

# Measles Control and Elimination in Somalia: The Good, the Bad, and the Ugly

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Despite enormous challenges, Somalia has been successfully implementing accelerated measles control activities since 2005. Through innovative strategies and with the support of local and international partners, the country has shown potentials of implementing measles mortality reduction activities in complex emergencies. Measles incidence has been reduced by >80% after the measles catch-up campaigns of 2005–2007, and national reported measles routine immunization coverage with first dose measles containing vaccine has reached 59% for the first time in 2009. However, the near collapse of the health care system and the ongoing insecurity continue to hamper the implementation of recommended measles control and elimination strategies in some parts of the country, making these achievements fragile. Somalia exemplifies the challenges in meeting measles elimination goals in the World Health Organization Eastern Mediterranean region. As the region is entering its 2010 measles elimination goals, it appears necessary to establish realistic and flexible interim goals for measles control in Somalia that will take into consideration the specificities of the country. Maintaining flexibility in conducting field operations, securing financial resources, multiplying opportunities for measles vaccination, and improving disease monitoring systems will remain vital to sustain and improve current achievements.

## BACKGROUND

Over the past decades, childhood immunization programs have substantially reduced measles morbidity and mortality on a global level [1]. However, measles is still one of the major causes of mortality in developing countries [2].

Tremendous progress has been made toward measles elimination in the World Health Organization (WHO) Eastern Mediterranean Region (EMR) since 1997 when its 22 member countries adopted a resolution to eliminate measles by 2010 [3]. By 2007, measles mortality was reduced by 90%, compared with 2000 estimates [4, 5].

To achieve this goal, 4 strategies were adopted: (1) achieve and maintain >90% vaccination coverage of children with the first dose of measles-containing vaccine (MCV1) in every district of each country through routine immunization services; (2) achieve >90% vaccination coverage with the second dose of measles-containing vaccine (MCV2) in every district either through a routine 2-dose vaccination schedule or through supplementary immunization activities (SIAs); (3) establish case-based surveillance with investigation and laboratory testing of all suspected cases of measles, strengthening measles surveillance and laboratory case confirmation; and 4) providing optimal clinical-case management, including supplementation of vitamin A [4, 6]. Despite these achievements, several countries in EMR, including Somalia, have encountered major challenges in implementing comprehensive measles-control activities [7].

The Somali Republic, located in the Horn of Africa, covers an area of 637 700 km<sup>2</sup> and has an estimated population of 8.7 million inhabitants [8]. The country is

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currently divided into 4 operational zones (Northeast, Northwest, South, and Central), subdivided into 19 regions and 113 administrative districts. Two decades of civil war and factional fighting compounded by natural disasters have had a negative effect on all aspects of life in Somalia. The political landscape has been dominated by instability and insecurity although the Northeast (Puntland) and Northwest (Somaliland) have enjoyed relative stability. Somalia is the only country to date without a functioning government and remains one of the poorest and most volatile in the world. The lack of a central government for almost 2 decades has led to the near collapse of the health system. Coverage for basic public health services is low, and child mortality is among the highest in the world [8]. Health care service delivery is fragmented and delivered through national and international nongovernmental organizations (NGOs) with the support of the United Nations Children's Fund (UNICEF), the World Health organization (WHO), and other United Nations (UN) agencies and multi-lateral aid agencies.

Despite these challenges, the country has been able to successfully implement accelerated measles control activities since 2005, with a subsequent reduction in the reported number of measles cases and deaths. Measles had been an important public health problem in Somalia, and frequent outbreaks have been reported all over the country. Pre-catch-up campaign data for Somalia suggested that ~200,000 children were infected with measles each year, with >10,000 estimated annual deaths. [9]. A nationwide measles mortality reduction campaign targeting 3 million children aged 9 months to 14 years was conducted over a period of 2 years, 2005–2007. This catch-up campaign was followed by measles follow-up campaign in 2009, delivered with other child health interventions as Child Health Days (CHDs). This report summarizes progress made in Somalia during 2005–2009 to reduce measles morbidity and mortality and describes country-specific challenges in the implementation of recommended measles elimination strategies.

