HEALTH

Afya Uzazi Surge Model for RMNCH Service Delivery

KNOWLEDGE CONTRIBUTION

To address persistently low rates of completing at least four antenatal care (ANC-4) visits and delivering at facilities with skilled birth attendance (SBA) among women in six sub-counties in Kenya, FHI 360's Afya Uzazi program developed an integrated activity that merged high-frequency monitoring and data use for intensified community and client engagement. The "surge" initiative comprised weekly facility staff data reviews to present clinical volume achievements against targets and discuss near real-time adjustments in engagement with communities and use of mobile phone appointment reminders and follow-up to encourage clients to return for ANC and delivery. These efforts resulted in substantial improvements in ANC 4 and SBA rates in the focus sub-counties and adoption of the surge model for scale-up by Nakuru and Baringo counties.

George Obanyi/FHI 360

BACKGROUND

Indicators of maternal and child health in Kenya

Further progress in improving maternal and newborn health (MNH) outcomes in Kenya to reach Countdown 2030 goals will depend on the widespread, continuous uptake of key care interventions such as antenatal care (ANC), skilled birth attendance (SBA) at delivery, and postnatal care (PNC) for mothers and newborns.[1] ANC and SBA coverage among Kenyan women ages 15–49 years improved from 2009 to 2014, resulting in overall rates of 56% of pregnant women receiving four or more ANC visits (ANC 4) and 65% delivering with a skilled attendant present.[2] However, these trends mask wide inequalities in the distribution and uptake of services across socioeconomic and geographic lines. For example, 75% of women in the top wealth quintile completed four or more ANC visits, compared to just 31% of mothers in the lowest quintile. Geographic disparities in health system coverage for MNH services also reflect these trends, with particularly limited coverage in Northeastern, Eastern, and northern Rift Valley regions of Kenya.[3]

Lessons learned from HIV service delivery

In the domain of HIV prevention and care, which faces a similarly ambitious set of targets and a cascading series of service delivery intervention points, practitioners at FHI 360 developed an approach termed Total Quality Leadership and Accountability (TQLA) that has as its foundation a commitment to continuous program improvement based on responsive data systems. TQLA has three core elements: adaptive leadership, situation room meetings, and performance improvement monitoring (Figure 1). The aim is to strengthen the capacity of program managers and health care workers to use data for planning and to develop local solutions to address program weaknesses.[4] The TQLA approach is

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complemented by a surge model that includes a minimum package of interventions focused on community mobilization, prompt linkage to appropriate facility-based care, and targeted logistics and infrastructure support. Together, the TQLA and surge model have substantially increased uptake of and sustained engagement in HIV services in several locations[4] and serve as a model that might be productively adapted to support improving MNH outcomes.

Rationale for adapting surge model for RMNCH services

Figure 1. Constituent elements of the Total Quality Leadership & Accountability approach

(Chabikuli et al., 2020)

The series of maternity care engagements from ANC to SBA to PNC present a natural care continuum likely amenable to a cascade approach: loss of engagement or contact with a client at an early point may reduce the likelihood of contact at subsequent health intervention points that can affect maternal and newborn outcomes. We hypothesized that a woman who engages with the health system and completes her first ANC visit early in her pregnancy is more likely to complete a minimum of four ANC visits, which in turn makes delivery with a skilled attendant and receipt of PNC more likely. Further, each of these engagements corresponds with a specific indicator and data collection point that enables facility staff to monitor retention. Collecting and disseminating data for these indicators on a monthly or quarterly basis, however, leads to a lag in response time and missed opportunities for supportive interventions. More frequent reporting and monitoring of these data would allow more nimble decision-making based on local health facility trends. In addition, the translation of more frequent data into visual dashboards that are easy to understand and allow comparison with other health facilities may help spur collective action and improve county/sub-county ownership, in line with the TQLA approach. With these objectives in mind, the Afya Uzazi program team worked with the Baringo and Nakuru county health management teams to adapt and implement the TQLA approach for MNH.

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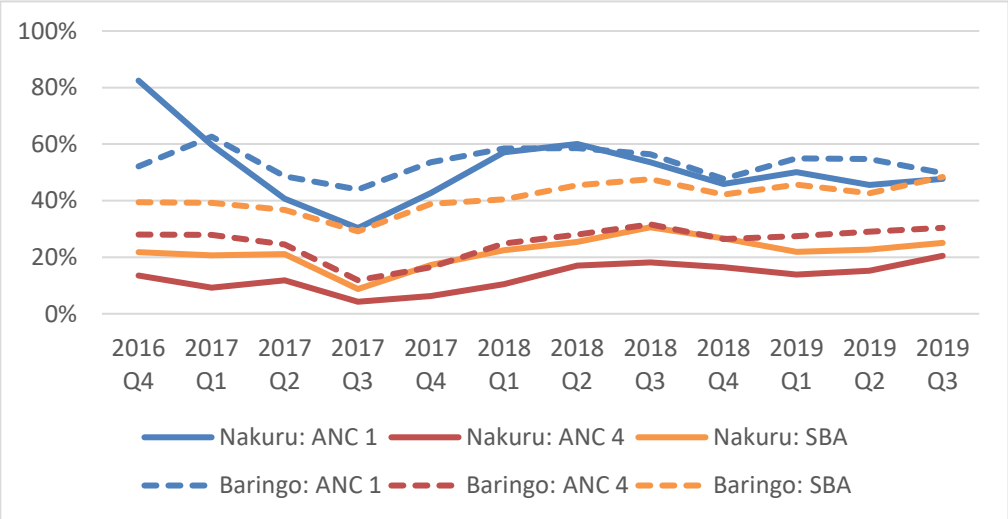
A BRIEF INTRODUCTION TO THE AFYA UZAZI CONTEXT

Afya Uzazi, meaning healthy parenthood in Kiswahili, was a five-year project (2016 - 2021) funded by the United States Agency for International Development (USAID) Kenya/ East Africa under Award No. AID-615-A-16-0011. Afya Uzazi aimed to increase family planning/reproductive, maternal, neonatal, child, and adolescent health (FP/RMNCAH), nutrition, and water, sanitation, and hygiene (WASH) practices and service utilization by improving the demand for and quality of facility- and community-based FP/RMNCAH and nutrition care provision in selected sub-counties of Baringo County (Baringo North, Baringo Central, Marigat, and Mogotio) and Nakuru County (Kuresoi North and Kuresoi South). These sub-counties were selected based on poorer MNH and other indicators relative to overall county and national statistics.

