polio global eradication initiative

BEST PRACTICES IN INNOVATIONS IN MICROPLANNING FOR POLIO ERADICATION

THIS DOCUMENT IS A SUPPLEMENT TO "BEST PRACTICES IN MICROPLANNING FOR POLIO ERADICATION".

World Health Organization

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ACKNOWLEDGEMENTS

These best practices documents for polio eradication have been developed from the contributions of many people from all over the world. The people concerned have themselves spent many years striving to eradicate polio, learning from successes and failures to understand what works best and what does not, and quickly making changes to suit the situation. In writing these best practices the aim has been to distil the collective experiences into pages that are easy to read and detailed enough to be adapted for other health programmes.

'To strive, to seek, to find, and not to yield'

ACRONYMS

EOC	Emergency operations centre
GIS	Geographic information system
GPS	Global Positioning System
GSM	Global System for Mobile communication
HQ	Headquarters
LGA	Local government area
MiFi	Mobile Wi-Fi (wireless communication)
WFP	Ward focal person

USING A GEOGRAPHIC INFORMATION SYSTEM TO IMPROVE THE QUALITY OF MICROPLANS

A geographic information system (GIS) is a computer system for capturing, storing, checking and displaying data related to positions on the Earth's surface. GIS can show numerous kinds of data on one map. Using satellite imagery, maps can be created to show such details as the location of buildings, streets and various landmarks that may not be shown on published maps.

For polio immunization campaigns, an operational microplan depends on accurate maps down to the street and village level, to guide vaccination teams and supervisors in their daily work. The advantage of using GIS is the ability to develop highly detailed and accurate maps to:

- clarify boundaries and team responsibilities
- follow vaccination team movements
- identify missed areas.

CLARIFYING BOUNDARIES AND TEAM RESPONSIBILITIES

Paper maps drawn by hand have been used for many years; if accurate, they can be very useful. However, they have common problems:

- The boundaries of team responsibilities may not be clear, leading to gaps between team areas.
- Some areas may not be included on the maps because of incomplete knowledge of the area.
- New housing and settlements in an area may change rapidly and may not be included on the maps.

Digitizing maps

Digitized maps can be downloaded from various sources, such as Google Maps. Lines can be drawn on them by using a mouse to indicate each team's area of responsibility. If satellite maps are not available for the area in question, suitable paper maps can be digitized and lines drawn using scanning hardware and software.

Assigning team and supervisor responsibilities

If existing team maps have many inaccuracies and require significant changes, it is best practice to organize interactive workshops for supervisors and team leaders to view the maps together.

