DIGITALIZING MALARIA CAMPAIGNS: ITN AND SMC HANDBOOK

Link to the downloadable handbook in English (and French later this month):
https://www.crs.org/our-work-overseas/research-publications/digitalizing-malaria-campaigns-itn-and-smc-handbook

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OPT-SMC
Optimizing Seasonal Malaria Chemoprevention in West and Central Africa

Why was this handbook developed?

- Growing number of countries digitalizing SMC and net campaigns

- Initial discussions with partners about the gap of resources for countries who want to digitalize their SMC and ITN campaigns

- Purpose of handbook:
  - Support country partners better understand steps to undertake & consider before full digitalization
  - Not a 'how-to' guide, but rather key considerations and recommendations in operationalizations of large-scale digital campaigns

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Introduction

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More than 3.4 billion people are at risk of malaria, or nearly half the world's population. But the majority of those who die from malaria are children under five years of age in Africa. Through great efforts over the last decades, the death toll has declined since 2000, in some countries dramatically, due to increased investment and improved operational strategies to deliver malaria control interventions. Despite these advances, the human cost of malaria is still significant and more needs to be done.

Sleeping under insecticide-treated nets (ITNs) provides protection from malaria-carrying mosquitoes and has been shown to reduce malaria incidence by 50 percent and all-cause child mortality by 17 percent. Since 2002 many countries, through the strong leadership of Ministries of Health, have successfully implemented large-scale campaigns to deliver over 2.5 billion ITNs to help reduce malaria cases and deaths.

Digitalization of malaria campaigns can improve operational efficiency as countries transition from paper-based systems to fully digitalized approaches. This can mean several things in terms of scope and scale. While many national malaria programmes are using digital platforms for recording and

aggregating household registration and ITN distribution data, digitalization is also expanding to other ITN campaign components and activities, including microplanning, social and behaviour change (SBC), supply chain management, supervision, monitoring, evaluation, and payments.

The Alliance for Malaria Prevention (AMP) was established in 2004. AMP partners assist and advocate for country-specific support to plan and implement ITN distribution, mass and continuous, and to mobilize resources should gaps in ITNs or operational costs occur. The AMP partnership works to ensure that best practices and new ideas being used or tried by national malaria programmes and partners are collected and shared to ensure that high quality distributions continue to take place. Part of the sharing of knowledge happens through face-to-face meetings, such as AMP trainings and technical assistance missions, while another part is based on guidance and documentation for planning and implementing mass ITN distribution campaigns.

This handbook draws from previously published AMP toolkits and the ITN Campaign Digitalization Matrix to continue to serve partners in digitalizing malaria campaigns.
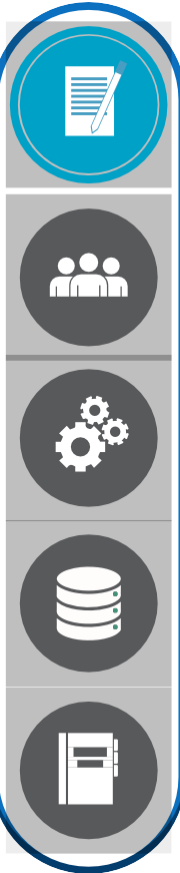
WHAT IS DIGITALIZATION?

Digitalize or Digitize? Often used interchangeably, a paper form is "digitized" when changed to a digital format but a "digitalized" campaign updates the delivery model through integrating processes, people, and technology to realize new opportunities and value. This handbook focuses on digitalization, in recognition that many excellent resources already exist to move from analog to digital systems as applicable to health campaigns – which are referenced throughout.

DIGITIZATION
Transition from analog to digital processes

DIGITALIZATION
Improve business processes by leveraging digital technologies and personnel

DIGITAL TRANSFORMATION
Leverages emerging technologies to take advantage of new opportunities

WHY DIGITALIZE CAMPAIGNS?

Approximately **82% percent of CRS' malaria programs use mobile technology** to improve speed and accuracy of data collection, enable simple analysis and use of complex data, or increase adherence to malaria treatment guidelines. A complement to routine services, health campaigns often achieve high coverage of high-impact interventions. Digital tools present a key opportunity to maximize the impact of health campaigns.

According to *Digitizing Health Campaigns: Here's What It Takes* (CRS), benefits include:

Better or More Rapid Decision Making	**To learn more,** read the full CRS report:
Investment Returned at Scale	
More Accountability and Efficiency	

This technology is critical, as health campaigns are **only effective when they can achieve high coverage, at scale**, which is extremely difficult to achieve and verify with paper-based records. According to The Incalculable Value of Digital Health Campaigns: Perspectives from Benin (**CRS**), helping implementers achieve campaign results can also offer "spillover" benefits that strengthen health systems implementation. This goes beyond single campaign cost-benefit analysis.

