Immunization Activities in Post-Conflict Settings: Field Notes from Southern Sudan

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Introduction

In July 2011, The Republic of South Sudan will become the newest country in Africa. In January 2011, a referendum vote for Southern Sudanese independence passed, with 98.8% of the electorate preferring secession from the Islamist North Sudan (SSRC, 2011). The referendum vote was the final component of the Comprehensive Peace Agreement, which was signed in 2005 to end the Sudanese Civil War, the longest civil war in Africa. This civil war (1954-1983, and 1983-2002) claimed the lives of two million people and displaced four million Sudanese (Cometto, Fritsche, & Sondorp, 2010). The clashes between the northern-based Islamist government and the southern-based rebel group, the Sudan People's Liberation Army, were prompted by various reasons, including conflicts over religion, resources, governance, and self-determination (ICG, 2002). When the Comprehensive Peace Agreement was signed in 2005, it brought an end to the conflict. Unfortunately, Southern Sudan was left with no health infrastructure and an inadequate healthcare system.

In 2004, only 25% of the Southern Sudanese population had access to healthcare. The health situation in this country remains grave: the maternal mortality rate is 2,030 per 100,000 births, skilled healthcare personnel attend only 5% of pregnancy deliveries, and there is only one doctor per 100,000 people (Cometto et al., 2010). Other socioeconomic indicators are grim; only 16% of females can read and write and schools have an average of 129 students per classroom (SSCCSE, 2010). About 80% of the population does not have access to any toilet facility (SSCCSE, 2010). The recovery of the health sector is impeded by lack of security, lack of electricity, secular conflicts, poor basic infrastructures, and weak leadership. The combination of these factors makes reconstruction more difficult than previously envisioned.

Health sector recovery in Southern Sudan has been coordinated by World Health Organization and The World Bank. These organizations have been involved with technical assistance to the Government of Southern Sudan, providing resource mobilization and policy formulation (Cometto et al., 2010). In this environment, the main implementers of healthcare activities are Civil Society Organizations (CSO), which include Non-Governmental Organizations (NGOs), Faith Based Organizations (FBOs), and Community Based Organizations (CBOs). Most NGOs run programs in two or three counties, each program having a budget of $1-2 million per year (Cometto et al., 2010). The NGOs work under Southern Sudan governmental leadership to accomplish their goals while building the Ministry of Health's capacity in the healthcare sector.

There are at least 76 CSOs involved with healthcare delivery in Southern Sudan (Cometto et al., 2010); they face a myriad of challenges. Inter-ethnic conflicts and rogue government soldiers continue to foster an insecure environment, which contributes to the slow pace of recovery. Poor infrastructures and lack of electricity escalate the operational costs of providing health care, while an inadequate supply of human resources for health makes it impossible to expand any health care activities.

The Case for Strong Immunization Programs

The advent of childhood vaccinations revolutionized the field of public health and continues to be one of the most cost-effective public health interventions. Vaccinations led to the eradication of smallpox in 1979, and scientists are currently on the cusp of using vaccinations to eradicate poliomyelitis (Modlin, 2010). Recent estimates provide an illustration of the effective nature of vaccines: immunizations averted up to 61% of measles deaths, 69% of tetanus deaths, 78% of pertussis deaths, 94% of diphtheria deaths, and 98% of polio deaths that would have occurred in the absence of vaccinations (Jamison, Breman, & Measham, 2006). These estimates are derived from mathematical models that focus on susceptible proportions of the population, infectivity rates of disease, and case fatality rates. In 2003, it was estimated that immunizations prevented two million childhood deaths from measles, neonatal tetanus, and pertussis (Tangermann, Nohynek, Eggers, 2007). However, there is a wide disparity in access to vaccines between industrialized and developing countries, as evidenced by the non-uniform global decline of mortality rates in children under five. In Kenya, the increase in child mortality was 2.5% per year among those residing in rural areas and among those who lack a formal education (Houweling, Kunst, Moser, & Mackenbach, 2006). The situation is worse in post-conflict settings such as Southern Sudan, where immunization services are nearly nonexistent.