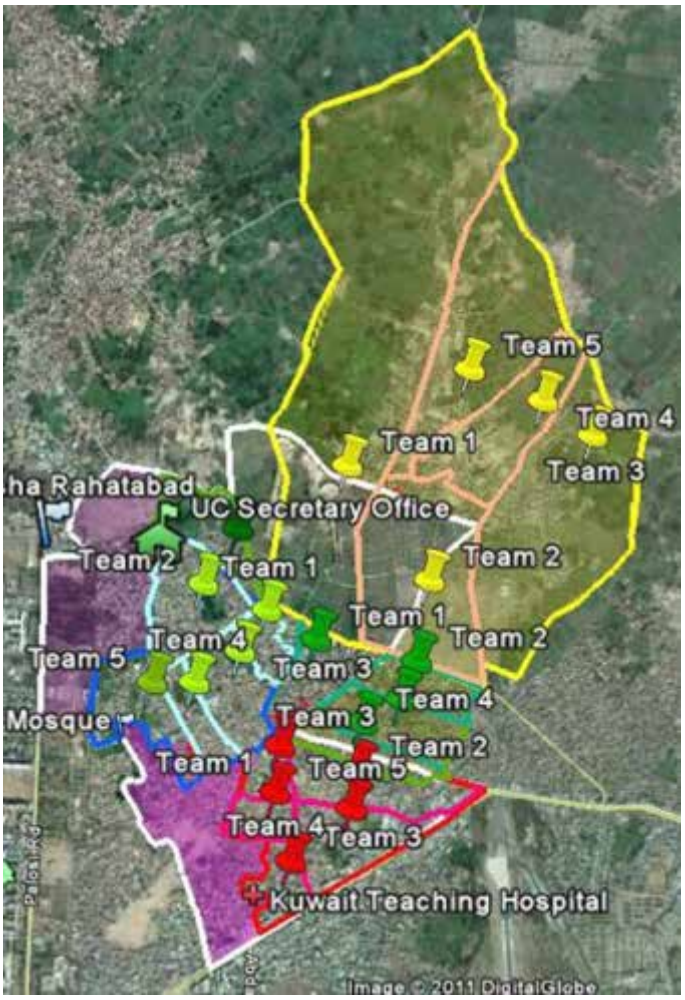
Organizing a mapping workshop

- Print and display the base maps of the area in large scale for team assignments.
- Encourage supervisors to bring their own hand-drawn maps for comparison.
- Display satellite images of the area using a projector.
- Assign one data manager to handle the digital tracking mouse.
- Encourage supervisors to identify their areas of responsibility on the map displayed on the screen.

- Encourage supervisors to identify landmarks and work collaboratively to avoid overlapping areas of responsibility (supervisors are likely to be local people who know their area well, but they may not be familiar with satellite images and large-scale maps).
- Assign areas on the maps that have not been included on the paper versions.
- Once all the supervisors' areas of responsibility have been identified, allocate immunization teams to each.

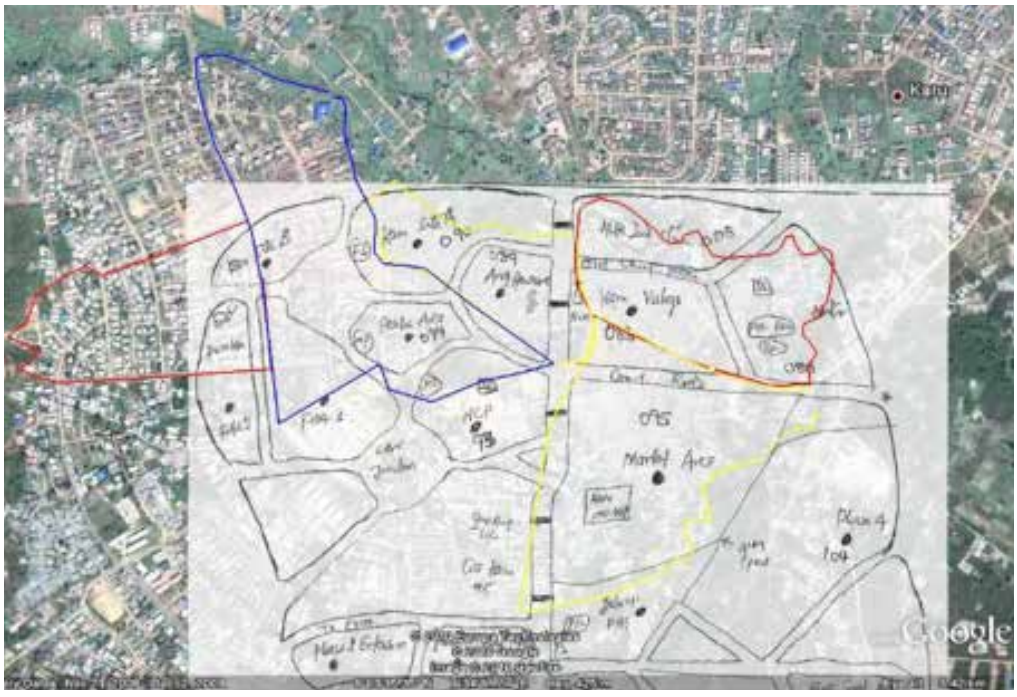
Walking the boundaries

It may be necessary to verify the boundaries of assigned areas if significant sections have been excluded from the existing paper maps. This can easily be done by walking around an area with a phone enabled to use Global System for Mobile (GSM) communication or a GSM device. The track derived from this walk can then be superimposed on the digital map, and supervisors and teams can be assigned accordingly.



GSM tracking on walks allows to delineate area boundaries and assign teams.

This satellite map shows a city area and coloured digitized lines drawn to indicate the areas assigned to different teams.



