC deaths	1,264,000	2,187,000	1,213,000	4,664,000
TOTAL LIVES THAT COULD BE SAVED IF 90% COVERAGE WAS REACHED:				
Maternal lives saved	34,000	69,200	35,000	138,200
Newborn lives saved	273,600	470,500	227,900	972,100
Child lives saved	710,100	1,417,000	742,600	2,869,600
Total number of annual MNC lives saved	1,017,600	1,956,700	1,005,600	3,979,900
Percentage of MNC deaths averted	81%	89%	83%	85%
Where do the nine example countries currently fit in?	**Ethiopia** and **Northern Nigeria** have less than 30% coverage	**Ghana, Kenya, Senegal, Uganda** and **Tanzania** have between 30% and 60% coverage	**Cameroon, South Africa** and **Southern Nigeria** have more than 60% coverage	

* Countries with less than 20,000 annual births are excluded from this analysis including: Cape Verde, Mauritius, Sao Tome and Principe and Seychelles
[a] Northern Nigeria includes the northern regions: North Central, North East, and North West
[b] Southern Nigeria includes the southern regions: South East, South South, South West
For more information on this analysis, visit www.nationalacademies.org/asadi

Saving lives with achievable coverage increase - analysis in selected African countries to identify priorities

Photo credit: Save the Children

It is clear that many lives could be saved if all essential MNCH interventions were increased to near universal coverage. While many African countries are far from reaching this level of coverage, even a moderate increase of a few interventions has the potential to save thousands of lives. The challenge for African leaders and policy makers is to identify which interventions could save lives even if increased to an achievable coverage level in the short term.

Health systems vary and local context matters. Therefore, a given intervention will not have the same impact, cost, and feasibility everywhere. Since many African countries have decentralised health systems with substantial variation even within countries, local factors must be considered in health planning and prioritisation, such as:

- Epidemiology (e.g. variation in cause of death, HIV prevalence, malaria endemicity)
- Health system performance and potential platforms for getting to scale (e.g. existence of a national cadre of health extension worker, major investment in facility care)
- Funding opportunities and constraints

The analysis presented on the following pages focuses on nine sub-Saharan African countries including the seven countries participating in ASADI, Tanzania, and Ethiopia. These countries provide a good representation of different health system contexts; Ethiopia and Tanzania were specifically added because of their growing interest in developing their academy of sciences. Nigeria is split by north and south for this analysis due to the extreme regional variations in the health system. Interventions analyzed were selected based on: evidence-base, potential mortality impact, affordability, cultural and social acceptability, feasibility to get to high level coverage, and ability to reduce inequity.

The analysis for these nine countries reveals how many lives could be saved and the estimated cost of the intervention within the three categories of health system context by achievable increases within the next two years. Three aspects are considered:

1. ***Principle:*** Which interventions should be prioritised in the health system context and why they were chosen?

2. ***Lives saved:*** How many lives would be saved each year with an achievable increase in coverage? Coverage increases for facility and community/outreach interventions differ and are:
    a. Community and outreach intervention coverage was increased by 20 percentage points from current level
    b. Facility-based maternal and newborn intervention coverage was increased to all births taking place in health facilities

3. ***Practice:*** what would it take to satisfy supply and demand needs?

Box 1: LiST Methods

A team of experts and representatives from the countries participating in ASADI undertook this analysis using the *Lives Saved Tool (LiST)*. *LiST* is a modelling software which allows users to estimate the impact of scaling-up proven maternal, newborn, and child health interventions by defining and running multiple country, state or district specific scenarios. *LiST* is programmed into a demographic software package called Spectrum, which has been widely used for 20 years and is designed to predict population changes over time by age and sex. *LiST* uses recent mortality rates by country and cause of death data for mothers, newborns and children to estimate the number of maternal, under-five, infant and neonatal deaths that can be averted in each scenario, by cause and intervention, as intervention coverage increases. *LiST* is based upon evidence reviews for intervention impact generated by the Child Health Epidemiology Reference Group (CHERG) starting with *The Lancet* Child, Neonatal, Nutrition, and Maternal series. *LiST* is linked to AIM, a decision support tool developed by UNAIDS and also estimates the effect of HIV interventions.

LiST can be used by Ministry of Health personnel, programme managers, and academics to combine the best scientific evidence about the effectiveness of interventions with information about cause of death and current coverage of interventions to inform their planning and decision-making, to help prioritise investments and evaluate existing programmes.

More information on *LiST*: www.jhsph.edu/IIP/list
LiST user manual: www.jhsph.edu/dept/ih/IIP/list/manuals/LiStManual.pdf
Spectrum software: www.jhsph.edu/dept/ih/IIP/list/spectrum.html

Priorities to save lives in low health system context

An illustrative analysis of Ethiopia and Northern Nigeria

Situation

Each year over one million mothers, newborns, and children die in the three sub-Saharan African countries and Northern Nigeria, which have skilled attendance at birth below 30%. This accounts for 27% of MNC deaths in the region, and nearly all (90%) of these deaths occur in Ethiopia and Northern Nigeria alone. Low coverage levels and a lack of supplies continue to be key issues for countries in the low health system context. Increasing coverage of care is a priority as well as improving capacity to manage supplies and logistics.

Maternal

Principle: Ethiopia and Nigeria are among the most populous countries in sub-Saharan Africa with total fertility rates of 5.3 and 5.4 children per woman, respectively. While there are a number of important interventions for maternal health, one of the most rapid and cost effective ways to reduce maternal deaths is to reduce unwanted pregnancy through voluntary family planning programmes.[11] Additionally, postpartum haemorrhage is one of the leading causes of maternal mortality which could be largely prevented through active management of the third stage of labour.[9]

Photo credit: Save the Children

Lives saved: An estimated 38% of maternal deaths could be avoided in Ethiopia and Northern Nigeria if modern contraceptive prevalence rates and the active management of the third stage of labour were increased to an achievable level in two years. An increase of modern contraceptive prevalence rates by 20 percentage points in two years would result in 15,400 lives saved per year, and if all health care facilities provided active management of the third stage of labour, almost 800 lives could be saved per year (Table 4).