Through its MNH activities at both community and health facility levels, the project specifically aimed to achieve: (1) increased availability and quality delivery of MNH services, and (2) increased care seeking and healthy behaviors for MNH. Implementation of activities in the selected sub-counties began in March 2017 (Q2). During project years 1 through 3, Afya Uzazi recorded gains (in the 5–10% range for most sub-counties) in the proportion of women completing four or more ANC visits and in rates of SBA at deliveries. However, by the end of Project Year 3 in September 2019, average coverage rates in Nakuru and Baringo counties for both ANC 4 and SBA remained substantially below the national rates of 51% for ANC 4 visits and 67% for SBA, partially driven by relatively low coverage rates across the selected project sub-counties. The drop-off between rates of ANC 1 and ANC 4 visits was particularly noteworthy and emphasized the need for a new approach to strengthen clinical engagement with women throughout pregnancy (Figure 2).

Figure 2. Coverage rates for key MNH services in Nakuru and Baringo Counties, October 2016–September 2019 (PY1-PY3)



THE AFYA UZAZI SURGE MODEL FOR RMNCH SERVICE DELIVERY

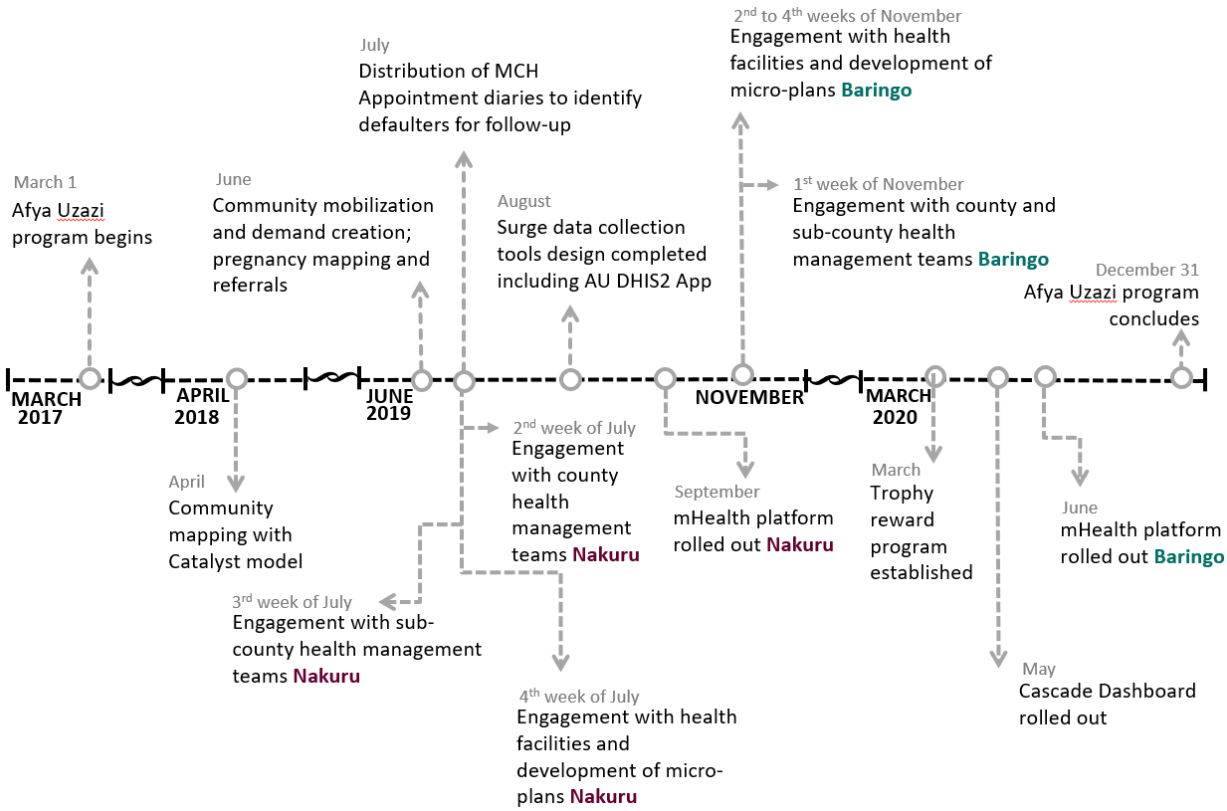
Seeking to improve key MNH indicators, the Afya Uzazi team drew on the TQLA approach to develop an adapted surge model in August 2019 (Q4). Using the Pareto principle, the team identified the approximately one-fifth of health facilities in the selected sub-counties that had contributed 80% of the delivery volume within the previous six months. Next, the team set the following cascade targets for those 74 facilities and their catchment areas based on national targets:

- 95% of estimated pregnant women attend at least one ANC visit (ANC 1)
- 80% of women who attend ANC 1 attend at least four ANC visits (ANC 4)
- 95% of women who attend ANC 1 deliver with skilled birth attendance (SBA)
- 90% of women with SBA receive PNC within three (3) days of delivery (PNC)

Prior to initiation of the surge activities, as part of their broader community-based activities, Afya Uzazi supported community health volunteers (CHVs) and community-based organizations to conduct periodic community mapping exercises to identify pregnant women in the catchment areas of target health facilities and

facilitated national health insurance registration and referral to ANC 1 for identified pregnant women. The team also supported a range of community mobilization activities with male engagement (e.g., chiefs' *barazas*) to generate widespread support for pregnant women's attendance at ANC visits. Surge activity planning began in Nakuru County in July 2019, with rollout in October, and then proceeded to planning activities in Baringo County in November 2019, with rollout in June 2020 (Figure 3).