EXPERIENCE FROM THE GAMBIA

Surrounded almost completely by Senegal, The Gambia is Africa's smallest mainland country and home to more than 1.9 million people. Malaria is endemic across The Gambia. The peak season for transmission is the rainy period from August to November. CRS is one of the few international organizations in The Gambia, where much of the work focus is on malaria prevention.

CRS continues to work with the NMP to scale up access to and use of insecticide-treated nets through both routine and mass distribution channels, indoor residual spraying, ntermittent preventive therapy for pregnant women, and SMC. Here's how the technology works.
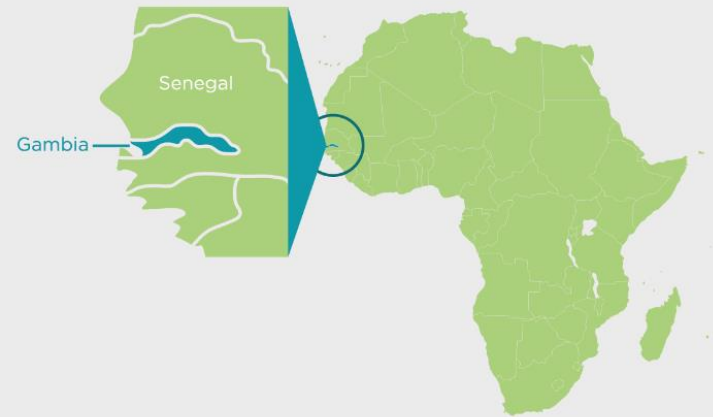
2011 - Paper

Paper-based process required 12 filing cabinets to store 36,000 paper forms

No electronic vouchers

Six months needed to transfer the information to an electronic database

Employed 2,700 teams working for 13 days (35,100 team days)

70% coverage for nets

VS

2014 - Start of Digitalization

Electronic forms used offline and synced to online database when connection available

Unique bar-coded vouchers (one per net) to improve accountability

Monitor distribution in real-time, alter daily workplans and strategies as needed.

Employed 100 teams working for 112 days (11,200 team days)

941,821 LLIN nets distributed. 94% coverage for nets

People

- Who is needed for a digitalized campaign?
- Training
- Household enumeration and distribution model
- Personnel: door-to-door
- Recommendations

WHO IS NEEDED FOR A DIGITALIZED CAMPAIGN?

National Level	State/District Level	Ward/Community Level
10-15 persons	**100-300 persons**	**100-10,000 persons**
• Full-time staff	• Includes state/district-level supervisors, as well as ICT4D support (Tier 1)	• Participant-facing
• Enterprise-level tech supervisors (Tier 2,3)		• Often volunteer or seasonal
• Provide technical oversight	• Assignments by campaign	• Engage with participants
• Contract vendors	• Conduct trainings	• Distribute nets and drugs
• Set policies	• Monitor and supervise campaign	
• Oversee trainings	• Manages mobile devices	

For each campaign, the required personnel is a function of the capacities/competencies needed to complete each task/activity of the campaign. Every level of effort thus needs to be carefully estimated to determine the competences required. These competencies then constitute a selection criteria which is established as a basis for selecting/recruiting campaign staff. An example of a criteria for selecting/recruiting household enumerators includes but not limited to the following:
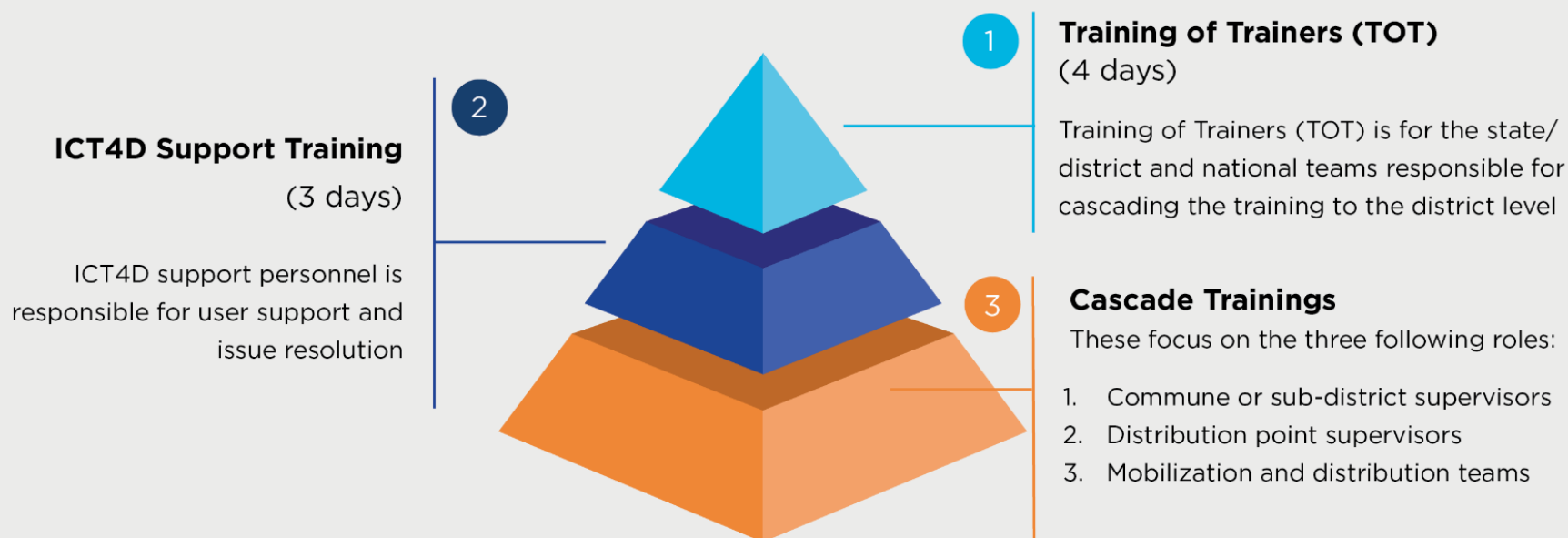
What is needed for campaign personnel?

