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# The Incalculable Value of Digital Health Campaigns:

## PERSPECTIVES FROM BENIN

Catholic Relief Services is the official international humanitarian agency of the United States Catholic community. CRS' relief and development work is accomplished through programs of emergency response, HIV, health, agriculture, education, microfinance and peacebuilding. CRS eases suffering and provides assistance to people in need in more than 100 countries, without regard to race, religion or nationality.



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# Introduction

Health campaigns achieve relatively high cost-effectiveness, [1] but represent a significant investment of financial and human resources. Beyond direct financial costs, campaigns also incure significant opportunity costs, such as time spent by front-line workers and supervisors on campaign activities in lieu of other routine health activities. These large investments are made because campaigns can be transformational: campaign style-approaches helped eradicate smallpox and have been instrumental in bringing Polio to the brink of eradication. But campaigns are only effective when they can achieve high coverage, at scale. Yet, with paper-based records, it can be difficult to verify who was reached during a campaign and true coverage can be near or even below the minimum needed to achieve anticipated health outcomes.[2] Digital tools can improve access to higher quality data that can be used to improve campaign coverage.

Catholic Relief Services (CRS) is a leader in health campaign digitization in Africa and has supported successful digital campaigns in Benin, Burkina Faso, Guinea, Mali, Nigeria, Niger and The Gambia. By helping implementers achieve better campaign results, digital tools can offer more impact. Digitization efforts can also offer spillover benefits that further strengthen health system implementation. Traditional cost-benefit analyses risk underestimating the true benefits of digitization, by relying on lower quality coverage data from paper campaigns as a point of comparison, and because many benefits of digital health interventions accrue at the system level and build over time. Decision makers need to draw on a more nuanced understanding how digitized campaigns are qualitatively different to advocate for increased investment in digital approaches.

This brief shares perspectives on advantages and challenges of campaign digitization collected from a range of stakeholders[3] in Benin (see Key Stakeholders, page 5) after their experience with CRS-supported digitization efforts. From 2019 to 2021, CRS supported the successive digitization of several campaigns in Benin: [4]

- A nationwide Insecticide Treated Bed Net (ITN) campaign (in 2020), carried out by Benin's Programme National de Lutte contre le Paludisme (PNLP).
- The four-month seasonal malaria chemoprevention (SMC) campaigns (in 2020 and 2021) carried out by the PNLP and the USAID Integrated Health Services project implemented by Management Sciences for Health (MSH) in four of the country's health zones.
- Half of the nationwide onchocerciasis mass drug administration effort (in 2021) carried out by the Programme National de Lutte Contre les Maladies Transmissibles (PNLMT) with support from USAID's Act to End NTDs implemented by FHI360.

Notably, these campaigns were partially integrated, with data from preceding campaigns deployed to reduce enumeration needs for subsequent campaigns through a live and updatable master campaign database.

The brief identifies many benefits that are intangible or hard to quantify. Therefore, it is important that global health leaders not rely on solely on cost-benefit studies when making digital investment decisions. Understanding the qualitative improvements derived from digital health campaigns should increasingly justify the significant financial investment in digitization capacity and infrastructure.

1 https://campaigneffectiveness.org/why-campaigns/
2 Kamara et al., 2019, Adriko et al., 2018
3 Stakeholders participated in interviews or focus group discussions with a CRS staff not directly involved in the digitization effort in November 2021.
4 CRS was initially requested to support the digitization of the ITN campaign. Based on the success of this effort, CRS received additional funding and mandate to support digitization of the SMC campaign and then the onchocerciasis campaign.

