MEASLES IMMUNIZATION:

How the Red Cross optimized the use of data and maps in the Democratic Republic of the Congo (DRC)

Community Epidemic and Pandemic Preparedness Programme March 2023



In June 2019, the World Health Organization (WHO) announced that the world's most significant measles outbreak was taking place in DRC. Between 2019-2020, there were more deaths attributed to measles than DRC's concurrent Ebola outbreaks. In total, over 380,000 cases and 7,000 deaths – mostly children under the age of five – had been reported throughout the country when the government declared the outbreak over in August 2020¹. Since the end of 2020, a large part of the country has reported increases in measles cases, with 18 out of 26 provinces confirming outbreaks by the end of 2021. Efforts to curb the disease require strengthening regular immunization and supplemental campaigns to identify and reach zero-dose children and their families.

This case study looks at how the DRC Red Cross and the International Federation of Red Cross and Red Crescent Societies (IFRC) applied Geographic Information Systems (GIS) and information management tools and approaches with the support of the Community Epidemic and Pandemic Preparedness Programme (CP3) to prepare and respond to measles outbreaks.

Key information

CROIX-ROUGE

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IFRC

- Information management support objective: Optimize the use of data and mapping to improve coverage of measles immunization in target health zones.
- Key datasets and mapping: Household mapping of zero-dose children, administrative boundary data, health system data such as facility catchment areas and vaccine cold chain status.
- Location: Kinshasa and Kongo Central, Democratic Republic of Congo (DRC).
- Period: October 2019 December 2021.
- Results:
 - **113,023 out of 134,749 children (83%)** vaccinated during the 2019 supplementary immunization campaign with CP3 support.
 - **21 health areas** within three health zones updated.
 - 330 volunteers engaged with supplementary immunization activities in November and December 2019, and routine immunization sessions in 2020 and 2021.

¹ Weekly bulletin on outbreaks and other emergencies. Week 35: 24-30 August 2020. WHO Africa Health Emergencies Programme. <u>Link</u>





What is measles?

Measles is a highly contagious viral disease, for which no specific treatment exists. It is preventable with two doses of a safe and cost-effective vaccine. According to the WHO, for a country to be safe from measles, 95 per cent of the population must be immune². In DRC, routine measles immunization coverage was **57 per cent** in 2018³.

Response to the 2019-2020 measles outbreak

WHO and members of the Measles and Rubella Initiative, including the DRC Red Cross and Gavi⁴, have supported DRC's Ministry of Health (MoH) in raising measles vaccination coverage for many years. When the MoH declared a major measles outbreak affecting all 26 provinces on 10 June 2019, the Red Cross joined forces with partners to respond to the epidemic.

Together with its technical partners, and with the support of WHO, the MoH carried out national Supplementary Immunization Activities (SIA)⁵ in November and December 2019, targeting a total of 179 heath zones and 5,789,008 children for measles immunization. This initial emergency vaccination campaign was then followed up by routine vaccination activities.



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Contribution of the Community Epidemic and Pandemic Preparedness Programme to measles immunization



The DRC Red Cross, with the support of IFRC and funding from the USAID Bureau for Global Health, has been implementing the Community Epidemic and Pandemic Preparedness Programme (CP3) since 2018⁶. The programme targets health zones in Kinshasa and Kongo Central provinces and aims to strengthen the ability of communities, the DRC Red Cross, and multisectoral partners to prevent, detect and respond to disease threats and prepare for future risks.

Humanitarian organizations need quality and timely information to reduce risk, anticipate, prepare for and respond to various types of emergencies in an effective manner. To strengthen the capacity of the Red Cross Red Crescent network and its partners to reach people most at risk or most affected by health emergencies, the programme has engaged in data readiness. *"In the Red Cross Red and Crescent Movement context, data readiness is the ability of National Societies to use quality and timely information in humanitarian operations and programs."*

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In response to the 2019 measles outbreak, CP3 worked with 330 DRC Red Cross volunteers to carry out community mobilization for immunization campaigns in Kinshasa (health zones of Binza-Meteo and Maluku 1) and Kongo Central (health zones of Nsona-Pangu and Kimpese) which took place between 25-29 November and 1-2 December 2019 in both provinces. The programme used information management systems to contribute to this campaign and built on lessons learnt during the response operation to continue supporting regular measles immunization through the Expanded Programme on Immunization (EPI) after the outbreak. CP3's information management technical support focused on updating health area boundaries, mapping the vaccine cold chain and geo-locating zero-dose children.

