Somalia: Supporting the Child Survival Agenda When Routine Health Service is Broken

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Somalia, one of the most unstable countries in the world, has been without a permanent government for nearly 2 decades. With a health system in total disarray, coverage of basic health interventions remains low and, maternal and child mortality is among the highest in the world. Health partners jointly outlined an integrated package of critical child survival interventions to be delivered through a population-based delivery strategy known as Child Health Days (CHDs), to reduce child mortality. Using this strategy, key child survival interventions are delivered to the community with an objective of reaching children <5 years and women of childbearing age in all districts of Somalia every 6 months. Through this strategy, immunization services were reached in remote areas, and coverage disparity between the urban and rural areas was reduced from 17% (42% urban and 25% rural) to 10% (50% urban and 60% rural). In addition, infants were reached with a third dose of diphtheria-pertussis-tetanus vaccine, achieving 51% coverage during 2009 and 66% in 2010. This paper summarizes the challenges of scaling up child interventions in the troubled context of Somalia by reviewing the planning, implementation, and achievements of CHDs as well as reflecting on challenges for the future of child survival in Somalia.

Since 1991, Somalia has been without a functioning central government and has experienced a prolonged humanitarian crisis due to armed conflict and drought that still affects large parts of the country. It has destroyed most of the infrastructure, displaced large populations, and taken a heavy human and financial toll on the Somali population [1]. Around 60% of Somalis are nomadic or seminomadic pastoralists, 25% are farmers, and the remainder (15%–20%) live in urban areas. The country is divided into the South-Central zone (SCZ), Northwest zone, and Northeast zone. Forty-three percent of the population (23.5% urban and 53.4% rural) lives in extreme poverty, subsisting on <$1 a day; 73% survive on <$2 a day [2]. Somalia is currently not listed in the Human Development Index but ranked 161 out of 163 countries in 2001 [3].

An estimated 80% of Somalis have no access to basic healthcare [4], with an under-5 mortality rate of 180 per 1000 live births, which remains far above the average of 144 per 1000 live births for sub-Saharan Africa countries [5]. The maternal mortality rate of 1200 per 100 000 live births is among the highest in the world [5]. Routine immunization rates are extremely low: in 2008, coverage was 40% for the first dose of diphtheria-pertussis-tetanus (DPT) vaccine, 31% for the third dose of DPT vaccine (DPT3), and 24% for the first dose of the measles vaccine [6]. According to a survey in 2010, the national level of acute malnutrition was 16%, with 4% severe malnutrition, which means that, in Somalia, 1 in 7 children is acutely malnourished and 1 in 25 is severely malnourished [7].

The delivery system for health services in Somalia is highly fragmented. Public health service provision mostly relies on national and international nongovernmental organizations that tend to be concentrated in urban and insecure areas. The rate of access to health services...
by the urban population is 50% vs 15% for the rural population (28% overall) [1].

One of the 4 strategic areas of the Global Immunization and Vision Strategy is to integrate immunization with other health interventions. This is being promoted to improve efficiency and productivity, to improve the health status of the populations, to improve user satisfaction and convenience, and to improve equity [8]. The various platforms for delivering additional child survival interventions with immunization are (1) routine immunization services, (2) supplemental immunization activities (SIAs), and (3) periodic intensification of routine immunization (PIRI) services (eg, Child Health Days). Given the poor healthcare infrastructure, Somalia has focused on the SIAs and PIRI strategy to deliver integrated interventions.

From 2005 to 2007, the first measles catch-up campaign was conducted in Somalia; >3 million children aged 9 months–15 years were vaccinated [9]. This achievement, along with multiple rounds of polio SIAs, demonstrated the ability of health partners in Somalia to deliver these interventions through population-oriented services. In 2008, the United Nations Children’s Fund (UNICEF) and the World Health Organization (WHO), with local authorities and other partners, jointly designed an Accelerated Young Child Survival Initiative, to reduce maternal, neonatal, and child mortality and morbidity in Somalia and contribute to the country’s effort toward the Millennium Development Goal 4 [10]. Under this initiative, Somalia had embarked on an ambitious time-limited integrated delivery program of Child Health Days (CHDs) to reach as many children through an equitable delivery strategy [11].

