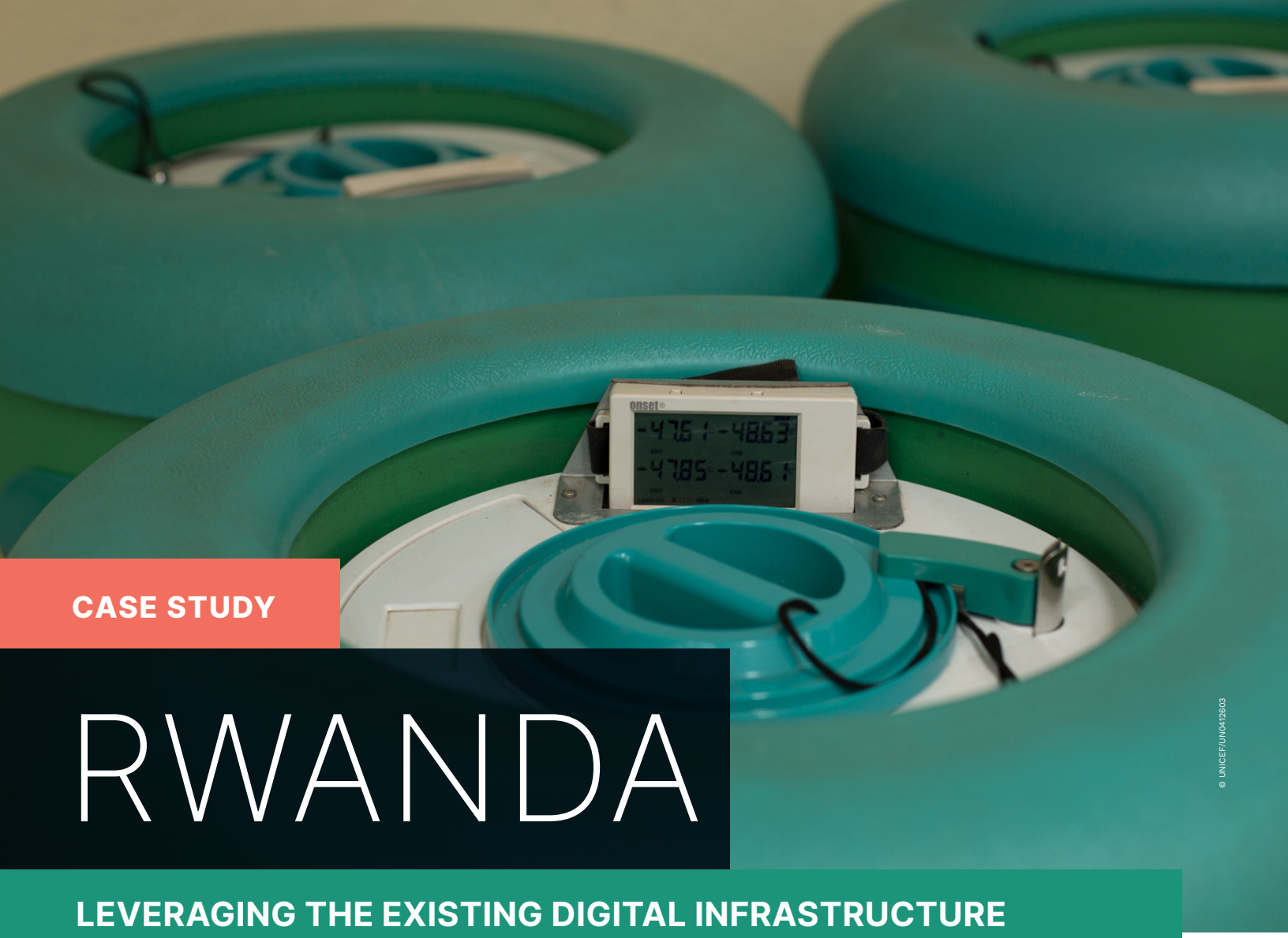

CASE STUDY

RWANDA

LEVERAGING THE EXISTING DIGITAL INFRASTRUCTURE FOR THE COVID-19 VACCINATION RESPONSE

Abstract:
Rwanda is an excellent example of a government leveraging its pre-pandemic commitment and investment to digitizing and connecting health information systems. On the vaccine side, this meant that both patient-facing and program management data requirements could be rapidly developed, integrated, and implemented. This included adapting the existing DHIS2 platform[1] and leveraging the support from the Health Information Systems Programme (HISP)[2], making Rwanda's experience and lessons learned especially valuable to other countries using this platform.