## METHODS

### Measles Routine Vaccination

Routine immunization services are delivered at fixed sites in Maternal and Child Health clinic (MCHs) and hospitals and on ad hoc basis in acceleration campaigns and outreach activities. Measles vaccine is administered as a single-antigen vaccine at the age of 9 months. Coverage estimates are derived from the number of doses administered and available population estimates.

Routine vaccination coverage has been historically low in Somalia. About 40 partners, including local health authorities, WHO, UNICEF, and NGOs, are engaged in delivering immunization activities in Somalia. UNICEF supports all EPI delivery sites with vaccines, supplies, and basic MCHs equipment. In

total, 200 MCHs provide routine immunization services and report EPI data to UNICEF on a monthly base, while WHO through the AFP surveillance network provides weekly information on the status of the cold chain and on vaccine availability.

To further strengthen EPI in Somalia, WHO and UNICEF supported the adoption of the Reaching Every District strategy (RED) in 2008. The RED strategy aimed at reestablishing outreach in selected areas of the country, establish supportive supervision of EPI activities, involve communities in EPI activities, promote planning and good management of resources, and develop a culture of monitoring data to take appropriate actions by local EPI managers [10]. Detailed EPI microplanning workshops were conducted in Somaliland and Puntland, involving community health workers and influential leaders to ensure full participation and smooth operation of immunization activities.

### Measles Supplementary Immunization Activities

Measles catch-up campaigns were implemented in phases from November 2005 through August 2007. The purpose of the campaign was primarily to reduce measles related mortality through the provision of a 2nd opportunity for measles vaccination, thus increasing measles immunization coverage rates among children aged 9 months to 15 years. The campaigns targeted 3 million children (~45% of the total population of Somalia) aged 9 months to 15 years, in all districts of Somalia.

### Child Health Days

To respond to immediate needs of vulnerable population and increase coverage and equity of access to basic child health interventions, WHO and UNICEF have formulated and implemented a joint initiative of Accelerated Young Child Survival (AYCS) [11]. AYCS was designed to be implemented using 3 delivery mechanisms: health facility based, community based, and population oriented child health services including Child Health Days (CHDs). The CHDs component of AYCS was designed around measles follow-up campaign in which 1,435,531 children aged 9–60 months were targeted for measles vaccination irrespective of previous history of measles vaccination. In addition to measles, the CHD package (Table 1) included several other interventions. This package was selected taking into consideration the current epidemiology of diseases in Somalia, the coverage of child health interventions among Somali children, the feasibility of delivery strategy of each intervention, the operational capacity of partners, and the urgent need to scale up access to life-saving interventions.

CHDs were implemented twice in 2009 through mobile fixed-posts (CHDs teams establishing fixed-posts in different locality/area everyday) campaigns of 5 days in duration. More than 1.9 million children aged <5 years, in rural and urban areas,

**Table 1. First Round and Second Rounds Child Health Days Package, Target Age Group, and Outcome (Number of Reached and Percentage) in 2009, Somalia**

Intervention	Target age group	1st round <i>n</i> <sup>a</sup> (Coverage)	2nd round <i>n</i> <sup>a</sup> (Coverage)
Trivalent oral polio vaccine	0–59 months	1,072,179 (85%)	1,015,144 (87%)
Measles vaccine (Children)	9–59 months	909,687 (85%)	835,927 (82%)
Diphtheria-pertussis-tetanus vaccine <sup>b</sup>	6 week–11 months	247,407 (98%)	248,672 (107%) <sup>b</sup>
Vitamin A	6–59 months	937,184 (83%)	855,587 (82%)
Deworming (Albendazol) tabs	12–59 months	839,512 (83%)	732,995 (79%)
Oral rehydration salt	0–59 months	1,073,727 (85%)	1,122,889 (96%)
Aquatabs	0–59 months	1,082,063 (86%)	981,404 (84%)
Tetanus toxoid vaccine for WCBA	15–49 years	819,862 (57%)	826,460 (61%)