Southern Sudan has one of the highest child mortality rates in the world, at 250 deaths per 1,000 live births (Cometto et al., 2010). Vaccine-preventable diseases like measles and neonatal tetanus account for the majority of childhood deaths and for the high childhood disease burden in Africa (Clements, Gasaria, & Nshimirimana, 2008). However, Southern Sudan only has 25% coverage of measles vaccines and a dismal 13% total immunization coverage. In August of 2010, Kajo Keji County in the Eastern Equatorial State of South Sudan had immunization coverage of 11% (South Sudan Ministry of Health, 2010). In these post-conflicts settings, where health systems have been destroyed by decades of war, it is critical to have strong immunization programs because these health systems cannot manage large outbreaks of measles or polio. In Southern Sudan, an unvaccinated child infected by a disease that a vaccine may have otherwise prevented will most likely die due to lack of healthcare services. With the current condi-

tions, the best method to guarantee the survival of post-conflict children is to invest in stronger immunization programs.

I spent six months in Southern Sudan's Kajo Keji and Magwi Counties as a volunteer Health Programs Quality Intern for the American Refugee Commission International (ARC). I worked on Primary Healthcare and HIV/AIDS programs. ARC decided to support a three month acceleration plan that would boost immunization coverage for Kajo Keji County. I assumed the leadership role for this exercise. In collaboration with the County Health Department (CHD), an acceleration plan was sketched to reach every village throughout the entire Kajo Keji County at least once every month.

The Kajo Keji County Health Department lacked the capacity, administratively and financially, to set up a consistent immunization program. The Southern Sudan government had been incapable of providing monetary support for the CHD, leading to a delay in the payment of health worker salaries, which resulted in a health workers strike. To that end, basic healthcare delivery came to a complete halt and NGOs had to intervene. With the monetary resources from ARC, the acceleration immunization campaign was designed with the objective of increasing immunization coverage in Kajo Keji County. The campaign was designed to take a community ownership approach, such that the vaccinators and supervisors were recruited from their own villages under the leadership of the County Health Department.

Goals and Objectives

The objective for this exercise was to conduct an acceleration immunization campaign in 2010 in Kajo Keji County during the months of August, September, and November that would fit within the budgetary limit of $6,000 USD. The goal was to double the county's immunization coverage of 13%. The targeted population was children who were under one year of age. The antigens administered were Oral Polio Vaccine (OPV), Measles, Bacille Calmette-Guérin (BCG), and Diphtheria-Pertussis-Tetanus (DPT). Tetanus Toxoid was given to women of childbearing age (WCBA).

The Campaign

Coordination with like-minded organizations was the first step. We teamed up with a local community based organization, the Sudan Health Association (SUHA) and a local World Health Organization Expanded Program for Immunization (EPI) supervisor. The coordination meetings were set up under the leadership of CHD. Pooling of human, technical, and monetary resources from different players increased the likelihood that the ARC's campaign would be successful. Despite the fact that the ARC funded most of the program, it was necessary to have CHD take the leadership role in order to build CHD capacity and promote government ownership of these activities.

Due to the shortage of human resources for health services, recruitment of competent vaccinators posed a challenge. Many health workers were already working in health facilities, and we did not want to create an internal brain drain by luring these workers towards an independent vertical program. As a result, CHD recruited laid-off health workers to our program. They had been laid-off because the Southern Sudan government could not afford to pay their salaries, despite the unprecedented shortage of human resources for health. Most of these workers had little background in immunization and few had completed nine months of training as Community Health Workers. With this crop of vaccinators, we were afraid that the quality of our immunization program could be compromised. It was important to set up a one day workshop on fundamentals of immunization to educate the selected vaccinators. The workshop covered the tallying process, administration of antigens, community mobilization, contraindications, and surveillance of adverse reactions. This workshop was imperative because it transferred knowledge and skills about immunization services and processes to the vaccinators. The vaccinators then had to demonstrate back to the trainers how to safely administer injections and how to fill immunization record data sheets.

In order to maintain the high quality of the program, we developed two layers of supervision. We recruited on-field supervisors who were responsible for overseeing the vaccinators throughout the county. We also hired central supervisors from CHD, ARC, and SUHA. Five central supervisors, equipped with motorcycles and motor-vehicles, conducted support supervision, which entailed supervising the field teams and complementing them with resources and encouragements. Our support supervisors reinforced the field teams with vaccines, icepacks, syringes, and other vital supplies. Support supervision was the most important component of this program. It enabled us to improve the vaccinators' production, while also making sure that vaccines were administered safely and that the data was recorded accurately.