Practice: The increase in contraception and management of the third stage of labour would cost an estimated US$0.17 per capita in these two countries. Many African countries experience a shortage of contraceptive supplies which could be mitigated through building public-sector capacity in forecasting, procurement, supply management, distribution systems, and storage capacity at the national, district, and local levels. Family planning uptake is also dependent on empowerment of women and shifting social norms regarding family size. Additionally, active management of the third stage of labour could be made available in all health care facilities through investment in training of staff and use of the partograph.

Newborn

Principle: Many newborns still die of tetanus despite the existence of a vaccine, which requires only two, low-cost injections during pregnancy.[3] Preventive postnatal care includes promotion of healthy practices such as breastfeeding, clean cord care, and prompt detection of illness. Case management of neonatal infections is high impact, and especially critical in settings with high numbers of neonatal deaths due to infections.

Lives saved: An estimated 8% of newborn deaths could be avoided if the tetanus toxoid (TT) vaccine, preventive postnatal care, and case management of severe illness with oral antibiotics increased by 20 percentage points in two years, resulting in over 24,000 newborn lives saved in Ethiopia and Northern Nigeria (Table 4). The majority of neonatal tetanus lives saved is in Northern Nigeria because Ethiopia has made recent major progress to increase TT coverage levels through a national maternal and neonatal tetanus elimination campaign from 2004-2005. The campaign resulted in a dramatic increase to 85% coverage in 2008; whereas the average rate of TT coverage for Northern Nigeria remains low at around 32%.

Practice: This increase would cost an estimated US$0.03 per capita in these two countries. Improvement in postnatal healthy practices and breastfeeding may be achieved through community mobilisation and media campaigns but early postnatal contacts, such as home visits are more effective in changing practices and in identifying illness.[20] However, such visits require dedicated time and human resources. Ethiopia has mandated this as one of the tasks for their 30,000 newly trained and deployed Health Extension Workers.

Box 2: Costing Methodology

Cost analysis for the interventions included in this report were undertaken with the *LiST* costing module using the ingredients approach. The type and amount of drugs, supplies, and personnel time required for each intervention were specified based on standard WHO protocols and expert opinion and then costed using international drug prices (supplied by the UNICEF supply catalogue and Management for Sciences Health International Drug Price Indicator) and salary data from WHO's CHOICE database.

Capital costs were not included as it was assumed that infrastructure needed to deliver the chosen interventions was in place (both in terms of facilities, equipment, and trained human resources). While this assumption is usually valid for many of the child interventions it may lead to underestimation particularly for expansion of maternal health interventions. The costs related to scaling up interventions vary from country to country particularly for salaries.

Child

Principle: There are a number of opportunities to reduce child deaths through preventive care, but provision of high impact case management of childhood illness in low health system context is possible through outpatient case management, while strengthening facility services.

Lives Saved: An estimated 25% of child deaths could be avoided if the following outreach interventions were scaled up by 20 percentage points in two years: exclusive breastfeeding and complementary feeding, vitamin A, malaria prevention, immunisations (measles, Hib, DPT3), and case management of childhood illness for diarrhoea, pneumonia, and malaria. Together these interventions would save 188,700 lives per year (Table 4).

Photo credit: Save the Children

Practice: Increasing these interventions to an achievable coverage would cost an estimated US$0.57 per capita in these two countries. While public health interventions such as immunisation are more feasible to scale up relatively rapidly, constraints such as maintaining the cold chain for vaccines and other critical supply management issues hamper progress. Improving case management for childhood illness can occur either through community outreach or through the primary health care system or both, depending on the available cadres of worker to achieve this at scale.

Table 4: Low health system context: lives saved and cost after increasing coverage of selected maternal, newborn, and child interventions

		Ethiopia		Northern Nigeria	
	Intervention	Lives saved	Cost per package (Cost per capita) US$	Lives saved	Cost per package (Cost per capita) US$
Maternal	Contraception prevalence	6,400		8,300	
	Active case management of the 3rd stage of labour	100		700	
	TOTAL	**6,700**	**$ 12,700,000 ($0.15)**	**11,300**	**$ 10,800,000 ($0.20)**
Neonatal	Tetanus toxoid	1,100		6,000	
	Preventive postnatal care	4,800		5,000	
	Oral antibiotics for neonates	4,000		2,800	
	TOTAL	**9,900**	**$ 1,100,000 ($0.01)**	**13,800**	**$ 2,700,000 ($0.05)**
Child	Breastfeeding improvements	4,800		5,000	
	Vitamin A supplementation	1,100		9,600	
	Malaria prevention [a]	3,100		27,400	
	Vaccines [b]	7,800		15,600	
	Child curative interventions [c]	24,200		90,100	
	TOTAL	**41,000**	**$ 27,100,000 ($0.33)**	**147,700**	**$ 51,000,000 ($0.93)**

[a] Insecticide treated materials or indoor residual spraying; [b] Vaccines scaled up 20 percentage points: measles, Hib, DPT3; [c] Interventions scaled up 20 percentage points: case management of diarrhoea (ORS, and antibiotics for dysentery, and zinc for treatment), case management of pneumonia (oral antibiotics), case management of malaria (antimalarials), vitamin A for measles treatment.

Immediate high impact opportunities for low health system context

Maternal: Increase use of modern contraceptives and active management of the third stage of labour.

Newborn: Increase preventive postnatal care and outpatient case management of infections.

Child: Deliver child curative interventions (e.g. case management of diarrhoea, pneumonia, malaria, and measles) at primary care level through IMCI and community case management, with critical preventive interventions such as vaccines (measles, Hib, DPT3), breastfeeding improvements, and malaria prevention.

Priorities to save lives in middle health system context

An illustrative analysis of Ghana, Kenya, Senegal, Tanzania, Uganda

Situation

Each year over two million mothers, newborns, and children die in 25 sub-Saharan African countries with moderately performing health systems where skilled birth attendance coverage is between 30%-60%. These countries account for 42% of MNC deaths in the region. Nearly all of these deaths could be avoided if essential MNCH interventions were scaled up to reach all families. In this section, the lives saved and cost of an achievable coverage increase of selected interventions are examined in five example countries: Ghana, Kenya, Senegal, Tanzania, and Uganda. There are critical constraints in the supply of current outreach packages as well as quality of care within health facilities. Demand-side barriers include a range of socio-cultural factors around accessing care, the distance to health facilities, and the direct and indirect costs of health care.

