Child health priorities and interventions[1]

ABSTRACT

While substantial progress has been made in addressing child survival since 1990, 6.3 million children less than 5 years of age continue to die every year, largely due to preventable conditions. Leading causes of underfive mortality are preterm birth complications (15%), pneumonia (15%), intrapartum-related complications (11%), diarrhoea (9%) and malaria (7%). Under nutrition is associated with almost half all under-five deaths and an estimated 200 million children are at risk of not attaining their full development potential. While there is a clear unfinished agenda for child survival, non-communicable diseases in childhood are taking their toll in almost all countries. The dual burden of malnutrition, injuries and violence, congenital anomalies, other NCDs such as diabetes and cancers, disabilities and child maltreatment will increasingly account for morbidity and mortality in childhood as mortality from infectious conditions declines. Children 5 – 10 years are a largely unrecognized in the global public health, and few countries collect robust epidemiological data on this age group as yet. There is an urgent need to broaden the agenda and strengthen health services to better address the unfinished agenda and to become more astute in recognizing the emerging priorities for children 0 – 10 years of age in order to provide appropriate care. The link between health, growth and development in childhood and health outcomes later in life has been irrefutably established. Essential interventions for protecting, promoting and supporting child health across the life course have been well documented. The importance of multi-sectoral actions, linking the health, nutrition, social protection, education and other sectors is well understood. Global action plans to end preventable newborn and child deaths within a generation have been formulated and endorsed by WHO Member States. The new Global Strategy for Women's, Children's, and Adolescents' Health provides an opportunity to invigorate attention towards a holistic agenda for children in order to enable them to realize their right to healthy growth and optimal development, and become productive and socially and emotionally adept citizens.

1. BACKGROUND AND INTRODUCTION

Since 1990, under-five mortality declined by 50% from 12.7 million in 1990 to 6.3 million deaths in 2013. While this is noteworthy, it falls short of the MDG target of two-third reduction. The good news is that the global rate of decline in under-five mortality has accelerated greatly in the past decade, providing empirical evidence that it is feasible to end preventable newborn and child mortality within a generation. However, beyond child survival, other issues of global public health relevance for children have emerged. The link between health and development in early childhood and the burden of non-communicable diseases later in life has been unequivocally established[1]. Many childhood morbidities and disabilities that are placing a large burden on health systems can be prevented. Even in

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resource constraint settings, the dual burden of conditions sparked by deprivation and affluence has started to play a role.

Evidence has grown about the critical importance of implementing a life course approach for addressing children's health, growth and development, with essential interventions starting from before conception through adolescence, complemented by a broader scope of actions to address social determinants of health.

This paper considers essential strategies and interventions to end preventable newborn and child deaths and promote children's healthy growth, development and wellbeing in children up to 10 years of age. It supports the UN Secretary General's effort to develop a new Global Strategy for Women's, Children's and Adolescents' Health that will respond to the sustainable development agenda, and provides strategic directions.

