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Data-driven program adaptation and continuous improvement: A case study of the Adolescents 360 (A360) project in Ethiopia, Nigeria, and Tanzania

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Abstract

Interventions benefit from ongoing continuous quality improvement during implementation to refine and strengthen them in response to changing contexts and emerging opportunities. This article reflects on the experience from the Adolescents 360 (A360) project in implementing user-centered, adaptive programming across Tanzania, Ethiopia, and Nigeria from 2018 to 2020. During this implementation period, A360 progressed through three distinct phases: an 'optimization' of project interventions in pursuit of efficiency and preparation for scale; a re-focusing on user-centered programming to go beyond efficiency and pursue greater impact; and a rapid course correction in response to the emerging COVID-19 pandemic.

A360's approach to data-informed adaptation evolved throughout these phases. From a hyper focus on cost-efficiency during optimization to a more expansive use of mixed methods data for adaptation during its second phase and finally iteration in response to an extremely restrictive service delivery environment during the COVID-19 pandemic. In this article we reflect on how these periods of adaptation and course correction contributed to the evolution of the project's interventions and provided significant lessons which the project has taken into its new investment phase. Balance is key –

utilizing a range of mixed methods data instead of a singular focus on cost-efficiency, streamlining interventions while not compromising long-term impact, and retaining a user-focus even while considering sustainability.

Keywords

adolescent, sexual and reproductive health, adaptive implementation, HCD, continuous quality improvement, user-centered

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Introduction

Adolescence is a period defined by paradoxes. Adolescents have heightened vulnerability to adverse outcomes, yet they are also establishing critical behaviors, skills, and mindsets that will endure throughout their lives.^{1,2} There is a tremendous opportunity to intervene early and support adolescents in gaining vital health-related knowledge and establishing healthy behavior patterns. Yet, adolescents face a range of social, systemic, economic, and political barriers that prevent them from accessing information and support at a time when they are most in need.³ This is particularly true with regards to adolescent sexual and reproductive health (ASRH). Across many low- and middle-income countries, national survey data reveal significant gaps between age at first sex and age at contraceptive use. In Nigeria, for example, where the median age at first sex is 17 years, women experience a gap of nearly eight years between first sex and first contraceptive use, and by the time of first contraceptive use, women have on average three children.⁴ Early and frequent childbearing can have considerable impact on adolescents' current and future health and wellbeing.^{5–8}

Adolescence is also a vital period for defining life aspirations – relating to education, economics and livelihoods, and family – which are critically important for adolescents' capacity to effectively shape and pursue a stable future for themselves.⁹ Interventions that foster optimism about the future, positive self-esteem, and skills have all been shown to support healthy decision-making, including around contraceptive use.¹⁰ Additionally, approaches that frame contraception as a tool to help achieve life aspirations as opposed to only focusing on mitigating risk, or method side effects, are similarly associated with increased modern contraceptive use among adolescents.^{11,12}

Human-centered design (HCD) has increasingly been recognized as a valuable tool to tackle the complex challenges that the global health community faces and to address community needs by facilitating faster innovation, better collaboration, and more effective scale.^{13,14} Yet, there has been less discussion about how to maintain a user-centered, iterative focus as projects move from design to implementation, particularly for projects which do not have resources to continue to implement comprehensive HCD processes over the full course of their life-cycle. Interventions benefit from ongoing continuous quality improvement during implementation to refine and strengthen them in response to changing contexts and emerging opportunities. Evidence collected in a narrow, relatively optimal set of circumstances, such as design, may not apply in the same way in every implementation context. In other words, design creates an incubator for positive outcomes, but interventions can never be “optimized” prior to implementation in an actual, real-world setting.¹⁵ Approaches which involve refining and adjusting during implementation are more effective than ‘quality assurance’ approaches which emphasize fidelity, or strict preservation of an intervention to the initial design, without reservation.

Program description

In 2016, Population Services International (PSI) and its consortium of partners launched Adolescents 360 (A360) with funding from the Bill & Melinda Gates Foundation (BMGF) and the Children's Investment Fund Foundation (CIFF). A360 was a 4.5-year project working directly with young people to design and deliver interventions that increase demand for, and voluntary uptake of, modern contraception among adolescent girls aged 15 to 19 years. A360 designed and implemented four interventions across three countries – *Smart Start* in Ethiopia, *Kuwa Mjanja* in Tanzania, *Matasa Matan Arewa (MMA)* in northern Nigeria, and *9ja Girls* in southern Nigeria.^{16–20}

A360 adopted a user-centered approach throughout design and implementation, recognizing a need to evolve traditional approaches to ASRH programming. Each A360 intervention leads with discussion of girls' aspirations (inclusive of motherhood) and then positions contraception as a tool that can assist girls (and couples) to achieve their goals. In addition, A360's approaches strengthen health systems to respond to the unique needs of adolescents and to provide adolescent girls with a full array of short- and long-acting reversible contraceptive methods in a supportive environment.

The A360 investment was divided into two distinct project phases. Within the project's **design** phase, A360 pursued inquiry to understand the experiences, contexts, and underlying motivations that inform adolescent behavior followed by insight synthesis and prototyping by multi-disciplinary youth-adult teams. Subsequently, A360 moved into an **implementation** phase, grounded throughout in adaptation and ongoing quality improvement (Figure 1). A360 emphasized meaningful engagement of young people to co-design interventions that would be relevant within individual country contexts and continued to pursue routine program improvement after design. This publication provides a case

