Health Systems Strengthening to Reach Zero-Dose Children in Chad

FUNDAMENTALS FIRST

1. ALTHOUGH CHAD'S CHILD IMMUNIZATION COVERAGE REMAINS LOW, RATES HAVE STEADILY INCREASED SINCE 2019

Global geospatial data from 2019 identified Chad as having one of the highest proportions of zero-dose children under 12 months. Children in the large remote-rural areas of northern Chad, rural non-remote areas, and conflict-affected areas are particularly affected, including those in nomadic communities [1]. Urban zones also have a sizable number of zero-dose children [2]. In 2022, the number of zero-dose children was estimated at 188,500, and an additional estimated 122,935 were undervaccinated [2].

In 2019, coverage for the first dose of diphtheria, tetanus, and pertussis (DTP1) stood at 89.63% in Chad, and the full three-dose series of DTP3 was 50%. Yet, in 2020, DTP1 coverage crept up to 93.93%, then to 97.9% in 2021, and by 2022 was 98.84%, and DTP3 coverage rose to 52% in 2020, 58% in 2021, and 60% in 2022. Similarly, rates for the first dose of measles-containing vaccine (MCV1) saw an upward trend, increasing from 41% (2019) to 47% (2020) to 55% (2021) and 56% (2022) [3].

These steady gains are a positive trend for the country and are all the more notable because they were realized during the COVID-19 pandemic, when many health care achievements globally were eroded due to limitations in access, medical supplies, freedom to circulate, and available personnel. A decrease in the already low routine child immunization coverage in Chad during that period would have been unsurprising; instead, Chad is a success story in the making.

One likely contributor to the increase in Chad's child immunization rates is investment by government and partners, including Gavi, in health systems strengthening. Specifically, health systems strengthening has focused on human resources (e.g., through hires, training, and formative supervision), transportation to facilitate reach, cold chain, and vaccine supply. These efforts have concentrated on underserved, often remote areas where child immunization coverage is lowest. The role of health systems strengthening in improving child immunization is all the more significant because, as a vital part of structural transformation, it holds the potential for broader applicability in health services beyond routine child immunization.

METHODS

We conducted qualitative interviews with stakeholders active in Chad's child immunization programming in June and July 2023. A local consultant in Chad was engaged to conduct, audio record, and summarize the interviews. The key informants had explicit knowledge of the child immunization efforts through their roles in national immunization programming and leadership, logistics, strategic communications, and advocacy. We asked their perspectives on which Gavi-supported interventions may have contributed to improved rates of zero-dose children.

It should be noted that the interviews do not constitute evaluation data upon which causality in the upward trend of child immunization in Chad can be established. In addition, positivity bias may have played a role in shaping the perspectives the key informants expressed, as those interviewed were aware that Gavi had commissioned the interviewing activity. Here we report the perspectives of the key informants, supplemented by grey literature.

CONTEXT

Chad is a large country in north-central Africa with an estimated population of more than 18 million [4]. The population is unevenly distributed across the country, with half residing in the southern 20% and the remainder dispersed throughout the remaining 80% of the country. A high proportion (80%) lives more than 5 km from a health facility [5].

In 2018, Chad's country leadership formally pledged its commitment to address child immunization at the National Forum on Vaccination. Former President Idriss Déby Itno assured national budget for the purchase of vaccines and set the tone for a new direction in acknowledging the efforts and structural changes the country would require. First Lady Hinda Déby Itno was also a strong advocate for immunization and used her public visibility to galvanize community support.

Gavi has been an instrumental partner in Chad's efforts to reach zero-dose children through the organization's support to the Ministry of Public Health and Prevention (Ministère de la Sante Publique et de la Prévention [MSPP]) and MSPP partners. In the area of health systems strengthening to support child immunization, Gavi's focus has been pragmatic in facilitating the day-to-day operations of immunization programming. The 10 provinces targeted for health systems strengthening are Batha, Chari-Baguirmi, Dar Sila, Guéra, Logone Occidental, Logone Oriental, Mayo-Kebbi Est, N'Djamena, Ouaddai, and Wadi Fira.

The interventions and activities support the five operational components of the Reaching Every District (RED) strategy developed by the World Health Organization (WHO), United Nations Children's Fund (UNICEF), and the Gavi Alliance: planning and management of resources, reaching all eligible populations, engaging with communities, conducting supportive supervision, and monitoring and using data for action [6].

CHALLENGES TO EQUITY

Challenges to equity in Chad's routine child immunization range from poor data quality to a geographically dispersed population, insufficient health worker coverage to low demand, as well as cold chain deficiencies and supply issues.