² Measles: fighting a global resurgence', WHO. 6 December 2019. Link

³ https://www.afro.who.int/news/who-and-partners-launch-emergency-vaccination-campaign-help-contain-worlds-largest-measles

^{4 &#}x27;Measles and measles-rubella vaccine support', Gavi – The Vaccine Alliance, December 2020. Link

^{5 &}lt;u>https://www.thelancet.com/journals/laninf/article/PIIS1473-3099(20)30265-6/fulltext</u>

⁶ Community Epidemic & Pandemic Preparedness, IFRC. <u>Link</u>

⁷ Data Readiness Toolkit, The Global Disaster Preparedness Center. 2020. Link



Updating health zone and health area boundaries

Accurate boundaries can ensure that routine immunization efforts reach all communities within a given area. Prior to the 2019 measles outbreak, the IFRC and DRC Red Cross had started working with the MoH to update health zone and area⁸ boundaries in targeted CP3 locations. Initial work consisted of compiling geographic data, administrative boundary data and core infrastructure data; this resulted in additions and amendments to the existing health zone and health area boundaries. These initial updates were used to support the emergency measles immunization campaign microplanning process in 2019 by developing the deployment plan of community health workers, Red Cross volunteers and other partners in assigned geographical areas. This reduced the risk of duplicated efforts and contributed to communication strategies for orienting families to vaccination sites.

Since the 2019 campaign, CP3 has continued to build on the skills of its trained volunteers to map ground-truth geographic boundaries and supplementary information to continue the



CP3 team members in the field conducting surveys for health area/zone boundaries. ©DRC Red Cross

validation and the refinement of health area boundaries. Through this, 21 health area boundaries within three health zones in Kinshasa and Kongo Central provinces have been updated, validated by the health zones teams and confirmed by the local Provincial Health Department (DPS). With approval from the MoH, all 21 of these health areas have been shared on the Humanitarian Data Exchange (HDX), the Référenciel Géographique Commun (RGC), integrated in the DHIS2 and OpenStreetMap (OSM) databases. This facilitates access and use of the information by DRC MoH and other health response partners for epidemic preparedness and response activities.

According to interviews of head nurses carried out by CP3 in Kongo Central in July 2021, updated boundaries have allowed for a better understanding of their target population, including their specificities, needs and challenges:



"When we don't know the boundaries well, we can miss people to vaccinate. Knowing where all the villages are allows us to have the target of each village and the coverage when we conduct campaigns. A map with all the villages can help us."

Kilueka head nurse

CP3 continues to advocate for the use of these updated boundaries and is working to ensure that these data are integrated into any health maps with outdated boundaries used by partners. Additionally, this has put in place processes for replication to update and add new health areas not existing in the national health database, and to enhance health services and planning. In further promotion of collaboration and information sharing, a similar approach is being used with GRID3, a project in which "GRID3 partners with governmental bodies and other stakeholders support the harmonization, production and use of digitalized legal/administrative units, operational units and statistical areas." ⁹ CP3 has partnered with GRID3 through sharing information and methodology lessons learnt.

⁸ In DRC, health areas (referred to elsewhere as health catchment areas) are defined as "containing one or more health facilities responsible for providing healthcare services to between 5,000 and 15,000 people" and collectively "aggregate to health zones, which are made up of 15 to 25 health areas and have a general referral hospital offering more comprehensive healthcare services." (Reference: Harmonising Subnational Boundaries, Columbia University. 2020. Link

⁹ GRID3 (Geo-referenced infrastructure and demographic data for development): https://www.grid3.org/content/uploads/2020/09/GRID3. BoundariesWhitePaper. Finalized.pdf



Mapping the vaccine cold chain

Proper refrigeration, storage, and handling practices, known as the vaccine cold chain, are essential in ensuring the effectiveness of the measles vaccine. With CP3 support, Red Cross volunteers and Kongo Central health authorities conducted mapping exercises aimed at mobilizing strategic information on the functional cold-chain, available vaccination sites and physical barriers to access vaccination points. This process used both secondary data made available through CP3, and data collection methodology developed through the programme. Secondary data included location of health facilities, and the updated health zone boundaries to more concisely represent health catchment areas relative to the vaccine cold chain.

With this information, the MoH put together a plan to reach these communities with routine immunization sessions. Three strategies were developed and implemented, based on accessibility of location and the mapped vaccine cold chain:

- 1. Fixed strategy: direct families to the main vaccination site if it is within walking distance
- 2. Mobile strategy: mobile teams are given vaccines to distribute within communities too remote from vaccination site
- 3. Advanced strategy: when access is very difficult a second immunization site can be set up for a health area.

Zone de Santé de Kimpese - Chaîne de froid



A map was developed to show the cold chain in the Kimpese health zone, with the location of both functional and non-functional vaccine refrigerators. © DRC Red Cross / IFRC

MoH local vaccination focal points in Kimpese and Nsona-Pangu carried out mobile vaccination strategies in November 2020 with the support of CP3; these joint field missions helped to immunize 269 children (ages 0—23 months) against measles.