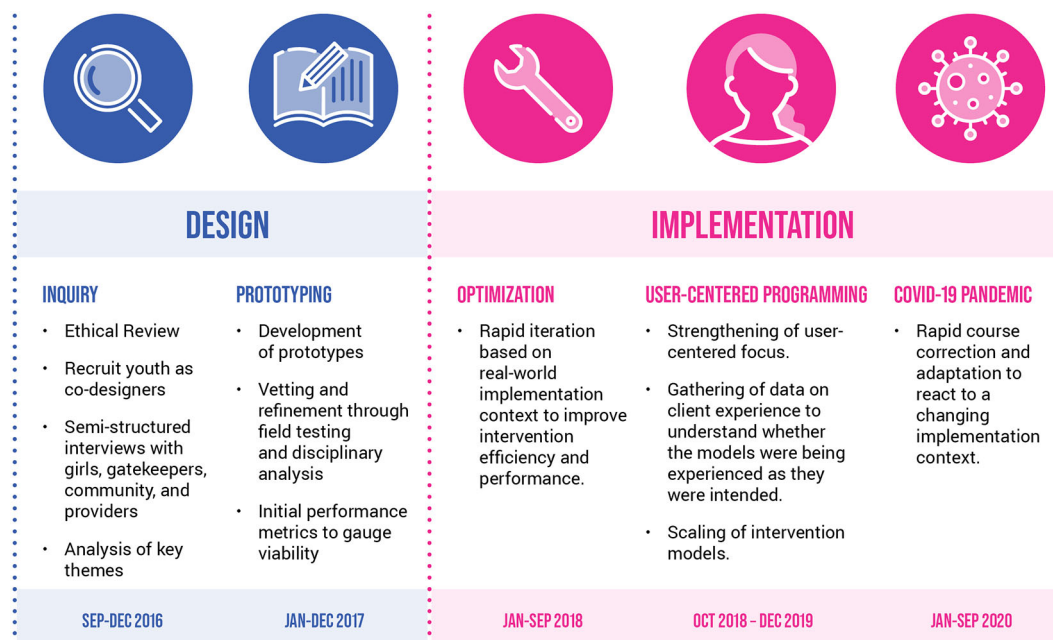


Figure 1. A360 project timeline (2016-2020).

study of A360's data-driven program improvement processes during its second project phase – implementation – and draws lessons for programs looking to apply user-centered adaptation approaches during implementation.

Methods

Study setting

Implementation of A360 activities took place across Ethiopia, Nigeria, and Tanzania between January 2018 and September 2020. *Smart Start* was implemented across four regions in Ethiopia: Oromia, Amhara, Tigray, and SNNPR in a total of 40 woredas and 620 health posts. *9ja Girls* was implemented across six states in southern Nigeria: Oyo, Osun, Ogun, Lagos, Edo, and Delta in a total of 16 local government authorities (LGAs) and 134 health facilities. *MMA* was implemented across two states in northern Nigeria: Kaduna and Nasarawa in a total of 6 LGAs and 59 health facilities. *Kuwa Mjanja* was implemented across 13 regions in Tanzania: Dar es Salaam, Dodoma, Geita, Iringa, Katavi, Morogoro, Mtwara, Mwanza, Pwani, Ruka, Ruvuma, Tabora, and Tanga in a total of 90 districts and 1,497 health facilities.

Data collection methods

This study employed three forms of data: routinely collected service delivery data, client exit surveys, and costing data. Routine data on key performance indicators (KPIs) (Table 1) was collected primarily through government health management information systems (HMIS) and tools. Routine client-level data was routinely collected by public sector providers through government-approved service registers as they served their clients. Key data elements captured included date, name, age, sex, new user or revisit client, and whether the client received a modern contraceptive method or

Table 1. A360 key performance indicator definitions.

Key performance indicator	Definition		
	Ethiopia	Nigeria	Tanzania
Girls Reached/ Attendees	The number of girls aged 15-19 years old who received counseling through <i>Smart Start</i> at active sites.	The number of girls aged 15-19 who were registered as attending a <i>9ja Girls/MMA</i> clinic or event to receive services.	The number of girls aged 15-19 who were issued a referral at <i>Kuwa Mjanja</i> events during outreach (in theory all girls attending events received a referral).

Table 1. Continued

Key performance indicator	Definition		
	Ethiopia	Nigeria	Tanzania
Adopters	The number of girls aged 15-19 who were not using a modern method of contraception at the time of receiving services and did not use emergency contraception (EC) or a condom at last sex who took up a modern method of contraception after attending <i>Smart Start</i> counseling.	The number of girls aged 15-19 who were not using a modern method of contraception at the time of receiving services and did not use emergency contraception (EC) or a condom at last sex who took up a modern method of contraception at a <i>9ja Girls/MMA</i> clinic or event.	The number of girls aged 15-19 who had never used a modern method of contraception previously who took up a modern method at a <i>Kuwa Mjanja</i> event.
Continuing Users	The number of girls aged 15-19 who attended a <i>Smart Start</i> counseling session and confirmed that they were using a modern method of contraception at the time of receiving services.	The number of girls aged 15-19 that attended a <i>9ja Girls/MMA</i> clinic or event who received counseling and were using a modern method of contraception at the time of receiving services, inclusive of those who switched methods.	The number of girls aged 15-19 who attended a <i>Kuwa Mjanja</i> event who received counseling and were using a modern method of contraception at the time of receiving services, inclusive of those who switched methods.
Conversion Rate	The proportion of girls counseled through <i>Smart Start</i> who were not pregnant or continuing users who adopted a modern method at the time of <i>Smart Start</i> counseling.	The proportion of girls attending <i>9ja Girls / MMA</i> clinics or events who were not pregnant or continuing users who took up a modern method of contraception at the time of receiving counseling through <i>9ja Girls/MMA</i> .	The proportion of girls receiving a referral who were not recorded as pregnant or continuing users who took up a modern method of contraception at a <i>Kuwa Mjanja</i> event.

counseling only. On a monthly basis, providers employed these registers to generate a facility summary report aggregating data on KPIs which was entered in the government HMIS at the facility or submitted to a sub-regional office where it was entered.

Where specific data was unavailable via HMIS – such as the number of girls reached by the intervention or age disaggregation of contraceptive adopters – we utilized parallel data collection systems developed by the project. In Tanzania, this included a tablet-based data collection system called ‘Connecting with Sara’²¹ which was fielded at all *Kuwa Mjanja* events to collect data on program reach and adopter age disaggregation. In Nigeria an activity attendance and service log was developed on a District Health Information System 2 (DHIS2) android application and used to capture all service uptake data. Analytic dashboards were also developed on PSI’s DHIS2. In Ethiopia the team used a paper-based *Smart Start Session Tracker and Extraction Tool* to collect the key data points for adolescent girls accessing services through the *Smart Start* program.