KEY CHALLENGES TO EQUITY

- Geographically dispersed population
- Large distances between communities
- Shortage of trained health workers
- Lack of cold chain equipment
- Supply chain ruptures
- Low demand

Data on zero-dose and undervaccinated children in the country, including nomadic communities as well as other populations, are lacking, collected inconsistently, or inaccurate, and the health information system underperforms. Systematic, community-level documentation of children in receipt of vaccine doses and those without any immunizations has been nonexistent. Data are particularly problematic for populations in hard-to-reach remote areas, among nomadic communities, and for the substantial number of children in underserved urban areas. Data analysis and use for monitoring and decision-making are weak, such that immunization needs and barriers remain unclear.

Equity in child immunization is also affected by geographical location, with the more populated southern provinces enjoying higher coverage than those in the north. One reason for this is that the more remote, northern geographical areas are difficult to access and have been inadequately staffed or serviced by health workers; some areas are particularly isolated during the rainy season. Health workers' ability to cover multiple communities is fairly limited, as communities are often separated by large distances. In addition, immunization activities are frequently implemented by staff who are underqualified and ineffectually supervised. Demand for routine immunization is also low across Chad, and implementation of communication strategies to generate demand has been ineffective.

Supply chain ruptures have posed further challenges. In particular, lack of cold chain equipment at many health centers has affected vaccine allocation decisions and local availability.

CHALLENGES ADDRESSED THROUGH HEALTH SYSTEMS STRENGTHENING

Gavi-supported strengthening of health systems and cold chain has addressed several challenges common throughout the country [7]:

- Unreliable implementation of advanced, mobile, and fixed strategies in immunization programming, with only 38% of health centers implementing a minimum of 80% of planned advance strategy outings in 2019
- Supply chain interruptions, including loss of vaccines by immunization teams, cold chain deficiencies, inadequate consumable supplies, and stock-outs of immunization cards
- Lack of adapted, sustainable strategies to reach populations with low access to services due to geography
- Inadequate human resource capacity in terms of numbers of staff, location of deployment, and supervision

Here we describe how Gavi is addressing these challenges. Demand-generation efforts have also received Gavi support but are not covered here.

2. HEALTH SYSTEMS STRENGTHENING INTERVENTIONS HAVE INCREASED REACH OF ZERO-DOSE CHILDREN IN CHAD

Gavi's health systems strengthening support in Chad has focused on improving the MSPP's operational capacity to increase child immunization coverage through strategies adapted to meet context-specific challenges in the country. These strategies have focused on augmenting human resource capacity, bridging geographical gaps through transportation, and providing cold chain equipment.

AUGMENTING HUMAN RESOURCE CAPACITY

Given the already stretched health care system, additional trained staff and supportive supervision of those staff are critical for the delivery of immunization services, particularly in remote and underserved urban areas.

"What worked in Chad is that the strategy was focused on fundamentals. That is, the country worked to ensure the availability of vaccines requiring good cold chain coverage throughout the country through the CCEOP [Cold Chain Equipment Optimization Platform], attaining coverage of more than 90%."

—Immunization officer

With Gavi's support, 235 new nurses and paramedics were recruited for posting as immunization workers in regional hospitals in nine of the 10 targeted provinces, the exception being N'Djamena Province. Consultants with expertise in project management were recruited to provide technical assistance and strengthen immunization program management ("Reaching All Eligible Populations," RED strategy), and the PEV [Programme élargi de vaccination /Expanded Programme on Immunization (EPI)] Manager app was introduced to help structure facility-based staff supervision.

BRIDGING GEOGRAPHICAL GAPS THROUGH TRANSPORTATION

Providing transportation options for health care workers to travel to remote and other affected areas increases the capacity to reach missed communities. Gavi support enabled the purchase of 203 motorcycles and 32 cars allocated to health districts and health facilities.

PROVIDING COLD CHAIN EQUIPMENT

Enhancing cold chain capability furthers the equitable delivery of immunization services, as functional cold chain equipment is critical to ensuring the integrity of the vaccine itself. By 2022, a total of 1,527 cold chain equipment items were purchased, including freezers, refrigerators, coolers, generators, and solar panels, and allocated to 1,506 health facilities found to have low cold chain coverage.

3. IMPLEMENTATION

HUMAN RESOURCES

Pressure on health workers to deliver immunization services to a dispersed population in often remote locations had burdened Chad's health system even before the COVID-19 pandemic further stretched human resources. More health workers, even if not resident to these communities, were needed to conduct child immunizations.

To address the problem of unstaffed health posts and health centers, Gavi held extensive discussions and negotiations with the MSPP around appropriate staffing allocations for the recruits Gavi would support in low-performing health districts. The new nurses and paramedics were recruited and contracted directly with the MSPP, with technical assistance from Acasus.