1 DHIS2 is an open source, web-based platform most commonly used as a health management information system (HMIS). Today, DHIS2 is the world's largest HMIS platform, in use by 73 low and middle-income countries. https://dhis2.org/about/

2 HISP is a global network comprised of 17 in-country and regional organizations, providing day-in, day-out direct support to ministries and local implementers of DHIS2.

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Global challenges in COVID-19 Vaccination

Many countries have faced and continue to face challenges in identifying and reaching target populations for COVID-19 vaccination. A key challenge to optimizing the delivery of COVID-19 vaccines has been the lack of timely access to data to inform operational planning.

Facing the urgent need to develop an information system for managing COVID-19 vaccine distribution and uptake, national COVID-19 vaccination managers often reacted by developing new, parallel data systems rather than by adapting existing vaccine-related data systems. In many cases, these new data systems added a substantial amount of work to an already overburdened workforce, engaged a workforce that was separate from the broader vaccine-related programs, were duplicative, did not always allow access to data at subnational levels, and lacked timely and complete monitoring indicators.

Background & context: Rwanda

Rwanda registered its first case of COVID-19 on 14 March 2020 and experienced sharp peaks of infection in late 2020 and early 2021, prompting stringent restrictions on daily life. On 3 March 2021, Rwanda received its first doses of COVID-19 vaccines and rapidly deployed these as part of its pandemic response.

In 2009, the Government had prioritized the development of a Digital Health Strategic Plan to use digital technologies to support service delivery across all sectors, including health. As a result, the country had previously deliberated on issues related to sustainability, interoperability, and scalability. This allowed them to swiftly (and cohesively) adapt existing tools to accelerate their COVID-19 vaccine deployment and use with the support of real-time monitoring solutions.

The Ministry of Health (MoH) required a system to register and monitor individual vaccination data, monitor vaccination coverage at all levels, and take remedial actions in areas with sub-optimal vaccination rates. To facilitate developing this system, the implementing arm of the MoH, the Rwanda Biomedical Centre (RBC), in collaboration with HISP, adapted the national Integrated Health Management Information System (iHMIS), that has used a web-based open source platform (District Health Information Software 2 [DHIS2]) since January 2012. The Electronic Immunization Registry (eIR) module (that uses the “e-Tracker” application within the DHIS2 platform) was part of the national iHMIS and enabled the collection of individual-level data on COVID-19 vaccination. This module was in place prior to the arrival of vaccines, which assisted in real-time monitoring of vaccination.

Rwanda's innovative response

Linking systems and facilitating accuracy and efficiency. A central monitoring enabler has been the country's National Identification Number which is linked to national iHMIS. At the health facility level, health workers create a beneficiary profile, and because of the linkage between the iHMIS and the National Identification Agency (NIDA), certain data fields are pre-populated. This makes the registration process more efficient and less prone to data entry errors. Along with demographic data, this individual profile includes data on the type of vaccine administered, batch number, dose number, and date of vaccination.

Patient-focused. The system connects and informs several aspects of patient management. It generates a unique health code (UHC) that enables health workers to access patient medical history and provides individuals with access to their vaccination certificate (and other medical history). The country's vaccination certificates are digital and include all details of the vaccination event. They also include a QR code that enables the vaccination certificate to be cross-referenced with the country's national database. The platform additionally generates phone text messages that inform people of their next scheduled doses and provides appointment details.

Empowering sub-national levels. Though the eIR module in the iHMIS is centralised, each district and health facility have real-time access to the data for their catchment areas. At the central level, data are reviewed and analysed every evening to brief high-level government officials. In addition, the data are presented weekly to the Scientific Advisory Group (SAG) to enable them to take strategic and operational decisions that lead to the allocation of resources and technical support to districts requiring them. The district command posts responsible for monitoring vaccination activities are also empowered to take decisions using the data accessible to them. The aggregate data are made publicly available on the MoH/RBC website3.

Beyond the basics. The system also assesses supply chain capacity and the type of vaccine being used in the facilities. This has been particularly valuable for tracking vaccines that have a short shelf-life and preventing vaccine wastage due to expiry. It has also mitigated vaccine hesitancy that is related to product preference by limiting the chances of beneficiaries being offered different products for completing their vaccination series.

Outcomes

Impact

Empowering all levels of the COVID-19 workforce, including vaccine-focused healthcare workers, with real-time data facilitated Rwanda's achievement of administering at least one dose to over 10.9 million persons, accounting for 81.3% of the total population (as of 1 August 2022). Over 10.4 million persons have received a complete primary series, accounting for 77.3% of the total population. The country is one of three countries in the WHO African region to have reached and exceeded the WHO coverage target of achieving providing the complete primary series of vaccination to 70% of the total population.