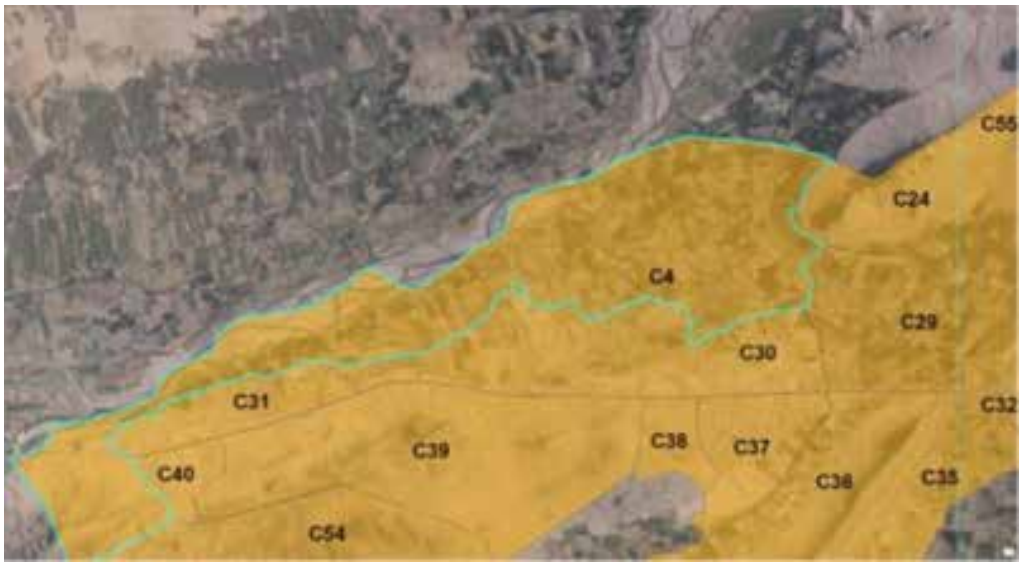
A paper map overlaid on the satellite map can show areas that have not been included in team assignments.

Adjusting the microplan

Having agreed on assigned areas, supervisors can be given new maps to assign team responsibilities on a daily basis. Because previously missed areas will now be included and borders adjusted, the whole microplan must be changed to take into consideration new areas, more teams, more vaccine, more vaccine carriers, transport, social mobilization and the budget.

Digitizing local boundaries

- Local boundaries are helpful for monitoring the work of teams. However, as most maps will not display the names of villages and urban communities, digitized boundaries must be created and named.
- Supervisors may be able to identify the names of villages and communities accurately on the map, but several different names may be used for the same communities.
- It may be necessary to identify boundaries on a map, validate the names and provide a unique code for each cluster of villages or urban communities in the mapping database.
- These steps may require field visits to the areas concerned to create digitized boundaries or to agree on the names to be used.
- As this field work is intensive, it is best to prioritize areas with known performance problems at the lowest operational level.

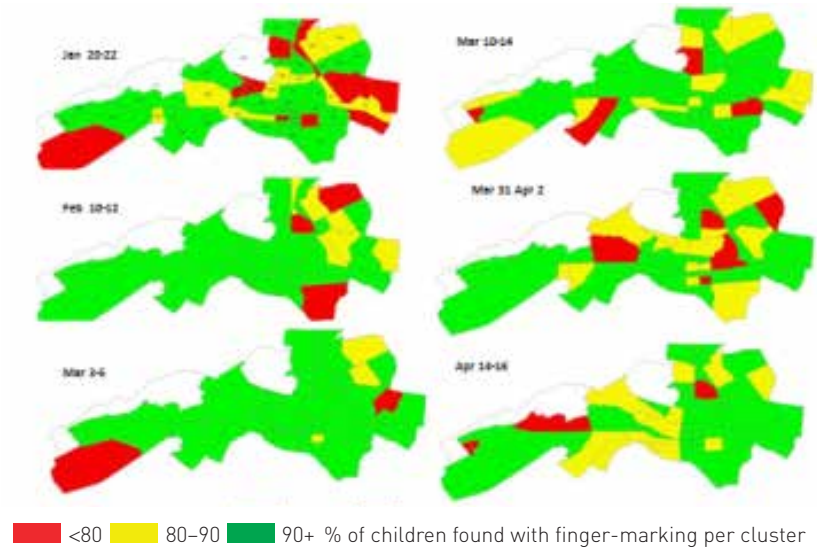


This map shows boundaries for supervisory areas and the teams allocated within.