?

- Must be willing to work for the full intervention (all cycles for SMC and throughout ITN campaign)
- Must reside in and be part of the community being served in the campaign
- Familiarity with Android devices preferred
- Verified and validated functioning bank account number (where electronic payment is required) and mobile number (where payments are done via mobile money)
- Must be eligible to work based on age, criminal record, and other criteria
- Guarantor may be required to guarantee good conduct of the staff and enable designation of digital tools and other campaign materials

👥 TRAINING

Scaling any campaign requires training for each role, as well as orientation to the hardware and software required for a digitalized campaign. Depending on the novelty of the digitalization or capacity of the available human resources in the implementing area, a cascade training may not be considered. The first-level trainers could directly train the campaign staff across the various administrative units to prevent knowledge loss down the chain. This can be achieved through a series of cascading training, each with specific teams working to prepare for mobilization and distribution. Below are a list of of trainings, roles, role descriptions, and estimated number of days required.

2
ICT4D Support Training
(3 days)

ICT4D support personnel is responsible for user support and issue resolution

1
Training of Trainers (TOT)
(4 days)

Training of Trainers (TOT) is for the state/district and national teams responsible for cascading the training to the district level

3
Cascade Trainings
These focus on the three following roles:

1. Commune or sub-district supervisors
2. Distribution point supervisors
3. Mobilization and distribution teams

*Not shown are additional trainings for Campaign Monitoring Team, as well as technical requirements for training. These are covered in a following section.
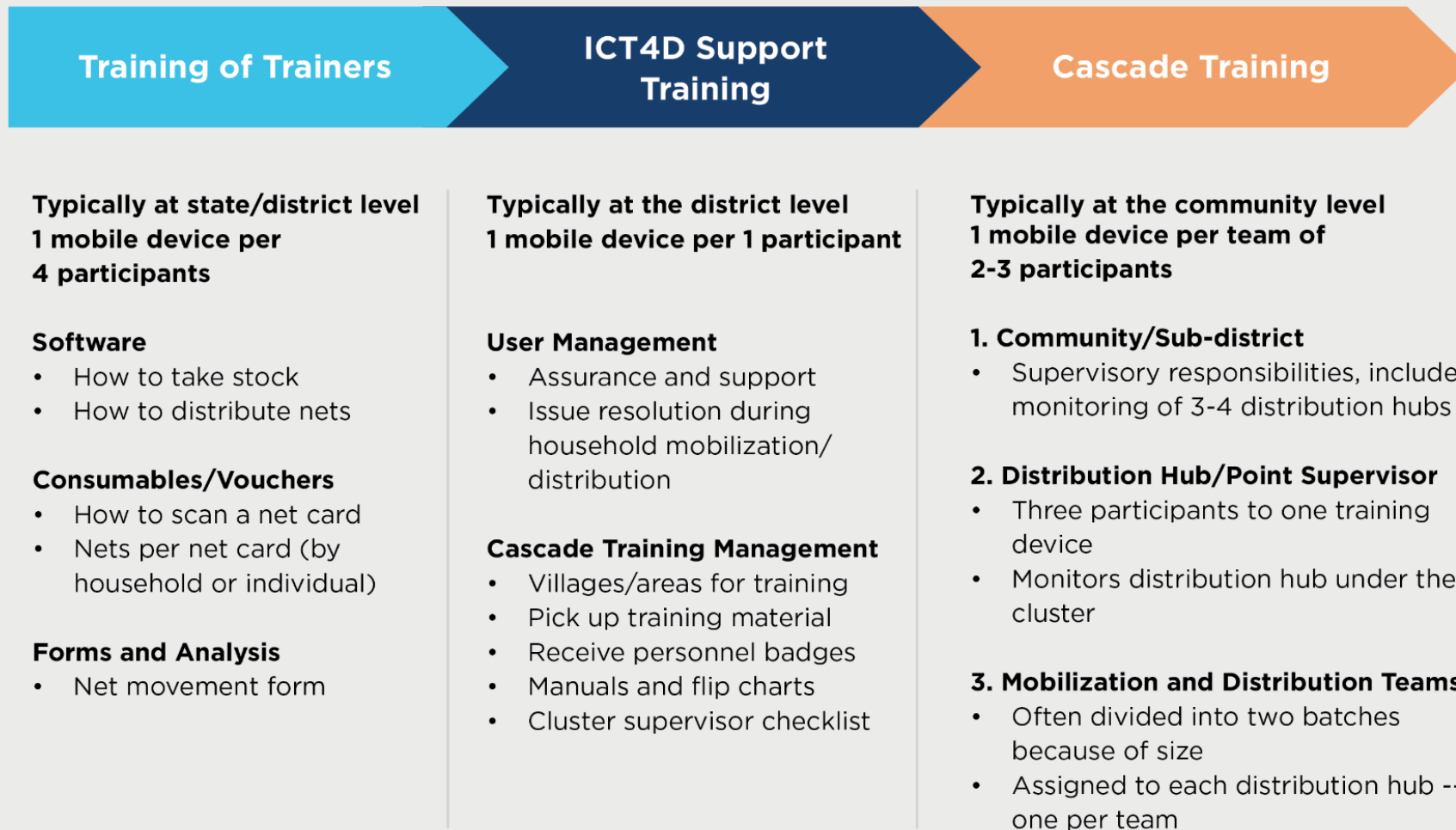
TRAINING

The content for each training varies, but an example from digitalized net campaigns in Nigeria and Benin supported by CRS may include:

Training of Trainers	ICT4D Support Training	Cascade Training

Typically at state/district level
1 mobile device per
4 participants

Software
- How to take stock
- How to distribute nets

Consumables/Vouchers
- How to scan a net card
- Nets per net card (by household or individual)

Forms and Analysis
- Net movement form

Typically at the district level
1 mobile device per 1 participant

User Management
- Assurance and support