We conducted structured client exit interviews (CEIs) among sampled adolescent girls who received contraceptive counselling and methods from A360 health facilities and events across Ethiopia (January - February 2020), northern Nigeria (August 2020), and southern Nigeria (August 2020) (Table 2). The CEI tool captured data on client demographics (such as age, socio-economic status, marital status, parity, and education) and client experience with the program, including the information and services received and quality of service delivery.

We collected costing data to facilitate a cost analysis that used a blended top-down and bottom-up approach. Costing data included financial costs incurred during A360’s implementation and excluded end-user or societal level costs. Financial data from PSI and its A360 consortium partners’ financial systems was pulled into an Excel database to calculate direct implementation costs. The project’s external cost-effectiveness evaluation partner (independently engaged by the A360 donors) supported in extracting site level costing data from government financial systems through facility surveys. This was employed to calculate government in-kind implementation cost. These surveys were conducted through interviews with staff in selected health facilities by trained data collectors using an excel-based costing tool. The tool captured costs which were unavailable data from PSI and its A360 consortium partners’ financial systems, including facility size and

Table 2. Client Exit Interview (CEI) protocols, A360.

	Ethiopia (Smart Start)	Southern Nigeria (9ja Girls)	Northern Nigeria (MMA)
Population	Married adolescent girls aged 15-19 receiving contraceptive service delivery through Smart Start	Unmarried and married adolescent girls aged 15-19 receiving contraceptive service delivery through 9ja Girls	Married adolescent girls aged 15-19 receiving contraceptive service delivery through MMA
Location	12 kebeles in Oromia, SNNPR, Tigray, and Amhara regions	10 LGAs in Oyo, Osun, Ogun, Lagos, Edo, and Delta states in southern Nigeria. Kaduna in northern Nigeria was also included to capture implementation of 9ja Girls at a few sites in the north.	Four LGAs in Kaduna and Nasarawa states in northern Nigeria
Sample	n=250*	n=433	n=428
Recruitment procedure	10 households per kebele were sampled from those households which had been recently visited by A360 program staff and/or Health Extension Workers (HEWs) to provide counseling on Smart Start. Clients within those sampled households were invited to the health post on days when data collection was planned to participate.	10 clients who attended Life, Love and Health (LLH) 9ja Girls' classes were systematically selected from a list of all girls who saw a health provider for contraceptive counselling and services on a given day during the data collection period. Overall, forty LLH (40) classes conducted in selected health facilities contributed to the sample.	10 clients who attended Life, Family and Health (LFH) MMA classes were systematically selected from a list of all girls who saw a health provider for contraceptive counselling and services on a given day. Overall, forty LFH (40) classes from selected facilities contributed to the sample.
Survey tool	Trained enumerators used a paper-based data collection instrument designed in English and translated into Amharic, Tigrinya, and Oromiffa to collect data. Collected data was entered in a Survey CTO database daily after interviews were completed. Data was downloaded and analyzed using STATA 16.0.	Interviewer-administered survey tool inbuilt on SurveyCTO and hosted in password-protected mobile devices (tablets) owned by Society for Family Health (SFH) in Nigeria was fielded by trained enumerators. Data was submitted to a secure server daily and data downloaded and analyzed using STATA 16.0.	Interviewer-administered survey tool inbuilt on Survey CTO and hosted in password-protected mobile devices (tablets) owned by SFH in Nigeria was fielded by trained enumerators. Data were submitted to a secure server daily and data downloaded and analyzed using STATA 16.0.
Consent	Obtained informed consent (girls aged 18+) or assent with waiver of parental or guardian consent (girls under 18 years of age).		
Interview procedure	Clients who provided consent to participate were given the option of conducting the interview on-site at the health post in a private room or at a separate location for additional privacy.	Consenting married and or assenting unmarried adolescent girls were interviewed immediately before they leave a participating facility where 9ja Girls is offered.	Consenting married adolescent girls are interviewed immediately before they leave a participating facility where MMA is offered.

*Though the CEIs surveyed 400 girls in Ethiopia, there were some inconsistencies with the mobilization approach for these CEIs which resulted in A360 discarding a portion of the sample during analysis.

cost for use of utilities, office and medical equipment, and government staff time. Surveys were also conducted among the project personnel to determine how project costs were allocated between the different phases of the project and between the major cost drivers.

Data analysis

Routine performance data was analyzed in [Microsoft Excel](#) or the [DHIS2](#) through in-built algorithms, primarily utilizing time trend analysis. CEI data downloaded from [SurveyCTO](#) was cleaned and checked for inconsistencies prior to analysis using [STATA 16.0](#). Descriptive analysis, cross-tabulations and Chi-square tests were conducted for selected indicators of service quality. To generate routine cost-efficiency metrics, each of A360's interventions was assigned a

'total implementation cost' which consisted of all direct and indirect costs incurred by PSI or a consortium partner at a country level. Global top-down costs, including personnel costs for the project's global staff and consortium partners and the associated indirect costs, were allocated to each country intervention's total implementation cost using the approximate time spent supporting each country intervention. Cost per adopter was calculated on a quarterly basis using a cumulative approach. The total to date implementation cost was summed with the cost allocation from the project's global costs and divided by the total to date number of adopters reached for the same period. For A360's two interventions in Nigeria, MMA and 9ja Girls, costs were split across proportionally based on the number of sites where A360 was currently implementing each intervention.

