



DIGITALIZATION IN GHANA:

THE USE OF AN IN-HOUSE ANDROID PLATFORM (NETAPP) DURING THE 2018 AND 2021 INSECTICIDE-TREATED NET (ITN) MASS DISTRIBUTION CAMPAIGNS

JULY 2023

amp | The Alliance for
Malaria Prevention

Expanding the ownership and use of mosquito nets

CONTENTS

Introduction	3
Digitalization of the mass ITN campaign	4
Implementation	5
Household registration (HHR)	6
ITN distribution	7
Supply chain management	9
Monitoring and evaluation	9
Outcomes	10
Lessons learned	11

INTRODUCTION

The Ghana Health Service (GHS), through the National Malaria Elimination Programme (NMEP) and in collaboration with development partners including the US President's Malaria Initiative (US-PMI), implements multiple malaria control interventions: distribution of insecticide-treated nets (ITNs), indoor residual spraying (IRS), intermittent preventive treatment in pregnancy (IPTp), and seasonal malaria chemoprevention (SMC). Since 2012, ITNs have been distributed throughout the country via mass campaigns and continuous distribution through antenatal clinics (targeting pregnant women), child welfare clinics (targeting children under the age of five who are due for their

second dose of measles vaccine), and primary schools (targeting pupils in primary 2 and 6).

The NMEP has been distributing one net for every two individuals in each household since 2012, following the WHO universal coverage policy. Mass ITN distribution campaigns in 2012 and 2014 relied on paper-based vouchers for registration and distribution, with manual processes that were labour-intensive. The paper-based tools resulted in errors, delays in consolidating data, and incurred additional costs for deploying teams to different districts to validate the registration and distribution information.



DIGITALIZATION OF THE MASS ITN CAMPAIGN

In 2018, the NMEP implemented a mass campaign with the objective of achieving the registration of, and distribution of ITNs to at least 90 per cent of the population. To overcome the challenges faced during previous paper-based campaigns, the NMEP introduced digital tools in the mass distribution campaign. This transition aimed to enhance data transmission, improve data quality, and enable real-time data analysis to support decision-making.

The NetApp platform was developed with collaboration between the NMEP and its implementing partners. The platform was developed by in-house IT personnel who were seconded to the programme from the Ghana Health Service. Consulting the existing paper tools from previous campaigns, the IT team collaborated with the technical team to identify the

necessary functions and design required to create a user-friendly and customized platform that could address the key challenges identified in previous campaigns. The decision to develop the tool in-house was driven by the absence of a suitable open-access campaign tool and the programme's need for sole ownership and control, as well as customizing to the local context.

The choice of an Android application was preferred due to the widespread use of Android devices in Ghana and the broader African region. Users tend to find Android applications easier to navigate. This made the adoption of the NetApp relatively simple and facilitated the training of campaign actors in its use.



