

EpiC Nigeria strengthens health information systems through locally led, tech-driven solutions

SUCCESS STORY | APRIL 2024



EpiC Nigeria developed the 360VAX app to strengthen immunization data reporting.

Poor data quality and reporting tools hinder COVID-19 vaccination efforts

When COVID-19 vaccines were introduced in Nigeria in March 2021, several challenges hindered rollout efforts. One significant impediment to uptake was vaccine hesitancy fueled by misinformation and distrust in the health care system. Misconceptions about vaccine safety and efficacy, as well as religious and cultural beliefs, also contributed to high levels of skepticism among segments of the population.

In addition, inadequate digital infrastructure for client-level data collection led to challenges in accurately documenting and reporting vaccine administration, doses administered, and recipient information. These issues were exacerbated by internet connectivity limitations that hindered real-time data transmission and monitoring at the national level. This impeded the ability to monitor vaccination coverage, identify high-risk areas, and allocate resources accordingly, especially in remote areas. To improve vaccination coverage, the Government of Nigeria, through the National Primary Health Care Development Agency (NPHCDA), designed an integrated COVID-19 vaccination strategy. The strategy included comprehensive resource and partner mapping, targeted and robust demand generation, strengthened electronic data reporting, and state-level performance management plans.

To strengthen the electronic data reporting system for COVID-19 vaccination, NPHCDA developed and deployed paper-based and electronic data capturing tools across all 36 states and the Federal Capital Territory. The Electronic Management of Immunization Data (EMID) tool was an essential component to inform decision-making for data-driven interventions, especially client-level monitoring, as it ensured a quantitative measure of vaccination efforts in the country. However, limitations in functionality of the tool and data synchronization led to data quality issues that caused an inability to monitor and assess all steps of the vaccination campaign, including donor support, which is crucial to program performance.

The Meeting Targets and Maintaining Epidemic Control (EpiC) project, funded by the United States Agency for International Development (USAID), commenced its support to the NPHCDA in January 2022 with a focus on vaccinating eligible people living with HIV (PLHIV) against COVID-19 in two states — Akwa Ibom and Cross River. In August 2022, the project's vaccination efforts expanded to the general population across four states — Akwa Ibom, Anambra, Cross River, and Enugu.

EpiC develops digital app to ensure quality vaccination data capture, reporting, and use

EpiC Nigeria deployed several existing digital tools and developed proprietary tools during implementation to address identified limitations of the national data reporting system. These interventions were approved by USAID to strengthen the health information system, particularly for COVID-19 vaccination.

360VAX addressed inconsistencies with data collection and reporting, tracked USAID's contribution to improving national COVID-19 vaccination coverage, and strengthened the national health information system for immunization.

During the early phase of implementation, EpiC leveraged its robust health information system for the monitoring and management of HIV clients, the Lafiya Management Information System - Electronic Medical Record (LAMIS 3 EMR). EpiC configured the LAMIS 3 EMR to include a COVID-19 module that captured, tracked, and monitored COVID-19 vaccinations, particularly among people living with HIV (PLHIV) at higher risk of mortality, which significantly contributed to strengthening the national reporting framework. At the time, EpiC Nigeria was responsible for coordinating the largest USAID HIV program in Nigeria, and the project successfully vaccinated 105,248 (84%) out of 125,712 eligible clients in care. The LAMIS 3 EMR platform monitored USAID-supported vaccination efforts, especially across Akwa Ibom and Cross River states.

When EpiC expanded its scope to the general population across four states, it needed to address the limits of the national reporting system, which had hindered strategic planning, resource allocation, and implementation efforts.

In August 2022, EpiC Nigeria developed 360VAX, an integrated immunization proprietary app. 360VAX addressed inconsistencies with data collection and reporting, tracked USAID's contribution to improving national COVID-19 vaccination coverage, and strengthened the national health information system for immunization. The app consists of modules that capture and verify client-level vaccination, monitor adverse events following immunization (AEFI), manage inventory for both vaccine stock and data collection tools, monitor quality of care, and visualize data to analyze performance and strengthen data use for optimized field implementation (Figures 1 and 2). All modules of the 360VAX app triangulate to ensure complete documentation of every aspect of vaccination events on one platform. This comprehensive app was a first of its kind in Nigeria as the existing national data reporting system was comprised of several electronic platforms that each reported only one aspect of a vaccination event.