Using digitized maps to monitor progress

When the maps have been digitized and coded by cluster, data can be added, including, for example, indicators of vaccination team quality. This figure shows a map in which clusters that have been named, coded and digitized display campaign quality over several periods based on finger-marking.

Figure 1. Finger-marking coverage by cluster in Kandahar City, Afghanistan, 2011



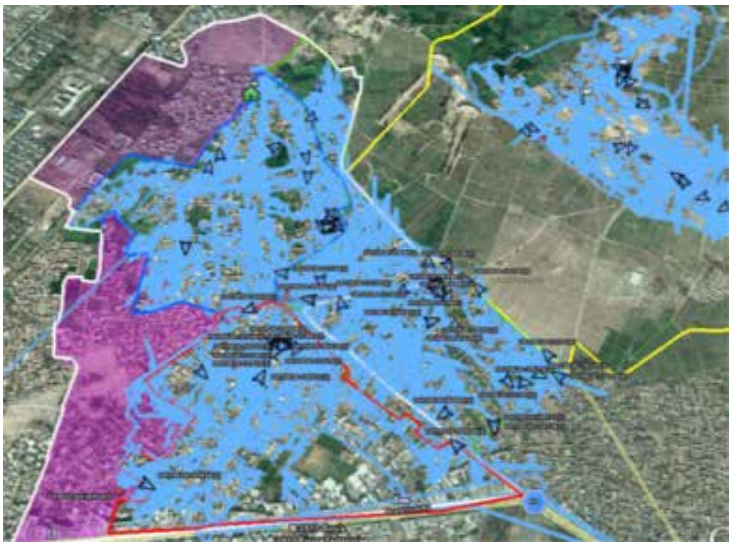
Tracking vaccination teams

The daily work of vaccination teams can be tracked by using GIS, phones equipped to use the Global Positioning System (GPS) or other GPS loggers. Provided to teams and fixed to vaccine carriers, commercially available GPS loggers were initially tried in Nigeria and Pakistan. The GPS logger received a signal every few minutes and the data showing the teams' routes were uploaded to a laptop at the end of the day.

Progressing from simple to more sophisticated vaccination tracking systems

When a small number of teams are involved, the location of individual teams is clear and missed areas are identified. When hundreds or thousands of teams are used, knowing which team is responsible for a particular area becomes confusing, making it difficult to hold teams and supervisors accountable.

Tracking one team with GPS provides clear results of the route covered.