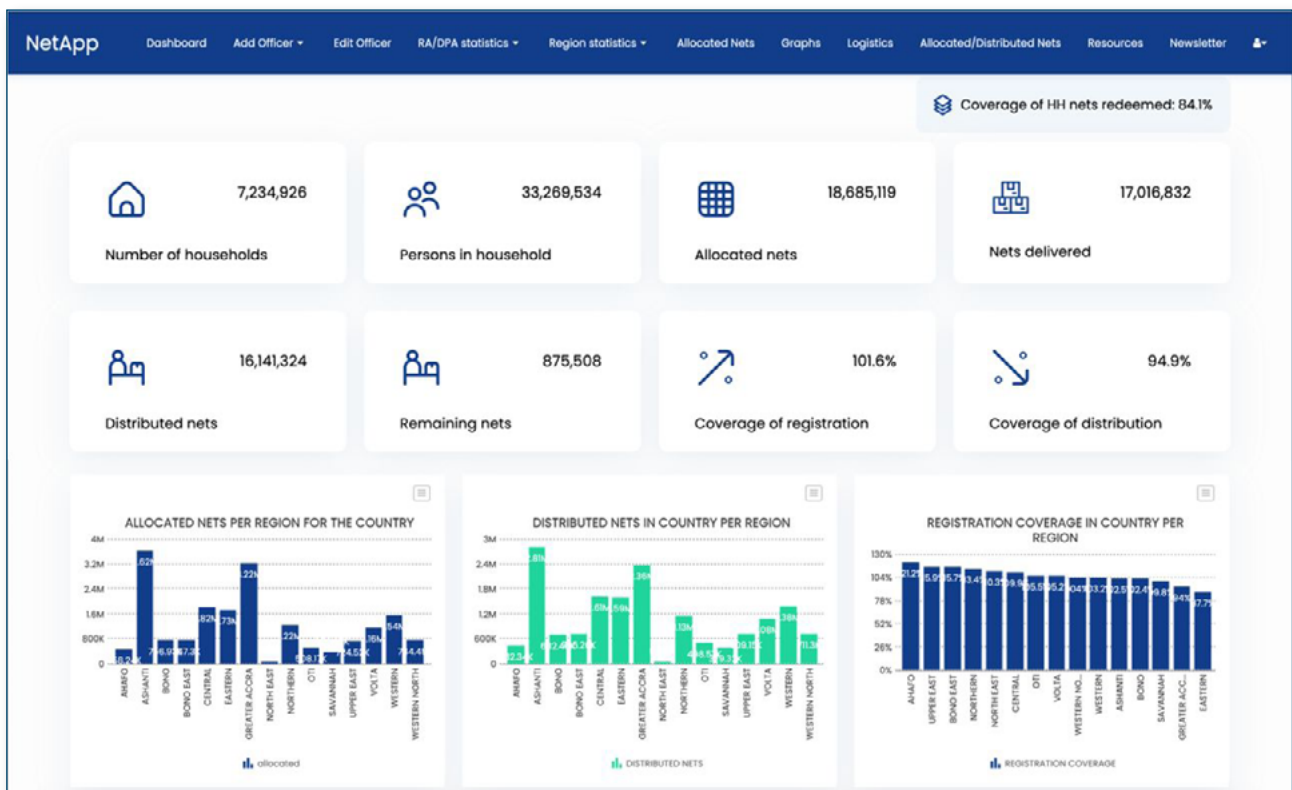
Household registration exercise with NetApp in Brong Ahafo region, Ghana - 2021 mass campaign
© Robert Opoku, AMP

IMPLEMENTATION

Following the design and development of the NetApp platform, the IT and technical team conducted thorough testing to ensure the successful integration of all components from the paper tools and to establish consensus on the essential metrics to be included in the dashboards. To assess its field practicality and address any potential challenges prior to a full-scale deployment for the 2018 mass campaign, the NMEP conducted a small-scale pilot in two districts. During the pilot, several gaps and synchronization issues were identified and successfully addressed before the platform was deployed nationwide.

Over 2,000 mobile Android tablets were purchased and distributed to regions for each phase of the ITN campaign. The system also included a web dashboard capability, which was accessible to regional and district managers, enabling them to monitor the progress of the campaign as it rolled out. To ensure widespread availability and accessibility, the NetApp application was made available on the Google Play store. This enabled supervisors to easily download and use the app for monitoring and supervising the campaigns on their personal devices. A dedicated team of national trainers was established to oversee the roll-out of the digital platform and provide training to health information officers and IT officers at regional, district and sub-district levels to ensure effective implementation of the ITN campaign digitalization.

Figure 1: Dashboard as viewed at the national level, 2021 mass campaign



During the 2018 and 2021 mass campaigns, the NetApp platform was designed to support the following campaign components:

Household registration (HHR)

The implementation of the NetApp platform greatly supported the registration and household data collection by enabling the registration of household members, summarizing registration data, cross-referencing with microplanning data and automatically allocating ITNs based on household size and campaign cap rule. Trained registration assistants used the assigned devices and the NetApp application to register community members at the household level.

