MOMENTUM
Routine Immunization Transformation and Equity

COVID-19 Vaccination Program in Review

April 2021–December 2023

NIGER

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USAID FROM THE AMERICAN PEOPLE

MOMENTUM A Global Partnership for Health and Resilience

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MOMENTUM Routine Immunization Transformation and Equity

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Acronyms

CCE	cold chain equipment
CVM	comprehensive vaccine management
DI	Directorate of Immunization
FPP	full-portfolio planning
NLWG	National Logistics Working Group
SOP	standard operating procedure

Results

Strengthening the Health System

Trained **398 supply chain technicians** on COVID-19 vaccine and cold chain management.

Updated **temperature monitoring and maintenance standard operating procedure (SOP)** that is pending approval by the Directorate of Immunization (DI) and the National Logistics Working Group (NLWG).

Conducted **60 supportive supervision visits** in Zinder, Maradi, and Tahoua regions to **reinforce supply chain management** best practices.

Developed and operationalized **vaccine waste management SOPs** in eight project regions.

Conducted a **human-centered design study** that resulted in concrete actionable ideas to **improve cold chain maintenance**.

Provided logistic, supportive supervision, and coordination support for **seven COVID-19 mass vaccination campaigns** in three regions.

Background

Niger is a landlocked country in West Africa with more than 80 percent of its landmass covered by the Sahara Desert. Niger has seven regions that are divided into departments, and one capital district, in which most of the population lives. Adequate and consistent funding for health has continued to be a challenge for Niger, despite initiating a free healthcare policy in 2006.[1] Niger has the region's lowest ratio of health workers at just 0.25 health workers per 1,000 people; a sharp decrease from the WHO recommended ratio of 4.45 health workers per 1,000 people to deliver essential health services and achieve universal health coverage.[2] A lack of health workers not only leads to service delivery issues but larger health systems challenges that can impact policies, supplies, and support efforts.

The first COVID-19 case was reported in Niger on March 19, 2020. Of the 9,515 confirmed cases as of December 4, 2023, 315 had ended in death.[3] To help combat the impact of COVID-19, Niger adopted a National Preparedness and Response Plan to COVID-19 that was validated in January 2021 and revised in March 2022.

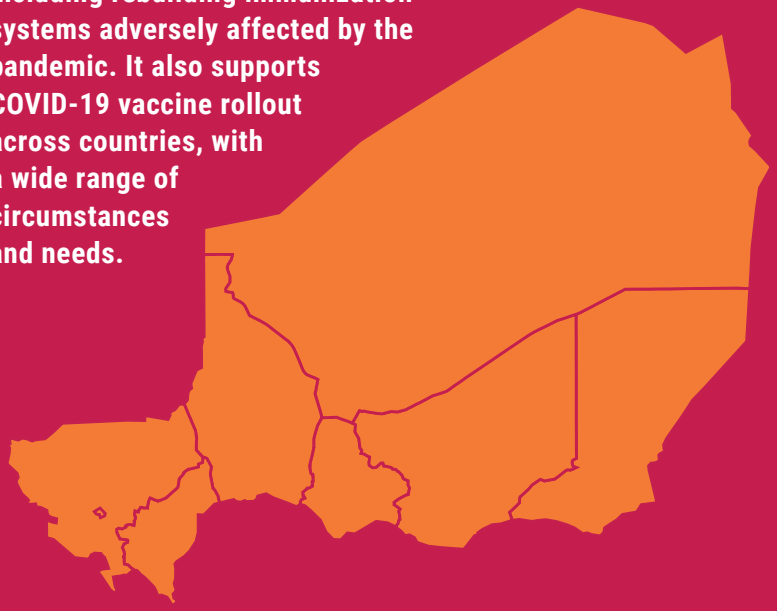
As outlined in the plan, Niger set a goal to vaccinate 58 percent of the target population (people ages 12 and above) by the end of 2023.[4] As COVID-19 vaccines were introduced in March 2021, there were increasing challenges with supply chain management including being able to adequately forecast supply needs, effectively distribute vaccines, and properly handle multiple vaccine presentations. Niger already faced supply chain challenges such as lack of funding flow and limited transport availability, and the introduction of COVID-19 vaccines exacerbated these challenges. As of December 4, 2023, 49 percent of eligible people in Niger had been fully vaccinated.[5] While Niger was close to reaching their 58 percent goal, throughout the second half of 2023, there was an overall slowdown in campaign efforts, and people's interest in the vaccine, due to perceived reduced risk of the disease, waned.