Maternal

Principle: Care at the time of birth is crucial for saving mothers and newborns. Basic and comprehensive emergency obstetric care (BEmOC and CEmOC) may not be available or effective in facilities; yet it is a critical missed opportunity given the high impact of these packages. Reducing barriers that prevent pregnant women from going to facilities is also important and may require innovative approaches to link women to facilities such as emergency funds, transport schemes and maternity waiting homes.[23]

Photo credit: Save the Children

Lives saved: An estimated reduction of 19% of maternal deaths could be avoided per year in the five example countries if all mothers giving birth in health facilities had access to CEmOC in two years (Table 5). This increase would save 8,300 maternal lives as well as an additional 20,000 newborn lives per year.

Practice: Increasing CEmOC to cover all births in health facilities would cost an estimated US$0.29 per capita in these five countries. The potential to save the lives of many mothers and newborns is high making this intervention cost-effective. Effective care at birth is a critical marker of the performance of a health care system.[22]

Newborn

Principle: In the middle health system context, an increasing proportion of newborn deaths are due to preterm birth complications and intrapartum-related deaths (previously referred to as "birth asphyxia"). Strengthening already existing programmes within health facilities could prevent many of these deaths, even without high-tech equipment and supplies.[24]

Lives saved: An estimated 22% reduction of newborn deaths could be avoided if all babies born in health facilities had access to the following interventions in the next two years: antenatal corticosteroids for preterm labour, neonatal resuscitation, KMC, and case management of neonatal infections with injectable antibiotics. Around 42,300 newborn lives could be saved per year in the five example countries (Table 5).

Photo credit: Save the Children

Practice: The increase of these interventions would cost an estimated US$0.42 per capita in these five countries. For the most part, these interventions are feasible additions to existing services within health facilities. KMC, for example, requires no specialised equipment and could be introduced in lower level facilities at a low cost. Currently, KMC services in many countries are limited to a few tertiary centres. Increasing demand for health services must be addressed, including finding innovative solutions to address widespread postnatal seclusion practices for mothers and newborns.[20]

Child

Principle: For most countries in the middle health system context, many preventive child interventions are already at high coverage, such as immunisations. However some preventive practices are still low, particularly nutritional care and malaria prevention. There is a major gap in availability and access to case management of child illness (e.g. diarrhoea, pneumonia, malaria, and measles). IMCI is a platform for case management at the primary care level.

Lives Saved: An estimated 47% of child deaths could be averted, resulting in 174,800 lives saved per year, with a 20 percentage point increase of outreach and community child interventions in two years (Table 5), including nutrition and hygiene, malaria prevention, immunisations (measles, Hib, pneumococcal, DPT3), and case management of childhood illness (diarrhoea, pneumonia, malaria, and measles). Almost half of these deaths are averted by an increase in case management of serious child illness alone. Not as many lives are saved in this analysis through immunisation because coverage levels are already high. However, if immunisation coverage was to decrease, deaths would again rise.

Practice: The increase of these interventions would cost an estimated US$1.60 per capita in these five countries. Investment in primary care would result in the most child lives saved at the least cost. Where primary health care systems still have low reach and community health workers exist, this cadre can also be used to increase coverage of preventive child care and case management.

Table 5: Middle health system context: lives saved and cost after increasing coverage of selected maternal, newborn, and child interventions

		Ghana		Kenya		Senegal		Tanzania		Uganda	
	Intervention	Lives saved	Cost per package (Cost per capita) US$	Lives saved	Cost per package (Cost per capita) US$	Lives saved	Cost per package (Cost per capita) US$	Lives saved	Cost per package (Cost per capita) US$	Lives saved	Cost per package (Cost per capita) US$
Maternal	CEmOC*	1,300		1,500		600		3,500		1,400	
	TOTAL	**1,300**	**$ 6,500,000 ($0.28)**	**1,500**	**$ 11,100,00 ($0.30)**	**600**	**$ 2,300,000 ($0.19)**	**3,500**	**$ 11,100,000 ($0.27)**	**1,400**	**$ 11,000,000 ($0.36)**
Neonatal	Antenatal corticosteroids	1,500		2,100		500		2,600		1,900	
	Neonatal resuscitation	1,300		1,800		400		2,300		1,600	
	Kangaroo Mother Care	1,400		2,100		1,100		2,600		1,900	
	Injectable antibiotics for neonates	2,900		3,600		1,800		5,600		3,300	
	TOTAL	**7,100**	**$8,100,000 ($0.35)**	**9,600**	**$ 18,000,000 ($0.48)**	**3,800**	**$ 11,200,000 ($0.90)**	**13,100**	**$12,700,000 ($0.31)**	**8,700**	**$ 19,900,000 ($0.64)**
Child	Nutrition and hygiene [a]	5,400		16,500		4,300		15,700		21,300	
	Malaria prevention [b]	2,900		3,200		1,500		5,100		6,200	
	Vaccines [c]	500		4,100		700		3,100		6,200	
	Child curative interventions [d]	11,100		16,200		6,800		23,000		21,000	
	TOTAL	**19,000**	**$ 30,300,000 ($1.29)**	**40,000**	**$ 54,700,000 ($1.46)**	**13,300**	**$ 22,600,000 ($1.83)**	**46,900**	**$ 64,600,000 ($1.60)**	**54,700**	**$ 58,800,000 ($1.90)**

* The cost estimate for CEmOC does not include the cost of building facilities, purchasing equipment or training health staff. The cost of the sanitation interventions only presents the cost to the Ministry of Health (which includes the cost of regulation and some education) but excludes the (substantial) cost of construction of latrines and wells which is usually borne by the Department of Water and Sanitation.
[a] Nutrition and hygiene interventions scaled up 20 percentage points: breastfeeding improvements, complementary feeding – education only, complementary feeding – supplementation and education, use of improved water source within 30 minutes, use of water connection in the home, improved excreta disposal (latrine/toilet), hand washing with soap, hygienic disposal of children's stools, vitamin A for prevention, zinc for prevention; [b] Insecticide treated materials or indoor residual spraying; [c] Vaccines scaled up 20 percentage points: measles, Hib, pneumococcal, DPT3; [d] Interventions scaled up 20 percentage points: case management of diarrhoea (ORS, zinc for treatment, and antibiotics for dysentery), case management of pneumonia (oral antibiotics), case management of malaria (antimalarials), vitamin A for measles treatment.