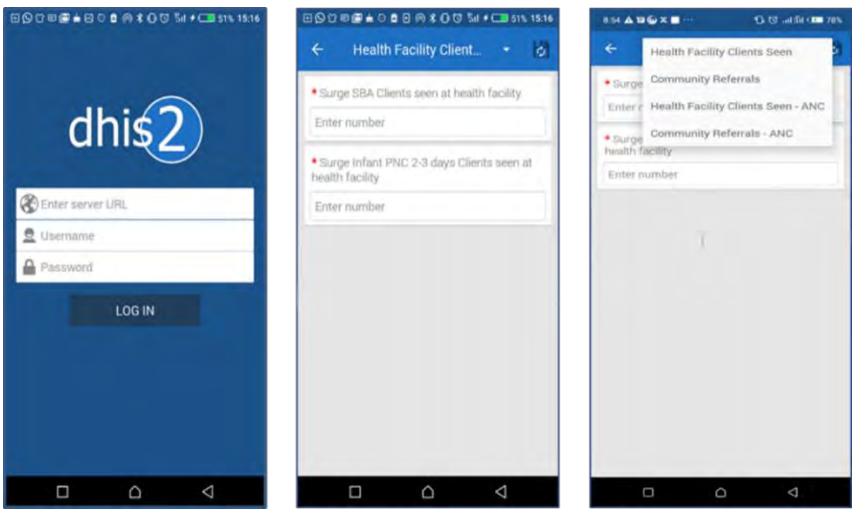
Figure 3. Afya Uzazi surge program timeline



DHIS Android App for data submission

Timely, accurate data are a key component of the TQLA and surge model. To facilitate the collection and monitoring of facility data, Afya Uzazi developed a DHIS2 data capture application for use on Android mobile phones and trained facility-based health care workers (HCWs) to record and submit data on key indicators weekly. In collaboration with county departments of health (DOH), our project team designed paper-based data collection forms to outline the types and flow of information to be reported. From the paper forms, we developed a data entry interface customized to a mobile application (Figure 4).

Figure 4. DHIS2 mobile phone-based data capture application, sample screens



Afya Uzazi procured smart phones, SIM cards, and data bundles and distributed them to HCWs from the selected health facilities—29 in Nakuru and 43 in Baringo sub-counties.

These HCWs received dedicated training on the use of the DHIS2 data capture application. Each week, the designated HCW reported on the four key indicators identified in the cascade:

1. Number of ANC 1 visits
2. Number of ANC 4 visits
3. Number of births with a skilled birth attendant present
4. Number of PNC visits within three days of delivery

All data entered at the facility level via mobile phones were transmitted through internet connections to a central server hosting the DHIS2 system, which served as a data repository. Excel-based pivot-tables (Figure 5) and graphs were designed to be populated with the weekly data and to provide input to a data visualization display via a PowerBI dashboard (Figure 6). A WhatsApp group consisting of county and sub-county health management team staff from the county DOHs, HCWs, and project technical team members was created for each sub-county to facilitate monitoring and discussion of the weekly data trends shown in the dashboard.

Figure 5. Sample data pivot table, Marigat Sub-county, Baringo County, ANC 1

Surge Week	(All)							
Region	Pregnant Women Mapped	Successful ANC1 Refarrals	Newly Mapped Pregnant	NGAO Mapped	Quarterly Mapped(%)	ANC 1 Quarterly Target	ANC 1	Quarterly ANC 1 (%)
Marigat	**220**	**59**	**0**	**50**	**13%**	**550**	**724**	**132%**
Mochongoi	**47**	**15**	**0**	**12**	**15%**	**105**	**180**	**171%**
Mochongoi Health Centre	21	9	0	12	17%	42	94	224%
Tuiyobei Dispensary	0	0	0	0	0%	12	22	183%
Lamaiwe Dispensary	0	0	0	0	0%	26	37	142%
Loboi Dispensary	26	6	0	0	87%	10	12	120%
Koimugul Dispensary	0	0	0	0	0%	15	15	100%
Marigat	**101**	**36**	**0**	**14**	**9%**	**374**	**478**	**128%**
Marigat Sub District Hospital	80	30	0	10	17%	155	222	143%
Marigat Catholic Mission	4	0	0	4	1%	156	201	129%
Kimalel Health Centre	17	6	0	0	9%	63	55	87%
Mukutani	**6**	**0**	**0**	**6**	**12%**	**17**	**18**	**106%**
Kiserian Dispensary	6	0	0	6	12%	17	18	106%
Lichamus	**66**	**8**	**0**	**18**	**41%**	**54**	**48**	**89%**
Eldume dispensary	0	0	0	0	0%	10	18	180%
Illinga'Rua Dispensary	25	0	0	0	42%	20	17	85%

Figure 6. Sample data dashboard, all sub-counties, ANC 1 and ANC 4

Facility-based surge activities

To support and improve the obstetric care outcomes reported in the DHIS2 application, the Afya Uzazi team initiated several surge activities at the target health facilities. This approach began with the assignment of an estimated delivery date (EDD) for each pregnant woman at her first visit, which was used to program a reminder SMS motivating planning for an institutional delivery to be sent two weeks prior to delivery. In addition, a paper-based clinic appointment diary was used to record scheduled ANC appointments and EDDs, serving as the basis for sending out SMS reminders prior to ANC appointments and to motivate planning of institutional delivery, and to identify missed appointments. A standardized response was developed to address missed appointments, comprising an SMS reminder notifying the client that she had missed an appointment and asking her to return to or call the facility to schedule a new appointment. A local CHV then followed up with the client either by phone or in person. For pregnant women without mobile phones or numbers, a list was generated and given to the referring CHV, who reported back with the reason for the missed visit and rescheduling information, as needed. If a pregnant woman did not present for delivery, the SMS and follow-up system notified CHVs or HCWs to contact the client and document whether the client had received SBA or PNC services at another facility. Over the 17-month surge implementation period, facilities sent 2,148 reminder SMS messages (Table 1).

Table 1. SMS reminders sent during surge, by outcome

TYPE OF APPOINTMENT	TOTAL NUMBER OF MESSAGES (MONTHLY AVERAGE)
ANC 2	484 (28.5)
ANC 3	433 (25.5)
ANC 4	293 (17.2)
SBA	938 (55.2)
TOTAL	2,148

These facility-based surge activities were complemented by intensified community-based activities. For example, community mapping of pregnant women became an ongoing continuous activity, rather than an annual or monthly event, carried out by CHVs while conducting missed-visit follow-ups or other household-level activities. The data generated on the four care indicators at local health facilities also informed community dialogues and directed more emphasis to be placed on ANC and SBA during *barazas*, community council meetings, as a way to have chiefs and other community leaders provide messaging and create positive social norms around ANC.