Photo by Jennifer Lazuta/CRS

## Key Stakeholders

- Campaign planners (PNLP and PNLMT)
- Campaign technical assistance providers (FHI360 and MSH)
- Campaign funders (USAID)
- Digital technical assistance providers (CRS field team and CRS in-country leadership)
- Decentralized health leaders (District Health Directors and Health Zones Doctors in Charge)
- Campaign supervisors
- Front line campaign workers (Door-to-door teams)
- Data stakeholders (Instance Nationale de Coordination)
- Other stakeholders (Clinton Health Access Initiative)


Photo by Jennifer Lazuta/CRS

# Advantages of Digital Campaigns

While stakeholders indicated that the digitization process experienced some challenges and identified areas for further improvement, they universally recommended it to other campaign implementers. The following advantages of digital campaigns emerged from their experiences:

- Timeliness and availability of data—in near real time—which enabled mid-course corrections
- Quality control and actionable information on adherence to campaign protocols
- Fraud prevention and detection which supported more accurate coverage information
- Payment system efficiencies leading to faster front line worker payments
- Planning and execution efficiencies

Each is described in more detail below. Together, these advantages can translate to substantial benefits for the achievement of campaign goals, impact on health outcomes, and health system efficiency.

## Timeliness and availability of data

In traditional, paper-based campaigns, data may not be available for months. Paper distribution reports from front line workers must feed up through several layers and be manually entered for data to be available to decision-makers. The process is onerous, time consuming, and prone to human error. Because implementation data takes a long time to become available and is often of low quality, many campaigns deploy post-coverage surveys, where a small random sample of households in the target area is visited to understand if they received the intervention or not. If the survey finds lower than intended coverage, there is often little that can be done until the next scheduled campaign. Post-coverage surveys also over-estimate coverage because the communities or areas not known to campaign planners would be left off distribution plans and survey sampling frames alike. Surveys may also under-estimate coverage due to poor recall or misreporting.

*"The digital system saves us time and effort in data collection, especially recording names. We also do not have to spend time doing math and tabulating reports."*