2. PROBLEM AND RATIONALE

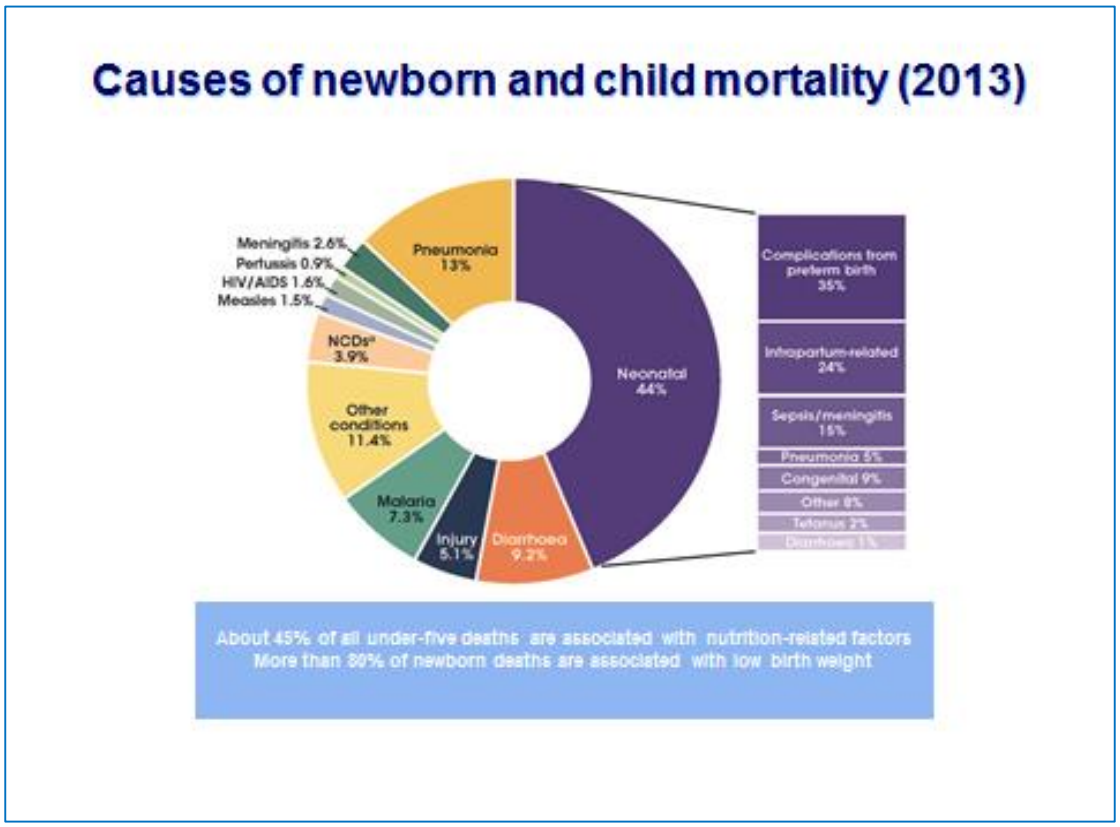
The unfinished agenda for children's health

The global rate of under-five mortality has declined from an estimated rate of 90 deaths per 1000 live births in 1990 to 46 deaths per 1000 live births in 2013.[2] Despite this significant progress, still 6.3 million children less than five years of age continue to die each year, with over 70 % of deaths occurring within the first year of life. In the past decade, the annual reduction in under-five mortality rate has accelerated in many high burden countries, and more so following the launch of the United Nations Secretary-General's Global Strategy for Women's and Children's Health in 2010[3]. However, the global decline in the neonatal mortality rate, at 39 %, has been slower than that for older children, and as a consequence the proportion of under-five deaths that occurs within the first month of life has increased from 37% in 1990 to 44% in 2013.

Under-five deaths are increasingly concentrated in Sub-Saharan Africa and Southern Asia, while the share in the rest of the world dropped from 32% in 1990 to 18% in 2013. The highest rates of child mortality are still in Sub-Saharan Africa, with an under-five mortality rate of 92 deaths per 1,000 live births—more than 15 times the average for developed regions[4]. Similarly, over half of child deaths occurs in setting that are affected by conflict, displacement and natural disasters, where people are in need of humanitarian assistance.[5]

The leading causes of death among children under age five are still largely due newborn problems and preventable infectious diseases: preterm birth complications (15%), pneumonia (15%), intrapartum-related complications (11%), diarrhoea (9%) and malaria (7%). In addition, 45 % of all under-five deaths are associated with undernutrition, while in the neonatal period, more than 80% of newborn deaths are associated with low birth weight due to prematurity or intra-uterine growth restriction. (Figure 1)

Figure 1. Global causes newborn and under-five mortality



It is known that the main causes of morbidity highly correlate with the major causes of death in under-five children. In 2010, there were an estimated 1·731 billion episodes of diarrhoea and 120 million cases of pneumonia in children younger than 5 years of which 36 million and 14 million progressed to severe episodes respectively[6]. The incidence of both pneumonia and diarrhoea are closely associated with poor home environments, undernutrition and lack of access to health services, and they are highest among the poorest.

Despite malaria being preventable and treatable, in 2013, there were an estimated 198 million cases of malaria worldwide, occurring mostly in children under five and more so in Africa[7]. While globally, 3.2 million children under the age of 15 were living with HIV, 240 000 were newly infected, 91% of whom were in sub-Saharan Africa.[8] Both malaria and HIV continue to have a devastating impact on children's health and livelihoods around the world especially in Africa.

Poor nutritional status of a child is strongly correlated to their vulnerability to infectious diseases particularly pneumonia, diarrhoea and measles, to delayed physical and mental development, and to an increased risk of mortality. However, in 2012 an estimated 162 million children under-five were stunted, 51 million wasted, and 101 million underweight globally[9].