- Issue resolution during household mobilization/ distribution

Cascade Training Management
- Villages/areas for training
- Pick up training material
- Receive personnel badges
- Manuals and flip charts
- Cluster supervisor checklist

Typically at the community level
1 mobile device per team of
2-3 participants

1. Community/Sub-district
- Supervisory responsibilities, includes monitoring of 3-4 distribution hubs

2. Distribution Hub/Point Supervisor
- Three participants to one training device
- Monitors distribution hub under their cluster

3. Mobilization and Distribution Teams
- Often divided into two batches because of size
- Assigned to each distribution hub -- one per team

SMC - 2 Persons

Each team consists of one Community Health Worker (CHW)–-the administrator of the SMC dose–-and one data collector who records data using an Android tablet equipped with the digital application platform.

Community Health Worker

Responsible for either administering the SMC dose to the parent/caregiver of the child, or explaining to the caregiver how to administer the first dose to the child under the observation of the CHW. The CHW also manages drug stocks.

Data Collector

Responsible for health talk messages to the household and records data on Android tablet with digital application.

ITN - 3 Persons

Each team consists of a Household Mobilizer/Health Educator who manages an Android phone equipped with the selected digital application, as well as the Distributor/Waste Manager who distributes nets. The security personnel is responsible for the safety of the team.

Household Enumerator

Dual role. Collects campaign-related data about the household including number of nets distributed. Before distribution gives education on what to do with the net, as well as info about COVID-19.

Distributor/ Waste Manager

Dual role. Distributes nets and manages waste.

Security

Provides security for the nets.

Please note *that the campaign implementation context would determine the kind and number of personnel to be utilized per campaign. The example above was derived from CRS experience.*

All considerations of people and staffing will change to fit the strategy, such as the number of people needed for a campaign, the training required, the technology used, and more. But there are some insights that may apply more generally.

1   **Data quality starts with the people.** Most of the data quality challenges regarding data input, redundant information, and data relevance can be traced directly to the users of the devices, not the devices themselves.