In addition to a slowdown in campaign efforts and people's interest in the vaccine, there were also political insecurities which taxed the immunization system due to cold chain functionality related to energy supply. The Niger Ministry of Health, in collaboration with partners, is actively managing the situation through weekly trackers and data review to ensure the supply chain is at full capacity despite new constraints.

1 WHO Newsroom. (2022, May 18). Reforming health financing and strengthening partner coordination: A key step towards UHC in Niger. https://www.who.int/news-room/feature-stories/detail/reforming-health-financing-strengthening-partner-coordination-niger. Accessed: 12/4/2023.
2 WHO. African Region. (2022, June 22). Chronic staff shortfalls stifle Africa's health systems: WHO study. https://www.afro.who.int/news/chronic-staff-shortfalls-stifle-africas-health-systems-who-study Accessed: 12/4/23
3 WHO Coronavirus Dashboard. Niger. https://covid19.who.int/region/afro/country/ne Accessed: 12/4/23.
4 Plan National de Déploiement et de Vaccination Contre La COVID 19 au Niger. Ministère de la Santé Publique de la Population et des Affaires Sociales. Avril 2022.
5 Africa CDC COVID-19 Vaccine Dashboard. Vaccine Doses Administered by Eligible Population. https://africacdc.org/covid-19-vaccination/ Accessed: 12/4/23.

Project Overview

MOMENTUM Routine Immunization Transformation and Equity (the project) applies best practices and explores innovations to increase equitable immunization coverage in USAID-supported countries. The project is USAID's flagship technical assistance mechanism for immunization working in 18 countries around the world. It works to build countries' capacity to identify and overcome barriers to reaching zero-dose and under-immunized children and older populations with lifesaving vaccines and other integrated health services, including rebuilding immunization systems adversely affected by the pandemic. It also supports COVID-19 vaccine rollout across countries, with a wide range of circumstances and needs.



Recognizing the specific challenges the government of Niger was facing to adapt and manage its vaccine supply chain to provide its population with COVID-19 vaccines, USAID provided American Rescue Plan Act and, Congressional Notifications 108, 18, 31, and 18 Core funding to the project from April 2021 to December 2023. Through this funding, the project, at the national level and in Niamey district and Agadez, Diffa, Dosso, Maradi, Tahoua, Tillaberi, and Zinder Regions:

- Provided targeted technical support to strengthen supply chain management for the COVID-19 vaccination program country-wide.
- Aligned COVID-19 service delivery strategies with tailored supply chain approaches to support sub-national rollout.
- Fostered the application of supply chain best practices, including warehousing and security measures for approved vaccines, and robust temperature monitoring and tracking for the different vaccines in the system.
- Supported development of and updates to national policies and procedures for cold chain maintenance.

Technical Areas of Support

TECHNICAL AREAS

- Planning, policy, and coordination
- Strengthening cold chain maintenance
- Improving safe waste management
- Improving vaccine temperature monitoring
- Data quality, management, and use

April 2021
Began supply chain technical support to the national level and in seven regions.

May 2021
Supported a vaccination campaign against COVID-19 in Niamey.

June 2021
Supported the first nationwide mass vaccination campaign against COVID-19.

August 2021
Procured and installed eight security cameras in the national vaccine warehouse.

January 2022
Procured Parsyl devices which monitor the temperature of cold chain equipment to ensure the quality of vaccines.

May 2022
Supported a WHO-led workshop on data triangulation related to the COVID-19 vaccine.

September 2022
Conducted a waste management workshop to align standard operating procedures across multiple divisions of the government.

November 2022
Finished installation of Parsyl cold chain temperature monitoring devices.

February 2023
Collected data for a human-centered design study on cold chain maintenance.

Reinforced components of the supply chain by purchasing security systems, fire alarms, batteries, and tires.

March 2023
Conducted a cold chain maintenance co-creation workshop resulting in innovative solutions for the maintenance system.

June 2023
Supported the seventh nationwide mass vaccination campaign against COVID-19.

August–December 2023
Continued analysis and reporting of cold chain temperature and maintenance to ensure equipment functionality.