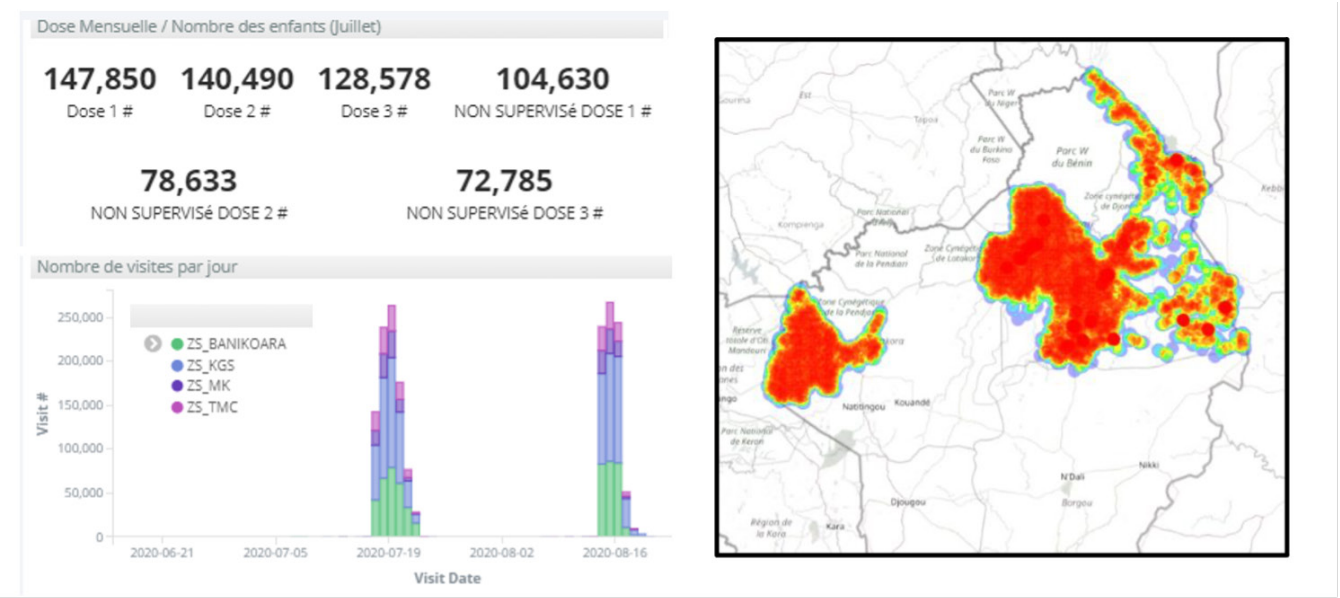
– Benin Frontline Campaign Workers

In Benin, the digital solution supported by CRS provided near real-time access to data on campaign activities. Campaign workers could see their progress daily against targets. Data was collected and reported live on a dynamic dashboard. Campaign managers could see as the campaign unfolded how individuals were working, stock levels, whether targets were being achieved, which areas had been covered and which remained. Daily coverage rates and inventory data allowed campaign managers to pinpoint where additional support was needed and avoid stockouts. In addition, through Maxar and other geographic information management tools, the campaign team had access to satellite imagery and could identify households and settlements that may have otherwise been missed, enabling a more equitable campaign. These solutions allowed the campaign to identify and correct gaps before the end of the campaign, and they did not have to wait for a post coverage survey to have a good sense of the coverage. Indeed, as digital efforts enable more accurate denominators and provide more reliable data on populations served, post-coverage survey may not longer be systematically needed.

Stakeholders also saw potential for further uses of campaign data. Decentralized health leaders and central ministry staff alike identified opportunities to apply this data to improve planning for other campaigns, and for other health system purposes. Such data-based decision making could improve resource allocations and health outcomes across the health system.

*"Real time geolocation data helped us improve coverage by showing us where the gaps were. We were able to target our supervision where it was most needed.*

– Benin Decentralized Health Leader




ABOVE: Example information available during the SMC campaign. (Left) Dashboard showing key results and doses distributed by health zone and day. (Right) Heat map showing areas of greatest concentration (red and orange) and lower concentrations (yellow, green and blue).

## Quality control

Digitization can support campaign quality by facilitating adherence to campaign protocols and allowing teams to monitor campaign execution at a micro- and macro-level. Algorithms built into the digital tool can reduce human error and improve adherence to campaign protocols. For example, during the ITN campaign, campaign protocols specified that each household should receive one net for each two people, rounded up for odd numbers, up to a maximum of four nets. Before the digital tool, frontline health workers sometimes struggled to correctly apply the formula, and some households took advantage to convince the frontline worker to give them additional nets. Similarly, for SMC campaigns, the child's age determines their dosage, and for the Onchocerciasis campaign height determines dosage; in both cases, having multiple dosages creates potential for error in administering the medication. The digital system can automatically calculate what is needed and guide the front-line worker.

*"One of the main advantages of the digital solution is that it helps you identify workers who are not following protocols, which allows you to strengthen your supervision with more targeted support."*

– Benin Decentralized Health Leader

Time stamps on the digital platform also supported quality. With information about start and end times for interactions with households, supervisors could identify frontline workers who were moving too quickly (suggesting that they were not correctly conducting all steps in the protocol such as directly observed treatment for a daily dose), or too slowly (suggesting they may be struggling with mastery of the protocol or the device). Supervisors used this information to target their support to frontline workers most in need.

*"The digital system makes it easier to serve people with the correct dose of medication."*

– Benin Frontline Campaign Worker

*"Now we can have an indicator about the number of children who received all 12 doses, which was not possible before. And we can also track children from one year to the next."*

– Benin Campaign Technical Assistance Provider

The digital solution also made possible analyses that were not available previously. For example, during the SMC campaign, each child was issued a QR code badge that was scanned as medication was issued during each cycle of the campaign. This allowed campaign managers and planners to know, for the first time, the percent of children who received doses during all four cycles. Some stakeholders were surprised to learn that fewer than 50% of children received all four doses, since their coverage rates during any given round had exceeded 95%. Post-coverage surveys in other countries have found similar rates of children receiving all four doses.[5] Without the detailed child-specific data made available by digitization it was easy for campaign stakeholders to believe they were achieving higher coverage of all cycles; the digital solution therefore brought to their attention an opportunity for improvement that was previously unrecognized, to discuss barriers and identify possible solutions for future campaigns.