In Somalia, CHDs have been conducted since December 2008, twice a year, as a nationwide campaign targeting children <5 years and women of childbearing age (WCBA). The CHD strategy took health services out of facilities to deliver them directly to the community through teams of hundreds of vaccinators and health workers by reducing access barriers (transport, security, and cost) and creating a bridge between health facilities and communities.

There are a few published reports on CHDs in complex and chronic emergency situations like Somalia. We hope to fill this gap by providing information on the planning, implementation, and outcome of CHDs in Somalia and by reflecting on the challenges and opportunities as a strategy to impact the lives of children in similar settings.

**METHODS**

Limited robust data are available on causes of child mortality and morbidity in Somalia. According to a 2008 meta-analysis [12] conducted by the Food and Agricultural Organization’s Food Security and Nutrition Analysis Unit (FSNAU), the most common form of illness among children <5 years was acute respiratory infections (24.8%), followed by diarrhea (21.4%), fever (16.2%), and suspected measles (5.1%).

The choice of the CHD package is based on existing public health evidence that most of the potential reduction in under-5 mortality rate is attributed to immunization (especially against measles and tetanus), vitamin A supplementation, oral rehydration therapy, use of insecticide-treated nets, and treatment of malaria [13]. The interventions delivered during Somalia CHDs and their targeted age groups are summarized in Table 1.

Recent census data are not available in Somalia; all population estimates are derived by extrapolating from official censuses (1975 and 1986). This approach has some limitations considering large population movements resulting from prolonged armed conflict and a decade of severe drought [14]. For CHDs, population estimates were derived from the most recent polio SIA coverage figures.

**Table 1. Specific Objectives of Somalia Child Health Days**

<table>
<thead>
<tr>
<th>Objective</th>
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<tr>
<td>1. Reduce morbidity and mortality from measles by immunizing ≥95% children aged 9–59 months with measles vaccine irrespective of previous immunization status.</td>
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<tr>
<td>2. Increase coverage of routine Expanded Program on Immunization vaccines from the current &lt;40% to at least 60% of children aged &lt;1 year.</td>
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<tr>
<td>3. Maintain polio-free status of Somaliland through immunization of ≥95% of children aged 0–59 months with oral poliovirus vaccine irrespective of previous immunization status.</td>
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<td>4. Supplement all children aged 6–59 months with 1 dose of vitamin A.</td>
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<td>5. Provide deworming medicine (albendazole) to all children aged 12–59 months.</td>
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<tr>
<td>6. Reduce mortality due to acute malnutrition through screening of all children 6–59 months using mid-upper arm circumference tapes and refer acutely malnourished children for further management in selective feeding centers.</td>
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<tr>
<td>7. Reduce morbidity and mortality due to communicable diseases such as diarrhea through promotion of the use of oral rehydration salts and hygienic practices coupled with provision of health education, sachets of oral rehydration salts, and Aquatabs for each vaccinated child.</td>
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<tr>
<td>8. Immunize ≥80% women of childbearing age with protective dose of tetanus toxoid vaccine.</td>
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**CHD Strategy**

Zonal CHD macroplanning was done with all partners, to agree on CHD interventions, target population for each intervention, social mobilization strategies and materials, and zonal requirement of supplies and budget. An operational field guide, standard operating procedures, and monitoring and evaluation tools were developed based on WHO and UNICEF guidelines and experience from other countries [16–23], and were translated into the Somali language to assist the process of planning and implementation at all levels. District based micropians were also developed, covering all aspects of CHDs including team deployment plans (Supplementary Figure 1).
The implementation in each zone was done in a phased manner and lasted for 5 days in each district, considering access, insecurity, authorization by local authorities, operational capacity of partners, availability of skilled personnel, and cold chain. CHDs’ services were provided via a mix of fixed sites (existing maternal and child health centers), outreach sites (temporary sites), and mobile units that travel to more remote areas, usually staying 1–2 days in each village.