**NOTE.** <sup>a</sup> No. of target population reached. WCBA, women of child-bearing age (15–44 years).

<sup>b</sup> Children 12–24 months with documented evidence of DPT1/2 dose were given 2nd/3rd dose, hence the above 100% coverage. In 2009, CHDs were implemented in all districts of Somalia except in Kismayo (local authorities' refusal).

including hard-to-reach and security compromised areas were targeted during the CHDs

### Measles Surveillance

Official aggregated figures for suspected measles cases and deaths are collected through the Acute Flaccid Paralysis (AFP) surveillance system of WHO Somalia and reported by the WHO Division of Communicable Diseases and Response (CSR). The AFP surveillance structure includes 2 international focal points, a national zonal polio eradication officer (ZPEO) in each zone, polio eradication officers (PEOs) in each of the 19 regions, and district polio officers (DPOs) in each of the 113 districts. This important manpower conducts regular active visits to more than 430 AFP reporting sites. On a weekly basis, data on suspected measles cases and deaths are collected and reported by polio surveillance officers from ~250 health facilities distributed throughout the country. Clusters of suspected measles cases are investigated according to existing guidelines [12] by joint teams from WHO, UNICEF, and local partners.

Measles case-based surveillance is still in its infancy in Somalia. The measles case-based surveillance network is based on sentinel sites. These sentinel sites currently include 16 hospitals and 12 maternal and MCH clinics and were established to cover major towns in the 2 relatively stable zones of Somaliland and Puntland. Ongoing insecurity had delayed the deployment of the measles case-based surveillance in the south and central zones of the country. Laboratory confirmation of cases is performed at laboratories in Hargeisa and Garowe. A confirmed measles case is defined on the basis of a positive measles immunoglobulin M (IgM) eEnzyme-linked immunosorbent assay (ELISA) test.

A blood sample shall be collected for every suspected measles case identified in the sentinel site and transported to the nearest measles laboratory for testing for measles IgM. Data on measles aggregated and case-based surveillance are shared on a monthly

basis between partners through WHO CSR and posted on WHO EMRO monthly bulletin [13].

### Ground Strategies in Support of Disease Control Activities in Somalia

Implementing disease control activities in Somalia have required the adoption of unique strategies.

**Involvement of the polio eradication structure in measles control activities.** The polio network, established in 1998, was able to maintain a continuous presence in all districts of Somalia and to establish an AFP surveillance system with key indicators above polio certification standards, irrespective of the political flavor of the authorities in charge. The Polio Eradication Initiative, with its large network of stable national staff selected within the community through close collaboration with local authorities and clan elders, supports all disease control efforts, including measles through surveillance (data collection and reporting, disease notification, sample transportation outbreak investigation) and participation in SIAs and CHDs.

**Working with the defacto local authorities.** After the disintegration of the central government, a number of local authorities have filled the gap in the control of localities including districts, regions, and zones. As the civil war is ongoing, so are the changing hands in local power structure. Adapting to the changing political landscape and preserving political neutrality by working with the de facto local authorities, irrespective of their political or ideological affiliation has been indispensable.

**Involvement of community elders.** Based on the experience of Polio SIAs, community elders do participate in all campaign preparatory and implementation activities including: provision of security to vaccinators, selection of volunteers, selection of vehicles for car rentals, and so forth. This participation and community ownership of SIAs has enabled measles campaigns to be conducted in most part of Somalia irrespective of who controls specific localities.

## Operational Flexibility and Partnership

The volatile situation on the ground sometimes dictates rapid adjustment. National staff do have the latitude of using the window of opportunities as they arise in implementing measles SIA in consultation and under the general guidance of WHO country office. Rapid disbursement, transfer, and flexibility in the management of fund by partners have played an important role in the implementation of measles control strategies. Strong and effective partnership between WHO, UNICEF, and local partners at all levels has resulted in coherent implementation of planned activities.