Ethical considerations

Research Ethics Board (REB) approvals were obtained for CEIs in Nigeria and Ethiopia from PSI's REB (approval No. 68-2019 dated 2 December 2019 for Nigeria and approval No. 62-2019 dated 23 November 2019 for Ethiopia respectively) and local REBs specific to each geography, including the Ethiopian Public Health Institute (approval No. PM23/216 dated 16 December 2019) and National Health Research Ethics Committee of Nigeria (approval No. NHREC/01/01/2007-29/07/2020 dated 29 July 2020). Written informed consent or assent (in the case of unmarried adolescent girls) was granted by all CEI participants prior to their participation. As CEI participants in northern Nigeria and Ethiopia were all married, they were considered emancipated minors and able to provide informed consent directly for participation. A non-research determination was obtained for the analysis of the routinely collected program and costing data utilized from Tanzania, Nigeria, and Ethiopia. Authors of this article did not have access to information that could identify individual participants during or after data collection.

Results

During the implementation duration, the four interventions reached 607,000 adolescent girls aged 15 to 19 years with aspirational program components and contraceptive services. Two thirds (410,871) of these girls voluntarily adopted a modern contraceptive method of their choice. Over the course of its over two-and-a-half years of implementation, A360 had to adapt to differing challenges and contexts. Each year of program implementation, based on these shifting priorities and changing contexts, necessitated detailed interrogation of monitoring and evaluation data and program experience for decision-making and adaptation. Within its first phase of implementation (January – September 2018), A360 pursued intervention **optimization**, applying rapid iteration based on real-world implementation context to improve intervention efficiency and performance. As A360 moved into its second phase (October 2018 – December 2019), we recognized a need to enhance our user-centered focus during implementation, **strengthening quality assurance and user feedback mechanisms** to ensure that adolescent girls were experiencing our intervention models the way they were intended as these models were brought to scale. This period included the peak of A360's 'reach,' driven primarily by our intervention in Tanzania which experienced a surge of program attendance during the school holidays. In 2020, we experienced disruption from the emergence of the **coronavirus disease 19 (COVID-19) pandemic**, necessitating rapid course correction and adaptation to react to a changing implementation context. The resulting performance outcomes during each phase are visualized in [Figure 2](#) and described in detail subsequently.

Optimization (January – September 2018)

A360's implementation phase began with nine months of program 'optimization' to continue refining and strengthening the solutions that had been created during design and to prepare for scale. We performed detailed analysis of performance data from each intervention model (including program reach, adopters, conversion rates, and adopter age and method mix disaggregation) alongside costing data (cost per adopter) to understand the most effective and cost-efficient ways to implement the project's interventions while maintaining fidelity to the core of the original program design and its intended experience for adolescent girls. This analysis of performance data led to the identification of key areas of program adaptation aimed at increasing program efficiencies and driving down cost ([Table 3](#)).

A360's global reach during this optimization phase increased from 15,393 girls during Q1 of 2018 to over 60,000 girls during Q3 of 2018. The project saw rapid increases in the proportion of program attendees who voluntarily adopted a modern method of contraception. In January 2018 during the first month of optimization, the project's global conversion rate was 33%. By September 2018, this conversion rate had increased to 67% due to the rapid adaptations tested during this optimization phase. Contraceptive uptake dramatically increased, but the project still saw a balanced contraceptive method mix throughout the course of this optimization period which showed high proportions of long-acting reversible contraceptives (LARC) uptake across all interventions ([Figure 3](#)). In Q1 of 2018, 47% of contraceptive adopters took up a LARC method compared to 48% in Q3 of 2018. This was predominantly driven by implant uptake. The second most popular contraceptive method within A360's global method mix was injectable contraception which encompassed 18% and 22% of global contraceptive uptake in Q1 and Q3 of 2018 respectively.

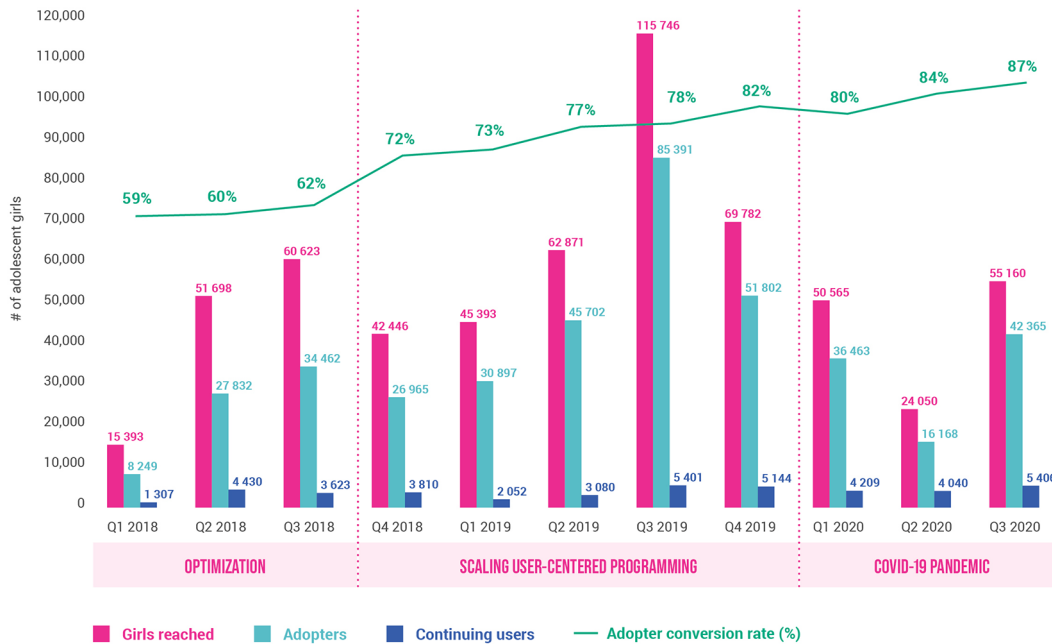


Figure 2. Girls reached, adopters, continuing users, and adopter conversion rate for A360’s global programming by quarter, 2018-2020.

Table 3. Examples of performance data analysis insights and adaptations in response by A360 country, optimization phase (2018).