During the 2018 campaign, each household head received a distribution voucher at registration with a unique identifiable code, which

was used to redeem ITNs during the distribution phase. Additionally, the application also automatically recorded GPS coordinates of registered households, allowing for precise geo-referencing of recipients. In 2021, to minimize interpersonal contact and prevent the spread of COVID-19, additional measures were implemented. In place of the unique registration code, any national identity card, such as health insurance, national ID or voter ID cards belonging to the household heads were used to register households. The unique identifiers on these cards replaced the need for issuing registration vouchers, reducing the cost of printing vouchers and the risk of multiple contacts.

Figure 2: Example of a registration code generated by NetApp during the 2021 mass campaign

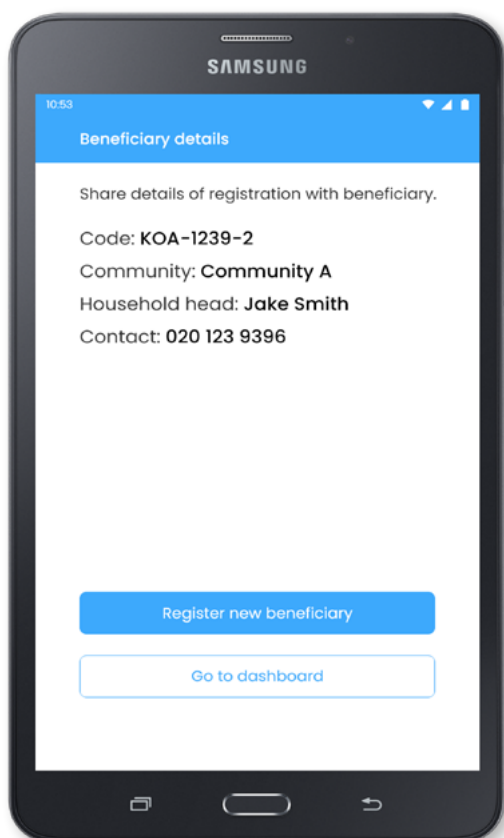
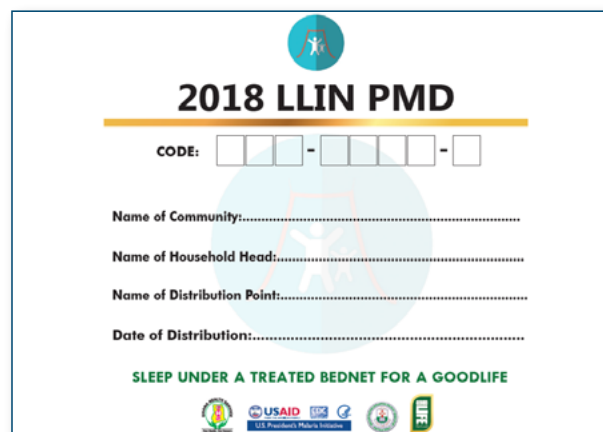


Figure 3: Example of a voucher issued to household heads at registration during the 2018 mass campaign