## RESULTS

### Routine Vaccination Coverage

Vaccination coverage in Somalia has been historically low since the inception of the Expanded Program on Immunization (EPI) in 1980. Official routine vaccination data, reported internationally through the WHO/UNICEF Joint Reporting process [14], have indicated a consistent low coverage of 20%–40% for measles and DPT3 over the last 8 years. This historically low routine vaccination coverage was substantiated by other sources [15, 16].

During the course of 2009, 3 rounds of EPI outreach were conducted in Somaliland and Puntland. At the same time, 2 EPI units within the ministries of health of Puntland and Somaliland were technically, financially, and logistically supported by WHO. This support to local EPI capacity development fostered appropriation of EPI activities by local authorities and is instrumental in coordinating immunization activities of local partners in the two zones.

In 2009, the measles follow-up campaign was scaled up in the form of CHDs during which DPT, polio, and tetanus vaccines were also administered. More than 900,000 children (85% of the target population), aged 9–59 months were vaccinated against measles.

At the end of the 2009, through the combined effect of CHDs and RED, the reported routine immunization coverage for

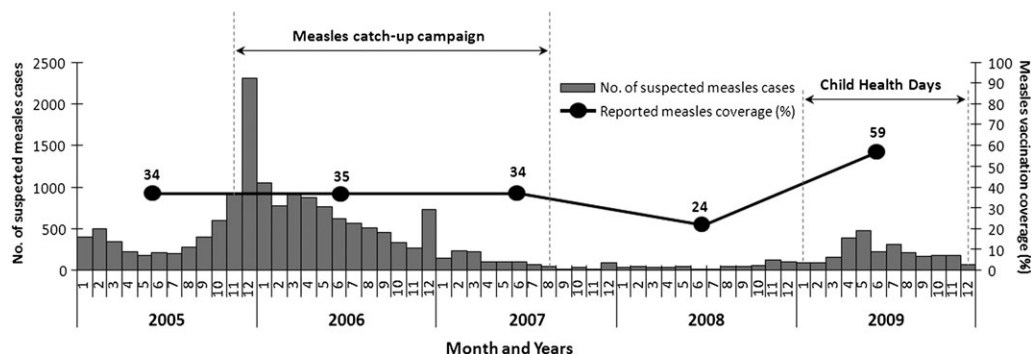
measles reached 59% at the national level, the highest ever reported in Somalia [17]. Post-campaign (CHDs) coverage data collected along side the Food and Agricultural Organization (FAO) Security and Nutrition Analysis Unit (FSNAU) survey [18] confirmed improvement in measles and DPT3 coverage after CHDs. For example, measles vaccination coverage measured through FSNAU 2009 surveys increased from 20% to 61% in Galgadug, from 55% to 75% in Bakool, and from 43% to 66% in Juba between 2008 (time of the same survey in those localities) and 2009 [18].

### Measles Supplementary Immunization Activities

Somalia measles catch-up campaign was implemented in phases from November 2005 to August 2007. More than 80% of the 3 million children (9 months to 15 years) targeted was reached and vaccinated against measles during the campaign. Vitamin A supplementation, an essential piece in the measles mortality reduction strategy, was concomitantly administered during the campaign to almost 1 million children aged 6–59 months.

### Disease Surveillance

Countrywide, complete, and reliable surveillance data on measles are limited. Reported measles cases from the WHO immunization country profile database [14] show an erratic pattern. However, available diseases surveillance estimates and nonpublished sources, mainly from the relatively peaceful operational zones of Somaliland and Puntland, suggested a decreasing trend in the reported number of suspected measles cases and outbreaks after the measles catch-up campaigns of 2005–2007. The number of suspected measles cases reported through the WHO Division of Communicable Diseases Surveillance and Response showed a marked decline from 7000 cases to <500 cases between 2005 and 2008, respectively, representing a decrease of >80% during that period (Figure 1). Due to the low routine immunization and the subsequent rapid accumulation of susceptible, an upward trend in measles cases became noticeable toward the end of 2008. In 2009, a total



**Figure 1.** Incidence of suspected measles cases, reported measles routine immunization coverage, and timing of selected measles control activities by year, Somalia 2005–2009.