Finally, starting in March 2020, Afya Uzazi and the sub-county health management teams established a reward and recognition system to inspire continued motivation for HCWs and health facilities with notable outcomes in FP/RMNCAH services across each of the six focus sub-counties. One trophy was procured for each sub-county and awarded quarterly to the best health facility based on a comprehensive review of indicators and client feedback. Certificates of recognition were provided to all staff (both technical and non-technical) and community-based partners (CHVs, catalysts, chiefs and villages elders) attached to the winning sites, and the award ceremony was broadcast on local television and radio and featured in print media.

High-frequency data monitoring

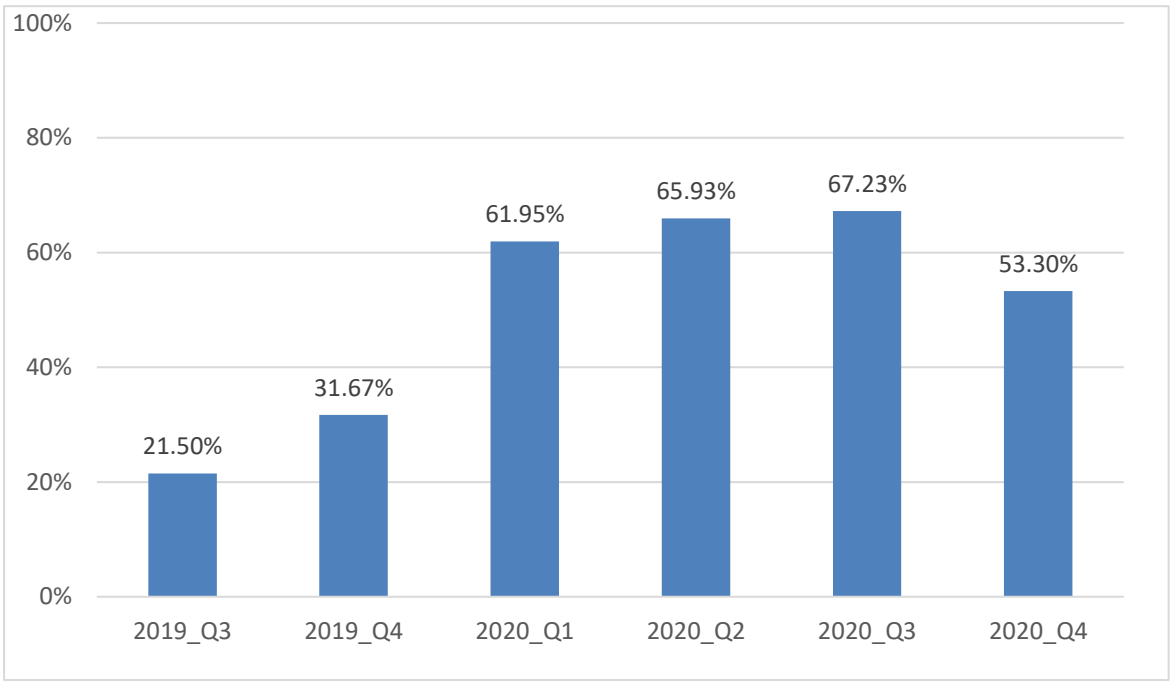
The data provided through the DHIS2 application and presented on data dashboards served as the foundation for regularly scheduled (generally weekly) discussions of missed targets and micro-planning at the facility level. The discussions provided a data-driven, multi-stakeholder forum to identify specific issues and support ad hoc problem solving at the facility or sub-county level as appropriate. The participation of sub-county-level stakeholders in these routine discussions was essential, particularly for addressing resource-intensive issues such as staffing or infrastructure needs, as described in the following sections.

Improved outcome indicator trends

We compared pre- and post-surge data from the focus sub-counties to identify trends for the relevant outcomes. With regard to ANC, we earlier noted the large gap in coverage between ANC 1 and ANC 4 visits prior to the surge (Figure 2). When we compare the 17-month period preceding the surge activities to the 17-month implementation period (July 2019–December 2020) using a two-sample t-test assuming equal variance, we see significant improvement in ANC 4 as a proportion of ANC 1. The mean rate of women attending at least four ANC visits in the surge facilities increased from 43.9% pre-intervention to 53.4% during the intervention period

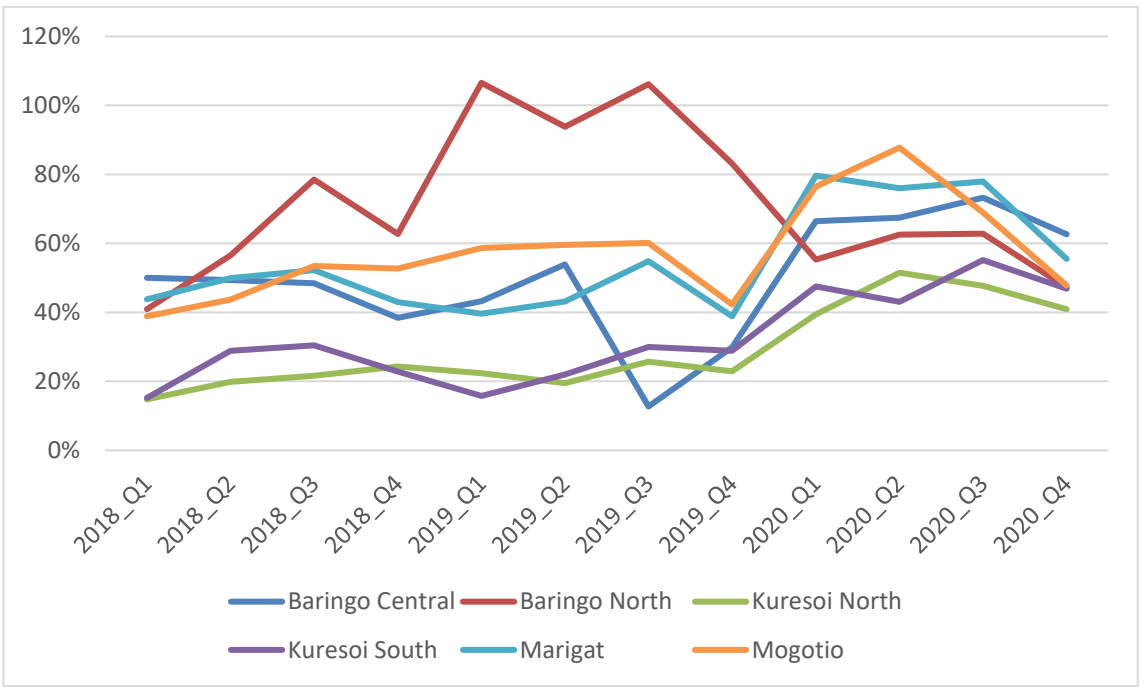
(p<0.001). The rate of ANC 4 visits as a proportion of the estimated number of pregnant women in the catchment area increased steadily during the surge (Figure 7), suggesting that the ANC needs of the population were being met. This increase continued until the last quarter of 2020, when the rate dropped slightly concomitant with COVID pandemic restrictions.

