



Digitalization of ITN and SMC campaigns in Complex Operating Environments (COE)

Global findings and five country case studies

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Led by inputs from national malaria programmes and partners in Burundi, Chad, Mali, Nigeria, Pakistan, Somalia, and South Sudan

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Examining the Use of Digital Technologies to Facilitate ITN and SMC Campaigns in COEs

Context

- HARP Working Group (WG) mandate – To improve the operational delivery, access to, and use of ITNs for internally displaced persons (IDPs) and refugees.
- CRS' Global Malaria Strategy, Priority Area 5 – To position multisectoral approaches as a global best practice for reducing malaria, particularly in humanitarian and emergency contexts.
- Recommendation of the HARP WG multi-sectoral roundtable meetings to address the challenges of malaria prevention in humanitarian relief settings – to collect and share data for evidence-based decision-making and accountability.

Objectives of the Review

- Identify and synthesize key trends, successes, and challenges for improving digital technology for monitoring COEs, ensuring the strategic allocation of resources, and enabling stakeholders to track progress and quantify the malaria needs of IDPs and refugees.

Methods

Literature review

- Compiled key relevant findings from the literature review were compiled in MS Excel, including information from national malaria programmes (NMP) and key project partners, including AMP, CRS, and the United Nations Development Programme (UNDP). These included case studies, MS PowerPoint presentations from meetings and webinars, handbooks, and landscaping reports.

Key informant interviews (KII)

- Organized and conducted with 24 key informants, including NMP Coordinators, AMP ITN digitalization consultants, and partners including UNICEF, UNDP, Against Malaria Foundation (AMF), eGov Foundation, Malaria Consortium, and Clinton Health Access Initiative (CHAI).
- Provided an overview of experiences with different digital technology solutions.
- Represented a range of COEs at national and sub-national levels and a range of geographic regions and partners.

Case studies

- Five case studies developed to provide in-depth overviews of NMP-led exploration, design, implementation, and continuous improvement for digitalization across key components of ITN and SMC campaign distribution.

Key Findings

Successes in the development and extension of digital technology for ITN and SMC campaigns

- *Improved Data Quality and Decision-Making.* NMPs are leading the use of real-time digital dashboards to identify and correct registration errors mid-campaign, ensuring accurate data-driven decisions that were previously impossible with paper reporting.
- *Enhanced Operational Efficiency and Campaign Equity.* Digital mapping and tracking tools have significantly increased campaign coverage and equity, successfully reaching remote or difficult terrains in countries like Nigeria and Mali.
- *Cost-Effectiveness and Resource Optimization.* Moving to digital platforms generates long-term savings by reducing logistical costs—such as a 90% reduction in printing—and preventing over-procurement through more accurate population estimates.
- *Building Local Capacity and Collaboration.* The transition to digital systems fosters national ownership by training local government staff to manage technical operations, reducing reliance on external support and improving the user experience for field volunteers.

Key Findings

Overcoming challenges in extending digital technology for ITN and SMC campaigns

- *Human Resource and Capacity Gaps.* To address digital literacy gaps and high staff turnover, programs are deploying specialized technical support groups from Ministries of Health to provide continuous, on-the-ground training for field teams.
- *Connectivity and Infrastructure.* Persistent power and network barriers are being overcome through robust offline application functionality and the provision of solar-powered charging solutions for volunteers in remote areas.
- *Security and Privacy.* In high-risk or conflict zones, teams mitigate security threats by employing local data collectors, using protective gear for devices, or pivoting to hybrid paper-based systems where mobile phone use poses a physical risk.
- *Data issues.* To tackle challenges like duplicate registrations and naming inconsistencies, programs are initiating pilot phases to refine app functionality and streamline data cleaning processes before full-scale rollout.
- *Interoperability and Scalability.* Countries are breaking down "data silos" by integrating campaign tools into national platforms like DHIS2, allowing household registries to be reused across different health interventions like immunizations and SMC.



Case Studies

Review of Technology to Facilitate ITN and SMC Campaigns

Case Studies

Country	Case Study
Burundi	<i>Tsinda Malariya – Defeat Malaria</i> <i>Burundi's use of the DIGIT HCM platform to promote ITN access and campaign efficiency</i>
Chad	<i>Use of Mobile Device Management, KoboCollect, DHIS2, and Power BI to mitigate flooding and security challenges during the 2023 ITN Campaign</i>
Mali	<i>Strengthening ITN and SMC campaigns in Mali through DHIS2, where security allows</i>
Pakistan	<i>Pakistan's leadership in Designing and Implementing the Digitalization of ITN Campaign Microplanning with DHIS2</i>
Somalia	<i>Somalia's Digital Transformation for Malaria Vector Control: Pioneering ITN Distribution and Innovative Use of DHIS2</i>

Burundi: DIGIT HCM for ITN distribution (Tsinda Malariya)

Background and ITN Campaigns

- Recent campaigns face complex challenges, including internal displacement from climate-related floods and an influx of over 40,000 refugees from the DRC in early 2025.