of 2445 suspected measles cases were reported nationwide. Confirmed measles outbreaks have been reported in internally displaced persons (IDP) camps around Mogadishu and in Somali refugee camps in nearby Kenya [19–22], confirming the persistence of measles virus circulation among special populations in security compromised areas of South and Central Somalia where chronic insecurity have hampered measles control efforts and triggered waves of mass displacement

## DISCUSSION

Tremendous progress toward measles elimination in the EMR has been made since the adoption of the measles elimination goal in 1997 [4, 5]. Available evidence suggests a decrease in the number of measles cases in Somalia from 2006 onward. However, implementing comprehensive measles control and elimination strategies and demonstrating progress in measles control in Somalia remain challenging. The near collapse of the health care system, the fragmentation of routine immunization, and diseases surveillance activities and the ongoing insecurity severely hamper the implementation of recommended measles control and elimination strategies and the establishment of a monitoring system required to measure progress toward measles elimination goal.

Gains achieved in measles case reduction through the measles catch-up campaigns of 2005–2007 and follow-up campaigns of 2009 remain fragile. Large cohorts of susceptible people remain in Somalia and accumulate rapidly, notably in hard-to-reach, security compromised areas and special populations (Nomads, internally displaced persons) of the Central and South. The current status of the health system and the ongoing volatility make it difficult to achieve and maintain >90% vaccination with MCV1 in every districts through routine immunization services. Reported national measles coverage achieved in 2009 (59%) reflects intensive outreach services, accelerations, and CHDs. For the same reasons, achieving >90% vaccination coverage with the second dose of measles-containing vaccine (MCV2) in every district through supplementary immunization activities (SIAs) remain problematic. The first measles catch-up campaign was phased over a period of 2 years; with constant adjustments in schedule to accommodate the local security and accessibility situation.

The establishment of measles case-based surveillance is at its early stage in Somalia. Current health system and security challenges do not favor investigation and laboratory testing of all suspected cases of measles. In the absence of a reliable, complete (high reporting rates from all zones), and timely disease monitoring systems, it is difficult to make firm conclusions on the current status or changes of measles epidemiology in the entire country. Therefore, measuring the impact of measles control activities in Somalia against known indicators is difficult. However, aggregate measles data reported from selected sites

through AFP surveillance suggest a significant decrease in the number of measles cases starting in 2007, following measles catch-up and follow-up campaigns. The change in frequency and severity of measles outbreaks is also difficult to evaluate because of a highly decentralized outbreak management structure and the lack of outbreak investigation documentation, even though indirect reports suggest persistence of measles circulation in special populations and geographical areas within and outside of Somalia [19, 21, 23].

In the framework of the AYCS, partners working in Somalia have devised strategies to rapidly decrease child mortality by increasing coverage of basic health interventions, including routine immunization, thus helping the country move towards the Millennium Development Goals 4 and 5 [24]. Delivery of interventions through campaign modes have the ability to rapidly increase coverage of basic health interventions and will continue to play a key role in the current context of Somalia.

## CONCLUSIONS

Somalia provides an example of the challenges to the achievement of the EMR 2010 measles elimination goal. The country has shown potential of implementing measles mortality reduction activities in complex emergencies. It appears necessary for EMR to establish realistic and flexible interim goals for measles control for Somalia that will take into consideration the specificities of the country. Any gains achieved in measles control in Somalia will remain fragile as long as the current political climate, which does not permit the development of a viable health infrastructure, able to provide basic health services and improve coverage for basic health interventions persist.

Whether sustainable measles control can be achieved in Somalia will also depend on the ability of partners to coordinate disease control efforts and to secure long term financial support to sustain CHDs and other measles control activities. It will be imperative to multiply opportunities for measles vaccination through pulse activities and measles SIAs of high quality to strengthen routine immunization coverage in stable areas of the country through RED, CHDs, and EPI acceleration. Finally, improving current disease monitoring systems in order to derive accurate disease burden estimates and track progress toward national measles goals is crucial.

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