Figure 7. ANC 4 visits as proportion of estimated pregnant women in catchment population during implementation period



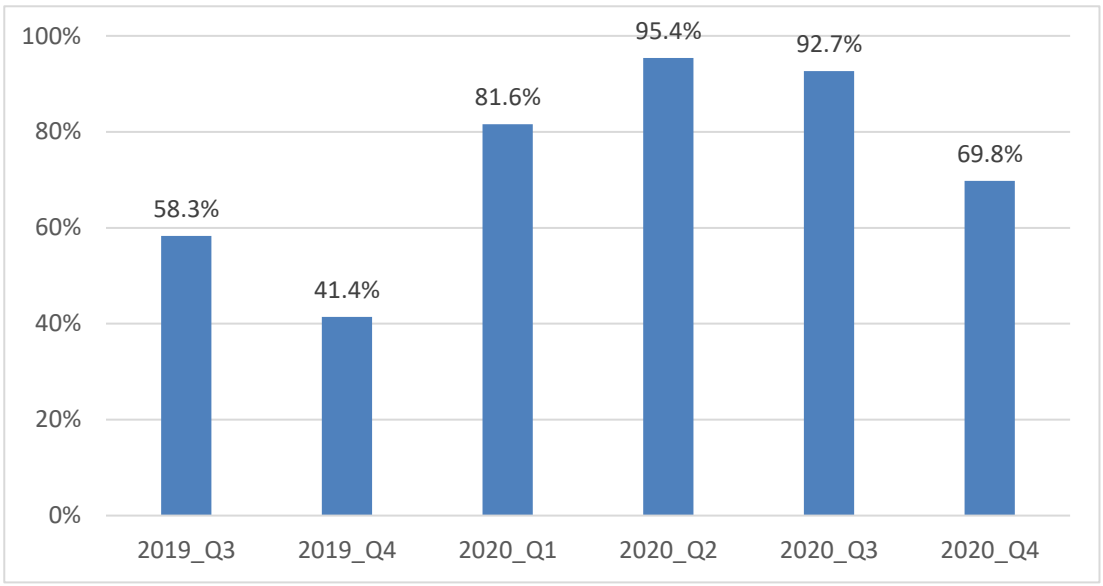
At the sub-county level, ANC 4 rates improved after surge initiation in all sub-counties except Baringo North (Figure 8). Surge activities improved data quality with higher monitoring frequency, potentially altering data trends in some sub-counties where reporting errors resulted in greater than 100% coverage for some indicators.

Figure 8. ANC 4 visits as proportion of estimated pregnant women by sub-county, Oct 2018–Sept 2020



A similar but more modest increase was observed in the mean rate of institutional deliveries with SBA. Among ANC 1 clients, the mean institutional delivery rate increased from 68.8% prior to the surge to 72.1% during the implementation period (p=0.32). Though this change differed in magnitude across the sub-counties, overall, there was an improvement in the rate of assisted deliveries as a proportion of estimated deliveries in the catchment population (Figure 9).

Figure 9. Deliveries with SBA as proportion of estimated pregnant women by sub-county, Oct 2018–Sept 2020



A large increase in deliveries with SBA occurred until Q3 of 2020, when the rate began to decline in tandem with COVID-19 restrictions but remained higher than the pre-implementation rate for all sub-counties except Baringo Central, where the county referral hospital had a disproportionately higher delivery level due to referrals. (Figure 10).

Figure 10. SBA as a proportion of estimated number of deliveries in catchment area, by sub-county