Country	Data analysis/trends	Intervention optimization	Optimization outcomes
Ethiopia	We analyzed key cost drivers to understand how to adapt Smart Start for improved cost-efficiency. We observed that two positions contributed nearly one-third of personnel costs. This included a Smart Start Navigator, responsible for mobilization of adolescent girls for services and implementation of some aspects of program counseling, and the Adolescent Health Officer, who partnered with woreda-level health officers to conduct supportive supervision at the health post level (where counseling occurred).	The Adolescent Health Officer role was maintained, but the Smart Start Navigator role was transitioned to more sustainable sources, such as the Women’s Development Army (WDA), a local cadre which often assists public health structures with mobilization and health promotional activities.	Cost per adopter reduced from \$2,714 in Q1 to \$484 in Q3.
Nigeria	By tracking costs at the site level, we learned that intervention branding could be limited and stand-alone service-delivery rooms in 9ja Girls and MMA sites could be abolished, and intervention delivery integrated with the family planning service-delivery room for women of all reproductive age within the primary health center (PHC) without impacting performance.	We adapted both the 9ja Girls and MMA models to include light-touch branding. For both programs, this included a youth-friendly and relatable logo. 9ja Girls also adopted a mantra which served as a reminder of what the program represents. Other branding (e.g., painted walls, rugs, etc.) which was seen as much less important to girls were discarded.	Cost per adopter for 9ja Girls and MMA decreased from \$618 and \$614 respectively in Q1 2018 to \$186 and \$215 in Q3 2018.

Table 3. Continued

Country	Data analysis/trends	Intervention optimization	Optimization outcomes
Tanzania	Kuwa Mjanja consisted of two implementation models: an out-of-clinic community-based outreach event with on-site contraceptive service delivery and an in-clinic event focusing on mobilizing girls for a static service delivery site. We observed that though the total cost per event was higher for out-of-clinic events, they yielded four times the number of attendees than in-clinic events and a conversion rate of 36% compared to 3% for in-clinic events.	Kuwa Mjanja shifted their implementation approach to focus more intently on out-of-clinic events which had greater efficiency.	Whereas previously 50% of Kuwa Mjanja events were in-clinic this reduced to around 25% by the end of the optimization phase. Kuwa Mjanja's performance improved from around 4,000 adopters in Q1 of 2018 to nearly 24,000 in Q3 of 2018.

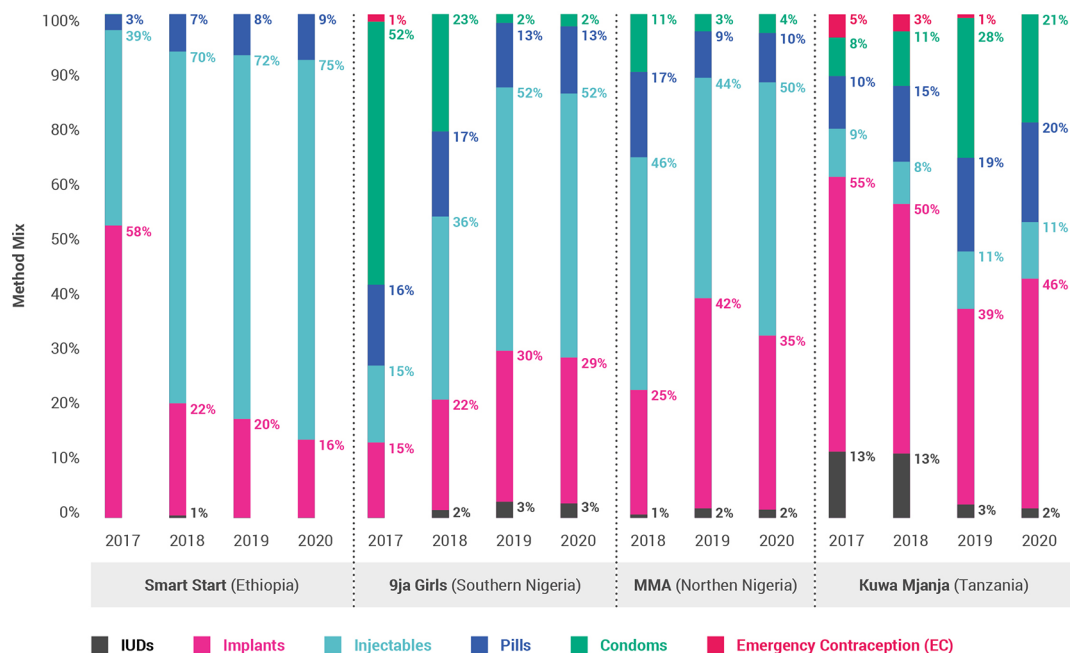


Figure 3. Method mix of program adopters by intervention and year, 2017-2020. Note: MMA's design process took place later than the other A360 interventions, therefore no data on method mix is available for 2017 for this intervention.

Through adaptations to improve program performance and reduce key cost drivers, A360's cost per adopter decreased across each program intervention by between 65% to 82% over the course of the first nine months of 2018 (Figure 4).

Scaling User-Responsive Programming (2019)

As A360 transitioned to its second full year of implementation, we reflected on the adaptations that had been made to optimize our intervention models. The project had succeeded in increasing adopter performance and driving down cost, utilizing adopters and cost per adopter as the pre-eminent performance metrics on which to base programmatic decision-making. Yet, A360's mid-term evaluation findings (distributed in late 2018 and published in 2019)²² and our own internal learning acknowledged that the ambitious targets set for A360 put pressure on implementing teams to meet the projected adopter goals, resulting in a decision to reduce or eliminate intervention components that could not be immediately seen to contribute to contraceptive adoption. As a result, in 2019 we began to broaden our approach, considering what changes needed to be made (and program components needed to be re-introduced or newly adapted) to deliver quality programming as we took our interventions to scale. In late Q3 2019, A360 also received additional funding to scale its programming in northern Nigeria which had previously been operating in a nominal number of sites.



Figure 4. A360 cumulative adopter performance and cumulative direct implementation cost per adopter by project geography.