2   **Prioritize personnel selection and recruitment.** Adhering to selection criteria will ensure the right staff are operating in the correct role and optimal activity.

3   **Adequate training is critical.** From using the devices to scaling technical support for common issues, trainings will result in either campaign success or failure.

4   **Build partner capacity.** Building the capacity of the government partners to utilize the rich ICT4D features for campaign implementation will promote state ownership, which is a positive step towards sustainability.

5   **Communicate early and often**. If data doesn't make sense, or a team member's request is confusing, just call or text to clarify. Leveraging WhatsApp, SMS, or even short video meetings keeps large teams in sync.

6   **Safety first**. Not just limited to COVID-19, but all epidemic and pandemic preparedness. Using the WHO standard with COVID-19 protocol for trainings will mitigate the spread of COVID-19 and ensure an effective training with maximum concentration from participants.

7   **Leverage in-country capacity as much as possible** to gain buy-in, save costs, and reinforce a sense of ownership.

8   **Build a feedback loop** so data collectors can see how the data was used during the next year's training, and show the collated data they collected and how it was useful. Get feedback from the distributors and consider adjustments to improve the usability of the software.

Process

- ▶ How does a campaign work?
- ▶ Technology components of a malaria campaign
- ▶ Technology vendor management
- ▶ Example of digitalized process for ITN campaigns: warehouse assessment
- ▶ Device management process
- ▶ Recommendations

What does it look like to integrate these tools across a single campaign? Below is an example of how various components of an ITN or SMC campaign may be integrated into technology solutions.

Macroplanning	Compare data from previous campaigns to DHIS2 data to estimate the number of ITNs or SMC drugs needed based on large-scale population estimates.
Microplanning	Facilitate and generate the detailed plan in order to add details on district and sub-district level and determine requirements for activities. May include GIS mapping to find missed populations.
Supply Chain	Leverage digital tools to assess warehouse size, track nets at the different storage levels, and conduct inventory management. Stock taking and taking note of distributed quantities at all levels as well as reverse logistics can also be digitalized.
Training	Leverage digital solutions to manage training attendance and pay stipends for training completion. For SMC campaigns, refresher trainings can be done with videos (link to videos) and child cards. Pre- and post-tests can also be done on devices to facilitate learning evaluation.
Communication	Integrate mobile applications for one-way messaging to target households for Social Behavior Change (SBC) initiatives, provide reminders to campaign personnel to communicate key messages, and inform targeted households of distribution activities. Includes payment processing, end process assessment.
Registration	Register households and provide coupons (or vouchers) to use when picking up ITNs, which are provided in advance. For SMC, register households and provide SMC child cards at the time of SMC drugs administration, which can be registered on a mobile device.
Distribution	Either with teams that go door-to-door or at fixed distribution points. In single-phase, registration and distribution may happen simultaneously by scanning net cards via QR codes on a phone.
Monitoring & Evaluation	Tracking against performance targets, coverage goals, any accountability metrics assigned to distribution teams, and independent monitoring.