Immediate high impact opportunities for middle health system context

Maternal: Provide access to comprehensive emergency obstetric care, including caesarean section and blood transfusion for all facility births.

Newborn: Seize missed opportunities by ensuring that all newborns currently born in facilities have antenatal corticosteroids if the labour is preterm, neonatal resuscitation if needed, KMC if born preterm and case management if infections develop.

Child: Deliver child curative interventions (e.g. case management of diarrhoea, pneumonia, malaria, and measles) at primary care level through IMCI or community health workers, as well as preventive interventions such as nutrition and hygiene, vaccines (measles, Hib, pneumococcal, DPT3), and malaria prevention.

Priorities to save lives in high health system context

An illustrative analysis of Cameroon, South Africa, and Southern Nigeria

Each year 1.2 million mothers, newborns, and children die in the 13 sub-Saharan African countries plus Southern Nigeria, which are in the high health system context based on over 60% skilled birth attendance coverage. This group accounts for 26% of MNC deaths in the region. Nearly one million of these deaths could be avoided if essential MNCH interventions were scaled up to reach all families in these countries. Non-fatal outcomes, such as near-miss obstetric complications and impairment following newborn illness, are increasingly important. Three example countries are examined in this section: Cameroon, South Africa, and Southern Nigeria. While the coverage of basic health packages is higher, quality of care is often lacking. Also service utilisation in these countries may be inequitable.

Photo credit: Save the Children

Maternal

Principle: Quality of care at the time of birth is a top priority, especially providing CEmOC and addressing delays in receiving appropriate care once in the health facility. Although demand for health services may be greater in this context, reducing barriers, especially financial, that prevent pregnant women from going to facilities is important.

Lives saved: An estimated 15% of maternal deaths could be avoided in the three example countries if the number of women receiving four or more ANC visits was increased to the same coverage as those who only get one ANC visit, and if all institutional births were to have access to CEmOC in the next two years (Table 6). Access to CEmOC would save 5,000 maternal and 9,300 newborn lives per year. Addressing missed opportunities in ANC by improving care during pregnancy, such as identifying pre-eclampsia, would result in 400 lives saved per year.

Practice: Increasing CEmOC to cover all births in health facilities would cost an estimated US$0.11 per capita in these three countries. Delays in receiving care can be identified through an audit process that links to clear solutions. Since the cost of care during pregnancy and childbirth is one of the main contributors to delays in accessing care – particularly for the poorest communities, restructuring the health system to provide low-cost public health services, or abolishing user fees are proven strategies for increasing the number of facility births, as experienced in Ghana and South Africa.[25]

Newborn

Principle: Once NMR is below 20 deaths per 1,000 live births the majority of neonatal deaths are due to preterm birth complications and most can be avoided by improving facility-based care. Improving care for preterm births does not require high-tech solutions even in these settings. Case management for infections should already be in place, as should antenatal steroids for preterm labour, and neonatal resuscitation for babies who do not breathe at birth. The next stage is to strengthen case management of smaller and sicker newborns including interventions such as universal availability of KMC for babies weighing less than 2000g, and newborn care packages at district hospitals with effective referral, considering the use of Continuous Positive Airways Pressure (CPAP), if appropriate.

Lives saved: An estimated 34% of newborn deaths could be avoided if all facility births had access to essential interventions: antenatal corticosteroids for preterm labour, neonatal resuscitation, KMC, preventive postnatal care preventive postnatal care (healthy practices and illness detection), and case management of serious neonatal illnesses resulting in over 46,800 newborn lives saved per year in the three example countries (Table 6).

Practice: The increase of these interventions would cost an estimated US$0.80 per capita in these three countries. Accountability mechanisms such as mortality audit can also be used to identify and address gaps in quality of care. Maintaining coverage and increasing the quality of newborn interventions already in place requires functional logistics management as well as competency-based training for health workers. Innovations for training, such as the recently released low-cost newborn resuscitation mannequin, will reduce costs for training but further investment is needed in low-cost, robust equipment.

Box 3: HIV/AIDS in South Africa

Each year around 220,000 child deaths are due to HIV/AIDS and most of these occur in a few countries in Southern Africa. South Africa alone has about 300,000 HIV-infected mothers giving birth to infants every year. HIV/AIDS contributes to 57% of all child deaths and more than 80% of child deaths after the first month of life. Over 37,000 child lives could be saved each year if prevention of mother-to-child transmission of HIV (PMTCT) with appropriate feeding choices were to be scaled up to 95%. Increasing progress has been made in the last few years. Yet many gaps within the health care system remain. For example, coverage of early postnatal care is low, affecting postnatal PMTCT coverage and also support for appropriate feeding. South Africa has the potential to reverse trends of increasing child mortality and even shift to being on track for MDG 4 with rapid scale up of PMTCT, plus strategic investment in neonatal survival, which would save an additional 12,000 lives per year.[26]

Child

Principle: For countries in a high health system context, many child health interventions are already at high coverage. However, there are key gaps. For example, coverage of measles and DPT3 vaccines tends to be very high, whereas coverage of the Hib and pneumococcal vaccines remain low. Counselling on breastfeeding, food fortification, and nutrition as well as food and vitamin supplements have the potential to reduce child mortality.[27] Increasing coverage and quality of curative care for childhood illness is also critical.

Lives Saved: An estimated 29% of child deaths could be avoided, resulting in 83,200 lives saved per year, with a 20 percentage point increase of outreach and community child interventions in two years (Table 6), including nutrition and hygiene, malaria prevention, immunisations (measles, Hib, pneumococcal, DPT3), and case management of childhood illness (diarrhoea, pneumonia, malaria, and measles).

Practice: The increase of these interventions would cost an estimated US$1.21 per capita in these three countries. Improving access to curative care will have an enormous impact. Conditional cash transfers and other incentives may increase demand for these health services, especially for the poorest families.