Both the health areas boundaries and mapping of the cold chain have supported microplanning towards immunization campaigns, including the establishment of mobile and advanced strategies when needed, and the distribution of vaccine doses among vaccination sites and mobile teams:



"With the cold chain map, we have a good view of health areas surrounding us that do not have a refrigerator. This helps us to better manage vaccine doses received and to better distribute them between our health area and two others."

Kisonga head nurse

The cold chain map is updated quarterly in order to strengthen data-based decision-making with MoH local stakeholders on how to address communication around access strategies for vaccination.

Data collection methodology for identification and geo-location of zero-dose children

To mobilize families for child immunization during household visits, Red Cross volunteers give families a health slip, called a "jeton". Families then give the jeton to the health provider when they bring their child to the immunization site for services. The DRC Red Cross then collects these health slips from the health providers in order to track the effectiveness of household visits. Out of the 409 health slips that had been distributed during the November 2020 routine immunization session, 393 were recovered. The health zone team included recovered children in their monthly update of the national database. This exercise was repeated in November 2021, with 1,500 health slips distributed for children missing vaccination doses. Of these 1,031 came for vaccination at immunization sites for missed measles doses. The lower percentage of children who came for vaccination is likely due to the hesitancy of the population to visit health facilities at the heart of the COVID-19 pandemic.

Immunization sessions to re-visit zero-dose children¹⁰ are typically based on vaccination records, which may not be complete, up-to-date or accurate. In CP3 target areas, the Red Cross set up data collection processes to identify which villages and households had children aged 0—23 months who had not been immunized (zero-dose children). Traditionally, head nurses use health facility immunization



Figure 1: Map of households with zero-dose children

records to provide information to Community Health Volunteers (CHV) in order to recover unvaccinated children. As a result, information on zero-dose children usually flows from the health centres to the communities. The process used here allowed Red Cross volunteers to collect information relating to zero-dose children directly from the communities and share it with the health centres to improve immunization activities targeting. This gave local EPI focal points a new tool to support planning by using GIS to identify areas with high rates of zero-dose children.



"In the child retrieval programme, a few years ago, we had difficulties. Since we had briefings and a training, the Red Cross volunteers and the community workers teamed up to go and recover missing children. In my area, we came up with a strategy that really helped us. When you see the data at the beginning and today, there is really a big change."

Kisonga head nurse

With these methods, 196 zero-dose children were identified in 51 villages throughout both Kimpese and Nsona-Pangu health zones in Kongo Central in 2020, and in 2021 an additional 346 zero-dose children were identified. From information collected by volunteers, Red Cross developed maps and shared updates with the MoH at the health zone level. The 51 villages were included and prioritized in the health zone microplan of immunization campaigns and routine immunization activities from the end of 2019 onward. As routine immunization campaigns extend, these maps will continue to be updated and the information on geo-location of zero-dose children updated in the national database to supplement potentially outdated or inaccurate vaccination records data.

¹⁰ Despite decades of progress increasing access to immunization in lower-income countries, nearly 10 million children worldwide still go without any basic, routine vaccines every year. Gavi, the Vaccine Alliance is now focusing on reaching these zero-dose children. Nearly 50 per cent of zero-dose children live in three key geographic contexts: urban areas, remote communities and populations in conflict settings. Two-thirds of zero-dose children live in just five countries: Nigeria, India, the Democratic Republic of the Congo, Pakistan and Ethiopia.

LESSONS LEARNT

In the past years, DRC has faced several outbreaks of vaccine-preventable diseases and has subsequently experienced thousands of preventable illnesses and deaths. Updated maps and health catchment boundaries are essential to reaching zero-dose children and the communities of which they are part. Building trust, engaging with families, listening to and addressing their concerns about immunization underpins the adoption of public health interventions.

Lessons learnt in 2020 informed planning for 2021 support, especially around coordination. In 2021, DRC Red Cross teams worked in joint teams with head nurses and MoH to plan and to set up more advanced mobile vaccination points where zero-dose children could present with health slips for missed doses. This strategy has enabled DRC Red Cross volunteers to support vaccination by supplementing the coverage given by MoH Community Health Workers.



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For future campaigns both EPI and provincial health department focal points have requested support from the DRC Red Cross. Additionally, some methodologies employed through various activities detailed in this case study are being replicated through the advisement of CP3. The DRC Red Cross has incorporated CP3 lessons learnt in its routine immunization project implemented in 13 health zones in Ituri and Lomami which aims to increase the coverage rate to at least 80 per cent by 2022.

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