Critical components of this intensified focus on user-centered scale-up processes were increasing the availability and use of program data to understand which sub-populations of adolescent girls the project’s interventions were reaching and strengthening quality of care mechanisms to make sure girls were experiencing the program the way it was intended. Availability of routine performance data on demographic factors such as parity and age were analyzed alongside results of CEIs to support decision-making on program adaptations (Table 4).

A few key factors emerged from in-depth analysis of these data sources that we considered as we made adaptations to remain user-centered during intervention scale. Data reinforced the importance of engaging adolescent girls’ key influencers for a supportive enabling environment for their contraceptive use and decision-making. Key influencers

Table 4. Key themes from A360 client exit interviews in Ethiopia and Nigeria, 2019-2020.

CEI theme	Illustrative data
A360 succeeded at supporting girls to delay and space births according to their fertility aspirations.	Between 59-76% of adolescent girls surveyed wanted to wait at least three years before becoming pregnant. A substantial proportion of married and married girls wanted to wait more than five years before becoming pregnant – this included 38% of those surveyed in Ethiopia and 46% in southern Nigeria. In northern Nigeria only 13% wanted to wait for five years.
A360 was reaching girls across differing socio-economic statuses, but reach was generally skewed towards wealthier girls.	In southern and northern Nigeria at least 50% of girls surveyed were within the fourth (29%/28%) and fifth (45%/20%) wealth quintiles (with the first quintile being the lowest wealth status and the fifth quintile being the highest).
Across all A360's programs, community-based mobilization was the most successful way to reach girls.	Between 60-77% of adolescent girls surveyed cited community mobilizers as their main source of information about the program and referral.
Most program attendees discussed attending an A360 event with someone before doing so, though the person with whom they discussed their attendance varied by marital status.	Between 50-93% of girls surveyed discussed attending an A360 event with someone before doing so. For interventions which targeted married adolescents, husbands/partners and friends were most often cited. For unmarried adolescents, mothers and friends were most often cited.
Some adolescent girls had someone close to them who were opposed to them seeking contraception. This was more frequent for married girls than for unmarried girls.	The proportion of girls reporting that someone important to them was opposed to them seeking contraception ranged from 16% to 37%. The highest proportion was demonstrated in northern Nigeria, A360's most conservative implementation context.
Adolescent girls found content around pregnancy prevention the most useful topic covered during A360 events.	Across all geographies, between 84% to 92% of girls surveyed reported that pregnancy spacing, or prevention, was the most useful topic.
Multiple factors influenced whether a girl was likely to take up a contraceptive method during an A360 event and which method they were likely to take up. Factors included age, marital status, childbearing, and residence.	In northern and southern Nigeria, adolescent girls aged 15-17 compared to girls 18-19 were more likely to receive counseling only and not take up a method (south Nigeria – 72.1% versus 29.4%; northern Nigeria, 37.4% vs 17.0%) $p=0.005$). Additionally, girls not married or living as if married in southern Nigeria were less likely to take up a method compared to those married in monogamous and polygamous arrangements (55.3% vs 70%, $p<0.0001$). In southern Nigeria, adopters who already had children were more likely to choose implants or injectables (62.8% vs 23.9%, $p<0.001$) and girls who had no children were more likely to seek counseling only and not take up a method (46.2% vs 17.2%, $p=0.002$).
Most adolescent girls were making informed contraceptive choices through A360 events, but not all were aware of potential side effects and switching options.	Between 96% to 98% of adolescent girls surveyed were informed by providers about other contraceptive methods available to them. Between 81% to 90% were told about side effects and 71% to 87% were told what to do if they experienced them. And between 77% to 93% were told they could switch methods if they chose to.
Most adolescent girls who took up a contraceptive method at an A360 event planned to continue using it for the next year and knew where to source contraceptive refills.	Between 79% to 98% of girls surveyed who took up a method planned to use it for the next year and between 82% to 99% knew where they would go the next time they needed a method.

could serve as an enabler or barrier to girls' participation in the program and use of contraception, particularly for populations of married adolescent girls. For example, in Ethiopia monitoring data showed that three out of five girls counseled without their husbands adopted a method of contraception, compared to four out of five when girls were counseled with their husbands. Within the constraints of program resources, we worked to meaningfully engage at least one key influencer population (for married girls, husbands and for unmarried girls, mothers) as interventions scaled.

Data also emphasized the value of a shift in focus from just service quality to person-centered quality of care. For the project this meant capturing and responding to data not just on how services were being provided, but how those services were experienced by its end users – for example did they feel they were treated with dignity and respect, and did they feel that the provider did not discriminate against them based on their age, marital status, or parity.

In some cases, A360’s definition of ‘user’ expanded during this time to include health system actors given their critical contribution to our interventions’ success. For example, beginning late in the optimization phase and bridging into this second implementation phase, in Ethiopia we identified a clear need to modify the program for alignment with the motivations and limitations of Health Extension Workers (HEWs). A360 streamlined the Smart Start intervention, reducing the length of its counseling session, to reduce any additional burden for HEWs and incorporated messaging to promote better understanding for HEWs regarding Smart Start’s contribution to helping mothers and babies thrive. This created greater alignment with HEWs’ intrinsic motivations and the limitations of their workload.

Lastly, we also broadened our focus on costing during this phase, knowing that reintroducing components that contributed to broader program impact but didn’t necessarily increase contraceptive uptake may lead to increases in key costing metrics. Yet, we saw cost per adopter continue to reduce across all our interventions over the course of 2019, albeit at a slower pace than in our optimization phase, with cost per adopter for each intervention decreasing by between 21 to 71% between Q4 2018 and Q4 2019 (Figure 4). The reason for this was likely due to some additional adaptations to improve program efficiency, as well as economies of scale. In the first nine months of 2018, A360 reached just over 127,000 girls, supporting 70,500 girls to voluntarily adopt contraception. During the same period in 2019 as the program went to scale this increased to 224,000 girls reached and 162,000 adopters (Figure 2). Though program reach increased by 75%, total program cost only increased by 36%. The intervention which achieved the greatest reduction in cost per adopter during this time was MMA in northern Nigeria, which also achieved the greatest increase in scale during this time, with an eleven-fold increase in reach and 71% reduction in cost per adopter.