Table 6: High health system context: lives saved and cost after increasing coverage of selected maternal, newborn, and child interventions

		Cameroon		South Africa		Southern Nigeria	
	Intervention	Lives saved	Cost per package (Cost per capita) US$	Lives saved	Cost per package (Cost per capita) US$	Lives saved	Cost per package (Cost per capita) US$
Maternal	ANC coverage	200		100		100	
	CEmOC*	1,200		900		2,900	
	TOTAL	**1,400**	**$ 2,800,000 ($0.15)**	**1,000**	**$ 5,900,00 ($0.12)**	**3,000**	**$ 5,400,000 ($0.08)**
Neonatal	Antenatal corticosteroids	1,100		1,800		4,800	
	Neonatal resuscitation	800		1,100		3,400	
	Kangaroo Mother Care	700		700		7,200	
	Preventive postnatal care	600		3,200		8,800	
	Case management of serious neonatal illness	2,700		2,700		7,200	
	TOTAL	**5,900**	**$ 5,300,000 ($0.29)**	**9,500**	**$ 62,000,000 ($1.28)**	**31,400**	**$ 38,600,000 ($0.59)**
Child	Nutrition and hygiene [a]	9,000		200		18,000	
	Malaria prevention [b]	2,800		-		6,700	
	Vaccines [c]	2,000		20		8,400	
	Child curative interventions [d]	12,700		100		23,300	
	TOTAL	**26,500**	**$ 31,900,000 ($1.72)**	**320**	**$ 36,400,000 ($0.75)**	**56,400**	**$ 92,100,000 ($1.42)**

* The cost estimate for CEmOC does not include the cost of building facilities, purchasing equipment or training health staff. The cost of the sanitation interventions only presents the cost to the Ministry of Health (which includes the cost of regulation and some education) but excludes the (substantial) cost of construction of latrines and wells which is usually borne by the Department of Water and Sanitation. [a] Nutrition and hygiene interventions scaled up 20 percentage points: breastfeeding improvements, complementary feeding – education only, complementary feeding – supplementation and education, use of improved water source within 30 minutes, use of water connection in the home, improved excreta disposal (latrine/toilet), hand washing with soap, hygienic disposal of children's stools, vitamin A for prevention, zinc for preventions; [b] Insecticide treated materials or indoor residual spraying; [c] Vaccines scaled up 20 percentage points: measles, Hib, pneumococcal, DPT3; [d] Interventions scaled up 20 percentage points: case management of diarrhoea (ORS, zinc for treatment, and antibiotics for dysentery), case management of pneumonia (oral antibiotics), case management of malaria (antimalarials), vitamin A for measles treatment.

Immediate high impact opportunities for high health system context

Maternal: Provide access to comprehensive emergency obstetric care, including caesarean section and blood transfusion for all facility births, increasing complexity and quality of care while targeting least served populations.

Newborn: Seize missed opportunities by ensuring that all babies currently born in facilities have antenatal corticosteroids if the labour is preterm, neonatal resuscitation if needed, KMC if born preterm, and case management if infections develop, increasing complexity and quality of care while targeting least served populations.

Child: Deliver high quality child curative interventions (e.g. case management of diarrhoea, pneumonia, malaria, and measles), and increasing complexity of preventive care package (e.g. newer vaccines and more comprehensive nutrition and household hygiene interventions).

Moving into action to save lives

Achievable increases of selected MNCH interventions have the potential to save many lives within each health system context, and the cost is extremely affordable. If the nine example countries could increase all essential MNCH interventions to achievable coverage levels in two years an estimated 32% of deaths could be avoided, saving 770,000 mothers, newborns, and children each year (Table 7). If these interventions were expanded to 90% coverage in six years, over 1.8 million lives could be saved per year – resulting in over three-quarters of MNC deaths averted.

Table 7: Estimates of lives saved of mothers, newborns, and children with coverage increases of all essential interventions in nine example countries grouped according to level of skilled attendance

	Coverage of skilled attendance at birth:			TOTAL numbers for all countries
	Countries with <30% coverage	Countries with 30-60% coverage	Countries with >60% coverage	
Nine example countries	Ethiopia Northern Nigeria	Ghana, Kenya Senegal, Uganda Tanzania	Cameroon South Africa Southern Nigeria	
TOTAL LIVES THAT COULD BE SAVED IF ACHIEVABLE COVERAGE WAS REACHED:				
Total MNC lives saved	344,400	263,300	162,200	769,800
Percentage of MNC deaths avoided	30%	36%	31%	32%
TOTAL LIVES THAT COULD BE SAVED IF 90% COVERAGE WAS REACHED:				
Total MNC lives saved	904,900	581,700	340,800	1,827,400
Percentage of MNC deaths avoided	79%	80%	65%	76%

Yet due to weak health systems and other substantial challenges, increasing coverage for all essential MNCH interventions is not happening fast enough in many sub-Saharan African countries. The in-depth analysis of the nine example countries identifies immediate high impact opportunities to save lives while considering the current performance of the health system. As MNCH funding increases, programmes will expand at an incremental rate. The immediate opportunities identified here can help inform policy and programme decisions around how best to use resources as they become available.

What does this mean for priority-setting?

- In settings with weaker health systems, community and outreach interventions are a priority to scale up now. However, countries should be investing in human resources and health facilities infrastructure at the same time to increase the potential of facility-based interventions to save more lives in the future.
- Seize opportunities now – ensure mothers, newborns, and children who are cared for in health facilities actually receive the highest impact interventions (e.g. obstetric care, neonatal resuscitation, KMC, case management of newborn and childhood illness).
- Consider how to address both supply and demand constraints, including innovative financing structures. For example, performance-based financing targets can increase health service supply. Conditional cash transfers and voucher schemes can be used as mechanisms for increasing demand. At the same time, policy makers and programme managers need to ensure that policies and mechanisms are in place to protect households against the potentially increased out-of-pocket spending due to increased demand and utilisation.
- More health systems research is needed in order to demonstrate the most effective service delivery strategies and the incremental cost of scaling up care in these different settings.