The first years of life provide the greatest opportunities for development but it also the time when the children are most vulnerable to negative effects of poor environments. Annually, over 200 million children under five years of age are at risk of not attaining their full developmental potential[10].

Epidemiological transition in underfive mortality

While child mortality continues to decline, countries face the so-called 'epidemiological transition' reflecting changes in demographic, socioeconomic, cultural, biological, technological, and environmental domains. As a result, important changes will occur in the distribution of causes of death in children under five years of age , shifting from acute infectious diseases and deficiency-related conditions, to non-communicable diseases (NCDs).

Figure 2. Distribution of causes of death in children underfive according to levels of U5MR

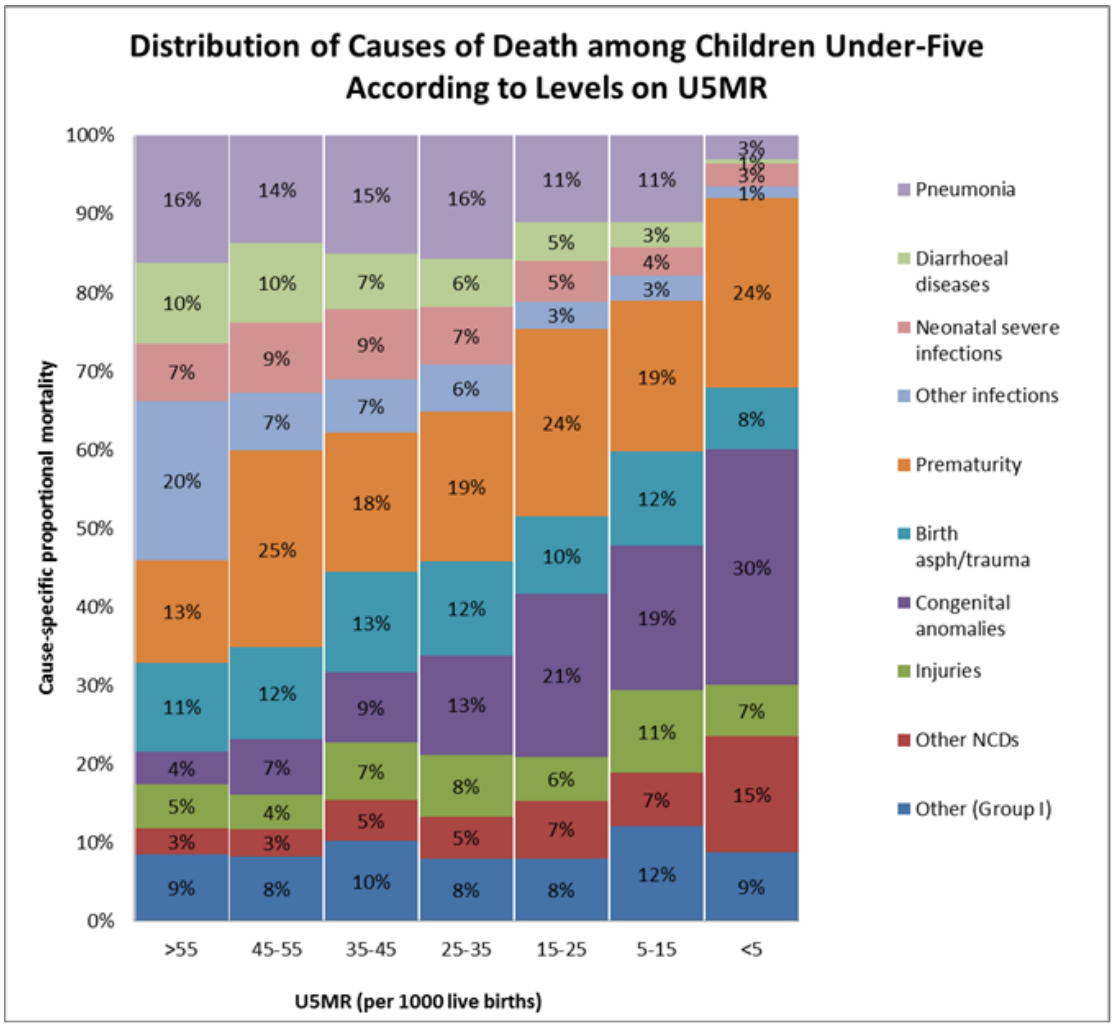


Figure 2 illustrates that with declining underfive mortality rates, a relative proportional increase will occur in conditions such as prematurity, congenital abnormalities, injuries, and other non-communicable diseases, as important causes of deaths .[11] As underfive mortality rates decline from 50, 20 and <5 per 1000 live births, the relative contribution to mortality of

congenital anomalies, other NCDs and injuries together is likely to increase from 15%, 34% to 51% of all under-five deaths, while the relative contribution of infectious diseases such as pneumonia, diarrhoea, neonatal infections, malaria, HIV/AIDS and others will decline from 40%, 25% to 8% respectively[12]. [13]