Strengthening Health Systems Management

Planning, policy, and coordination

A strong supply chain management system must be able to forecast and procure vaccines, store them at the appropriate temperature, and assess the performance of the supply chain to make adjustments to ensure sufficient quantities of vaccines are available at the right time and place and in good condition. The project worked with the DI in each of these areas to determine COVID-19 vaccine quantities needed, develop distribution plans, analyze supply chain data to manage expiry dates, and ensure proper linkages to microplanning and service delivery strategies. As efforts evolved, the project supported the DI to integrate the vaccine into regular health care services and strengthen overall planning for the immunization program and supply chain.

As part of these efforts, the project provided strategic guidance on the CCE section of the full-portfolio planning (FPP) application for Gavi, The Vaccine Alliance (Gavi) during the third quarter of 2023, on how to continue to strengthen the vaccine supply chain and immunization service delivery in Niger. The application is expected to move forward with approval from the Gavi board by the beginning of 2024.

Reviewing supply chain performance is a crucial way to continuously ensure smooth functioning of a supply chain system. Gavi and UNICEF designed a global comprehensive vaccine management (CVM) initiative in 2023, which established a process to assess country supply chain performance. As part of its supply chain strengthening efforts in Niger, the project organized a workshop to help the DI supply chain team and UNICEF conduct the CVM assessment, which brought together in-country partners and the DI. The team conducted a gap analysis and data review, where they identified strategies to strengthen the vaccine supply chain, such as moving forward innovative maintenance solutions identified through the project's human-centered design study or re-designing the distribution system to be more efficient at reaching the last mile. Workshop participants reviewed data related to vaccine stock, temperature monitoring, and supply chain performance. The process resulted in six prioritized areas (system optimization and segmentation; data visibility and use; capacity development and professionalization; smart integration and harmonization; fundamental infrastructure; and strategic planning) to better include supply chain management in planning and proposal development for Gavi funding priorities.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One of the key ways the project strengthened supply chain efforts was joining the NLWG to support best practices for supply chain management for the DI logistics team at the national level and in Zinder, Maradi, and Tahoua. The project's extended team supported the NLWG and regional immunization logistics teams to review stock levels to manage re-supply decisions and cold chain capacity, and avoid vaccine expirations during seven nationwide COVID-19 vaccination campaigns. The project conducted 60 supportive supervision visits in these regions and their districts to ensure coordination and reinforce best practices for supply chain management. The project also tracked the number of people vaccinated, vials distributed and doses used, and estimated daily wastage rate during campaigns - making planning and coordinating COVID-19 vaccine campaign and distribution efforts more efficient.

Strengthening cold chain maintenance

Failure to store, transport, or handle vaccines properly can reduce potency, resulting in poor protection against disease. If people believe that vaccines are ineffective, they will lose confidence in vaccination and health care providers. CCE, which is critical to keeping vaccines effective, requires both regular preventive maintenance, such as keeping a refrigerator clean and defrosting it, and corrective maintenance when a technical repair is required. However, CCE maintenance is often overlooked and underfunded. Most immunization programs respond to maintenance challenges by training government cold chain technicians; outsourcing maintenance to private companies; or requiring manufacturers to provide maintenance while the equipment is under warranty. These approaches alone are insufficient and should be implemented as a part of a carefully designed, comprehensive CCE maintenance system designed for reliability and sustainability.

Niger's cold chain maintenance system is no exception. The project designed and conducted a human-centered design study to understand cold chain maintenance challenges. Project researchers conducted interviews with 23 cold chain technicians, supply chain managers, immunization officers, and financial managers in Tahoua and Maradi. After analyzing data and identifying trends and insights, the researchers identified three main themes:

- **Agility of the system and optimizing available resource:** Dependence on external partners for CCE maintenance creates a system that is rigid and unable to respond quickly and efficiently to maintenance needs. Communication among key actors lacks structure and clarity. The absence of clear guidelines on how to use temperature data undermines optimization of available resources.
- **Prioritizing cold chain:** Prioritizing the cold chain requires dissociating it from vaccination programs, particularly as it relates to training. Respondents noted that cold chain maintenance was often an 'add-on' to training focused on the technical aspects of immunization. Combined training does not give sufficient attention to the specific needs of cold chain maintenance and is not tailored to staff who provide preventive and corrective maintenance.
- **Knowledge sharing across the system between stakeholders responsible for maintenance:** There is limited understanding of roles and responsibilities and a misalignment between decision makers and cold chain staff about expectations for knowledge sharing and training.

In March 2023, after data analysis, the project held a two day co-creation workshop with government and other stakeholders to generate potential solutions to some of the common cold chain challenges.


