The True Cost of COVID-19 Vaccination Campaigns in South Sudan

Background

By November 2023, South Sudan had received 7,076,570 doses and administered 5,101,991 doses of COVID-19 vaccine through various vaccination strategies to curb the detrimental effects of COVID-19. The country has fully vaccinated 5,033,836 individuals across 80 counties of 10 states and 3 administrative areas[1].

$6.02 is the distribution cost per dose

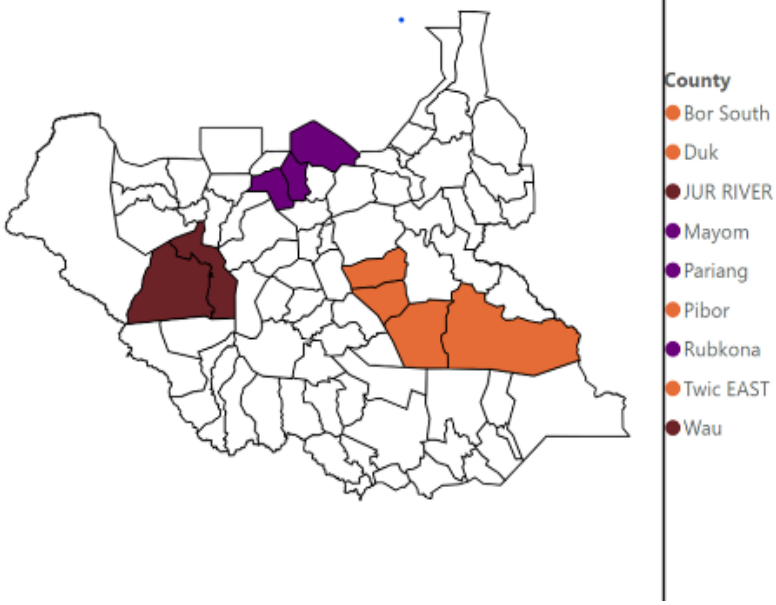
3x times the global average

73% of the target population was fully vaccinated

CARE got funding from the United Nations Children's Fund (UNICEF) through Crown Agents (prime recipient of UNICEF). CARE International South Sudan conducted both static and intensified National COVID-19 Vaccination Campaign (NCVC)/Integrated COVID-19 Vaccination and Preventive Therapy (ICVOPT)[2] in 9 counties from 3 states and 2 administrative areas out of 80 counties in South Sudan. CARE implemented the NCVC in Jonglei State (Twic East, Bor South & Duk counties), Western Bahr El Ghazal State (Jur River and Wau counties), Unity State (Rubkona and Mayom counties), Greater Pibor Administrative Area (Pibor County and Boma sub-county), and Ruweng Administrative Area (Pariang county).

[1] Ministry of Health South Sudan: Power BI database. 2023. Microsoft Power BI
[2] It is tasked with implementation and coordination of COVID-19 vaccination campaign in South Sudan

Figure 1: South Sudan Counties where COVID-19 NCVC and ICVOPT took place.



The campaign was conducted through three rounds of vaccination:

- **Round One and Two**: Involved 8 out of the 9 counties of 3 states and 2 administrative areas.
- **Round Three**: Involved 5 out of the 9 counties in 2 states with one additional county with low coverage rate were added due to CARE's performance and experience in delivering health services in hard-to-reach areas.

CARE successfully implemented a range of approved strategies from the South Sudan Ministry of Health and World Health Organization (WHO)to provide vaccines in challenging-to-access regions of Jonglei, Unity, and Western Bahr El Ghazal States, as well as Ruweng and Pibor Administrative Areas. Furthermore, in conjunction with CARE's outreach strategies designed to access last mile populations, such as vaccine delivery via boats, and community engagement initiatives involving local leaders such as priests.

By employing regular, intensified, and national campaign vaccination approaches in their implementation sites, **CARE achieved full vaccination for 637,338 individuals (73%) out of the targeted 878,848 population.** Notably, the COVID-19 NCVC/ICVOPT strategy facilitated the full vaccination of 281,971 (44%) out of the 637,338 individuals in CARE-supported counties during the COVID-19 NCVC Rounds One, Two, and Three.

Table 1: Total number of females and males that accessed COVID-19 vaccination through COVID-19 NCVC campaigns.