Gavi, UNICEF, WHO, Acasus, Speak Up Africa, and HISP Rwanda supported the country through the recruitment of officers to provide technical assistance to the EPI team and ensure strong management of immunization activities at all levels ("Conducting Supportive Supervision," RED strategy). At the operational level, for example, consultants were recruited to provide technical assistance in the field to support health districts in their polio programming.

TRANSPORTATION

The purchase of motorcycles and cars has enabled health care workers to reach highly remote areas through advanced strategies, as well as to implement mobile service delivery in the case of health districts where immunization activities have been shifted toward mobile strategies. This pro-equity intervention built upon geospatial data that identified areas of Chad where the population is unable to access health centers due to distance from their residence ("Reaching All Eligible Populations," RED strategy).

COLD CHAIN

Gavi's Cold Chain Equipment Optimization Platform (CCEOP) is a pro-equity strategy to improve supply chains and increase equity in immunization coverage ("Planning and Management of Resources," RED strategy). In 2018 and 2019, UNICEF and other partners in Chad supported the development of a health map used to prioritize health centers for solar-powered cold chain equipment based on population density and remoteness of location [8].

ENABLERS AND BARRIERS TO SUCCESS

Gavi's central role in facilitating pro-equity immunization programming in Chad was a common theme in the key informant interviews. The organization's contributions were described as critical to reducing zero-dose children.

Key informants cited several enabling factors as contributing to the success of the interventions. One key factor is state ownership of and political leadership in efforts to decrease zero-dose rates, particularly at the provincial level. This engagement with the community in turn engenders mobilization and ownership. As one key informant noted, "Here in Chad, we have the advantage of strong political leadership, which we saw during transmission of the wild poliovirus. Political ownership was the key factor. When provincial administrative authorities take ownership, it increases impact and performance. […] The more accountability there is among high-level administrative authorities at the decentralized level, the more communities are mobilized and own the effort—the head of the canton, religious leaders, traditional leaders, association leaders, women's associations."

Low community awareness, information, and communication about child immunization between campaigns and activities are major barriers to decreasing zero-dose rates. The Directorate of Immunization's communication and advocacy strategy has been instrumental in increasing the human resources dedicated to communications planning and shifting the focus to community engagement, an area with little previous attention. "Earlier there was much more emphasis on [engaging with] the administrative side, but this time around we are putting a lot of emphasis on the traditional authorities, and they have also reaffirmed their commitment." In addition, working "hand in hand with civil society organizations to conduct grassroots education" is essential.

The limits on service accessibility resulting from vulnerabilities such as poverty and nutrition, among others, pose major barriers to reducing zero-dose immunization rates. As a key informant described, "Even if they know quite well the importance of vaccination, it is useless, and they are hungry. […] The priority is to go out and get food for the child rather than go and sit in a health center for a whole day. So, accessibility is a problem. It's a challenge when our services are not really welcoming. We have to keep an eye on them." Increasing access to immunization requires awareness of these critical community needs and a response that integrates immunization and other services.

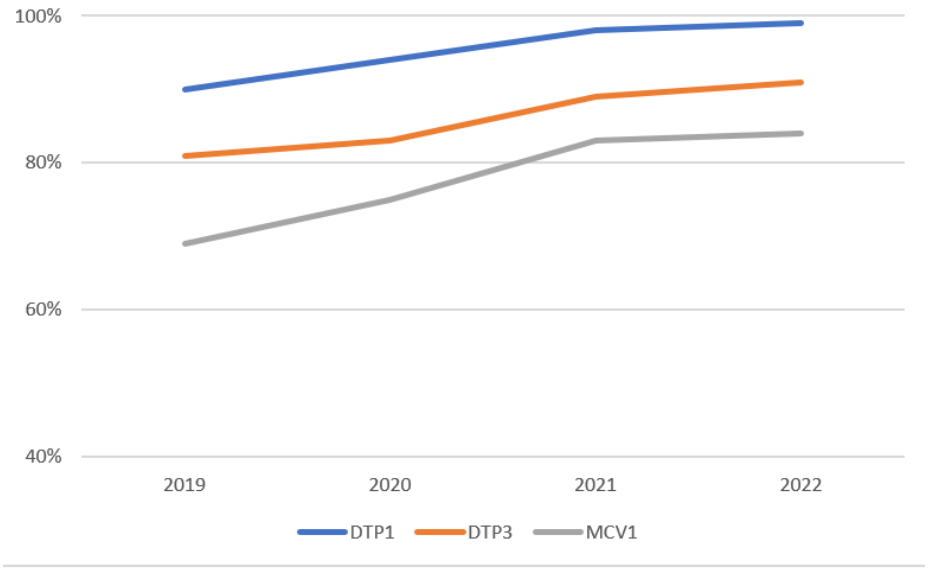
The key informants interviewed also perceived the technical assistance provided through UNICEF, WHO, Acasus, Speak Up Africa, and HISP with Gavi support as an important contributor to the increased capacity across various components.