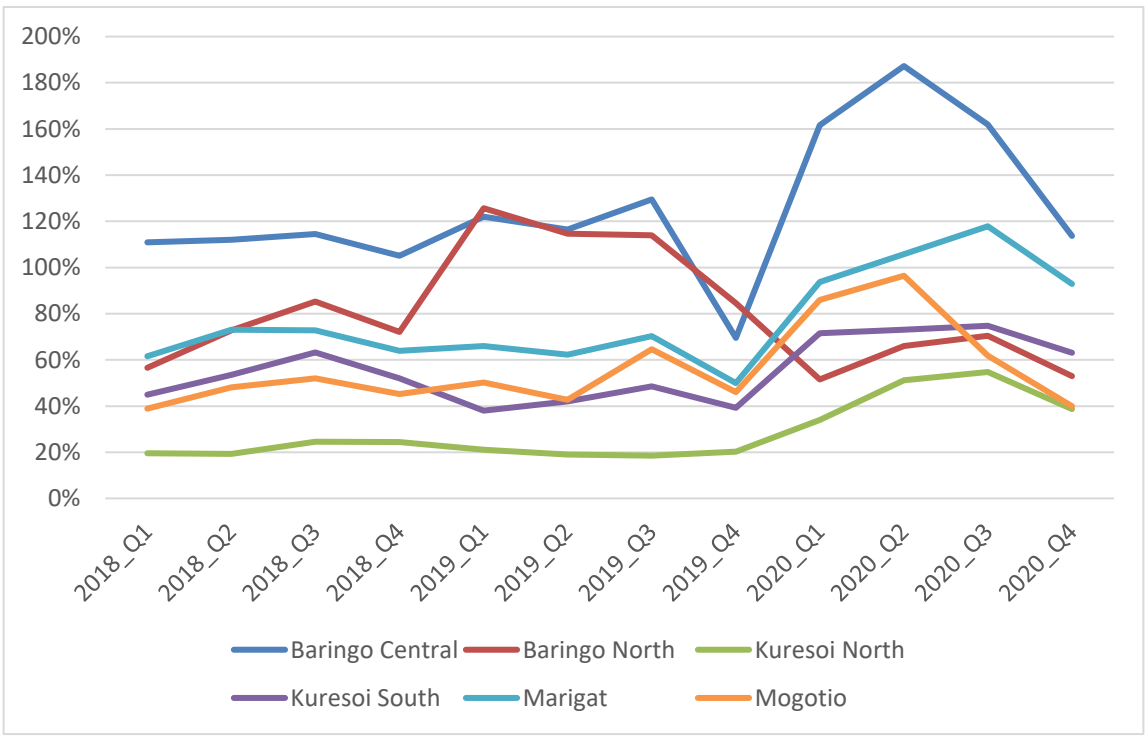
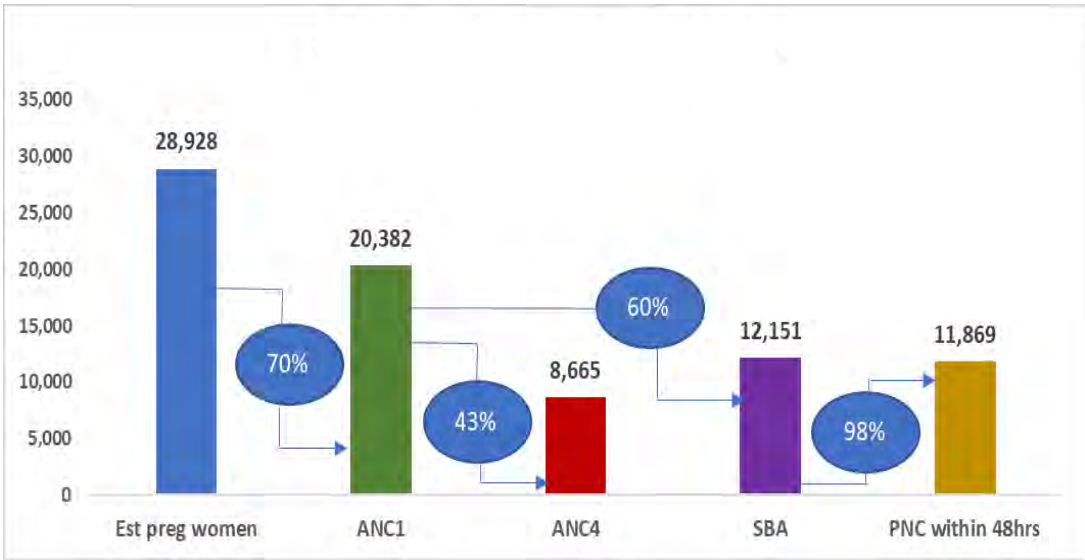
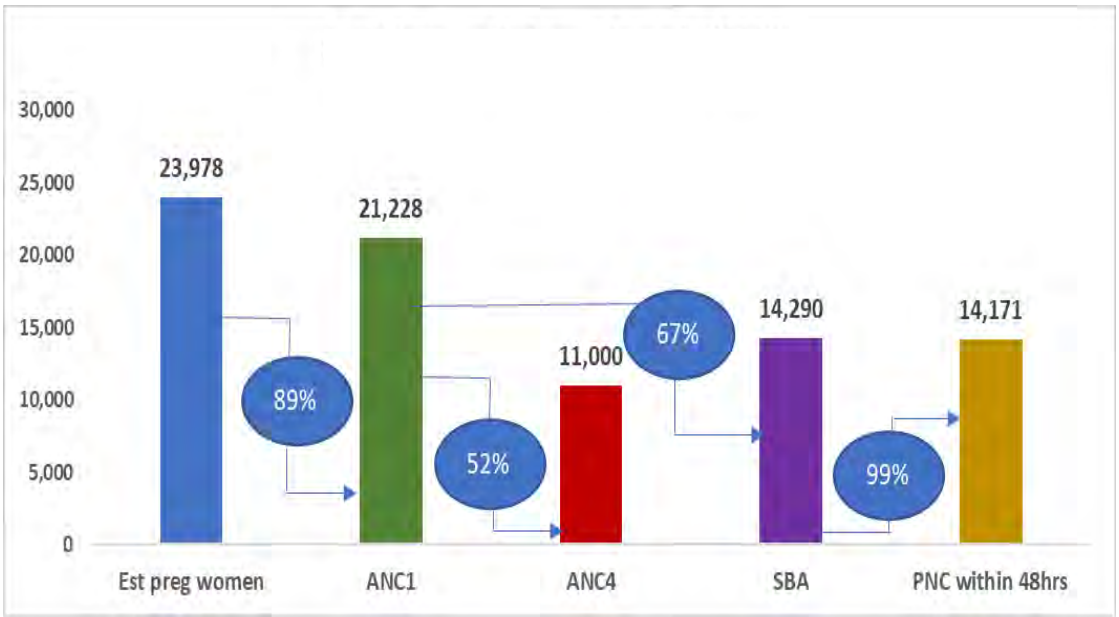


Figure 11. Maternal and newborn health service delivery cascade, 2018 (pre-surge)



Another way to consider MNH service delivery outcomes is in the context of the care cascade. Compare the Afya Uzazi-supported health facilities' (not just surge facilities) coverage rates across the cascade for 2018 before the surge (Figure 11) and 2020 during the surge (Figure 12). Coverage for ANC 1 as a proportion of estimated pregnant women rose from 70% to 89%, while retention in care between ANC 1 and ANC 4 increased from 43% to 52%. Although we cannot isolate the effects of surge activities such as mHealth SMS reminders and routine quality improvement monitoring or group ANC, these activities likely contributed to this improved coverage across the cascade as part of an integrated set of activities at the community and health facility levels.

Figure 12. Maternal and newborn health service delivery cascade, 2020 (during surge)



OBSERVED SUPPLEMENTAL BENEFITS OF USING THE SURGE MODEL

The data-driven surge model implemented by Afya Uzazi yielded a number of related benefits, from the individual client level to the broader sub-county level.

Improved data for discussion and decision-making

One way that surge activities helped improve service quality was through rapidly identifying when and where women were missing scheduled care. The clinic appointment calendars improved data on missed ANC visits—at

the time they were missed—which gave HCWs **greater ability to track and follow up individual mothers**. This degree of engagement offered pregnant clients additional contacts with health facilities. It also helped facility staff understand the reasons for missed visits (which facilitated additional problem-solving during weekly meetings) and when to reschedule appointments or, in the case of SBA, when to record a birth at a different facility rather than as a missed institutional delivery.