	Females*	Males**	Total	% Female	% Male
Round 1	25,680	30,051	55,731	46%	54%
Round 2	48,733	54,179	102,912	47%	53%
Round 3	65,068	58,260	123,328	53%	47%

*Out of the three rounds, female represent 49% of the vaccinated population

**Out of the three rounds, male represent 51% of the vaccinated population

Table 2: Total number of females and males that were health care workers and internally displaces populations (IDPs) through the COVID-19 NCVC campaigns.

	Females		Males		Total	
	Round 2	Round 3	Round 2	Round 3	Round 2	Round 3
Health care worker*	963	2,264	1,643	2,108	2,606	4,372
IDPs**	8,095	3,631	8,702	11,091	16,797	14,722

*Women encompassed 46% of the total health care workers vaccinated against COVID-19 (54% were men)

**Women encompassed 37% of the total IDPs vaccinated against COVID-19 (63% were men)

Methodology

The report is based on a combination of primary and secondary data obtained during and after vaccination campaigns. **Primary data** was collected through interviews and discussions with key stakeholders involved in the vaccine delivery process, including officials from the State Ministry of Health, County Health Departments (CHDs), healthcare workers, and local technical staff from NGOs. **Secondary data** was obtained from official reports, budget versus expenditures documents, and reliable sources such as WHO and UNICEF who are supporting the vaccination in South Sudan.

Figure 2: County health Department during COVAX campaign in Round one at Panyagor Hospital.

The cost

$6.02

cost to fully vaccinate each person against COVID-19 in South Sudan

South Sudan relies on global initiatives and agencies such as WHO, GAVI, and UNICEF, to acquire COVID-19 vaccines. While the vaccines themselves may be acquired at lower costs or through donations, the administration and last mile distribution cost increases based on the locations, means of transportation, seasons and community-based variables which are often associated with the cost of delivering the COVID-19 vaccines. Therefore, the pattern of cost varies from one location to another based on the state and county predictors.

To analyze how much it will cost to fully vaccinate a person in each county, the calculation of the cost per dose was based on the budget expenditure of each county and each round of the vaccination. This calculation involved dividing the total cost of conducting the campaign by the number of doses administered during the campaign. South Sudan relied primarily on Johnson and Johnson vaccines, and a single does was considered full vaccination. The average cost per dose given over the course of three rounds stood at $6.02. **See graphic 1.**

Representation of costs within the vaccination campaign

2% - Administrative and vaccination sites

3% - Demand generation

32.7% - Personnel

48% - Last-mile distribution

14.3% - Miscellaneous

Across the three rounds, the cost per dose varied between $7.50, $4.82, and $5.74 respectively. Overall, this cost is **3 times higher than the global cost per dose of a single dose-vaccination** and **1.6 times higher than the global two-dose vaccination cost per dose of COVID-19.** The first round of vaccinations was the most expensive, at least in part because, the cost to administer one dose of vaccine reduces with the health workers' level of experience and extreme weather events.

Graphic 1: Analysis of cost per dose per county during the three Round of National COVID-19 campaign (NCVC) in 9 Counties of CARE