Emerging priorities for children's health

Other conditions affecting children as they grow from early childhood towards adolescence, are becoming increasingly important in almost all countries. They include obesity, injuries, violence, congenital anomalies, other NCDs such as diabetes and cancers, disabilities and child maltreatment. Child health services will need to evolve to better address these emerging priorities and become more astute in recognizing and providing appropriate services. Better coordination between the health, nutrition, education, social protection and other related sectors is necessary to create conditions that will comprehensively address children's health.

The dual burden of malnutrition is now a reality in the majority of countries. In addition to the enormous global burden of stunting, wasting, and underweight, the number of overweight children worldwide increased from 32 million in 2000 to 42 million in 2013[14]. Prevalence is highest in high- and upper-middle income countries, but is increasing in all regions of the world, particularly in Asia (18 million), Africa (11 million) and in Latin America and the Caribbean (4 million). If these increasing trends continue, it is estimated that the prevalence of overweight in children under 5 years of age will rise to 11% worldwide by 2025[15]. Overweight or obese children are at a higher risk of developing serious health problems, including type 2 diabetes, high blood pressure, asthma and other respiratory problems, sleep disorders and liver disease, and their social and economic performance is impaired, with increasing gender differentials in adolescents.

Injuries and violence are major killers of children under the age of 15 years. In 2012, unintentional injuries and violence killed an estimated 740 000 children under the age of 15, with unintentional injuries accounting for 90% of the total deaths[16]. The most important causes of these unintentional injuries are road traffic injuries, drowning, burns, falls and poisoning. They rank among the top three causes of death and life-long disability among children aged 5-15 years. Child injuries are largely absent from child survival initiatives presently on the global agenda, although many are preventable. [17,18]

Congenital abnormalities affect an estimated 1 in 33 infants and result in approximately 3.2 million birth defect-related disabilities every year. An estimated 270 000 newborns die during the first 28 days of life every year from congenital anomalies. [19]Congenital anomalies may result in long-term disability, which may have significant impacts on individuals, families, health-care systems and societies. Although congenital anomalies may be genetic, infectious or environmental in origin, most often it is difficult to identify the exact causes. Many congenital anomalies can be prevented including through appropriate preconception care.[20]

Other non-communicable diseases (NCDs) such as cardiovascular diseases, cancers, respiratory diseases and diabetes often have their onset in childhood. By definition, NCDs impact the health of children (directly and indirectly) just as much as they do the health of adults. Cancer, diabetes (both type 1 and type 2 diabetes), chronic respiratory diseases (such as asthma), congenital and acquired heart disease and many endemic NCDs all affect children. Children suffer from a wide range of NCDs: some are triggered in childhood by a complex interaction between the child's body, surrounding environment, living conditions, infectious agents, nutritional and/or other factors, with consequent scope for preventive action. NCDs are a major cause of preventable mortality, morbidity and disability amongst children in low- and middle-income countries. The global profile of childhood NCDs will continue to emerge as infectious conditions are increasingly brought under control.[21]

Disabilities are neither purely biological nor social but instead the interaction between health conditions and environmental and personal factors. There are currently no reliable and representative estimates based on actual measurement of the number of children with disabilities, but it is estimated that more than a billion people live with some form of disability, which equates to approximately 15% of the world's population.[22] Disturbingly, children with disabilities are 3.7 times more likely than non-disabled children to be victims of any sort of violence.[23]

Child maltreatment, sometimes referred to as child abuse and neglect, includes all forms of physical and emotional ill-treatment, sexual abuse, neglect, and exploitation that results in actual or potential harm to the child's health, development or dignity. A quarter of all adults report having been abused as children. One in 5 women and 1 in 13 men report having been sexually abused as a child. Preventing child maltreatment before it starts requires a multisectoral approach.[24]

3. RESPONSE AND PRIORITY INTERVENTIONS

Effective, feasible and affordable interventions for child survival, growth and development that are well-known but as yet not reaching all children who need them[25]. Essential interventions to address infectious diseases and nutrition have been complemented by those that are effective to combat non-communicable diseases, injuries, violence, child maltreatment, congenital abnormalities and disabilities.