Each CHD team was composed of trained vaccinators to administer injectable interventions; trained staff to provide noninjectable interventions; and nontechnical members (selected from the same community) to assist with crowd control, registration, and social mobilization.

Social mobilization committees were established involving local political, religious, and clan leaders. Advocatory messages on the importance of CHD interventions, as well as dates of implementations, were issued for the general public through local television, radio, mosques, newspapers, SMS messages to mobile phone owners, and loudspeaker-mounted vehicles. In addition, each CHD team had 1 social mobilizer with a loudspeaker, to encourage women and caretakers to bring their children from their homes to the CHD site.

Service Delivery
All under-5 children were initially screened for age for respective CHD interventions. They were then screened for malnutrition by mid-upper arm circumference and were provided with oral poliovirus vaccine (OPV), vitamin A, albendazole, measles vaccine, and DPT, in that order. Tetanus toxoid (TT) vaccine was administered to WCBA before their accompanying child was vaccinated. Mothers were also given 3 sachets of ORS and 5 water purification tablets (Aquatabs) before leaving the CHD post, for later use in case of a diarrheal episode and mostly to promote safe water and prompt diarrhea management practices.

Health workers screened all children, using the routine immunization card for vaccination history, and vaccinated only those who had not previously been vaccinated. Children with a routine vaccination card were given the next required dose; however, for children without any vaccination card or data uncertainty, a conservative approach assuming no prior vaccination [24] was used, and they were given DPT1. During the second round, children 11–23 months of age having at least 1 DPT dose were given a second or third dose of DPT to complete the series. Similarly, all WCBA were given required TT vaccine. However, to achieve the global goals of polio eradication and measles elimination, all children received OPV and measles vaccines irrespective of previous vaccination history. All interventions provided were recorded on tally sheets for administrative use and on CHD/TT cards (which were provided to caretakers and women), with data disaggregated by age categories and vaccine dose administered.

CHD Coverage Assessment
Administrative data from CHD teams, districts, regions, and zones were later collated to provide national figures and coverage assessment for each intervention provided. FSNAU conducts 30-cluster household nutritional surveys [25], twice a year, all over Somalia, and these were used to collect measles, OPV, vitamin A supplementation, and TT vaccine coverage data by asking and checking vaccination cards. The survey results were compared with those of previous surveys in the same geographical area, and with health facility–based routine immunization data collected through a health management information system (HMIS). Any increase in DPT3 coverage not associated with a change in routine immunization coverage, in the same geographical area, was attributed to CHDs.

RESULTS

CHD Outcomes
During the first round of CHDs, from December 2008 to August 2009, >1 million children <5 years (65%) and >800,000 WCBA (43%) were reached by CHD interventions (Tables 2 and 3) in the entire targeted areas. The first round of CHDs could not be implemented in Mogadishu, Lower Shabelle region, or Kismayo district (SCZ) because of insecurity and refusal by the local authorities.

During the second round, which began in August 2009 and continued until April 2010 (for some parts of SCZ), children <5 years and WCBA in Mogadishu were also reached along with other areas of SCZ, exclusive of Lower Shabelle and Kismayo district.

As of this report, the third and fourth rounds could not be completed in all districts of SCZ due to security constraints and refusal by anti–Transitional Federal Government elements in most of the areas now under their control. The Lower Shabelle region in SCZ (targeting approximately 282,000 under-5 children and 325,000 women) remains a serious concern as both CHDs and polio SIAs have been banned since 2008.