Digitalization of Campaigns

- The 2025 "Tsinda Malariya" initiative uses the DIGIT HCM open-source platform to manage micro-planning, household registration, ITN distribution and monitor supply chain.

Addressing Identified Challenges

- *Fuel shortages limiting electricity*: Volunteers received power banks or linked to facilities with solar-powered charging.
- *High staff turnover and digital literacy gaps*: Census-trained officers were paired with 11,485 community health workers for on-the-job capacity building.

Results and Achievements

- During the 2025 pilot distribution coverage reached 97%.
- Digitization effectively reduced the time required for household registration to just 8.5 days.

Lessons learned

- Important to complement initial theoretical training with practical training, i.e., scanning barcodes on bales rather than paper

Chad: Use of technology in mitigating flooding, security challenges

Background and ITN Campaigns

- Chad is Africa's fifth-largest country and hosts more than 1.2 million refugees and 300,000 internally displaced persons (IDPs) while facing significant climate vulnerability.

Digitalization of Campaigns

- Transitioned in 2023 to a fully digital solution integrating three cloud-based platforms: KoboToolbox for household data, DHIS2 for analysis, and PowerBI for visualization.

Addressing Identified Challenges

- *Heavy rains and floods:* To protect expensive hardware, staff were provided with specialized rain gear and carrying cases.

Results and Achievements

- The transition demonstrated that a nationally led, digitalized campaign could be implemented within standard timelines even in highly complex regions.

Lessons Learned

- *Continuous improvement:* Incorporated user feedback and applied lessons from a 2022 SMC pilot to reinforce the digital platform for operational realities.
- *Standardized Infrastructure:* Moving to cloud-based systems (DHIS2/PowerBI) proved more effective than maintaining local physical servers in a fragile environment.

Mali: Strengthening ITN, SMC campaigns with DHIS2

Background and ITN Campaigns

- 2023 campaign split into two phases due to security and logistical constraints.
- Mali implements annual SMC during the rainy season.

Digitalization of Campaigns

- Began as 10-district pilot for 2022 SMC campaign, with lessons applied to the 2023 ITN campaign.
- Will ensure interoperability with wider DHIS2 which Ministry of Health is adopting in 2025.

Addressing Identified Challenges

- *Security*: In northern Mali, carrying digital devices in public is a security risk; digitalization is thus restricted to "office-based" supply chain management and supervision to protect staff.
- *Cultural Context*: Digital tools helped identify multi-generational households (sharing one compound) that did not fit standard definitions, allowing ITN allocation adjustments.

Results and Achievements

- SMC: coverage increased from 60% in 2022 to 95% in 2024.
- ITN: achieved a 99.26% distribution rate across 46 districts.

Lessons Learned

- *Device Quality*: Procurement is a hurdle; over 20% of initial devices had operating system problems, highlighting the need for rigorous hardware testing before deployment.

Pakistan: Leadership in designing and implementing the digitalization of ITN campaign microplanning with DHIS2

Background and ITN Campaigns

- Floods (2022) caused malaria cases to quadruple, particularly along border with Iran and Afghanistan.
- Operating environments are highly complex due to violent extremism, tribal feuds, and a massive influx of refugees in border areas.

Digitization of Campaigns

- DHIS2 used for microplanning, household registration, using coupons, and ITN distribution.

Addressing Identified Challenges

- *Security Concerns*: In high-risk areas, the program uses *Hit and Run* strategies (rapid door-to-door distribution) and recruits personnel from local communities to build trust and ensure safety.

Results and Achievements

- The 2024 ITN campaign achieved a coverage rate of 93%.

Lessons Learned

- *Integrated Surveillance*: Leveraging Pakistan's experience using DHIS2 for flood monitoring and malaria surveillance made the transition to ITN campaign modules faster and more cost-effective.
- Due to these successes Pakistan intends to conduct cost-comparisons across all campaigns since 2018 to further refine the economic efficiency of digital tools.

Somalia: Pioneering ITN Distribution and Innovative Use of DHIS2

Background and ITN Campaigns

- Somalia has several COE contexts due to fragility, natural disasters (droughts and El Niño flooding), and significant population displacement.

Digitalization of Campaigns

- DHIS2 for household registration, geospatial tracking of distribution sites, and a "Last Mile Monitoring" app to track stock from procurement to district warehouses.

Addressing Identified Challenges

- *Security & Robbery:* Field staff navigate risks of phone theft and interference from armed groups by engaging district commissions for security support.
- *Data Duplication:* To address the lack of national ID systems and common naming conventions, technical teams use close ground-level coordination to eliminate duplicate registrations.

Results and Achievements

- The digital system allows for spot checks via household phone numbers to confirm they received the correct number of ITNs.

Lessons Learned

- *Local Context Nuance:* It is critical for technical developers (often based externally) to maintain dialogue with local teams to capture Somali-specific needs, such as the different categories of IDPs.

Thank You

Digitalization of ITN and SMC campaigns in COEs



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