Concerted efforts are required to take these child health intervention to scale to increase coverage while ensuring quality services. This will require attention to those children and families that are particularly vulnerable and as yet not reached by services, including a strong focus on populations living in humanitarian settings. Efforts are also needed beyond the health sector including community involvement, maternal education, women's empowerment, and poverty alleviation as well as addressing inequalities in health and access to health care. In addition, laws and policies including on marketing of food products, ensuring access to safe drinking water and sanitation, keeping the environment free from toxins, preventing indoor and outdoor air pollution, and creating safe places for children to play and recreate are all essential to protect and support the health of children.

Table 1 summarizes essential interventions that have benefits for survival, growth and development. They include non-health sector interventions. These are not new, but require greater coordination and refinement, and innovations for implementation at scale as evidence evolves.

Table 1: Summary of essential newborn and child health interventions

Adolescence and pre-pregnancy
• Family planning • Preconception care
Pregnancy[2]
• Appropriate care for normal and high risk pregnancies
Childbirth[1]
• Essential maternal and newborn care • Newborn resuscitation
Postnatal Period[1]
• Postnatal visits as per WHO guidelines • Extra care for small and sick babies
Infancy and Childhood[3]
• Exclusive breastfeeding for 6 months with appropriate complementary feeding from 6 months • Care for child development • Routine immunization for common child disease including H. influenzae, meningococcal, pneumococcal and rotavirus vaccines • Micronutrient supplementation, including Vitamin A from 6 months • Comprehensive care of children exposed to or infected with HIV • Prevention and case management of childhood pneumonia, diarrhoea and malaria • Case management of moderate and severe acute malnutrition • Prevention of childhood accidents and injuries • Prevention of child maltreatment • Attention to maternal mental health • Attention to violence in the home and the community • Care for children with congenital abnormalities and disabilities
Multi-sector actions[4]
• Food security • Maternal education • Safe drinking water and sanitation • Hand washing with soap

[2] For more interventions, see paper on ending preventable maternal and newborn mortality
[3] For more interventions, see papers on nutrition and early child development
[4] For more interventions, see paper on social determinants

- Reduced household air pollution
- Safe environments including places to recreate
- Health education in schools

See footnotes for papers with more details on essential interventions

Strategies and action plans

In 2012, the global community embraced the initiative committing to Child Survival: A Promise Renewed[26]. The APR drew attention to the feasibility of ending preventable under-five deaths and set an ambitious target for every country to achieve a U5MR of 25 or less per 1000 live births by 2030. By 2014, 179 governments and many partners had made a pledge to achieve this goal, and multiple countries had initiated a process to review their progress and sharpen national plans for child survival.

In follow-up, WHO Member States and partners have adopted a number of strategies and action plans, goals and targets that are relevant for ending preventable newborn and child deaths. Figure 3 summarizes selected targets.

The *Every Newborn: an action plan to end preventable mortality (ENAP*)[27] focuses on ending preventable maternal and newborn mortality and stillbirths and it is closely linked to the strategies for ending preventable maternal mortality.[28] The ENAP includes five strategic objectives that promote universal coverage of high quality maternal and newborn care, focus on the time around birth as the period with greatest risk of mortality, and call for every mother and very baby to be counted.

The *Global action plan for the prevention and control of pneumonia and diarrhoea* (GAPPD)[29] promotes integrated actions to accelerate progress and brings together interventions to Protect, Prevent and Treat childhood pneumonia and diarrhoea. Its strategic objectives call for coordinated and integrated actions to improve infant and young child feeding and child nutrition, access to safe drinking water and sanitation (WASH)[30] and hand washing with soap, reduction in indoor air pollution, immunization, HIV prevention, and treatment of pneumonia and diarrhoea.

The draft *Global technical strategy for malaria*[31] to be launched in May 2015 aims to reduce global malaria mortality and malaria case incidence rates by more than 90% compared to 2015 levels by 2030.[32] While countries will tailor their strategies to local context, the recommended package of core interventions include quality-assured vector control, chemoprevention, diagnostic testing and treatment.

