Lessons learned from a public sector community-based distribution program for scaling up DMPA-SC contraceptive services in Nigeria [version 1; peer review: 1 approved, 1 approved with reservations]

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Abstract

Background: From August 2016 to December 2017, the United Nations Population Fund (UNFPA) in Nigeria, through three implementing partners, scaled up the public sector delivery of subcutaneous depot medroxyprogesterone acetate (DMPA-SC, brand name Sayana Press) across 10 states. The public sector program featured a proactive community-based distribution (CBD) model, led by community health extension workers (CHEWs) and supported by community health volunteers (CHVs).

Methods: We conducted monitoring and evaluation (M&E) alongside program implementation to understand the program’s reach, particularly in terms of clients served, and their proportions of new users of modern contraception and younger women. Key performance indicators (KPIs) were calculated from end-user data digitized from client registers. To evaluate performance trends over time and understand geographic variation, we analyzed quarterly data in Excel and Stata 15, and complemented these analyses with data from interviews conducted periodically with program staff and performance documentation submitted by implementing partners.

Results: The program reached 144,505 clients, of whom 88% (n=127,315) were women. Among women reached, 92% (n=116,614) chose DMPA-SC. The program reached a high percentage of new users of modern contraception: 80% (n=93,075) of DMPA-SC clients were new users, as were 80% (n=111,350) of overall clients. However, only 26% (n=36,313) of clients were under 25. From performance reports and interviews with program staff, many involved credited the CBD model with reaching a client base largely comprised of new users of modern contraception.
Conclusions: Our analysis of the Nigeria public sector DMPA-SC program suggests that the combination of DMPA-SC and proactive CBD may accelerate contraceptive uptake and reduce unmet need in Nigeria. While some strategies for increasing the cost-efficiency of the CBD emerged, future research on this delivery model should focus on key concerns about the modality’s sustainability.

Keywords
Injectable contraceptive, subcutaneous depot medroxyprogesterone acetate, Nigeria, social marketing, private sector, public sector, community based distribution

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Introduction

In Nigeria, unmet need for contraception remains high (16% among married women) and the modern contraceptive prevalence rate (mCPR) remains low (15% among women of reproductive age)\(^2\). Challenges to increasing contraception use include a lack of reproductive health knowledge among potential users, bias among providers towards young and unmarried women, and restrictive cultural norms\(^3,4\). As part of the strategy to reach the national goal of 27% mCPR by 2020\(^5\), DMPA-SC (subcutaneous depot medroxyprogesterone acetate, brand name: Sayana\® Press), a three-month, progestin-only injectable contraceptive, was introduced into Nigeria’s contraceptive method mix in 2015\(^6\). Because of its unique features—a lower-dose formulation than the intramuscular version (Depo Provera) packaged in the all-in-one Unject\™ system—DMPA-SC permits easier administration by lower-skilled individuals, which has the potential to reduce barriers to contraceptive access and uptake\(^7\).

Given the importance of both public and private sector provision of health services in Nigeria, policymakers embraced a total market approach for expanding contraceptive service provision to include DMPA-SC\(^8\). In 2015, DKT Nigeria, an NGO specializing in contraceptive social marketing, introduced DMPA-SC into the retail market in seven states in South West Nigeria, distributing to private providers at hospitals, clinics, drugs shops, and wholesalers\(^9\). In late 2016, after completing a pilot project in two states, the United Nations Population Fund (UNFPA), in collaboration with three implementing partners (IPs), expanded contraceptive services to include DMPA-SC in 10 states while DKT Nigeria scaled private sector distribution to all states.

As part of the introduction and national scale-up of DMPA-SC in Nigeria, we conducted standardized external monitoring and evaluation (M&E) of program operations with the following specific goals: (a) tracking overall service-delivery key performance indicators; and (b) assessing to what extent contraceptive services, including DMPA-SC, were reaching younger women and new users of modern contraception. Published findings from the introductory DMPA-SC private sector program are detailed elsewhere\(^9\). In brief, lessons from the private sector experience included: (a) challenges in sustaining community-based distribution (CBD) amid cost-recovery aspirations; (b) targeting high-volume facilities and wholesalers to enhance distribution; and (c) insufficiently reaching underserved populations (e.g., younger, poorer women) among DMPA-SC recipients.