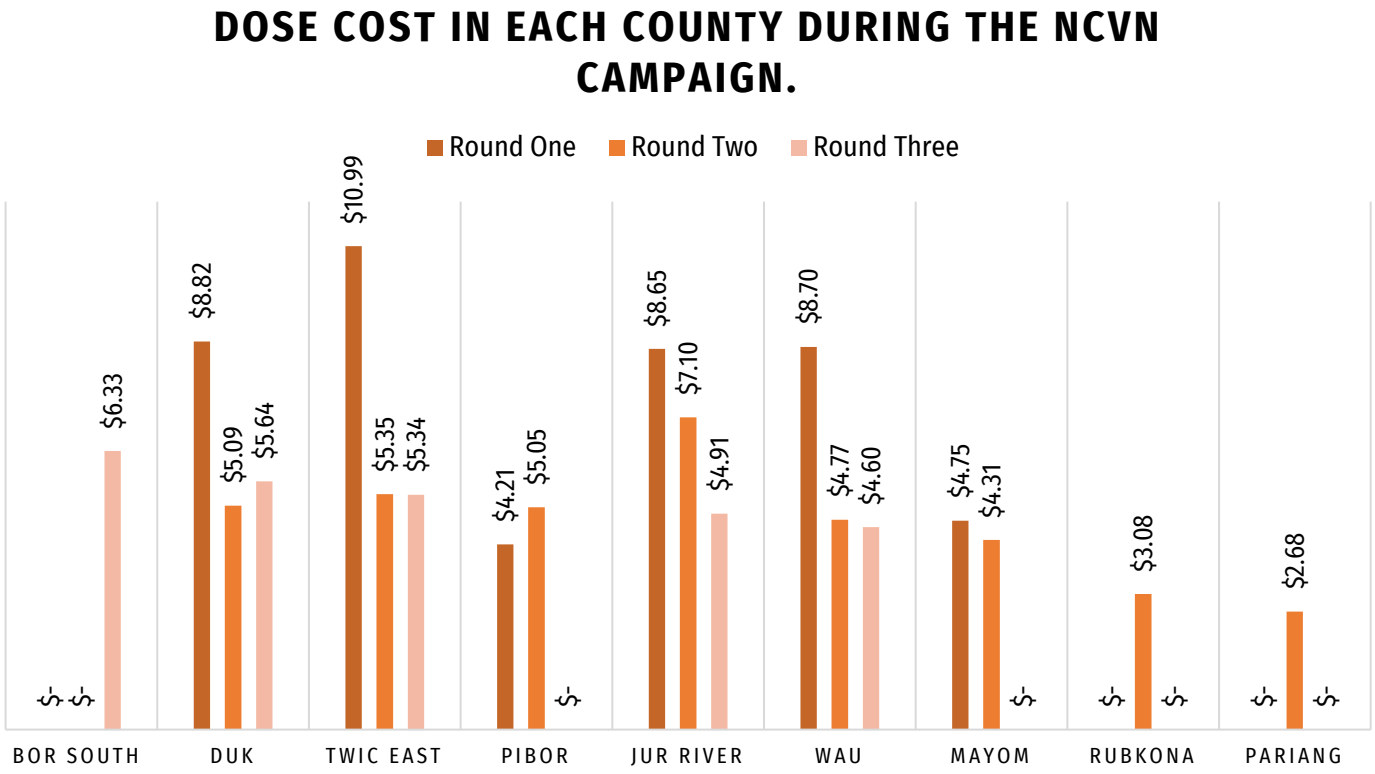


Figure 3: Delivering vaccination services via boats.

Vaccines in South Sudan were so costly due to the challenges posed by poor health system in South Sudan, leading to high cost of logistics and personnel. The need for substantial investments in widespread—and occasionally atypical—transportation methods for vaccination services significantly drove up the costs. For example, $800 per day for a speedboat, $100 per trip for a canoe, $60 per day for a motorbike, and $400 per day for a tractor or vehicle. These costs varied significantly across locations. The major factors associated with the high costs include climate-related impacts such as floods, conflict, scarcity of vendors in remote areas, economic instability, and the overarching frailty of the health system. For example, during the NCVC campaign, some of the locations experienced flooding and conflict which displaced the population to safe places. In Round One, intercommunal conflict displaced the population to IDP camps in the Greater Pibor Administrative areas. People were more centrally located in those camps, leading to lower vaccine distribution costs compared to Round Two, where majority of the population had returned to their homes. These multifaceted challenges collectively contribute to the financial burden associated with vaccination efforts.

Cold chain and storage

The cold chain preparation contributed to the major cost of the COVID-19 vaccine delivery cost in South Sudan. Due to the poor health system conditions, NGOs support was critical, as they provided incentives and activities to the cold chain workers to run their functions and ensure the cold chain system was working properly.

The cost of the cold chain during the campaign stood at

6.7%

The maintenance of a cold chain is critical for vaccine effectiveness at the county level. During the vaccination campaign, the cold chain required maintenance, cleaning, fuel, and other services for its efficiency and effectiveness. Costs related to the cold chain infrastructure, including cold rooms, refrigerators, freezers, cold boxes, icepacks, cold-chain temporary workers and temperature monitoring devices, which are crucial during the campaign.

Last mile distribution and logistics

Last mile distribution and logistics refer to the final stage of delivering COVID-19 vaccines from the county cold chains and storage facilities to vaccination sites and ultimately reaching eligible individuals. **This cost represents 48% of the cost of delivering the COVID-19 vaccine.**

Optimizing last mile distribution costs: Last mile distribution costs involve the coordination and organization of vaccine transportation to vaccination sites, covering transporters' wages (especially where other means of transportation are not available) and necessary equipment for efficient last-mile distribution across different levels (counties, Payam, Boma, and health facility levels).