ABOVE: Image of a child badge.

5 Access SMC 2020

## Greater transparency

Health campaigns around the world are prone to instances of fraud or leakage.[6] [7] Substantial resources create temptation while dispersed activities make oversight difficult. Greater transparency was among the most frequently cited benefits of the digital solution across all stakeholders. Actors across the system had developed innovative strategies to evade existing checks and balances; the digital system enabled more rigorous oversight and revealed malpractices that were previously going undetected. For many stakeholders, this benefit came as a bit of a surprise because they were not aware of the extent of deviation from protocols in previous campaigns.

*"Digitization showed us that there was frauds and malpractices that we were not aware of…now people know they are tracked and improved their quality. This higher quality leads to better results in mortality and morbidity."*

– Benin Campaign Planner

Some of the types of fraud that were prevented or identified by the system included:

- Frontline workers and supervisors who collected per diem for training which they did not attend (fabricated attendance records), which was mitigated by the requirement to scan in and out of each day of training with a badge.
- 'Ghost' workers who did not exist (whose payments were pocketed by others), who were mitigated by the requirement for a unique mobile money account for each worker and systems that only made payments to workers active on the digital platform.
- Frontline workers who did not carry out campaign activities or overreported their work, which was mitigated by time stamped and geolocated data entry confirming in real time their activities.
- Frontline workers who did not follow campaign protocols—for example, workers who distributed from a fixed location rather than going door-to-door—which was mitigated by the geospatial data.
- Supervisors who pocketed part of the frontline workers' stipends which was mitigated by direct mobile money payments to frontline workers.
- Frontline workers who fabricated households to divert health commodities for sale, which was mitigated by geospatial data.

*"Before the digital solution [front line workers] would accuse [their supervisors] of taking a cut of the money before giving it to them. With mobile money we know where the money is going and how much. Nobody can accuse the other."*

– Benin Decentralized Health Leader

Following their experience, stakeholders viewed greater transparency as an advantage that would ultimately benefit campaign coverage and, importantly, campaign impact. However, they noted that these benefits were not universally appreciated. For instance, campaign coverage data could appear lower because fabricated data could not be included. Since campaigns are often measured by the number of inputs distributed or the number of households reached, going the extra mile to ensure true coverage presented some disadvantages, especially when funders were not insisting on this level of transparency and accountability. There was also recognition that those who have been profiting from mismanagement and corruption would resist the greater accountability imposed by the digital system.

*"With digitization, we have reliable data. We know that the coverage data is real and we will have the impact on morbidity and mortality that we expect."*

– Benin Decentralized Health Leader

Likewise, while there was widespread agreement that funds should be put to their intended use, a lot of stakeholders also expressed reservations about systems that demanded too much accountability of the frontline workers, who are often volunteers or receive very limited stipends. Indeed, though the World Health Organization recommends

6 Chuma et al., 2010
7 Kramer et al, 2017

that community health workers are paid,[8] not all countries pay community health workers and some countries include both paid and unpaid cadres in routine and campaign work. For decades, many health systems have use campaign payments as de facto compensation for the routine, unpaid work community volunteers do daily. As a result, frontline workers (and their supervisors) do not necessarily see their campaign payment as being tied to their campaign work; this presents a challenge when demanding additional accountability for these funds. There is also widespread variability in campaign incentives within Benin, with the daily rate varying from $1.72 to $7.74. Before, campaign managers may have looked the other way when the low paying campaign protocols were not fully followed, but the digital system no longer permits this and discontent can emerge among the underpaid workforce.