This paper aims to describe the challenges experienced and lessons learned from the public sector DMPA-SC scale-up in Nigeria in 2016-2017. Because the public sector DMPA-SC program was centered around community-based distribution (CBD) service delivery model and was implemented by three NGO partners across 10 states, the specific M&E objectives for this program were to: (a) document performance in key performance indicators (KPIs) across states and IPs; (b) identify the factors that facilitated or challenged program implementation and DMPA-SC uptake; and (c) summarize the lessons learned from this experience to inform future national scale-up. We analyzed information sources from program data and narrative reporting documents to describe KPIs related to program reach, including method uptake and user sociodemographic profiles. We further discuss the results of our analysis and their implications for scaling DMPA-SC throughout the public sector in Nigeria.

The UNFPA public sector DMPA-SC program in Nigeria

Overview

UNFPA’s public sector DMPA-SC program was based on the implementation model of a previous, small-scale 2015 pilot project. The 2015 pilot, implemented in two states, Kebbi and Ebonyi used CBD for service provision and leveraged a 2014 government policy shift that expanded the scope of work for Community Health Extension Workers (CHEWs) to allow them to administer injectable contraceptives\(^1\). The 2015 pilot showed promise\(^1\), and, as a result, the Nigeria Ministry of Health, in partnership with UNFPA, planned to follow the pilot’s model as they expanded the public sector introduction of DMPA-SC to 10 states in July 2016. Public sector scale-up program states (described in Table 1) were selected based from the following criteria: (a) states with high unmet need and large numbers of estimated public sector contraception clients; (b) states that would represent all Nigeria’s geopolitical zones; (c) areas where the public sector DMPA-SC pilots had already occurred; (d) states where previous public health programs had developed cadres of experienced health volunteers; and (e) not located in the South West, where the private sector DMPA-SC program had been launched\(^1\).

UNFPA coordinated implementation for three IPs: Action Health Incorporated (AHI), Planned Parenthood Federation of Nigeria (PPFN), and the Association for Reproductive and Family Health (ARFH). UNFPA selected IPs based on their experience with CBD, reproductive health programming history, success reaching marginalized populations, and/or presence in different states. Each IP was responsible for implementation in several states (see Table 1). Program implementation was targeted toward selected urban and peri-urban areas in each state, with participating primary health centers (PHCs) selected based on catchment area size and available health human resources available in local government areas (LGAs).

The program officially launched in July 2016, beginning with a planning, coordination, and preparation phase. This was followed by a provider training phase (November 2016 – February 2017), after which the final phase, program implementation, reached full capacity in March 2017 and continued until September 2017. Thereafter, program coordination was expected to transition to the control of state-level government managers\(^1\).

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\(^2\) According to the 2013 Nigeria Demographic and Health Survey, about 60% of women using modern contraception obtained their method from private sector providers, ranging from doctors at hospitals to untrained drug shop vendors. These women are more likely to be wealthier, married, and more educated. Approximately 30% of contraceptive users obtained their method from a public sector, government-run facility, including primary health centers (PHCs). Public sector clients are more likely to be poor, unmarried, and live in rural areas\(^2\).

\(^1\) Following the September 2017, some additional data was delivered to UNFPA by state-level managers, but it was not consistently collected across all program states.
Operational model

Modeled after the experience of the 2015 two-state pilot, the public sector program was structured around CBD, but IPs were free and encouraged to adapt program features based on their own organizational strengths and experiences and on the context of the local environment (e.g. cultural norms, population density).

IPs used two types of community outreach to raise awareness for contraceptive services and deliver products to users: group mobilizations and individual outreach. Group mobilizations were informational presentations designed to engage large groups of women in community spaces including markets, community centers, churches, and other gathering places. For individual outreach, program workers made household visits, knocking on doors and introducing themselves to potential clients. Outreach workers were primarily community health volunteers (CHVs) and were connected to supervising CHEWs at PHCs in small hub-and-spoke networks.

CHVs and CHEWs were the two types of health workers trained and deployed for community mobilization and service delivery. CHVs were primarily lay volunteers recruited and trained to conduct community outreach. Across all states, CHVs counseled women on method options and were able to provide nonprescriptive contraception: male condoms, female condoms, contraceptive pills. CHVs working with AHI and ARFH were permitted to administer DMPA-SC for reinjection, but were required to refer first-time potential injection clients or other long-acting reversible contraception (LARC) methods to CHEWs. CHVs working with PPFN’s program were not permitted to administer DMPA-SC.