*To learn more about this process, visit the AMP resource on The use of digital tools to improve the operational efficiency of ITN campaigns
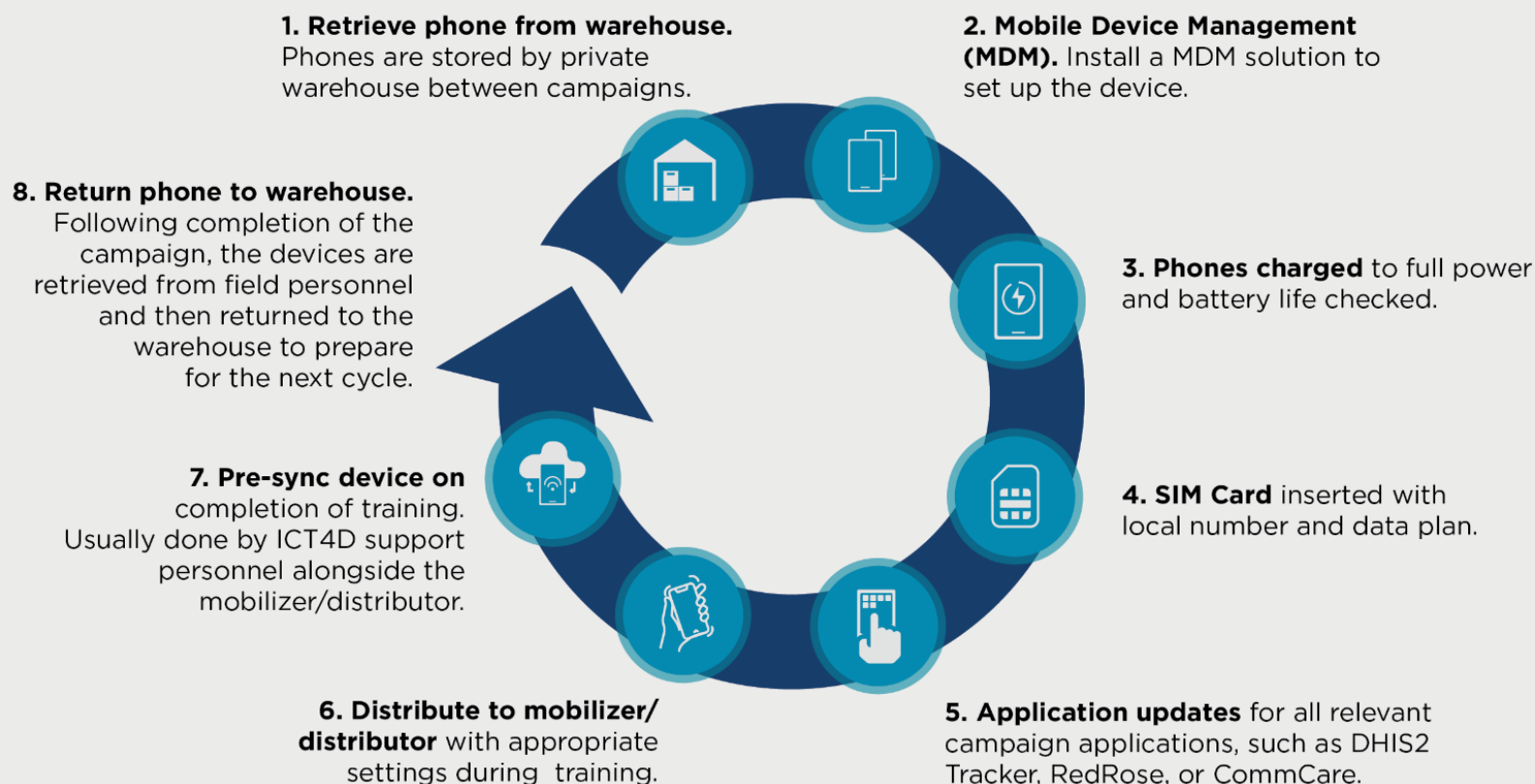
In every campaign cycle, **mobile devices go through forward and reverse logistics** to be retrieved from storage in a warehouse, be prepared for the campaign, be fully deployed, and then returned to the warehouse. The chart below assumes that devices have been purchased and identification of device storage locations has been made alongside government partners. Here's what that process requires:

1. Retrieve phone from warehouse. Phones are stored by private warehouse between campaigns.

2. Mobile Device Management (MDM). Install a MDM solution to set up the device.

3. Phones charged to full power and battery life checked.

4. SIM Card inserted with local number and data plan.

5. Application updates for all relevant campaign applications, such as DHIS2 Tracker, RedRose, or CommCare.

6. Distribute to mobilizer/ distributor with appropriate settings during training.

7. Pre-sync device on completion of training. Usually done by ICT4D support personnel alongside the mobilizer/distributor.

8. Return phone to warehouse. Following completion of the campaign, the devices are retrieved from field personnel and then returned to the warehouse to prepare for the next cycle.

Digitalizing campaigns is an exciting field that many organizations are exploring and refining. These are some methods of improving chances of success, but there are many more variations and details than have been included in this section. Here are some ways to continue to improve:

1   **Does this need to be digitized?** Picture yourself as the implementers of this project so you can explain to those in the organization who have worked for years on processes and systems that did not involve digitalization. "What makes this better than what I've always used?"

2   **How does this align with National Health Strategies?** Prioritize the government's current strategy, if there is one. Begin with the understanding that this campaign will need to be understood and eventually run by the government or an actor of the government's choosing.

3   **What is the existing process?** Chart your current processes to better understand where there may be potential for applying technology solutions. Share information and consider scenario planning.

4   **Have you mapped the existing systems?** The experts who can help you do the mapping first – BEFORE you make any big expensive tech purchases. How do these systems integrate? Can campaign data be fed into a compatible HMIS?

5   **Who are you engaging for relationship management?** Your organization is probably not the only actor, and most supply chains are controlled at the Ministry of Health level. How do you address questions of data ownership, data privacy, and server storage for sustainable programming?

6   **Have you piloted the solution prior to scaling?** One way to test and scale is to find "model health facilities" that are willing and able to do everything they want to be replicated across other health facilities.

7   **Have you considered the existing in-country digitalization ecosystem?** What are key indicators such as private data center, government-owned data center, IT local market, and maintenance support? What are the legal issues regarding data access and storage should be taken into account?