## Payment system efficiencies

Health campaigns can require an extensive workforce. For example, the Benin SMC campaign relied on more than 2,500 frontline workers to distribute medications door-to-door three days each month over four months. Digital payments are more secure and less prone to security issues and mismanagement than cash payments. An integrated system that links payments with daily reporting of work hours offers further benefits to payment processing efficiency, which has been a bottleneck in previous systems. Workers have a right to be paid in a timely way. But the need to verify the details of so many workers and issue payments is time and labor intensive. This has negative implications on campaign execution since workers who are not paid for the previous month's work before the start of a new cycle begin, rightly, to question whether they should continue to work and may abandon the campaign. In Benin, the digital solution cut in half the time needed to process payments, improving worker satisfaction and retention while reducing labor costs for the paying agency.

*"Before, the time to validate payment data took forever… with the full digital solution payment processing went from 21 days to just 10 days."*

– Benin Campaign Technical Assistance Provider

## Planning and execution efficiencies

Stakeholders also identified that digital health campaigns offered substantial planning and execution efficiencies, saving resources. A main efficiency was related to the improved availability of data which could inform a range of decisions for the ongoing campaign, future campaigns and the health system overall. It was also noted that the digital solution was a management tool which enabled supervision to be more targeted and effective. The quality control aspects of digitization were also seen as having potential to achieve greater integration of future campaign activities.

*"Previously we have had a high margin of error in estimations. This can lead to reported coverage over 100%, which is impossible. We know the gaps between campaign reported coverage and the actual percent of target participants served is very high."*

– Benin Campaign Data Stakeholder

Digital data can benefit not only the ongoing campaign (as described above) but also future campaigns and the health system as a whole. Future campaigns can benefit from data about population composition and locations from previous campaigns, which can facilitate microplanning, input forecasts, workforce assignments, and more. In other words, with more data about who you are trying to reach and where they are, campaign planners can more efficiently design campaigns that achieve higher coverage and impact. Incorporating accountability and efficiency indicators within the digital solution can maximize this potential.

Future campaigns may also leverage efficiencies by building on existing datasets. In Benin, where CRS provided support to successive digital campaigns, the 2021 SMC campaign updated the 2020 ITN database campaign database rather than creating a new one. This meant that frontline workers did not need to recollect and enter information about households, they just needed to make updates to births, deaths, or population movements. While there

8 WHO, 2018


Photo by Jennifer Lazuta/CRS

was an initial learning curve on updating data rather than collecting new data, the new system ultimately saved substantial time and costs associated with enumeration. These benefits can continue to accrue to future campaigns, and a single national household-level database can offer substantial benefits to health service planning and monitoring.

***"This data supports equity by making sure resources go where they are needed."***

– Benin decentralized health leader

At the health system level, the robust data availed from the digital campaign efforts can benefit health system planning and decision making. For example, stakeholders noted that robust population data could help them to better understand how many health workers are needed, and where, and how many medications are likely to be needed in different locations. Since health campaigns are implemented more regularly than censuses, the campaign data is often timelier and more actionable, especially in areas of migration or substantial demographic change.

Decentralized health managers universally recognized the power of digital campaign tools as improving the efficiency of their management. These staff often cover broad areas and oversee several campaigns per year. While they are generally tasked with overseeing the quality of the whole campaign in their area, they struggled to feel effective in this role. They were able to use the real-time data from the campaign dashboards to target their support to the geographic areas and technical elements that most required their support – leading to more effective supervision. By targeting their support, they also felt that campaign activities were less disruptive to their routine work. Campaign planners also felt that their support was able to be more targeted, reducing the opportunity costs of the campaign.

*"We no longer have to drop everything to be able to pull off a campaign. We can support the campaign and carry on with our routine work simultaneously."*

– Benin Campaign Technical Assistance Provider

Stakeholders also noted that built-in algorithms and quality checks afforded by the digital tools could facilitate integration of future campaigns activities by providing front line workers with tools that would enable them to better manage the complexity of multiple protocols (within limits). Such integration, that is serving a household with multiple interventions simultaneously, could bring greater health benefits to the population though synergy of interventions. Integration could also reduce opportunity costs associated with campaigns, both for households who need to stay home to receive campaign workers, and for the health system that must supervise and oversee activities.