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One of the main solutions that cold chain technicians generated at the co-creation workshop was a digital platform to share technical aspects related to repairs and maintenance. This platform would be a place to learn from peers and ask questions. Technicians also highlighted the need to tailor training to various cold chain staff required competencies. For example, a health worker who needs to clean a refrigerator regularly requires different training than a technician who needs to replace a compressor. At the end of the workshop, ideas were prioritized into four final concepts (Figure 1).

Figure 1. Final workshop concepts

6 WHO. Tonnes of COVID-19 health care waste expose urgent need to improve waste management systems. News Release. February 1, 2022. https://www.who.int/news/item/01-02-2022-tonnes-of-covid-19-health-care-waste-expose-urgent-need-to-improve-waste-management-systems

These ideas were discussed during the country's FPP process with Gavi, UNICEF, WHO, and other partners. The DI is interested in exploring opportunities to prototype and test them. The FPP is expected to be approved by the Gavi Board early 2024, at which point these ideas will be further developed through prototyping and testing.

Improving safe waste management

As countries focused on the immediate task of securing COVID-19 vaccines and personal protective equipment, they devoted less attention and fewer resources to the safe and sustainable management of health care waste.[6] In Niger, waste management guidelines were vague and disjointed, resulting in an ad hoc approach to disposal. In September 2022, the project conducted a workshop in Dosso for people working in waste management to clarify and coordinate roles, responsibilities, and guidelines. The workshop was organized by the DI and included attendees from the Directorates of Public Hygiene and Environmental Health, Waste Management, and Pharmacy. The project drafted SOPs that participants reviewed, discussed, amended, and approved during the workshop. This workshop was the first time the Directorates of Public Hygiene and Pharmacy worked on SOPs together. As a result of the workshop, it was agreed that the Directorate of Public Hygiene would dispose of general waste (e.g., syringes) and the Directorate of Pharmacy would dispose of chemical waste (e.g., vaccines, open vials). The new guidelines provide a clear process for health system users and facilities to manage health care waste, improving how waste is collected, sorted, and stored.

"COVID-19 produces a lot of waste and Niger is really in need of a process to destroy waste. The country had guidelines, but there were too many guidelines, which was confusing. People disposed of waste as they wished. These standard operating procedures will allow people to go to one place for guidance."

- Abdoulaye Brah Bouzou, MOMENTUM Routine Immunization Transformation and Equity supply chain and planning advisor.

Improving vaccine temperature monitoring

A critical element for assuring the safety and effectiveness of vaccines is the ability to control the temperature where they are stored. The project introduced Parsyl temperature monitoring devices for the cold chain at fixed sites (health facilities) and during transport. When a temperature excursion occurs, the Parsyl device sends SMS alerts to regional and district immunization officers responsible for the CCE and the national logistics team and real-time data to a dashboard for monitoring and long-term planning by logisticians. The project deployed the Parsyl technology at the national level, in the eight regional warehouses, and at the district stores. In conjunction with the DI, the project trained 202 regional logisticians to use the device and dashboard. Currently, more than 2,000 devices are in use. The project also procured and deployed LogTag devices, which map temperatures in walk-in cold rooms, at the national and regional levels. By alerting immunization officials of temperature excursions, these devices will help to ensure the safety and efficacy of stored vaccines. These temperature monitoring devices and the Parsyl devices will continue to be used after the end of the project to support a sustainable cold chain system.

Data quality, management, and use

Data review is a critical component of assessing if an approach is working, needs additional support, or needs to be adjusted. The Niger DI monitoring and evaluation team had been meeting monthly to review immunization and supply chain data, however were not reviewing temperature data and maintenance practices during these meetings. This left out a critical review stage of vaccine management. The project worked closely with the DI monitoring and evaluation team to incorporate cold chain temperature data and maintenance practices into these monthly reviews. The project developed an Excel tracker to log CCE issues and track corrective actions taken. Using the tracker, the project supported reports which cataloged data such as preventive and curative maintenance issues across the supported regions (Figure 2) and the percentage of functioning equipment (Figure 3).

The addition of the cold chain during monthly review meetings reinforced the importance of supply chain and cold chain management.

The project supported several smaller national data efforts, including supporting a WHO-led workshop with all partners on data triangulation related to COVID-19 vaccines in order to track supply and demand and more effectively plan campaign efforts. The project contributed to the data analysis, particularly focused on the supply chain data used to manage COVID-19 vaccines. Data triangulation, which compares data on vaccine stocks and consumption with service statistics on doses administered, is being adopted nationally for regular immunization program management.