Impact of CHDs on Routine Immunization
The first round of CHDs across Somalia reached 84% more infants with measles vaccination (CHD, 163,180; routine Expanded Program on Immunization [EPI], 88,474), and almost 5 times more women with TT vaccination (CHD, 819,922; routine EPI, 167,333), compared with “classic” routine immunization through facility-based care achieved during the whole of 2009.

Analysis of health facility HMIS data and reported CHD coverage showed that the proportion of regions with routine measles coverage >50% increased from 10% (2 regions over 19 had measles coverage >50%) based on classic routine only to >84% (12 regions over 19 had measles coverage >50%) in 2009 through the combined effects of classic routine coverage and...
CHDs (Figure 1). The FSNAU nutritional survey conducted in SCZ during 2009 reported that measles vaccination coverage had increased from 20% to 61% in Galgadud region, from 55% to 75% in Bakool region, and from 43% to 66% in Juba region compared with the 2008 survey findings in the same regions [26].

Comparison was made between the numbers of infants reached through CHDs compared with classic routine immunization with measles vaccine during 2009. The results show that the measles vaccine coverage disparity between the urban and rural populations was reduced from 17% (42% urban and 25% rural) to 10% (50% urban and 60% rural), due to the concerted efforts made to reach remote areas during the CHDs. As 53% of persons living in extreme poverty in Somalia live in rural areas, major gains in reaching the children were seen there through this strategy. As a result of CHD’s complementary strategy, additional children were reached in remote areas with DPT3 vaccine [27], allowing Somalia to achieve 51% DPT3 reported coverage during 2009 and 66% in 2010 for the first time in 20 years (Figure 2). During CHDs, >60% of under-5 children were also dewormed with albendazole and received vitamin A supplementation, in addition to Aquatabs and ORS; other than vitamin A supplementation, these services were available through health facilities only.

**DISCUSSION**

In countries with weak health systems, it is suggested that innovative delivery mechanisms be used to scale up effective child survival interventions in a manner complementary to ongoing efforts to strengthen national health systems. A recent article [28] indicated that levels of excess mortality have been high in Somalia for long periods but have increased recently since 2006, and recommended broad-based, high-coverage basic public health interventions. After 2 rounds of CHDs, coverage of basic childhood services such as vitamin A supplementation, deworming, and immunization has been increased to values, which can have an impact on child survival and can help to avert under-5 mortality in Somalia.

The CHD strategy has provided new directions for health programming in Somalia. It is crucial to recognize that public health facilities are accessible to an estimated 30% of the population in Somalia, the majority of which is in urban areas [2, 4]. Most of those facilities operate far below minimum standards and suffer from irregular supply, insufficient staffing, and inadequate supervision and management. Therefore, the range of services provided is limited and leads to low trust among the population, which reduces demand for and utilization of services. Due to a currently weak primary healthcare system, the first objective for transformation of the primary healthcare

### Table 2. Number and Proportion of Target Population Reached by Rounds of Child Health Days in Somalia (December 2008 to December 2010), by Intervention