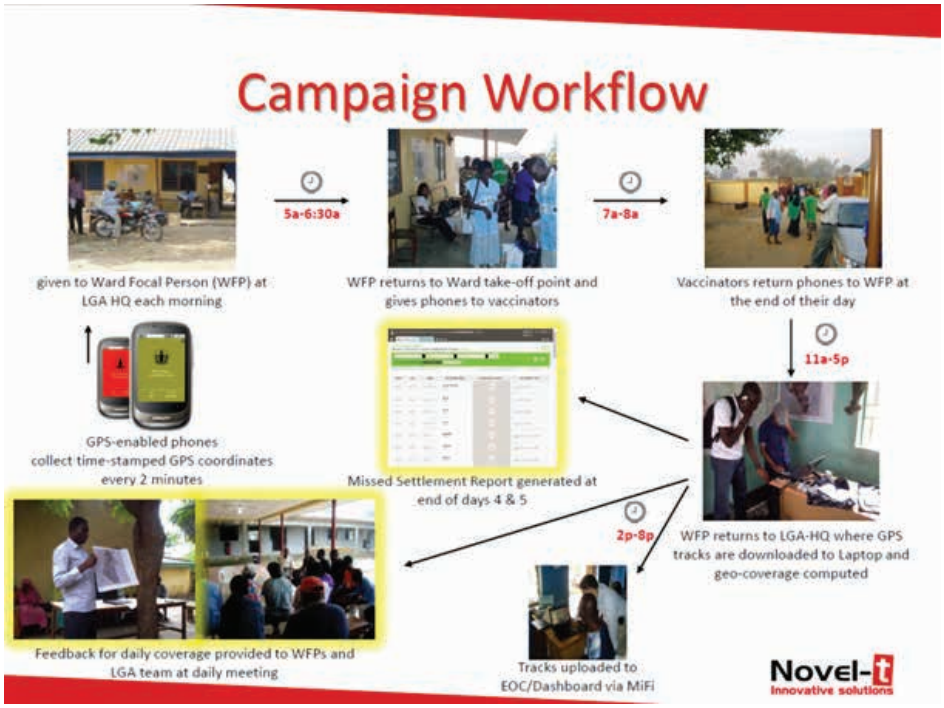


Tracking multiple teams is less clear unless the GPS software system monitors individual teams and their precise routes.

As shown in the figures, a more sophisticated system of mapping and tracking vaccination teams has been developed for use in Nigeria.

- High-resolution maps are used, and software with feature extraction is applied to identify man-made structures in rural and urban areas. Names are given to areas and a grid is then applied, showing cells with the estimated population for each. The cells can be up to approximately 100 m^2 and are overlaid with the population number.
- Teams and supervisors are identified, listed and assigned to areas on the map.
- Each day, every team is given an inexpensive mobile phone with GSM capability. Special mapping software is installed on each phone.
- No SIM card or interaction is involved; carrying the phone is all that is required.
- As the teams move, GSM detects their location.
- At the end of the day's work, the phone is returned to the operational office and the data from each phone are uploaded using mapping software that displays each team's route on a map. Many teams can thus be listed and identified, and their routes visualized on a map.

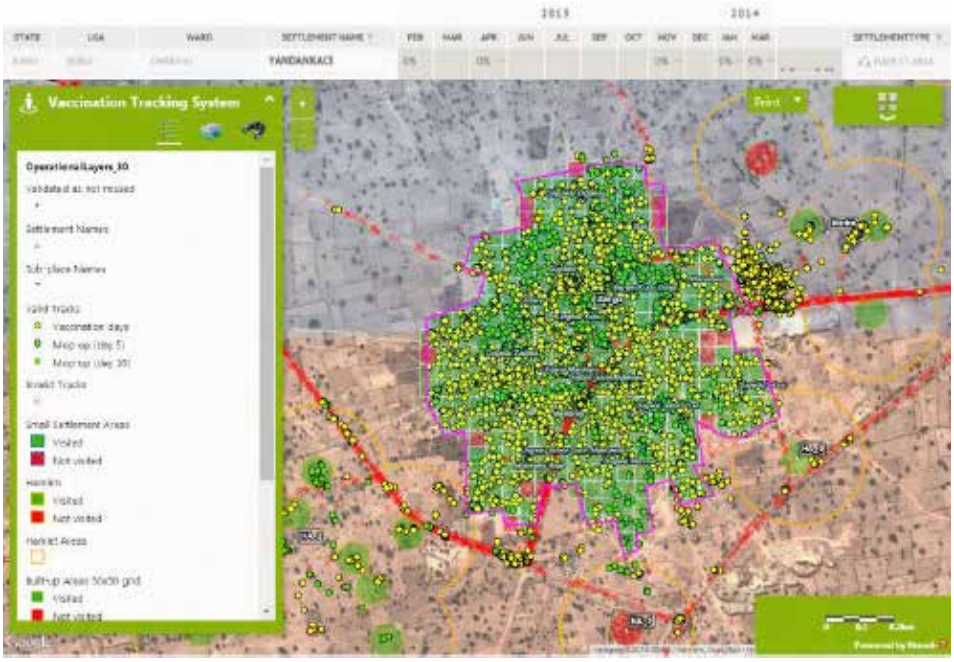
Figure 2. Mapping and tracking teams in Nigeria



LGA: local government area; HQ: headquarters; EOC: emergency operations centre; MiFi: mobile Wi-Fi (wireless communication)

Source: Novel-T

Figure 3. Tracking individual vaccinators on the map, Nigeria



Source: Novel-T/The Vaccination Tracking System

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