Figure 2. Preventive vs. curative maintenance issues

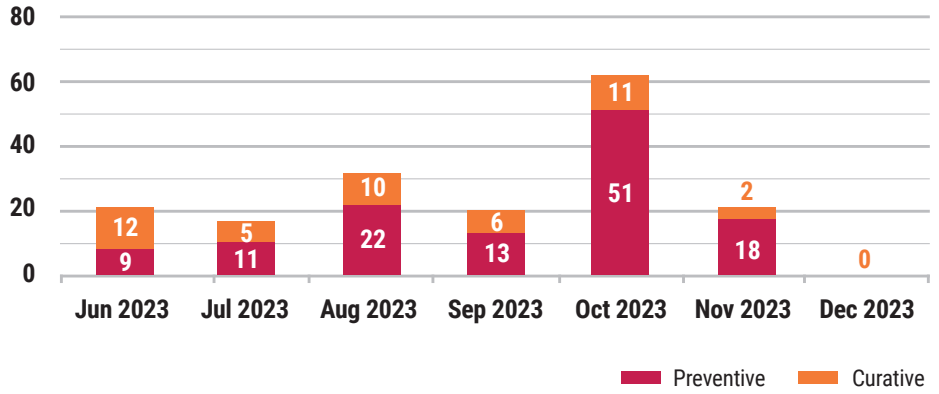
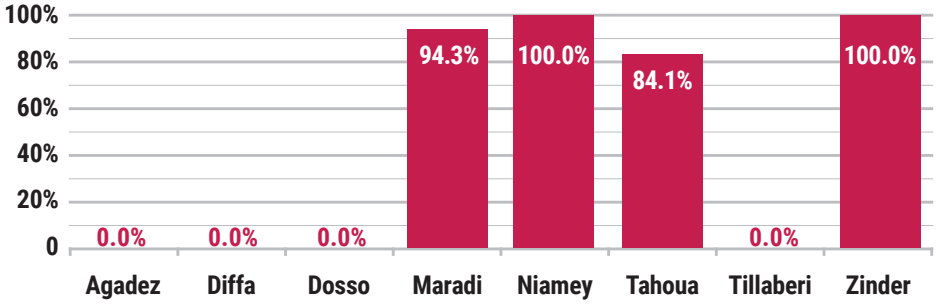


Figure 3. Cold chain equipment functionality



Lessons Learned

Sustainable change to the health system and supply chains requires significant investment in areas that are not traditionally funded (e.g., CCE maintenance).

When introducing new technology, it is important to also introduce and invest in change management. Introducing Parsyl temperature monitoring devices was an important innovation for the DI. But investment needs to go beyond investing in the technology to support a longer term process of change management. Personnel were trained to use the device, analysts were trained to interpret and use its data, and government officials were introduced to all aspects of the technology. However, if the technology is to succeed, more work, including reinforcing the training and promoting daily use of the technology and the data it produces, is needed. This will facilitate and strengthen staff commitment to routine cold chain maintenance.

Convening staff from multiple sectors to discuss common goals is not easy, but is necessary for lasting change. Cross-sectoral collaboration was necessary to make fundamental changes in waste management. Effective collaboration led to new and collaborative SOPs that improved COVID-19 waste management.

Integrating COVID-19 vaccines into the health system requires a full system approach, from community to data. For COVID-19 vaccines to be integrated into the health system sustainably, all personnel must have specific training on how vaccines pertain to their job and fit into the larger health system.

A Way Forward

Supply chain and cold chain maintenance are rarely the first things considered when thinking about the lasting impact of a program. However, both are vital components of a strong health system and proper vaccine management. Supply chain strategies and cold chain maintenance must be combined with service delivery and program planning to ensure supplies are available where and when they are needed. Niger has four new concepts (Figure 2) to improve its cold chain maintenance and support a safe and consistent vaccine supply. Thanks to support and collaboration efforts, new waste management SOPs will protect health workers and the communities they serve. While these activities were conducted in response to the COVID-19 pandemic, they strengthened national and sub-national health system infrastructure that will benefit routine immunization vaccine management in Niger.

Readers can find additional information about MOMENTUM Routine Immunization Transformation and Equity's work in Niger at the following website: https://usaidmomentum.org/where-we-work/niger/

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