Technology

- What technology is needed?
- Hardware: procurement and management
- Software: choosing the right application
- Open source or proprietary?
- Mobile device management
- Experience from Benin

WHAT TECHNOLOGY IS NEEDED?

It's important to note that there can be important differences between how campaigns are executed, which can impact the features needed from a digital tool. Features change over time, partner experiences vary across contexts, and legacy decisions influence future decisions on technology applications.

Hardware. How many devices are needed? What are the requirements of the device? Will you provide and store them or ask CHWs to bring their own? Are you going to set up or rely on a local infrastructure (servers, Internet link, LAN/WAN etc...) or a cloud one?

Software. What operating system (probably Android v.6 and above)? What mobile applications will CHWs use to implement a campaign? Are you going to use off-the-shelf software or develop it?

Participant Data. What data will you collect? How will it be stored? How does this integrate with existing datasets? Is there a personal data policy in place to comply with? How will data privacy be managed?

Dashboards. How will this be turned into data-driven decisions? What data is needed to improve malaria outcomes?

Consumables. A consumable is intended for consumption during the malaria campaign. These could include vouchers for nets, limited data plans, and more.

The Alliance for Malaria Prevention (AMP) provides a helpful guide for leveraging digital tools in campaigns (2021). An example of what this looks like in the context of malaria interventions, along with accompanying feature sets, can help assist in decision making. In reality, campaigns may use multiple tools throughout at different stages.

	RedRose	CommCare	ODK	DHIS2 Tracker
Model	Proprietary	Open Source	Open Source	Open Source
Platform	Android, iOS	Android, iOS	Android	Android
Supply Chain	✓	Potential	*Not available*	Potential
Training	✓	Potential	*Not available*	*Not available*
Communication	Potential	Potential	*Not available*	*Not available*
Application Use by Country (by CRS)	Nigeria, Benin	Guinea (SMC), The Gambia (ITN)	Multiple	Burkina Faso, Guinea (ITN), The Gambia (SMC)

It's important to note that this is not a comprehensive list of tools. A critical distinction is that the more people that have to use a given solution, the simpler it should be. It may be necessary for an ICT4D specialist to understand dozens of solutions and their tradeoffs, but scaling that across thousands of frontline workers and dozens of technology solutions can be costly, time-consuming, and impossible to implement.
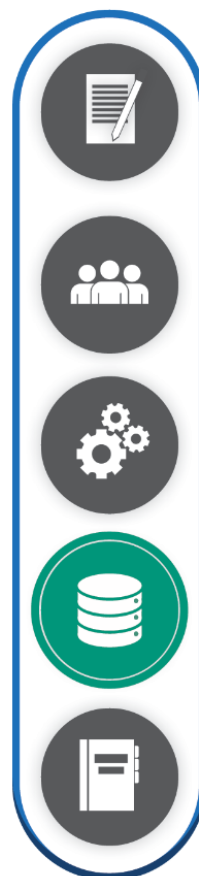
MOBILE DEVICE MANAGEMENT

Individually managing dozens of mobile devices can be difficult. Managing the thousands required for a malaria campaign can appear impossible. Fortunately, Mobile Device Management (MDM) is a device lifecycle management technology that enables organizations to deploy, configure, manage, support, and secure mobile devices through MDM profiles installed on the devices. (CRS)

Here's how it supports a malaria campaign:

Device Inventory and Management. Provides a unified platform to see all device users, locations, and list of software and configurations deployed on the device.

Define or Disable Phone Plans. Define and manage phone plans to alert users and admins on reaching pre-set usage levels.

Device Security and Restrictions. Identify compromised devices or a security breach, set or disable passcodes on devices, or lock and unlock remotely. It also allows you to define certain restrictions on the devices to limit misuse.

Manage Software Applications. Install and uninstall software applications and updates remotely, as well as limit visibility, access, and functionality to specific applications both at the home screen and within the background processes.

Alerts and Messages. Push messages out to devices that are in your project fleet for data collection or engagement with mobile workers.

Tracking Device Location, Theft/Loss Prevention. In addition to tracking solutions provided on mobile application, MDM can geolocate devices for workforce oversight or loss prevention.

Note that the recommended settings may vary by campaign and use case. Generally, best practice is to lock all applications that are not directly being used by the campaign to streamline processes and preserve both data plans and battery life.