Figure 4: Last Mile Distribution in Twic East County, Jonglei State during flood (NCVC Round 1).

Navigating logistical challenges in vaccine delivery: Logistical challenges, including reaching remote areas with inadequate road networks, facing floods, and dealing with insecurity, contribute to the cost of vaccine delivery. Additional expenses arise from utilizing alternative transportation methods (e.g., boats, canoes, or tractors) or employing community health workers and community members (casual workers) to reach marginalized communities.

Figure 5: Last mile distribution in Twic East County, Jonglei State after the flood receded (NCVC Round 3).

Administration and vaccination sites

The sites designated for COVID-19 vaccine delivery are equipped with the necessary infrastructure, supplies (e.g., tables, chairs, mats, et al), and trained healthcare professionals to safely administer the vaccines. They may have separate areas for registration, screening, vaccine storage, and vaccination stations depending on the nature of the area and the population catchment. **This cost represents 2% of the total campaign costs.**

Administrative costs include vaccine registration, data management, and monitoring systems for vaccine recipients. Moreover, setting up vaccination sites and ensuring their functionality require

additional resources, including the deployment of healthcare workers, health worker training, personal protective equipment (PPE), and logistics support.

Community engagement and vaccine awareness

Figure 6: Vaccination of Chief in Mankien, Mayom County.

To ensure that people were willing to get vaccinated, teams had to provide accurate and up-to-date information to individuals regarding the benefits, safety, and potential side effects of the vaccine. At the same time, they had to address vaccine-related misinformation. Staff members address any concerns or questions regarding the vaccine, ensuring individuals have the necessary knowledge to make informed decisions about vaccine uptake. **The cost represents 3% of the campaign cost.**

Fostering public acceptance of COVID vaccines requires active community engagement and heightened awareness. It is crucial to consider costs related to community mobilization, education campaigns, and the dissemination of accurate information. Additionally, allocating resources for street announcements and vehicle hire can significantly contribute to effective communication strategies.

Personnel Cost

Personnel cost during the COVID-19 campaign refers to the expenses associated with enumeration, training, per diem, and compensation of the vaccination teams involved across the COVID-19 vaccine administration**. The cost of personnel represents 32.7% of the campaign cost.**

- **Healthcare Workers:** The primary personnel involved in the COVID-19 campaign are healthcare workers, including clinical officers, nurses, vaccinators, recorders[3], social mobilizers, controllers, clerks, Monitoring and Evaluation specialists, and other health professionals. These individuals are at the frontlines, providing direct vaccination services to COVID-19 vaccine eligible population. Personnel costs include salaries, benefits, and incentives for these healthcare professionals.

[3] Personnel in charge of collecting vaccination data.

- **Support Staff:** Besides the frontline personnel, support staff are also involved in various COVID-19 campaign activities from the State Ministry of Health, and CHDs. These include administrative staff, Expanded Program on Immunization (EPI), logistics personnel, maintenance workers, security, and other essential workers who ensure the smooth functioning of vaccination sites and other response operations. Personnel costs for support staff cover their incentives, and other relevant expenses.

Usually, health workers work overtime, in high-risk environments, and in resource-constrained settings

Conclusion

In navigating the intricate landscape of COVID-19 vaccination campaigns in South Sudan, CARE's team dedication and resilience shine through. With 637,338 individuals (73% of the target population) fully vaccinated across challenging regions, not only deliver crucial vaccination but also showcased adaptability in the face of logistical challenges. Forty-four percent of these were vaccinated via the COVID-19 NCVC/ICVOPT strategy. While at the same time providing gender equality in access, with 49% of the population accessing vaccines being female.

The true cost, both financial and contextual, unveils the complexities inherent in South Sudan's health landscape, where issues of poor infrastructure, climate-related hurdles, and socio-economic instability drive expenses. Yet, this journey, marked by collaboration and innovation, stands as a testament to CARE's commitment and the collective will to protect communities. As we move forward, let this be a beacon of inspiration—a reminder that overcoming challenges in public health is not just a duty but a shared commitment to a healthier, resilient future.