3 https://www.rbc.gov.rw/index.php?id=707

Benefits

MoH staff described clear benefits of utilizing the DHIS2 platform for vaccination registration and monitoring.

The most notable was the use of a single platform to capture data from the different pillars of the COVID-19 pandemic response, facilitating interoperability between different systems.

Because the system is familiar, is considered user-friendly, is integrated with NIDA, and has offline functionalities, the tool was efficiently adopted. This reduced the burden on health workers and allowed them to vaccinate more persons per day.

The use of the DHIS2 platform enabled RBC real-time access to data at all administrative levels, permitting timely operational decisions and corrective actions including related to supply chain capacity and vaccine distribution.

Improved public awareness and use of individual access to COVID-19-related personal data, as well as non-COVID-related medical records, resulted in increased public trust and likely positively influenced the uptake of vaccination.

Challenges

One notable challenge was the lack of human resource surge capacity to process with the huge influx of data at the field level. This was managed by recruiting medical students and volunteers to assist with data entry.

Since training of all cadres of COVID-19 vaccine deployment staff largely took place virtually, it was not possible to train the medical students and volunteers in data analysis. If this been possible, having these extra hands would have further strengthened the monitoring capabilities at the district and health facility level.

Enablers

Several good practices enabled the success in establishing and scaling up the system:

- Rwanda's Digital Health Strategic Plan and the government's priority to digitize health data enabled rapid, efficient, and well-integrated information solutions
- Clear coordination structures at all levels facilitated communication between stakeholders and enabled the planning and implementation phases of vaccine deployment
- Multi-sectoral engagement and coordination ensured a cohesive all-of-government response
- The use of an open-source digital solution provided flexibility to adapt the system (by using the DHIS2 community of practice) to meet local needs, as well as utilize the local health systems management capacity already established within the country (e.g., HISP Rwanda)
- Public access to individual data generated public trust and likely enhanced vaccine uptake
- Government learnings from the Ebola preparedness activities and the continuous learning during the pandemic enabled improvements that could be used for routine service delivery, e.g., the interface between the civil registration and vital statistics systems (CRVS) and the routine immunization data system

Opportunities beyond the COVID-19 vaccine response

Having one primary platform – DHIS2 – to support multiple areas of the COVID-19 response serves as a proof of concept that the digitization of COVID-19 systems can advance the country's wider digital health services. The country is also planning to integrate the e-Tracker for routine immunization with the CRVS thus further enhancing its ability to efficiently manage its vaccination programmes.

Lessons

- Anticipate the need to rapidly scale up human resource capacity for vaccine information systems and monitoring at all levels, including contingency plans when preparing for future pandemics
- To the extent possible, build on existing information systems, and when not possible, optimize interoperability between different digital systems and tools
- Include technical information, communication, and technology experts (including communities of practice) in early planning and decision-making forums related to data systems and programme monitoring to ensure that the data systems can be rapidly adapted and acknowledge field realities and challenges

Additional Resources

Key in-country stakeholder contact details:

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The Digital Health Centre of Excellence (DICE) (https://www.digitalhealthcoe.org/about-digitalhealthcentreofexcellence-dice) is a mechanism to deliver agile and coordinated technical assistance to national governments on sustainable and scalable deployment of carefully chosen mature digital health solutions that address health priorities in the context of the COVID-19 pandemic and post-pandemic health system needs. For queries or requests for technical assistance with digital solutions for COVID-19 response, email: contact@digitalhealthcoe.org

Acknowledgements

Information for this case study was extracted from the following sources:

1. Rwanda's experience in scaling up real-time monitoring approaches using digital solutions to support COVID-19 surveillance, vaccination, and case management: country brief. Gavi, the Vaccine Alliance, World Health Organization and UNICEF. 2022.
2. Investigating the use of digital solutions in the COVID-19 pandemic: an exploratory analysis of eIR and eLMIS in Guinea, Honduras, India, Rwanda, and Tanzania. CERGAS – Centre for Research on Health and Social Care Management at SDA Bocconi & MMGH – MM Global Health Consulting. November 2021.
3. Use of digital tools to strengthen COVID-19 management: Rwanda case study. May 2021. https://www.finddx.org/wp-content/uploads/2021/05/FIND_Digital-Health-Report_RWANDA_v1.pdf

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