COVID-19 Pandemic (2020)

A360 entered 2020 intending to continue implementing its programming at scale and building on the lessons from the previous phase. However, the emergence of the COVID-19 pandemic in March 2020 presented a new and challenging context for the project. Many pieces of the implementation strategy were incompatible with the new precautionary restrictions that were instituted to prevent the spread of COVID-19, and the project grappled with health system overload that detracted attention from SRH service delivery. In some countries, particularly in Tanzania, government leadership required immediate shut down of all service delivery by implementing partners. Additionally, we encountered challenges addressing myths and misconceptions related to the spread of COVID-19 which necessitated community-level intervention to ensure that girls continued to be supported by their influencers to access critical SRH services. In the last six months of 2019, A360 had reached an average of 31,000 adolescent girls each month, supporting around 23,000 girls per month to adopt a contraceptive method of their choice. In April and May of 2020, at the very beginning of the pandemic, this dropped to around 5,000 girls reached and 3,000 contraceptive adopters per month (Figure 2).

Table 5. COVID-19 restrictions and A360 program adaptations in response.

COVID-19 changing context	A360 program adaptations
Large group gatherings were limited or eliminated.	In Tanzania, A360 transitioned its Kuwa Mjanja model away from large outreach events in the community and adapted a model which could be implemented in a clinic setting to accommodate COVID-19 restrictions. This included modifying mobilization approaches to limit attendance at each event. Event settings and seating arrangements for Kuwa Mjanja were also adapted to maintain social distancing and event duration was minimized to reduce exposure. Nigeria’s cohort-based in person skills classes were no longer feasible to implement given the restrictions on in person gatherings. The project tested an adaptation which utilized WhatsApp to facilitate these skills classes instead. During the pandemic, 847 adolescent girls engaged with these virtual LLH classes. In Ethiopia, all group-based activities, including community kick-off events conducted upon entry into a new community, HEW training on Smart Start, and group counseling were modified to be conducted with a limited number of participants.

Table 5. *Continued*

COVID-19 changing context	A360 program adaptations
Health system actors were overloaded or distracted by the extensive needs of managing the pandemic response.	A360 worked to ensure that wherever feasible program resources were utilized to promote a safe and comprehensive health system response to COVID-19. This included large procurements of personal protective equipment (PPE) for public providers engaged by A360's programming so that they could safely provide ASRH services. With the approval of the COVID-19 vaccine, A360 supported governments to leverage program activities for vaccination campaigns. For example, in Ethiopia a national-level training on <i>Smart Start</i> was utilized to also provide the opportunity for Health Extension Workers (HEWs) to receive their COVID-19 vaccination.
Decreased mobility for adolescent girls because of fear and anxiety of COVID-19 exposure along with government restrictions imposed such as curfews.	A360 shifted mobilization approaches to conduct more outreach and one-to-one mobilization as adolescent girls were not as easily mobilized as they were prior to the pandemic. As girls were also not always able to seek out contraceptive refills for short-term methods, A360 Nigeria fast-tracked testing of a community-based distribution model for DMPA-SC self-injection called 'Big Sistas.' 'Big Sistas' are experienced, knowledgeable peer educators who are satisfied DMPA-SC users and could support girls through conveying their own experience with choosing an SRH method. 'Big Sistas' were oriented on how to train, refer, supply, and support other adolescents who were interested in DMPA-SC through one-on-one engagement. Between May-October 2020 the project trained 25 'Big Sistas,' 152 adolescent girls initiated DMPA-SC and 40 adolescents were referred.
Reduced access to information, particularly among adolescent girls.	A360 increased its SRH information campaigns through existing digital platforms. In Nigeria, the program partnered with Facebook to revamp the 9ja Girls Facebook page to provide medically accurate and unbiased family planning information and related health information to girls. This also included messaging to continue reinforcing the relevance of contraceptive use for girls in achieving their aspirations. The project initiated a communications plan to reach more girls, growing its Facebook followers from 2,400 in April 2020 to 12,000 in September 2020. Since September 2020 the page has gained an additional 85,000+ followers and reached 5.9 million adolescent girls. In Tanzania, A360 re-designed its existing unstructured supplementary service data (USSD) platform so that it specifically targeted adolescent girls as opposed to all women of reproductive age. Through December 2021 over 1,200 adolescent girls aged 15-19 interacted with this platform. Around 10% of USSD users selected the option to receive a referral to a nearby facility for contraceptive services.

The foundation established by A360's iterative design process and its adaptive approach to implementation supported us to swiftly course correct and adapt during this changing context (Table 5). A360 conducted rapid prototyping to test out new implementation strategies and components to its intervention models that considered these restrictions and additional COVID-19 precautions, rolling out an adapted strategy and intervention models at scale in June and July of 2020. In the last four months of the program (July-October 2020) program performance increased to around 17,000 adolescent girls reached and 13,000 contraceptive adopters per month.

These required adaptations led to some shifts in client demographics. This included a slight increase in the proportion of project adopters who were 18-19 (68% in 2019 compared to 73% in 2020), resulting from the need to adopt a more

streamlined mobilization strategy that required less individual interaction. However, method mix remained consistent throughout this period. Though we experienced a decline in adopter performance at the beginning of the pandemic, this was accompanied in most cases by cost efficiencies stemming from reduced implementation costs. As a result, cost per adopter remained stable throughout the COVID-19 period. The exception was for Kuwa Mjanja in Tanzania, which was most affected by pandemic restrictions on group gatherings and experienced the greatest decline in monthly performance. Kuwa Mjanja's cost per adopter increased slightly, from \$45 in Q4 2019 to \$49 in Q2 2020 (Figure 4).

Discussion

Throughout the course of its implementation phase, A360's dynamic course correction and adaptation led to a greater understanding of the value of 'balance' in the context of program implementation - balance in the use of a wider array of diverse data sources for program adaptation compared to a hyper focus on one metric; between higher performance and equitable access among harder to reach girls; between cost-efficiencies from streamlined interventions and greater impact; and finally between sustainability and user-centered, adaptive programming. These insights, drawn from A360's experience under its first investment phase, informed our priorities for the new investment phase which runs between October 2020 and September 2025.