MODULES

EpiC designed the 360VAX app to consist of five modules:

1. Vaccination Module

The Vaccination Module serves as a comprehensive, client-level data collection tool that documents and authenticates routine immunization and COVID-19 vaccination events. This module captures client demographic details, socioeconomic factors, clinical history, and vaccine-specific variables, ensuring a thorough record of each vaccination encounter, as well as cataloguing vaccination events, especially for children and adolescents. Leveraging geographic information systems (GIS) technology, the module pinpoints the location of vaccination events, facilitating accurate tracking and monitoring across diverse geographic regions. Additionally, facial recognition software is integrated to provide an extra layer of security and verification to confirm the identity of vaccine recipients. By harnessing these advanced technologies, the Vaccination Module within the 360VAX app offers efficient, accurate, and secure documentation and validation of COVID-19 vaccination activities.

The 360VAX app also includes a dual-layered documentation process that mandates each vaccinator document their details and affix their signature upon the completion of every vaccination. This quality assurance process further bolsters health care worker accountability and engenders a culture of diligence and precision around vaccinations.

2. Stock Management Module

The Stock Management Module is pivotal in managing vaccine stock and data collection tools (DCT) inventory vital to the vaccination process. This system ensures coordination and alignment between the vaccines supplied and the vaccination events conducted, thereby guaranteeing a robust triangulation mechanism. Every vaccine collected from the cold chain store is documented in the app and cross-referenced with tally sheets/registers, and each vaccination event is recorded in the Vaccination Module of the app. This triangulation process mitigates the risk of discrepancies and ensures synchronization of vaccine supply and utilization. Previously, the process of harmonizing vaccine events and vaccine stock at national and state levels was fraught with inconsistencies. This caused ambiguity regarding the true extent of vaccination coverage, especially for COVID-19 vaccinations. However, implementation of the app has ensured clarity and precision in vaccination data management in the states supported by EpiC.

The DCT sub-module facilitates the forecasting of essential tools and prevents stock-outs, particularly during field implementation. Previously, vaccination events were disrupted frequently due to unavailability of critical documentation tools and vaccine seals. Integration of the app has ensured uninterrupted service and bolstered the overall efficiency of the vaccination campaign.

3. Adverse Events Following Immunization Module

The AEFI Module serves as a dedicated platform for the comprehensive documentation and management of any adverse events following immunization. Prior to the implementation of this module in the 360VAX app, the reporting of AEFIs on the national scale relied on disparate electronic platforms that did not directly link to individual client vaccination events. This caused challenges in correlating adverse events with specific instances of vaccination, which impeded the ability to formulate a targeted response.

The integration of the AEFI Module within the app has forged a link between individual vaccination events and subsequent adverse reactions. By swiftly identifying and documenting adverse events within the same system used for vaccination data management, the 360VAX app empowers health care authorities to expedite the assessment and implementation of targeted interventions, allowing them to respond quickly to AEFI incidents.

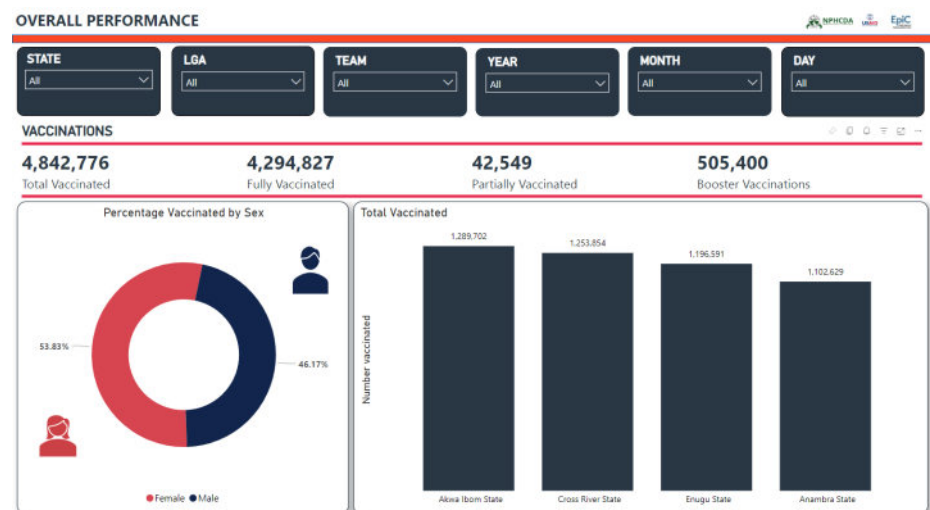
4. Analytics Module

The Analytics Module provides comprehensive insights into vaccination efforts both at the field and management levels. In the field, the analytics module empowers teams conducting community campaigns with an overview of daily performance metrics, which enables them to make informed decisions and implement targeted interventions to maximize efficiency.