The *Comprehensive implementation plan on maternal and infant and young child nutrition*[33] addresses the double burden of malnutrition through a set of six global nutrition targets[34]. Effective priority interventions include both nutrition-specific and nutrition-sensitive investments at the policy, health-system and community levels, and through an intersectoral approach for achieving the targets.

The *Global vaccine and immunization plan* (GVAP)[35] endorsed by the 194 Member States of the World Health Assembly in May 2012 is a framework to prevent millions of deaths by 2020 through more equitable access to existing vaccines for people in all communities[36]. GVAP aims to strengthen routine immunization to meet vaccination coverage targets; accelerate control of vaccine-preventable diseases with polio eradication as the first milestone; introduce new and improved vaccines and spur research and development for the next generation of vaccines and technologies.

Elimination of mother to child transmission of HIV[37] is one of the key pillars in the worldwide response to the AIDS epidemic. The PMTCT strategic vision calls for promoting a comprehensive approach that includes four components: primary prevention of HIV infection among women of childbearing age; preventing unintended pregnancies among women living with HIV; preventing transmission from an HIV-positive woman to her infant; and providing appropriate treatment, care and support to mothers living with HIV and their children and families.

Figure 3: Selected goals and targets for ending preventable newborn and child mortality

A Promise Renewed target by 2030:

- Every country should reduce its U5MR to 25 or less per 1000 live births

ENAP country targets by 2030:

- Every country should have a NMR 12 or less per 1000 live births and a stillbirths rate of 12 or less per 1000 total births

GAPPD country targets by 2015:

- Every country should reduce < 5 mortality from pneumonia to less than 3 per 1000 live births
- Every country should reduce < 5 mortality from diarrhoea to less than 1 per 1000 live births

Draft Global Technical Strategy for Malaria target by 2030

- Reduce global malaria mortality by 90% compared to 2015
- Reduce global malaria incidence by 90% compared to 2015

GVAP country target by 2020:

- Every country should reach 90% of national coverage and 80% in every district or equivalent administrative unit with all vaccines in national programmes, unless otherwise recommended

Comprehensive implementation plan on maternal and child nutrition by 2025:

- Reduce the global number of children who are stunted by 40%
- Increase the rate of exclusive breastfeeding in the first 6 months up to at least 50%
- No increase in childhood overweight

The implementation of these actions plans need to be complemented by interventions and strategies to tackle the emerging disease priorities of which we highlight some below[5].

Violence and injury prevention requires a broad range of strategies based on sound scientific evidence that have shown to be effective and cost-effective in reducing injuries, such as setting and enforcing relevant laws to make the environment safer; developing better road infrastructure; health education on risks of injuries, burns and drowning; setting standards for safe places for children to recreate; and establishing services for treating children with accidents, burns and poisoning[38].

Zero increase in childhood obesity: childhood obesity originates from a complex interplay of biological and contextual factors. Maternal over- or under-nutrition prior to and during pregnancy changes the way the child will respond to later nutritional experiences. During infancy, eating and exercise patterns are established. Many children are being exposed increasingly to ultra-processed, energy-dense, nutrient-poor foods and drinks, and reduced opportunities for physical activity. Attention is required to both the life-course and environmental conditions, by addressing maternal health before and during pregnancy, infant and young child feeding practices, the exposure of children and adolescents to the marketing of unhealthy foods and factors which restrict physical activity[39].

Congenital anomalies can to a certain extend be prevented. WHO has defined effective interventions as part of a package of preconception care. They include interventions such as vaccination, intake of folic acid and iodine, eliminating tobacco use, and genetic counselling. In addition, countries should develop and strengthen registration and surveillance systems, capacity for dealing with congenital conditions, and research on aetiology, diagnosis and prevention of congenital anomalies.[40]

Strengthening health systems to deliver for children's health

Programs to address child health services rely on systems to provide medicines, finance health services, assure quality and efficiency of care, manage the health workforce, and generate needed information for effective operational decisions. These are complex and often leading to bottlenecks and barriers[41] especially poor supply management systems, insufficient funding for medicines, inadequate knowledge by providers, health worker shortages, and a failure to convert national policies into action plans. In addition there are often programmatic barriers like ineffective programme coordination, scarce financial resources, inadequate training and support for health workers, sporadic availability of key commodities, and suboptimal programme management. As a consequence the coverage of many essential intervention remains low in many high burden countries that are tracked by Countdown to 2015 (Table 2).