High-frequency multi-stakeholder monitoring of the data helped **strengthen the communication between health facilities, county and sub-county level stakeholders, and communities** and created an ongoing feedback loop. Close-to-real-time data and routine micro-planning instead of quarterly reports made faster response possible, and the sustained involvement of stakeholders resulted in what facilities and communities perceived to be more responsive action from sub-counties. Trends in facility-level data **provided justification for requests from health facilities** for needed resource investments in provider staffing, infrastructure improvements, or lab network optimization to ensure delivery of services at national standards. These exchanges, in turn, led to policy and investment decisions that helped to address gaps in the efficiency and availability of services.

For example, review of unmet weekly targets led to discussion of factors contributing to suboptimal performance. One factor similar across sub-counties was constraints in sufficient facility-level human resources to meet client (and target) demands. As a result, and based on data documenting increasing service volumes, the county DOH employed nurses on a one-year renewable contract for all dispensaries and other facilities staffed with only one provider. For non-dispensary facilities facing staff shortages, nurses were allowed to work additional hours with motivation through allowances such as lunch and transport, and facilities organized staff retreats to enhance the development of solutions to service delivery issues and improve provider retention.

With regard to infrastructure, the data discussions revealed that certain facilities could not support deliveries because they lacked equipment to safely do so [Box 1]. In some cases, this identification led to authorization for facilities to spend a portion of previously allocated county budget funds to make the necessary improvements. In other situations, Afya Uzazi was able to link facilities to the Linda Mama program of the

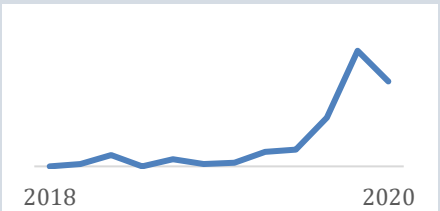
Box 1. Data-based micro-planning leads to novel solutions

In Kuresoi North Sub-County of Nakuru County, weekly data monitoring of a health facility within Kamara Ward revealed that the facility was consistently missing its target for institutional deliveries (SBA). As of Q4 2019, the observed rate of institutional deliveries at the facility was just 18% of estimated pregnant women in the catchment area.

In one of the weekly discussions about these rates, the health facility staff identified the lack of running water at the facility as a major constraint on their service delivery capacity. For example, clients delivering at this facility were asked to bring in their own water so that staff could carry out appropriate cleaning of the delivery area and equipment after delivery. The lack of running water created a bottleneck to increasing the number of deliveries.

In response, the facility staff proposed a simple and cost-effective solution: They suggested harvesting rainwater, which would require minimal investment. Staff used the micro-planning process to allocate some of the small amount of revenue received from NHIF reimbursements for their low volume of deliveries to cover the costs of a water collection tank, construction of a base for the tank, and gutters for collecting water from the roof. The tank was installed and provided an onsite water reservoir for facility use.

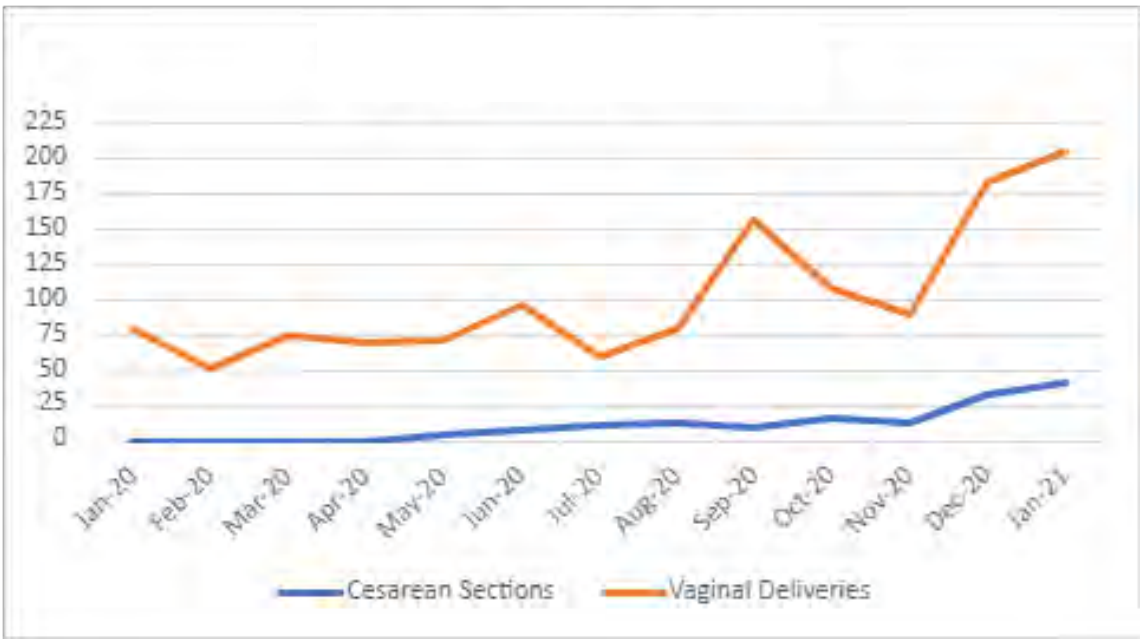
The results in the proportion of estimated pregnant women living in the facility catchment area delivering with a skilled birth attendant were dramatic: from 21% in Q1 of 2020 to 105% in Q4 of 2020, with women coming from other catchment areas to the improved facility.



National Hospital Insurance Fund (NHIF) and help them navigate the Linda mama service reimbursement process.

This effort resulted in improved investment of county money and increased documentation and consequent facility reimbursement by NHIF, resulting in facility-level re-investment and infrastructure improvements, such as the ability to perform cesarean deliveries, for some facilities. For example, the Marigat Catholic Dispensary in Baringo County used reimbursements from the Linda Mama fund along with some medical donations from USAID through Afya Uzazi to improve the facility's maternity and operating theater facilities, attaining comprehensive emergency obstetric and newborn care (CEmONC) signal functions. As a result, the number of cesarean deliveries at the facility rose from zero in January 2020 to 41 in January 2021, with a similar increase in vaginal deliveries (Figure 13).