Social mobilization and community awareness of this exercise were two other components necessary for the success of this campaign. There is evidence suggestive of 12% to 20% increases in the absolute level of immunization coverage and 33% to 100% increases in relative coverage compared to baselines when communication is included as a key component of immunization strengthening (Waisbord, Shimp, Ogden, Morry, Ogden, 2010). Radio broadcasts are widely listened to in Kajo Keji County and were identified as the most effective method of propagating immunization messages to the communities. We constructed radio spots in English and Bari languages. The spots had concise messages on the significance of immunization, as well as dates and locations where free vaccines would be administered to children and women of childbearing age. In order to augment the communication component of the program, each field supervisor was partnered with one community mobilizer. The community mobilizer traveled to churches, markets, and individual houses to inform the community about the immunization campaign. In some areas these mobilizers used megaphones. The purpose of the mobilizers was to reinforce the message disseminated through the radio spots. The supervisors had the final say on where to send the mobilizers, depending on the ground situation. In some cases vaccines would arrive late at the specific locations, and community mobilizers played a critical role in updating the communities.

The coverage results of this campaign reflect only the targeted age group. Total immunization coverage before the campaign (January to July), was 13.8% of the 7,848 children under one year of age in Kajo Keji County. After the three month acceleration campaign, vaccine coverage increased to 35.1%. Our campaign administered 5,340 doses of Oral Polio Vaccine, 2,087 doses of measles, 1,466 doses of BCG, and 4,227 total doses of all DTPs (South Sudan Ministry of Health, 2010).

Global Health Implications

Global Health immunization efforts have focused on increasing access to vaccines in low-income countries. Availability of vaccines is important, but safe administration of potent antigens to remote populations poses a completely different set of challenges. Southern Sudan has no electricity, which makes maintenance of cold chain difficult. Cold chain is temperature-controlled supply chain; vaccines must be maintained at certain temperatures to preserve their efficacy. In order to maintain the cold chain, the immunization program relies on costly generators, frozen icepacks, cold boxes and consistent transportation to remote health facilities, all significantly raising operational costs. These are the main reasons why lack of routine immunization activities at the Primary Healthcare Center (PHCC) are in line with low immunization coverage rates in South Sudan. The national cold chain storage is at Juba, the capital of South Sudan, but vaccines do not trickle down to more rural and inaccessible areas of the country.

It would take a long time for the Southern Sudan government to provide permanent electricity to Kajo Keji County. Electricity is a requirement for cold chain maintenance. In the meantime, routine immunization strengthening can be achieved by procuring solar freezers and kerosene fridges at every Primary Healthcare Unit (PHCU). In this situation, only monthly transportation of vaccines and kerosene would be required, since the facilities would have the capacity to maintain the efficacy of vaccines for the entire month. In return, there would be fewer disruption of services and the population would have consistent access to immunizations. This would increase the immunization coverage in a more sustainable fashion and strengthen management of immunization information systems. Despite the presence of NGOs in Kajo Keji, including (at one time) the Global Alliance for Vaccines and Immunizations (GAVI) and UNICEF, there are no solar freezers at any PHCC, and only four PHCCs have working kerosene fridges. The GAVI alliance has already spent $55,656,903 in Sudan, according to their latest reports. However, they have made no investments in solar freezers or refrigerators in Kajo Keji County health facilities (GAVI Alliance, 2008). A WHO-approved solar freezer-refrigerator unit costs $1,554. Installation of these freezers and refrigerators in each health facility would significantly improve the routine immunization activities, because health facilities would be able to store their vaccines for longer periods of time, given the presence of solar rays. The lack of permanent cold chain solutions in Kajo Keji County demonstrates the deficiency of long-term strategic thinking in many Global Health programs that have previously worked in Kajo Keji County.

The other obstacle in improving overall immunization outcomes in post-conflict settings is the focus on polio eradication campaigns. A global commitment to eradicate polio is a noble one. However, in post-conflict settings, focusing energy and resources on only polio, while there are other vaccines that are just as important and just as easy to administer at the same time as polio vaccines, does not make sense. On November 1, 2010 the WHO initiated a "National Immunization Day," with a strong community mobilization component and a network of vaccinators that reached every corner of the Kajo Keji County—but administered only Polio drops (WHO, 2010). It is dangerous to ignore a measles coverage of only 9%, even if WHO's goal is to eradicate polio. In a country that has limited health infrastructures, it would have made sense to take advantage of the opportunity and administer additional vaccines as well. If you consider the lives that could have been saved by integrating services, global health activities focused on immunizations in post-conflict settings should be broad in scope and provide children with *all* the vaccines they need. When higher percentages of immunization coverage are established, then we can venture towards more vertical, targeted approaches, like a polio eradication campaign.

Immunization is one of the most potent and cost-effective public health interventions of the modern era. In post-conflict settings, strengthening health systems, such as cold chain solutions, and integrating immunization services will lay the foundation for sustainable immunization programs.

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