[5] For child maltreatment, kindly refer the background paper on Early Child Development

The paper on *Health workforce and resilient health systems* will address the health system barriers to scale up in a broader context. Here we highlight a few specific areas that deserve attention.

Health in humanitarian settings: over half of all newborn and child deaths take place in settings with conflicts and disasters where health systems have been eroded and families often live in abject poverty. The motto that the Global Strategy should be relevant for Every Woman, Every Child in Every Setting reflects the imperative for the global community to pay more attention to fragile settings and increase investments towards context –relevant solutions to protect and support the health of children, their mothers and families.

Table 2: Coverage of essential interventions in countries with latest survey since 2008[42]

Indicator	N^{O} of countries with data	Median coverage	Range (%)
Demand for family planning satisfied	54	64	13 - 95
Antenatal care at least 4 visits	48	53	15 - 94
Skilled attendant at birth	60	84	43 - 94
Postnatal visit newborn	17	30	5 - 83
Exclusive breastfeeding	51	41	3 - 85
Measles immunization (first dose)	75	84	42 - 99
Antibiotic treatment for pneumonia	40	46	7 -88
Oral rehydration therapy for diarrhoea	45	47	12 - 76
Malaria treatment (first line)	35	32	3 - 97

Integrated service delivery: children are often affected by a range of conditions and promoting their healthy growth and development requires a holistic approach. IMCI holistically combines both preventive and curative interventions to tackle the main causes of under-five mortality at every contact with a sick child. It has been shown that when implemented well it improves the quality of care and reduces child mortality.[43,44] It has been adapted in over 100 countries to respond to local epidemiology and context, and remains a highly relevant strategy towards ending preventable child deaths. The tools that accompany the IMCI approach have been used by countries to strengthen well-child clinics as well. Care for Child Development is an example of such interventions.

Multiple delivery platforms: quality care is required along the continuum, from community based services, to first – and second level health facilities. Evidence on task delegation has demonstrated that it is possible for lower health cadres to deliver selected interventions and services that traditionally they might have done so. As a consequence, many countries are strengthening to role of community health workers in providing home-based newborn care, care for children's health growth and development, and integrated community-based management of childhood illness[45].

A the same time, it is critical to ensure access and high quality care in first and referral level health facilities. A significant number of preventable deaths still occur in these facilities due to poor quality of care. Despite this evidence, improving the quality of care for children has not received much attention within the package of interventions to improve child survival. There is now substantial global experience of strategies and interventions to improve the quality of care in referral facilities that should form an essential component of interventions. Improving quality of care in this facilities will require competent and motivated health workforce; the availability of essential physical resources; care provision based on evidence-based standards and clinical guidelines; and actionable information systems where record keeping enables review and audit mechanisms. The strategic approach would be to understanding the gaps through assessment, and implementing quality improvement strategies and interventions based on Plan-Do-Study-Act cycle.

Multi-sectoral actions: as shown in table 1 other sectors have a clear role to play for improving child health. The Commission on Social Determinants to Health highlighted the importance of investing in child health through multisectoral actions as a powerful equalizer[46]. More information can be found in the background paper on Social Determinants.

Innovations: A myriad of challenges constrain equitable health system delivery of essential, quality interventions to populations in need. There need for investment in innovations that can help improve coverage, quality and effectiveness of child health services. Innovations such as digital health systems (including mHealth) can strengthen health systems, increase the quality and coverage of essential health interventions, reduce barriers to health access and enhance the potential for universal health coverage, while collecting data to improve monitoring and evaluation. There is also need for continued investment in the dispersible child-friendly medicines and development of new point-of-care tests to improve early diagnosis and treatment especially for pneumonia.

4. CONCLUSION

Childhood from birth up to adolescence is a critical period in which the foundations for people's health, development and productivity are built for their life time. The undue burden of childhood mortality calls for continued and increased investment, in particular since it is now well established that preventable newborn and child deaths can be ended within a generation. At the same time, increased attention and investments are required to tackle emerging. non-communicable diseases which affect children from the early years through the first decade of life. The sustainable development agenda provides an excellent platform of focused actions in the health and other sectors to provide children with the services and the care that they need, and to leave no child behind. The global community has already developed and committed to implementation a series of action plans that give clear strategic directions of what needs to be done. 2015 can be the turning point towards a reinvigorated agenda in which children are enabled not only to survive, but also to thrive!

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