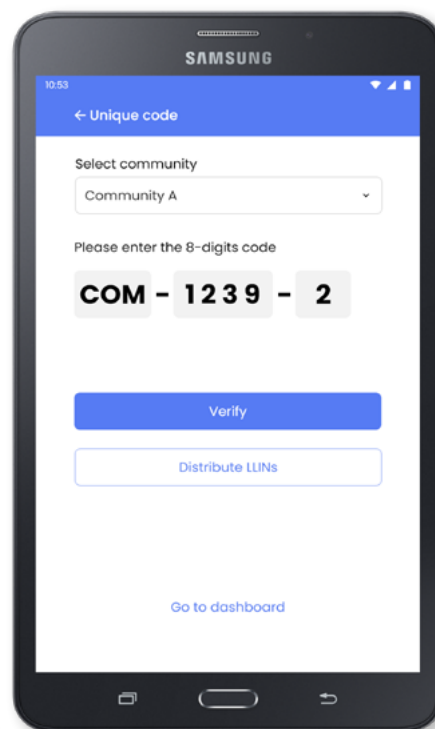


ITN distribution

The NetApp has three main functions: household registration, distribution of ITNs with the unique codes or identifier and stock management. The user-friendly interface of the application allows for seamless linking of allocated ITNs with recipient details and distribution locations. To ensure reliability and precision, a further interface validates the allocated ITNs and distribution records, guaranteeing that the nets reach their intended recipients as planned.

Furthermore, the application includes checks to verify if each registered individual has received their allocated ITN(s) using the unique code to prevent double distribution. This feature enhances the accuracy of the distribution process, reducing discrepancies and ensuring that ITNs are effectively delivered to the intended recipients. By employing these functions, the NetApp system streamlines the ITN distribution process, improving its effectiveness and reliability.

Figure 4: Sample of distribution interface of the NetApp during the 2021 ITN mass campaign



Distribution of ITNs during the 2021 campaign, using digital tools
© Robert Opoku, AMP



Tallying of ITNs distributed at a distribution point, 2021 mass campaign
© Robert Opoku, AMP

Supply chain management

The NetApp application significantly enhanced the visibility of the ITNs throughout the supply chain, providing a streamlined process to track the actual quantities of ITNs supplied to different districts. Supervisors at every level could track the ITNs provided for distribution.

After completion of registration, the application automatically consolidates the quantity of ITNs

to be supplied to each region, district, sub-district and community. As the nets are transported to the prepositioning sites, the system is updated in real time to reflect the number of ITNs that have been supplied. This transparency enables accurate monitoring of the net supply and ensures that the distribution process is closely monitored.

Monitoring and evaluation

The NetApp provides regional and national management with the ability to monitor the activities of the district health management teams (DHMTs). This allows the NMEP to ensure compliance with guidelines and to take appropriate action if any discrepancies are identified.

The guidelines clearly outline the expectations for each actor involved in the process. The NMEP uses the digital platform's built-in audit functions and various checks to monitor the activities of registration assistants (RAs) and staff at the distribution points. This enables the NMEP to identify any irregularities, such as instances

where households are not being registered accurately or when single households are being presented as multiple households to obtain more nets than allocated.

The digital platform also includes features that raise warning flags for unusual activities, such as ITN redemptions logged in at unconventional hours like 01:00 a.m. This prompts further investigation, as net redemptions are typically expected to occur during daytime hours. These checks and audit functions help maintain accountability and ensure the integrity of the registration and distribution processes.

OUTCOMES

Digitalizing the ITN mass campaign has resulted in significant improvements and efficiencies throughout the entire campaign process. Previously, it took up to two years to complete the distribution of ITNs nationwide due to the labour-intensive and time-consuming manual tasks of consolidating and validating registration data before sending ITNs to districts and prepositioning sites. However, with the introduction of digitalization, the time required to complete ITN campaigns nationwide has been significantly reduced to about nine to twelve months.

The introduction of digitalization has accelerated the data validation process to within two days, compared to two weeks with the paper-based approach, facilitating accurate quantification of ITN needs and informed decision-making regarding the allocation of nets to districts and prepositioning sites based on registration data. It also improved logistics management by providing data to inform logistics teams on commodity movements. This has resulted in cost savings by eliminating the delivery of extra nets that were previously required to compensate for inaccuracies in net quantification. Additionally, it has reduced the costs associated with transporting leftover nets to different regions.