4. RESULTS

Gavi grants have facilitated the implementation of an identical package of routine immunization interventions throughout Chad. As of 2022, cold chain coverage was estimated at 96%—a nearly 70% increase since 2017.

As shown in Figure 1, coverage of DTP1 at the national level increased steadily from 2019 through 2022. The increases from 2020 to 2021 are particularly telling, because this is when COVID-19 was affecting immunization and other service delivery. Although the gains are not dramatic, it should be noted that data collection, reporting, and quality present ongoing challenges in the country [9].

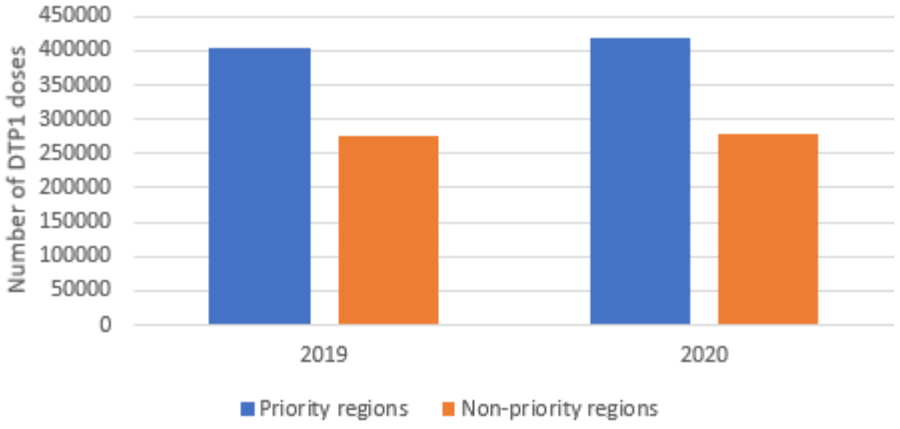
Figure 1. National trends in DTP1 coverage in Chad (2019–2022)



Source: National administrative data

Despite the challenges posed by COVID-19 in 2020, the number of DTP1 doses delivered in both priority and non-priority areas increased from 2019 to 2020, with this increase three times higher in priority regions than in non-priority regions. As shown in Figure 2, the priority regions for Gavi saw a 3.02% increase in DTP1 doses from 2019 to 2020 (12,259 extra doses were delivered in 2020), while non-priority regions saw a 0.80% increase from 2019 to 2020 (2,225 extra doses were delivered in 2020).

Figure 2. Number of DTP1 immunization doses delivered in priority vs. non-priority areas for the Gavi health systems strengthening grant



5. CONCLUSIONS AND NEXT STEPS

Gavi plays a leading role in pro-equity interventions in Chad through support to the Directorate of Immunization. As one respondent noted, Gavi's support to health systems strengthening in Chad focuses on "fundamentals." These fundamentals are the backbone of a successful pro-equity strategy for routine immunization. Without trained health workers to conduct immunizations, transportation to allow health workers to go where need is high and access is low, and cold chain equipment for safe storage of the vaccines, there can be no equity in immunization and no reduction in zero-dose levels. Gavi's infusion of vaccine supply into Chad's immunization program has also been critical.

Other ways Gavi has supported Chad's routine immunization program include technical assistance in communications and demand generation, engagement with civil society organizations, and ongoing technical assistance in proposal writing and through participation in discussions.

As Gavi seeks to continue technical assistance to Chad and build on recent momentum in health systems strengthening, one potential area for consideration concerns the need for systematic documentation of immunization status—a pillar of a data-driven pro-equity approach to routine immunization. WHO and UNICEF have noted that immunization data for Chad is of poor quality, likely as a result of challenges with recording tools, training in data verification and analysis, and the absence of data review meetings [9].

A recordkeeping system for establishing and tracking immunization status at the community level, along with a sustainable plan for ongoing data collection, would drive planning for staffing, vaccine supply, outreach, and communication, among other aspects of routine immunization. This would likely involve engagement with community leaders who enjoy the trust of the community and whose support is needed to record and track immunization at the community level. Involving community leaders could also double as a means to educate the community about routine immunization and create demand. Community ownership and engagement with the health system could also involve liaising regularly with the health districts to review data, assess progress achieved, troubleshoot, and develop actions to be taken across all levels of the health system.

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