<table>
<thead>
<tr>
<th>CHD Intervention and Age Group</th>
<th>Round 1, No. (%)</th>
<th>Round 2, No. (%)</th>
<th>Round 3, No. (%)</th>
<th>Round 4, No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPV (children 0–59 mo)</td>
<td>1 072 179 (65%)</td>
<td>1 503 306 (89%)</td>
<td>1 249 253 (72%)</td>
<td>837 075 (48%)</td>
</tr>
<tr>
<td>Measles vaccine (children 9–59 mo)</td>
<td>909 687 (65%)</td>
<td>1 241 590 (86%)</td>
<td>1 041 727 (70%)</td>
<td>707 120 (48%)</td>
</tr>
<tr>
<td>DPT vaccine (children 6 wk–11 mo)</td>
<td>247 407 (75%)</td>
<td>338 947 (100%)</td>
<td>234 992 (68%)</td>
<td>159 191 (46%)</td>
</tr>
<tr>
<td>Vitamin A (children 6–59 mo)</td>
<td>937 184 (64%)</td>
<td>1 282 128 (84%)</td>
<td>1 001 429 (60%)</td>
<td>665 268 (33%)</td>
</tr>
<tr>
<td>TT vaccine (WCBA 15–49 y)</td>
<td>819 922 (63%)</td>
<td>1 302 384 (87%)</td>
<td>922 603 (66%)</td>
<td>609 874 (44%)</td>
</tr>
<tr>
<td>Deworming (children 12–59 mo)</td>
<td>839 512 (64%)</td>
<td>1 005 219 (74%)</td>
<td>922 603 (66%)</td>
<td>609 874 (44%)</td>
</tr>
<tr>
<td>ORS (children 0–59 mo)</td>
<td>1 073 727 (65%)</td>
<td>1 610 674 (95%)</td>
<td>1 182 971 (68%)</td>
<td>828 337 (48%)</td>
</tr>
<tr>
<td>Water purification tablets (children 0–59 mo)</td>
<td>1 082 063 (66%)</td>
<td>1 469 041 (87%)</td>
<td>1 246 758 (72%)</td>
<td>834 535 (48%)</td>
</tr>
</tbody>
</table>

Percentage coverage calculations are based on targeted populations.

**Abbreviations:** CHD, Child Health Day; DPT, diphtheria-pertussis-tetanus; ORS, oral rehydration salt; OPV, oral poliovirus vaccine; TT, tetanus toxoid; WCBA, women of childbearing age.

* Third and fourth rounds could not be completed in much of South-Central zone.

### Table 3. Number of Children Reached During Somali Child Health Day Coverage for Third Dose of Diphtheria-Pertussis-Tetanus Vaccine (DPT3) and Measles Vaccine, by Zone

<table>
<thead>
<tr>
<th>Round 1</th>
<th>Round 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DPT3</strong> (6 wk–11 mo)</td>
<td><strong>Measles</strong> (9–59 mo)</td>
</tr>
<tr>
<td><strong>Northeast zone</strong> (Puntland)</td>
<td>4457</td>
</tr>
<tr>
<td><strong>Northwest zone</strong> (Somaliland)</td>
<td>15 635</td>
</tr>
<tr>
<td><strong>South-Central zone</strong></td>
<td>16 368</td>
</tr>
<tr>
<td><strong>Somalia</strong></td>
<td><strong>36 460</strong></td>
</tr>
</tbody>
</table>
system should be to improve the quality of services rather than establishing new facilities. In a public healthcare system without adequate staffing, supply management, information systems, or functioning referral, child health programs cannot be sustained. This means that even if health system reform efforts are successful—which is uncertain given the current security and financing environment—coverage of comprehensive, facility-based primary health services may not expand but rather decrease, as it is unlikely that the public health system can be radically transformed in the next 5–10 years. However, CHDs have been linked and integrated to health systems with efforts to strengthen their capacity.

There is considerable evidence that geographical inequalities in health may exist beyond social class and income inequalities [29]. In Somalia, key access barriers for families to receive health services are cost of transport and consultation or treatment fees [30, 31], physical inaccessibility to health facilities, and drug stockouts. To overcome these barriers, CHDs brought bundles of free basic services from health facilities to communities that might otherwise not have access to either. Hence, hard to reach and rural children were given multiple health services; these children had previously been receiving only 1 service, mainly immunization, during outreach sessions, as current health services are mainly available to urban populations.

The magnitude and diversity of volunteers, selected from every clan, had a tremendous effect on the acceptance of vaccination services, as no significant refusal to receive services was reported from any location. CHD acceptance as evidenced by mothers’ turnout was remarkable, especially in rural areas, where communities lack access to basic health services.