# Key Takeaways and Future Directions

**The global health community invests a lot of time, money and human resources each year in health campaigns.** For example, the RBM Partnership to End Malaria estimates that over 200 million ITNs were delivered each year between 2018 and 2020.[9] A metanalysis of ITN cost-effectiveness studies found a median financial cost of $7.03 per net (range $2.97 to $19.20), with larger campaigns achieving lower costs per unit.[10] At this median price, the annual investment in ITN campaigns alone would exceed $1 billion annually.

**We must demand maximum returns on these investments.** While a few post-campaign surveys have found ITN ownership of 95% [11], many have found as few as 70-80% of households have an ITN after a mass campaign, meaning one in five households remains unprotected. Campaigns have recognized for decades that discrepancies exist between campaign data and post campaign surveys and the true number of people served. These discrepancies can be due to recall bias or data quality issues, such as inaccurate denominators (including due to population growth) or low quality or fraudulent data on people served. In the case of ITNs, deterioration or loss may also play a role. With so much money and so many lives at stake, campaign planners should not have to rely on estimates and projections to evaluate their coverage. Digital campaigns support more efficient and transparent management of campaign resources and ensure interventions are truly reaching the people intended.

**Digitization benefits the health system as a whole by making more reliable and timely data available to decision makers and instituting more rigorous management and accountability expectations.** As such, transitioning campaigns to digital solutions also benefits the health system and the people it serves.

*"Before we spent a lot for low efficiency, but now we know more about the population to serve and what is really happening during the campaign. With this new information we can deliver better and more equitable services."*

– Benin Decentralized Health Leader

9 https://endmalaria.org/dashboard/campaign-dashboard
10 https://malariajournal.biomedcentral.com/articles/10.1186/1475-2875-10-337
11 Uganda public health fellowship program, 2021, Ng'ang'a et al., 2021

**While some question the cost of digitization, we cannot afford to not digitize.** The digitization of a health campaign comes at a cost (for devices, technical support and training, among others), but yields better intervention coverage, more reliable data, higher health impact, additional impact and efficiency from campaign integration (including time and cost savings), and the ability to analyze and direct our investments based on impact on disease burden. Campaign planners and funders need to work together to make health campaign digitization the norm and to support countries to standardize and oversee digital efforts to reduce illness and save lives.

**But we should also be exploring opportunities to maximize our digital investments through better coordination.** To date, most campaign digitization efforts have been limited to a single campaign. Sometimes, different technical partners bring different platforms and approaches to different campaigns within the same country. However, as was seen in Benin, while individual campaigns can reap the benefits of digitization, additional benefits accrue at the system level and build over time: the SMC campaign saved time and costs on enumeration because they were able to use the same database and tools as the ITN campaign. Hardware can and should be used across campaigns. Building digital skills and literacy also yields benefits far beyond a single campaign, and training time and costs will likely reduce over time as workers become familiar with common hardware and software.

**As a global health community, we need to begin to shift our thinking away from how we can support digitization of individual health campaign activities and towards how we can enable integrated digital health systems that meet Ministries of Health visions.** Support will need to be provided to Ministries of Health to figure out the core features that they need across all their campaign and routine efforts so that they can work with technical partners to design a standard solution. Governments will also need support to think through device logistics – like where and how will they store them? How will they be allocated to campaigns? What will be the replacement strategy and how will this be funded? Will they be reserved for health campaigns or will they be used for other community purposes? Data security is another critical issue for which Ministries will need expertise, as personally identifiable information must be safeguarded and not used for nefarious purposes. An additional area of essential support will be strengthening data systems, data literacy and culture of data use.

**Funders and technical support providers need to support Ministries of Health to capitalize on the benefits of technology to improve health outcomes.** Currently, Ministries of Health are not necessarily structured and equipped with the expertise to design deploy digital solutions. But in the digital era, as fiduciaries of the populations' health needs, they need to be. The international community should help them get there.

*"Digitization seems more expensive but when it comes to cost efficiency it's worth it."*

– Benin Decentralized Health Leader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