Effective data for decision-making

Continuous program improvement processes during implementation are critical and decision-making must be informed by rigorous routine and non-routine mixed methods data collection. In our experience adaptive implementation can be a useful tool to support a project in adapting to changing program needs and context over its lifecycle. Projects should be wary of an over-reliance on one data point, as A360's experience during optimization and its over-reliance on cost-efficiency and contraceptive adoption shows. Use of diverse data sources for programmatic decision-making is best practice, and A360 had the benefit of robust qualitative data from its external process evaluation to contextualize what we were seeing in our routine performance data.²³ Yet this can often be a challenge for programs which have a goal of pursuing sustainability. Projects working towards institutionalization of their interventions within government systems may seek to utilize government data systems as much as possible and be severely limited by the depth and breadth of data available. This is particularly true for mixed methods data on user experience, which rarely is collected routinely by government HMIS.

Demographic reach informed by program adaptation

A360's original goal was to reach the broad population of adolescent girls aged 15 to 19 years. However, the HCD process and A360's continued adaptation during implementation revealed the extreme diversity of needs, experiences, and perspectives within this population and necessarily resulted in some specific sub-group targeting based on where the need was most apparent. In A360's case, sub-group targeting led to higher reach among older aged adolescent girls compared to younger girls. Though as a program A360 was described as serving the broad population, it was effectively supporting mainly 18- to 19-year-olds, the sub-group which often were the easiest to reach. This sub-group targeting was reinforced during periods such as optimization when there was a push to focus more intensively on program results (particularly on contraceptive uptake). Yet, we recognized a need during latter project stages to balance these quick performance wins with a broader focus on equity, meeting not just the needs which currently exist among the population but also anticipating future needs among younger adolescent girls who may not already be sexually active, married, and in active need of contraception.

Maintaining user-centered focus in implementation

Our two-and-a-half years of implementation presented many varying contexts that necessitated unique iteration and problem solving to ensure the program continued to be effective. We also found a need to re-affirm the relevance of our programming to our end users at routine points throughout the course of implementation, not assuming that because something was relevant to users during design that it continued to be so. Meaningful adolescent and youth engagement (MAYE) was one tool we introduced, alongside more routine client experience data, to maintain this user focus during implementation. Just as mixed methods data is often unavailable for projects intent on utilizing only existing public sector data sources, user-centeredness and adaptation can be at odds with a focus on sustainability through institutionalization. Governments are not often capacitated to routinely identify areas for adaptation based on performance and user feedback.

Appropriate use of costing data for program decision-making

Throughout the course of the project, A360 learned that while collecting costing data was critical in informing program adaptations there are also limitations and tensions in using that data routinely. For example, delays in costs being actualized in an organization's financial system can result in difficulties tying those costs to specific project phases or timelines. Likewise, it can be difficult to understand the costs of different components of an intervention when pulling transactions from financial systems. To circumvent some of these challenges and to track costs by intervention

component, A360 had to rely on manual calculations which was labor intensive. The project also benefited from data generated through an external cost effectiveness analysis (e.g., percentage of global staff time supporting each of A360's implementation geographies). However, availability of this data often did not align with timelines for reporting on costs routinely. A360's intensive focus on costing data in some phases created 'blinders' that led decision-making to be solely focused on cost efficiency rather than cost effectiveness. Our experience in course correction from this initial optimization phase reinforces the need to take a more balanced approach, understanding that pursuing the lowest cost intervention can often jeopardize long-term impact.

Given the project's focus on costs, there was a consistent desire among internal and external stakeholders to benchmark the costs of A360's interventions against those of other programs. Yet, the project encountered significant challenges that prevented it from doing so in a meaningful way. In reviewing several figures upon which to benchmark ourselves, we found that benchmarking figures varied widely. In addition, there was a lack of consistent data available to interpret variations in benchmarking. Example of these data include scale of the project, whether the figures were cumulative or non-cumulative, what costs went into the numerator and denominator, does the denominator reflect method mix, were the interventions pilots or long—running programs, are the target segments and geographies comparable, what was the service delivery salary, etc.

Data availability

Underlying data

Figshare: Routine Performance Data 2017-2020.xlsx, <https://doi.org/10.6084/m9.figshare.28311542.v1>.²⁴

Figshare: Cost Calculations, <https://doi.org/10.6084/m9.figshare.28311548.v1>.²⁵

Figshare: Ethiopia Client Exit Interviews (2020), <https://doi.org/10.6084/m9.figshare.28311731.v1>.²⁶

Figshare: Southern Nigeria Client Exit Interviews (2020), <https://doi.org/10.6084/m9.figshare.28311764.v1>.²⁷

Figshare: Northern Nigeria Client Exit Interviews (2020), <https://doi.org/10.6084/m9.figshare.28311773.v1>.²⁸

Data are available under the terms of the [Creative Commons Attribution 4.0 International license \(CC-BY 4.0\)](#).

Extended data

Figshare: Ethiopia Client Exit Interview Tool (2020), <https://doi.org/10.6084/m9.figshare.28311788.v1>.²⁹

Figshare: Southern Nigeria Client Exit Interview Tool (2020), <https://doi.org/10.6084/m9.figshare.28311797.v1>.³⁰

Figshare: Northern Nigeria Client Exit Interview Tool (2020), <https://doi.org/10.6084/m9.figshare.28311803.v1>.³¹

Data are available under the terms of the [Creative Commons Attribution 4.0 International license \(CC-BY 4.0\)](#).

Software availability

Software used in the analysis of data in this article include Microsoft Excel and STATA 16.0. Datasets shared via Dryad, accessible through the DOI in the data availability statement to this article, can be viewed and analyzed via alternative free software such as Microsoft Excel online or Google Sheets with some limitations on functionality for statistical testing.

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