Photo credit: Rebecca Hearfield

"Everyone has a role to play in saving the lives of Africa's mothers, newborns and children"
Former President of the Pan African Parliament, Gertrude Mongella

Scaling up these high impact interventions to save the lives of mothers, newborns, and children requires attention and action from many actors: government, health policy planners, health care professionals, development partners, researchers, civil society, and communities.

The analysis of potential lives saved and cost helps identify priority actions and generates evidence that can be used to inform MNCH policy. By working together, hundreds of thousands of lives can be saved within a very short time period – and millions of lives would be saved in the long term.

Actions for Government, Ministry of Health, and Ministry of Finance

How many lives could your government save?

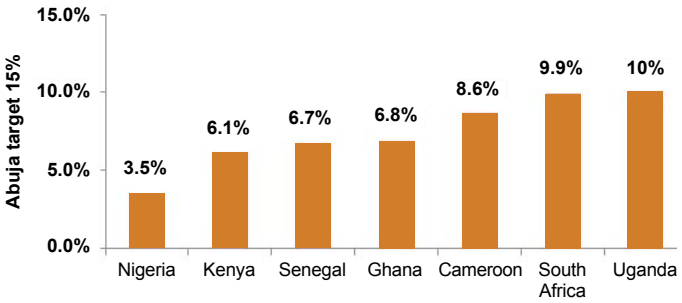
Invest and track resources:

Invest in health by meeting the Abuja target set in 2001 to devote at least 15% of government spending to the health sector. As illustrated in Figure 8, none of the countries participating in ASADI has achieved this goal. More than half of governments in sub-Saharan Africa spend less than 10% of their total expenditure on health. Governments should also hold development partners accountable for promised funding.

Implement:

Implement promised MNCH commitments. Ensure the implementation of the national action plan for MNCH through accountable leadership and good stewardship of resources.

Figure 8: Proportion of government spending allocated to health



Source: www.whosis.org

Photo credit: Save the Children

Innovate:

Take ownership of MNCH and pioneer change. Governments have an obligation to save mothers, newborns, and children in their country. Cost-effective interventions have proven to work with the right support and financial backing of governments, as demonstrated by numerous countries including Tanzania (see below).

Inform:

Inform lower- and mid-level health facilities on national policy by improving communication lines between strategic planning at the national level and action in districts. The gap between national policy and district implementation can be bridged through improved information sharing.

Government leadership improves child mortality in Tanzania

Tanzania achieved a 24% reduction in mortality rates for children under-five years old from 2000 to 2004, saving over 280,000 child lives from 1999 to 2005. A recent study published in *The Lancet* examined contributing factors for this decline and identified government actions as the driving factor.[28] Between 1999 and 2004, the Tanzanian government doubled public health spending, decentralised the health system, adopted a sector-wide approach and prioritised the implementation of cost-effective interventions. The decentralised health system gave financial resources to districts allowing for local problem solving, specific needs-based interventions and local ownership of problems and solutions. Tanzania's adoption of a sector-wide approach for medium-term and long-term planning synchronised health policy as well as harmonised government and donor resources. Finally, the implementation and prioritisation of improved service delivery strategies such as the IMCI resulted in greater coverage of care.

Over 280,000 child lives were saved (from 1999-2005) in part by the Tanzanian government through a combination of the following actions:

- Adopt a sector-wide approach to bring together development partners and other stakeholders
- Increase public health expenditure
- Decentralise health systems and give districts the authority to plan services and allocate resources. A district level prioritisation tool was developed to match the number of deaths with spending
- Implement and prioritise cost-effective interventions

"Maternal and child mortality rates in Tanzania are too high. Significant new resources are needed to scale up known effective interventions if we want to reduce them. I am calling on all bilateral and multilateral partners, national and international, to align their resources and support this plan, to make the attainment of MDGs 4 & 5 a reality in Tanzania."[29]

His Excellency, President JE Kikwete, Launch of* Deliver Now for Women and Children *Campaign, 22 April 2008

Actions for Health Policy Planners and Implementers

Are your priorities based on the best evidence?

Invest and track resources:

Invest in district level health systems. Allocate financial resources and responsibility to districts in order to encourage local ownership and problem solving.

Implement:

Strengthen health systems at a district level and maximise human resource potential, including the use of community cadres where appropriate. The global shift towards decentralised health systems allows decisions to be made closer to where care is provided. Due to the human resource shortage in Africa, health policy planners need to incorporate skills development and task shifting into their district level plans.

Innovate:

Investigate and support new research and home-grown solutions and apply recommendations. It is important for health policy planners to stay abreast of new research, evidence, and tools, such as *LiST*, to set priorities effectively. Policy planners must also use differential approaches to identify struggling institutions for getting tailor-made technical support, and where appropriate additional support with resources. Also the creation of programmes and policies will benefit from the participation of national academies of sciences, other civil society organisations, and communities.

Inform:

Monitor coverage and evaluate effect and cost. When scaling up services, it is crucial to increase the availability and quality of information to monitor progress and inform decision-making.

Many African countries rely on mid-level cadre health workers

A shortage of qualified health workers is a major constraint for accessing essential health care in sub-Saharan Africa. Due to this shortage, many countries rely on mid-level health worker cadres, e.g. non-physician clinicians, midwives and community health workers. Task shifting presents a viable solution for improving health care coverage by making more efficient use of the human resources already available and by quickly increasing capacity while training and retention programmes are expanded.

Photo credit: Save the Children

For example, in Malawi, Mozambique, and Tanzania, around 90% of emergency obstetric operations, including caesarean sections are performed by clinical officers. Other countries, such as Ghana, have used medical assistants to diagnose and treat common disorders for decades.[30] Since many developing countries have already successfully employed the use of mid-level health care workers, the current question is how to expand, supervise and monitor their role.

Training more mid-level health workers especially in surgery will save lives at a lower cost. Yet in order to maximise the benefits of using non-physicians, some concerns need to be addressed such as qualification levels, abuse of roles and low motivation. Recent studies suggest that some of these challenges can be resolved with salary enhancements and greater professional recognition. In the long term, additional investment in non-physicians is needed to encourage them to stay at rural posts and serve at district hospitals longer.

Actions for Health Care Professionals

Are you practising evidence-based, high quality care?