Figure 13. Deliveries at Marigat Catholic Dispensary, Jan 2020 – Jan 2021



High-frequency monitoring of facility-level data also alerted sub-county health management teams to common problems across health facilities that might be best addressed collectively. For instance, most health facilities do not have laboratory infrastructure or technology to perform basic ANC screening tests, such as Rhesus factor, on patient samples. Previously, facilities would refer patients to larger facilities with laboratory capacity for these tests, resulting in added patient expense and perceived poor quality of care. A lab sample referral network was developed—adapted from HIV viral load sampling and PCR tests—to ship samples to labs with the capacity to do the tests. The lab then sent results to the original health facility. This lab referral network was implemented in seven target health facilities; in other facilities, providers developed other solutions, such as referring clients to neighboring facilities when testing or lab services were needed for one-stop ANC service provision.

Improved local ownership and accountability between facilities and communities

The rotating trophy system for recognizing outstanding efforts and improvements at one health facility within each sub-county per quarter proved to be a popular addition to the surge package that helped to foster teamwork, engagement in surge activities, and a sense of pride and ownership in the MNH work done at the facility. The committee that reviewed and selected the high-achieving facilities for recognition looked at performance comprehensively, considering not just MNH indicators but also staff attitudes, commitment, and the general quality of service provided based on client exit interviews. For example, the committee selecting Marigat Catholic Mission as the most improved facility in Marigat Sub-County included additional indices in their deliberations, such as the HCWs' passion for their work, the confidential and respectful care given to clients

(based on exit interview feedback), the presence of a maternity waiting home for pregnant women living in remote locations with limited access to delivery services, and the acceptance of non-monetary forms of payment (e.g., goats) for health services. Another facility, Ndoinet Dispensary in Kuresoi North Sub-County, received the trophy based on greatly improved patient volume achieved through engagement of a volunteer nurse to support the higher workload, the support of CHVs and *Binti Shujaa* mentors making ANC and SBA referrals, the high quality of services offered by the staff, reduced client waiting times for services, and the availability of lab services that enabled ANC profiling. The recognition of all levels of the network—from chiefs to CHVs to HCWs to lab technicians—at the facility and within the community provided further motivation to sustain the surge activities.

LESSONS LEARNED FOR FURTHER MNH SURGE MODEL ADAPTATION OR SCALE-UP

Afya Uzazi's MNH adaptation of the TQLA and surge model successfully demonstrated the feasibility and acceptability of this model in public sector health facilities and revealed its promise for supporting improved MNH care outcomes. Use of a phone-based application for data reporting led to the provision of required health data and information in a relatively shorter period (i.e., on a weekly basis compared to routine monthly reporting), which was necessary for effective monitoring of progress and decision-making to achieve surge goals. Afya Uzazi-generated dashboards, populated with facility-submitted data, effectively stimulated discussion across health system levels on how to reach targets by identifying barriers, successes, and resource needs and generating locally relevant solutions. To replicate this approach, several lessons can be taken from the implementation experience to strengthen and further refine the surge and accelerate the process.

1. **Develop real-time surge dashboards that can easily be accessed and used via a handheld device at the facility level.** This could include mHealth system enhancements that would allow syncing of a digitized appointment diary with delivery of SMS appointment reminders.
2. **Promote greater involvement and ownership by health facilities from the start.** Having sub-county health management teams host the weekly monitoring meetings and rotating hosting responsibilities among the facility teams, perhaps by Zoom, could have accelerated the development of a sense of agency and investment in the process.
3. **Institute an earlier, expanded rotating health facility awards program.** The element of friendly competition between health facilities and the ability to monitor relative progress toward goals against that of other facilities, provided a source of motivation and enthusiasm for health care staff—and a great sense of pride for those who received awards. Considerations for taking this idea forward might include more frequent awards or categories of awards, such as "most improved," so those starting farther behind do not become discouraged. Providing facilities with a clear list of review criteria, as many of the winning facilities did, might also help motivate staff to focus on the full spectrum of operational issues.
4. **Pairing high-achieving health facilities with lower achieving ones.** A twinning approach could help accelerate improvements from diffusion of innovations and best practices through peer-led learning. Such partnerships could also be motivating for both sides of the twinned pair.

In addition to these suggestions, Afya Uzazi's experience with developing and coordinating an MNH surge approach revealed some likely areas of implementation challenges to be considered for future programming. First, staff turnover at health facilities led to the need for frequent on-the-job training and mentoring on surge-related activities. This challenge might be addressed by allocating resources for ongoing training needs or by designating a sub-county "surge champion" whose primary task is to coordinate and support implementation within the current county government framework. This role could be played by, for example, the person serving as the focal point for quality improvement. This pervasive issue should also be raised to advocate for counties to align their annual budgets and staffing plans with recently revised county human resources for health policies based on exercises conducted with Afya Uzazi technical assistance (Workload Indicators of Staffing Needs).

Second, poor network coverage in some implementation areas delayed or prevented upload of weekly data on some occasions. Hot spots or signal boosters may need to be allocated to these locations, or counties could

advocate with private mobile network operators to extend signal tower coverage, as poor network coverage also diminishes referral capacity for emergency cases.

Third, there were challenges related to the loss or malfunction of mobile phones provided to health facilities for data recording. In the event a phone malfunctioned or a loss was reported, investigations were conducted, and the phone was either sent for repair by a contracted phone repair company or replaced. Health facility development of standard operating procedures that detail phone use and protection, along with plans for dealing with loss or malfunction, could help to ensure that all staff involved have a clear understanding of roles and responsibilities before surge activities begin. Mobile phone supplementation may also be considered as a component of NHIF reimbursement for re-investment in facilities as smart phone photos are used to facilitate NHIF reimbursements as well as weekly data reporting.

CONCLUSION

Afya Uzazi's innovative adaptation of the TQLA and HIV surge model to support achievement of MNH service coverage goals demonstrated the potential of this approach to efficiently monitor service delivery at the facility level, identify "leaks" in the care cascade, and design and mobilize responsive, locally developed solutions. In addition, descriptive longitudinal trends suggest this approach contributed to improvements in MNH service coverage. Together, these observations support the further exploration of a data-driven surge approach within the MNH context. Future implementation science might investigate which elements or combinations of interventions contributed to these improvements, to inform the development of a toolkit and guidance on essential and supplemental activities to improve MNH services.

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