The availability of real-time data through the digital platform has greatly enhanced the monitoring and supervision of campaign progress. Through interactive dashboards, supervisors now have a comprehensive overview of the entire distribution process without the need to be physically present at every location. This real-time data accessibility enables the prompt identification and resolution of challenges, such as low registration or distribution coverage in urban areas or low redemption rates in specific areas. The ability to make informed decisions based on up-to-date information has enhanced the efficiency and success of the ITN distribution campaign.

The reliance on a paper-based system and Excel for consolidating final registration and distribution data created notable delays and inaccuracies in the reporting of distribution figures. Previously, it took over a month for districts to report their final distribution numbers to the central level. The introduction of digital tools reduced this time owing to the availability of near to real-time data. By transitioning from a paper-based system to digitalization, the challenges associated with data delays and inaccuracies were reduced, addressing some audit queries the NMEP used to receive from donors after campaign implementation due to inaccuracies in the paper-based systems.

LESSONS LEARNED

- **Leadership and commitment:** Strong leadership and commitment from all levels of the health service are crucial for the success of digitalization initiatives. Active participation and dedication from stakeholders helped identify challenges and necessary functionalities to improve campaign efficiencies.
- **Continuous improvement:** Ghana's successful digitalization was attributed to in-house development, allowing seamless adoption to the local context and modifications during implementation. Regular updates and continuous development of tools resolved issues and kept up with evolving needs and challenges.
- **User-centric design:** Considering the needs of end users from the early stages and actively seeking their feedback during the design and development of the application ensured easy acceptability and use of the digital tool. User feedback should be actively encouraged to drive continuous improvement.
- **Adaptation to changing circumstances:** Flexibility in the design of the platform is essential for successful digital tool implementation. In 2018, Ghana's NMEP was using a "code card" which recorded details of each recipient. This code card was then exchanged for an ITN at the distribution point. During COVID-19 there was a need to minimize exchange of paper documents, so the use of code cards was abandoned (unique codes are still used, but these are not paper-based) and the number of options for redeeming an ITN was increased. Using tools that can be adaptable to the circumstance should be considered in the development and implementation of digital tools.
- **Implementing a multifaceted deployment strategy:** The campaign employed multiple strategies to deploy the digital platform effectively. While tablets were provided for registration and distribution assistants, the availability of the NetApp on the Google Play store enabled supervisors to install it on their personal devices for real-time monitoring and oversight. This approach ensured widespread access to the platform, enhancing supervision and monitoring of the campaign.
- **Long-term cost savings:** Although digitalization incurs initial high investment, it results in long-term cost savings. Improved accuracy in net quantification and logistics management eliminates transport of excess nets and reverse logistics, reducing overstocking and unnecessary transportation costs. The devices procured can also be used for multiple interventions including SMC and larval source management (LSM).
- **Support for volunteer adaptation:** Introducing digital tools to volunteers accustomed to paper-based systems can be challenging. Providing support and training to help volunteers adapt to the new technology is crucial. There is also the need to consider deploying technologically competent community health workers or asking community volunteers to nominate people within the community who can use the devices to address the initial difficulties.
- **Consider connectivity constraints:** Not all areas of the country may have reliable internet connectivity. This can pose challenges for synchronizing data at the end of the day, particularly in remote areas where internet access is limited. Optimizing the offline functionality of the app ensures smooth operation in such circumstances, allowing data synchronization when internet access becomes available.



AMP CONTACTS

To join the weekly AMP conference call each Wednesday at 10:00 AM Eastern time (16.00 PM CET) use the following Zoom meeting line:

<https://us06web.zoom.us/j/2367777867?pwd=allhZk9KQmxcMXNaWnRaN1JCUTQ3dz09>

You can find your local number to join the weekly call:

<https://zoom.us/u/acyOjkIj4>

To be added to the AMP mailing list visit:

<https://allianceformalariaprevention.com/weekly-conference-call/signup-for-our-mailing-list/>

To contact AMP or join an AMP working group please e-mail:

allianceformalariaprevention@gmail.com

For further information please go to the AMP website:

<https://allianceformalariaprevention.com>