Invest and track resources:

Invest time and resources to train more health care professionals and communities. This includes pre-service training for various levels of health workers, upgrading of skills and provision of competency-based education, as defined by the specific professional group (e.g. midwives associations and physicians associations).

Implement:

Set standards for care. Health care professionals need to be aware of, maintain competency in, and adhere to standard care protocols, including correct assessment of patients and lifesaving skills, especially during labour, childbirth (e.g. neonatal resuscitation), and the management of childhood illness.

Innovate:

Partner with research institutions, other professional bodies and government. Identify proven effective interventions and make them known to country-level professional groups and their members; promote linkages with academic institutions to undertake research, education and monitoring through existing networks.

Inform:

Report cases and incorporate research in health care practice. Supervisors at all levels must be accountable for quality of patient care, recording cases, and identify gaps in the health system in order to improve care. Monitoring and evaluation needs to be embedded within primary health care activities, especially the documentation of MNCH interventions.

Scaling up Kangaroo Mother Care to save preterm babies

Around one quarter of newborn deaths are a due to complications of preterm birth. The majority of these deaths could be avoided by scaling up effective interventions for small babies. KMC is an acceptable and resource-efficient method of caring for preterm babies whereby the baby is secured to the mother's front, promoting warmth and breastfeeding, and preventing infections. KMC prevents infections and reduces nursing workload as the mother does most of the caring and saves health system costs through earlier discharge from facilities. KMC is feasible in peripheral health centres but is not widely practised in sub-Saharan Africa.

Three provinces in South Africa have scaled up KMC, and hospitals that have introduced KMC have seen a 30% reduction in neonatal mortality for babies 1-2 kg.[31] Two randomised trials testing different implementation strategies found that face-to-face facilitation for staff with ongoing support results in better practice.[32, 33] Regional or tertiary hospitals can serve as centres of excellence. KMC is also practised in other countries participating in ASADI such as Cameroon, Nigeria, Senegal, and Uganda, although mostly in teaching hospitals. In Ghana, KMC is practised at two teaching hospitals and is being scaled up in regional and district hospitals in four regions.[2]

Photo credit: Save the Children

Actions for Development Partners

Does your investment count to maximise lives saved now and systematically strengthen health systems?

Invest and track resources:

Invest in essential MNCH interventions. Donor countries need to fulfil their commitment to the Abuja target of devoting 0.7% of their gross national product as Official Development Assistance to developing countries and cancelling Africa's external debt. There needs to be follow through on recent commitments to improving maternal, newborn, and child health.

Implement:

Implement the principles of the Paris Declaration on aid effectiveness: *one* plan, *one* coordinating mechanism, and *one* monitoring system to lighten the management and reporting load. Donor convergence allows for better decision making and more efficient use of resources at the country level.

Innovate:

Renew commitment to primary health care and invest in strengthening health systems. MNCH and overall health system strengthening in the long term relies on development partner support for an integrated continuum of care rather than a vertical strategy of promoting single interventions that are not linked to the health system.

Inform:

Align MNCH targets with country-specific needs. While research identifies specific gaps in MNCH and guides country policy, many African countries still rely on the support of development partners to implement services. Vertical aid programmes are often too narrow to address MNCH effectively. Donors are encouraged to fund initiatives that are locally relevant.

GAVI Health System Strengthening

In 2004, GAVI Alliance (formerly the Global Alliance for Vaccines and Immunisation) identified weak or inadequate health systems as a major constraint to sustainable immunisation coverage in many developing countries.[34] A new funding window called Health System Strengthening (HSS) was opened to increase immunisation coverage by investing in the health systems. Between 2006 and 2010, GAVI HSS is investing US$500 million to target the bottlenecks in the health system that impede immunisation progress.

The GAVI HSS funds are non-earmarked and flexible. Proposals are encouraged to be country-driven, aligned with national strategies, harmonised with activities of development partners, catalytic, innovative, and result-oriented. Priority areas for the GAVI HSS funds are human resources, supply and distribution of drugs and equipment as well as logistical and managerial weaknesses. GAVI HSS has a strong results focus and can make a major contribution not only to improving immunisation coverage but also to achieving MDG 4 and 5. GAVI HSS is currently being evaluated and may be extended depending on the results. For more information: www.gavialliance.org

Photo credit: Save the Children

Actions for Researchers and Academies

Is your research translating into action?

Invest and track resources:

Invest in the right research using systematic priority setting to identify pertinent research gaps in MNCH. Since there are limited resources for health research, it is important to prioritise research and use cost and time effective methodologies.

Implement:

Implement effective research strategies that inform health systems. Once research priorities are set, it is important that academies of sciences participating in ASADI and other academics support and encourage the implementation of high quality research.

Innovate:

Involve all stakeholders in the process of systematic priority setting. Research priorities for scientists often differ from local stakeholders and recipients as well as donor agencies. It is important to incorporate all perspectives in research agendas.

Inform:

Share knowledge. Inform policy makers on cost-effective interventions specific to each country and share knowledge with global research institutions and development partners. Since the aim of health research is to influence future health policy, there needs to be continuous information sharing. National academies of science throughout Africa can serve an extremely valuable translation role between the research and policy communities.

African research networks linking evidence to action

INDEPTH network: The International Network for the Continuous Demographic Evaluation of Populations and their Health (INDEPTH) carries out vital events monitoring at demographic surveillance system sites most of which are located in rural sub-Saharan Africa. An important contribution of the INDEPTH Network, which is headquartered in Ghana, has been the documentation of child and adult mortality rates, causes, and patterns in rural Africa. For more information: www.indepth-network.org.