In Somalia attempts have been made to work synergistically with CHDs and immunization services. The development and implementation of district microplans for CHDs (following the Reaching Every District approach) are used to strengthen

Figure 1. Percentage of measles vaccine coverage among infants by various strategies in Somalia during 2009, at regional level.
Microplanning for routine immunization. The influx of resources for CHDs provides an opportunity to assist the routine program in attaining cold chain (e.g., refrigerated storage and the capacity to freeze ice packs in every health facility). Personnel involved in planning and implementing CHDs at the national, regional, and district levels are also responsible for routine services and are trained in logistics, cold chain, data management, and all aspects of CHDs, which helped them to use these skills to strengthen routine programs. With the development of safe injection/immunization waste disposal procedures and trainings during CHDs, the application of safe injection and Adverse Events following Immunization surveillance skills to routine immunizations is highlighted.

Although CHD strategy has been successful, there are some challenges. Control over access to some areas is decentralized in Somalia; permission to conduct mass campaigns must be granted by the group in local control. Factors affecting local authorities’ decision to allow CHD teams to access their areas are not well defined. Because of these challenges, CHDs have not been conducted since 2008 in some highly populated localities of South and Central Somalia. Disease surveillance systems in Somalia are under development; hence, measuring the impact of CHDs in terms of reduction of disease burden is challenging. The lack of postcampaign evaluation data was a limitation in Somalia. To overcome this limitation, source of immunization and use of ORS during CHDs have been included in ongoing Multiple Indicator Cluster Surveys to access successes and coverage of CHDs. In addition, the private sector is planned to be involved whenever possible, especially in monitoring and ensuring quality and equity [32].

Finally, there are concerns raised as to the cost of CHDs and the disruptive impact this may have on broader health system reform and reconstruction. On one hand, CHDs are expensive and absorb an enormous amount of technical and managerial input, including staff time. On the other hand, CHDs can only deliver a small range of promotional and preventive services and do not provide access to critical curative services required by any population.

An economic evaluation of the 2 CHD rounds conducted in Somalia [33] estimated that at least 10,000 children’s lives were saved by the interventions delivered during these rounds; at $34 per life-year saved, the CHD rounds meet the criteria for a very cost-effective intervention. The study concluded that despite the high operational costs, CHDs is a very cost-effective service delivery strategy to address the leading causes of child mortality in a conflict setting like Somalia.

In Somalia, where the public health services cannot supply sufficient services to ensure coverage, the CHDs approach offered

(a) coverage and geographical equity of health service provision as all eligible children from all districts of Somalia were targeted with CHD intervention;
(b) impact by rapidly increasing coverage of high-impact interventions;
(c) building of local institutional capacity by working continuously with central, regional, and district level authorities on the planning and implementation of CHDs;
(d) accountability to the population through community involvement in planning and mobilization as well as more direct interface with the end users of services; and
(e) collaboration and leveraging on existing strengths, such as utilization of OPV program, which has an extensive network of vaccinators in all districts of Somalia.

CONCLUSIONS

The successful completion of CHDs has proved that the strategy is effective, practical, and feasible in Somalia to achieve...
significant gains in child survival. CHDs now form an integral component of the government’s agendas.

Given the current capacity of the public health system in Somalia and projections about the future scope and sustainability of such system, CHDs will remain—at least for the short to medium term—a practical necessity to ensure some modicum of coverage and equity of cost-effective, lifesaving health services, thereby contributing to some level of social stability and capacity development for Somalia. However, a multiyear financial commitment is needed to implement CHDs in Somalia for the next 3–5 years.

**Supplementary Data**

Supplementary materials are available at The Journal of Infectious Diseases online (http://www.oxfordjournals.org/our_journals/jid/). Supplementary materials consist of data provided by the author that are published to benefit the reader. The posted materials are not copyedited. The contents of all supplementary data are the sole responsibility of the authors. Questions or messages regarding errors should be addressed to the authors.

**Notes**

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**Potential conflicts of interest.** All authors: No reported conflicts. All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

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