MDM settings also vary by options available, with AirWatch and Intune being two of the most commonly used solutions. Consider cost and support model in addition to the functionality listed.
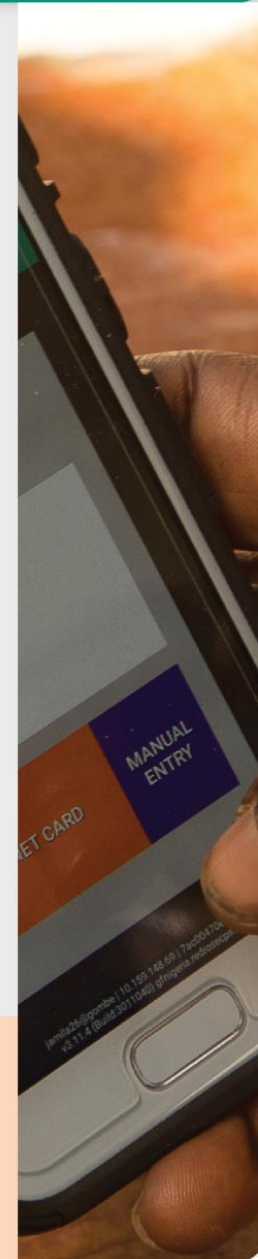
When the Republic of Benin began its first health campaign digitalization in 2019, the standard practice was for each health campaign to set up a separate digital platform instance in order to perform the household enumeration and distribution. The data generated from this standalone campaign is usually used only for the purposes of the specific campaign and may not be used for any other health campaign.

The CRS country program in Benin collaborated with the Ministry of Health to determine and explore opportunities to reuse the investment in one health campaign in an integrated manner by developing a robust digital system called Health Campaign Management System (HCMS). This tool provided the ability to leverage data across campaigns, by registering and updating information on individuals and households during each visit in a central database, as well as designating health commodity to the household or its members.

The HCMS platform was used to successfully enumerate the entire country population in 2020 during the ITN campaign and this data was reused as enumeration data for the 2020, 2021, and 2022 SMC campaigns. The same platform and updated population data from the SMC campaigns was used to implement the 2021 and 2022 river blindness campaigns. This approach also enabled the Ministry of Health to have more in-depth, cross-campaign coverage data to better understand the impact of malaria prevention intervention by household.
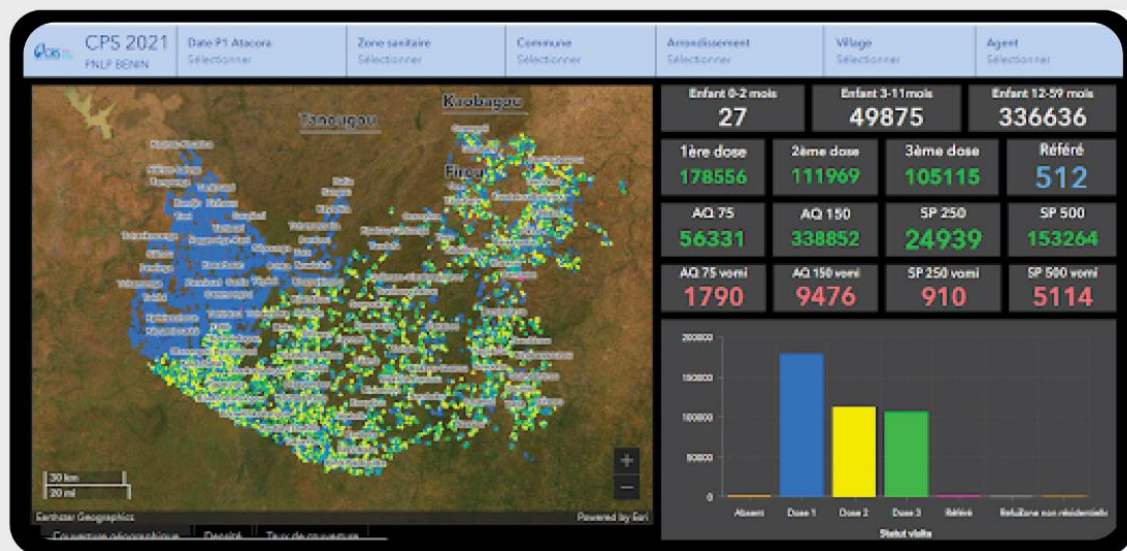
To read more about CRS digital support to Benin's campaigns, visit:
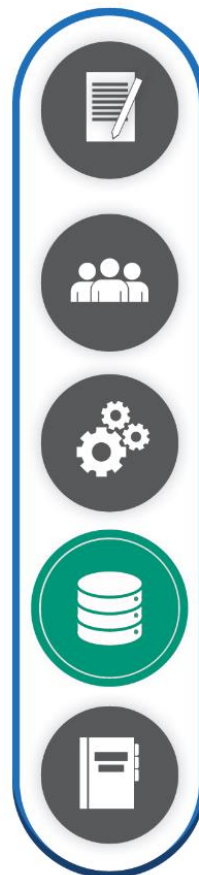
APPENDIX

▶ Full list of contributing experts

▶ References

Thank you! Questions?
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