Photo credit: Allen Jefthas/MRC

IPTi consortium: Intermittent Preventive Treatment in infants (IPTi) is a new anti-malarial prevention strategy involving administration of a drug (sulfadoxine-pyrimethamin) to children attending vaccination visits at 2, 3, and 9 months of age. The IPTi consortium comprises 13 institutions including leading malaria research centres, plus WHO and UNICEF. It was formed in 2003 to further the development and evaluation of IPTi for future implementation and has overseen research projects in Benin, Gabon, Ghana, Kenya, Malawi, Mali, Mozambique, Senegal, and Tanzania. The benefits of working as a consortium include standardised designs, methodologies, and outcome measures as well as pooled analysis of efficacy, drug resistance, and cost-effectiveness, with evaluation of implementation in different health systems. For more information: www.ipti-malaria.org

Saving Newborn Lives Africa Newborn Network of evaluations and trials: Saving Newborn Lives, supported by The Bill & Melinda Gates Foundation, is a programme of Save the Children that supports the design and implementation of research to inform national policy and to advance the global knowledge base for newborn health. So far, most such research has taken place in Asia. A network of seven large-scale evaluations is in progress in Africa, including five cluster randomised trials, three with populations over half a million in Ethiopia, Ghana, and Tanzania. All have been designed in partnership with national governments, linking to local academic institutions and addressing nationally relevant questions for scaling up newborn care. Multi-country analyses, including economic evaluations, are designed to maximise policy relevance.
For more information: www.savethechildren.org/savenewborns

Actions for Civil Society and Community

What can I do as a citizen?

Invest and track resources:

Advocate for increased investment in MNCH. Governments and development partners have made financial commitments but have not followed through with actual budget allocation. Civil society has a responsibility to ensure that commitments are met and money is spent effectively.

Implement:

Engage in activism and monitor MNCH activities. It is up to civil society to hold government and health providers accountable for progress towards the MDGs, especially 4 and 5. Actions may include signalling mismanagement of health services and working for equitable, efficient and sufficient resource allocation.

Innovate:

Build partnerships with government and development partners to create an environment whereby civil society can engage in policy dialogue and share lessons learned.

Inform:

Educate communities about how to access health care and empower them, especially poor and marginalised families, to demand quality health care for themselves and their children.

Civil society action for PMTCT-plus and paediatric treatment

Almost 90% of children (under 15 years) who die from AIDS live in Africa.[21] Key interventions proven to avert these deaths include prevention of mother-to-child transmission of HIV (PMTCT) and paediatric treatment. While recent data from UNAIDS indicates increasing coverage, millions of women and children are still not being reached. In response, many civil society organisations have mobilised communities to hold governments accountable. Some effective civil society initiatives from example countries include:

Photo credit: Sandy Bailey

Women Fighting AIDS in Kenya launched the Male Plus PMTCT Champions project, using community champions to hold discussions, counsel community members and raise awareness about PMTCT. The project has increased antenatal attendance with 98 per cent of programme attendees having agreed to be tested for their HIV status.[21] For more information: www.wofak.or.ke

Treatment Action Campaign (TAC) in South Africa has been at the forefront in the fight against HIV/AIDS. In 2000, TAC took the government to court for failing to provide ARV medicines to pregnant women despite scientific evidence supporting its effectiveness. The ruling from the Constitutional Court instructed government to implement a comprehensive PMTCT programme as a matter of urgency. TAC continues to monitor PMTCT progress in the country and the South African Ministry of Health currently now offers PMTCT at over 90% of government clinics. For more information: www.tac.org.za

In Uganda, **The AIDS Support Organisation** (TASO) promotes a family-centred approach to HIV treatment whereby community health workers deliver HIV treatment to homes along with a range of other outpatient and preventive health services (such as mosquito nets, clean-water tablets etc).[21] For more information: www.tasouganda.org

Conclusion and recommendations

The lives saved and costing analysis for each health care context aims to inform governments and policy makers about which interventions, if scaled up, would have the greatest impact on saving the lives of mothers, newborns, and children. This new analysis has shown that hundreds of thousands of lives could be saved within a very short time period – and millions of lives would be saved in the coming years if everyone plays their part to reach all mothers, newborns, and children with essential care.

Photo credit: Save the Children

There are clear priorities based on the evidence that can save the lives of nearly 4 million African women, newborns and children each year:

1. Make childbirth wanted and safe: Saving lives requires accessible, affordable 24-hour care for mothers and babies including transport and referral for complications, skilled care at birth, and emergency obstetric care.

2. Give newborn babies a healthy start: Deaths and much disability could be prevented by effective care at birth including resuscitation for babies that do not breathe, hygiene, and promotion of breastfeeding. Antenatal steroids for preterm labour and KMC would save many preterm babies.

3. Prevent infections: Effective prevention measures include nets and intermittent preventive treatment in pregnancy and infants (IPTp/i) for malaria, prevention of mother-to-child transmission of HIV, and to reduce diarrhoea and pneumonia, adequate nutrition, immunisation, and hygiene.

4. Manage infections: Case management at the primary level through IMCI and community level case management of pneumonia, diarrhoea, malaria, neonatal sepsis, and maternal sepsis are feasible and will save many lives. Antiretroviral therapy for HIV-infected women and children is another crucial missed opportunity. There are immediate actions that can be taken to strengthen health systems to provide life-saving care.

While much is known about high impact interventions that can save lives, there are still unanswered questions regarding service delivery, reaching families close to home, and hard-to-serve populations. More health systems research is needed on optimum delivery strategies for specific interventions and health care packages, and how to increase coverage with existing packages within each individual country. National academies of science can support the policy development process in a number of important ways including encouraging policymakers to use and generate evidence to inform effective implementation to save the lives of Africa's mothers, newborns, and children, strategically strengthening health systems.

How can science influence policy change

Accelerating access to life-saving vaccines with research, communications and vaccine forecasting

The Pneumococcal Accelerated Development and Introduction Plan (PneumoADIP) has been successful in accelerating the development of new childhood pneumococcal vaccines, and ensuring rapid access of these innovations for the 72 poorest countries in the world. A strategic three-pronged approach was planned from the start:

1. Surveillance and epidemiological research to establish the need for the vaccine
2. Trials to evaluate the effectiveness of new or adapted vaccines
3. Strategic demand forecasting, to assure predictable supply of quality vaccine at an affordable price and advance financing to rapidly introduce and sustain implementation

This three-pronged approach was dependent on key collaborations with partner organisations such as UNICEF, GAVI, WHO, civil society partners and a wide network of advocates, especially in the paediatric community. Strategic communications have raised awareness among policy-makers and provided tools for informed decision-making. This model of advance planning for research to rapidly link to implementation at scale holds promise for addressing key gaps in MNCH in Africa which require innovation.

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