The successful integration of the analytics module has strengthened daily performance review meetings. The interoperability of the 360VAX app with other data visualization tools, such as Power BI, provides a dynamic dashboard with a panoramic overview of vaccination activities, enabling stakeholders to gain a nuanced understanding of operational performance and identify areas to make strategic improvements to service delivery. This iterative performance evaluation and refinement process ensures that vaccination efforts remain agile, adaptive, and responsive to evolving needs and challenges.

The analytics module represents a paradigm shift in how vaccination programs are monitored, evaluated, and optimized, especially in the field. By harnessing the power of data analytics, this module complements and guides daily vaccine implementation plans.

Figure 1. Epic Nigeria COVID-19 Power BI monitoring dashboard



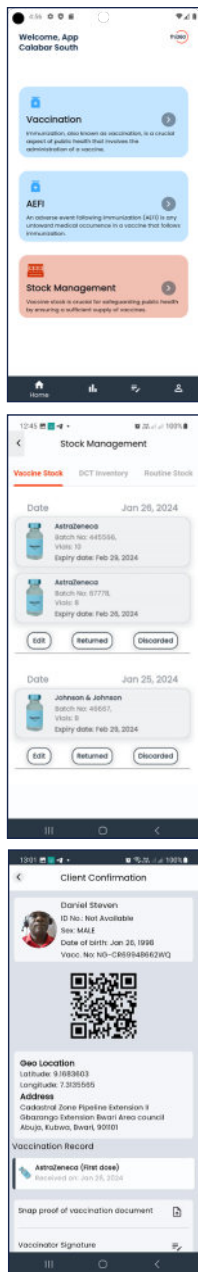


Figure 2. Screenshots of 360VAX modules

5. Quality Assurance/Quality Improvement Module

The Quality Assurance/Quality Improvement (QA/QI) Module optimizes the delivery of vaccination services, particularly in the field, through a comprehensive review and assessment of all factors essential to high quality delivery of vaccination services. Every aspect of the vaccination process is examined, from ensuring health care workers' competence (by holding them to established protocols and standards for vaccinating) to assessing vaccine availability and ensuring the adequacy of data collection tools.

At its core, the QA/QI Module harmonizes all essential components of service delivery. By consolidating these elements within a unified framework, the QA/QI Module empowers supervising health care workers and donors with a comprehensive toolkit for conducting supportive supervision and continuous quality improvement initiatives.

Furthermore, through its rigorous evaluation mechanisms, the QA/QI Module provides a platform for real-time feedback and actionable insights. It helps to facilitate ongoing capacity-building efforts, empowering health care workers to continually refine their skills.

Results

The first iteration of the 360VAX app was deployed in May 2023 across the four EpiC-supported states. A total of 1,260 people working on 315 mobile vaccination teams were trained to use the app. Each vaccination team used the app to document vaccine stock, which is critical in tracking fidelity of vaccination events and for state-level planning. 360VAX serves as a data quality tool to prevent overreporting and ensure all standards are maintained for an effective system. The 360VAX app was also used to capture information for monitoring and managing vaccinated clients, especially for key populations including PLHIV, the elderly, and people living with co-morbidities.

Since deployment, the 360VAX app has supported the Government of Nigeria in documenting 1,049,738 people who received the COVID-19 vaccination and 1,730 children and adolescents who received routine immunizations across the four EpiC-supported states. This has ensured that USAID funding for vaccination activities is tracked at the project level and triangulated at the national level. The integration of data analysis tools such as dashboards within 360VAX informs micro plans and tracks team efforts in the field. Interoperability with an EpiC Power BI dashboard has strengthened data use, real-time monitoring, and the ability to provide strategic feedback to the program, USAID, and NPHCDA.

Reflections and lessons learned

The 360VAX app has the potential to strengthen health information systems in Nigeria for immunization and primary health care. The successful deployment of the app showcased product viability compared to other global digital solution trends based on industry standards. The app has the potential to drive positive impact across diverse contexts as an FHI 360 global immunization tool. The successful implementation of the 360VAX app underscores the importance of technology and collaboration in improving health care outcomes. By integrating vaccination data, stock management, and client verification, 360VAX has strengthened the reliability of vaccination data, empowering informed decision-making and resource allocation. This success is a testament to the immense potential of technology-driven solutions and collaborative endeavors, especially amid crises like the COVID-19 pandemic.

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