CHEWs who were employed at PHCs were tasked with counseling new clients interested in contraception and offering informed choice provision. CHEWs also fielded referrals from CHVs for clients, including those reached through group mobilizations, who wished to receive facility-based contraceptive services (e.g. DMPA-IM injections, implants, or IUDs).

Health worker training

UNFPA adapted training curricula and tools from global training resources developed by PATH1-11. IPs recruited and trained one CHEW per PHC who was recommended by local health managers. As part of the training curriculum, CHEWs

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Table 1. Geographical coverage and implementation features.

<table>
<thead>
<tr>
<th>Geography: state, geopolitical zone1, and local government areas (LGAs)</th>
<th>Action Health Incorporated (AHI)</th>
<th>Planned Parenthood Federation of Nigeria (PPFN)</th>
<th>Association for Reproductive and Family Health (ARFH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 states</td>
<td>3 states</td>
<td>4 states</td>
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</tr>
<tr>
<td>• Cross River, SS (6 LGAs)</td>
<td>• Benue, NC (2 LGAs)</td>
<td>• Kebbi, NW (7 LGAs)</td>
<td></td>
</tr>
<tr>
<td>• Akwa Ibom, SS (6 LGAs)</td>
<td>• Kaduna, NW (2 LGAs)</td>
<td>• Ebonyi, SE (8 LGAs)</td>
<td></td>
</tr>
<tr>
<td>• Abia, SE (6 LGAs)</td>
<td>• Federal Capital Territory (Abuja), NC (2 LGAs)</td>
<td>• Gombe, NE (11 LGAs)</td>
<td></td>
</tr>
<tr>
<td>• Sokoto, NW (6 LGAs)</td>
<td></td>
<td>• Sokoto, NW (6 LGAs)</td>
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</table>

DMPA-SC provision by Community Health Volunteers (CHVs)

<table>
<thead>
<tr>
<th></th>
<th>Permitted only for reinjections</th>
<th>Not permitted</th>
<th>Permitted only for reinjections</th>
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<tbody>
<tr>
<td>• Conducted specific stakeholder focus groups</td>
<td>• Recruited peers as CHVs</td>
<td>• Recruited peers as CHVs</td>
<td></td>
</tr>
<tr>
<td>• Outreach on university campuses</td>
<td>• Outreach to youth clubs and young adult gatherings</td>
<td>• No overall explicit focus for young people indicated</td>
<td></td>
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<tr>
<td>• Recruited peers as CHVs</td>
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<td></td>
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<tr>
<td>• Screened providers for age bias during recruitment</td>
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CHV Compensation

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<tbody>
<tr>
<td>• Transport stipend to attend monthly outreach events</td>
<td>• Small stipend to attend monthly meetings</td>
<td>• Transportation stipend to attend monthly meetings</td>
</tr>
<tr>
<td>• Small stipend to attend monthly data reporting meetings.</td>
<td>• Small monthly stipend plus transportation allowance to attend monthly data reporting meetings.</td>
<td>• Small-business training and microfinance support offered to CHVs in at least one state (Ebonyi)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Recruited unemployed CHEWs with prospects of future employment opportunities</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Weekly transport allowance</td>
</tr>
</tbody>
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1 NE=North East, NC=North Central, NW=North West, SE=South East, SS=South South
2 DMPA-SC= subcutaneous depot medroxyprogesterone acetate
received refresher information on general contraception and supplemental training on DMPA-SC.

For CHV candidacy, minimum requirements were proficiency in English and completion of primary school. IPs recruited CHVs from different candidate pools, with a general goal of finding volunteers who had previous health campaign experience. CHVs received training on interacting with users, establishing referral relationships with CHEWs, general information on contraception, and basic reporting practices. Patent and proprietary medicine vendors (PPMVs) were excluded from participating in the program.

ARFH developed a series of visual guidance materials to facilitate the training of CHVs for all IPs. These “job aids” included information on basic child health, HIV/AIDS, contraception, informed choice strategies, and DMPA-SC.

Volunteer compensation
IPs provided moderate compensation to CHVs in the form of stipends. CHVs were required to attend monthly debriefing meetings and return data collection forms, for which they received reimbursement for transportation costs. AHI and PPFN paid CHVs an additional 2,000N (~$5.50 USD) per month cash stipend. ARFH implemented a small-scale microfinance scheme to support health workers in Ebonyi and had planned to expand the model through all their program states, but was unable to secure support to do so.

Program data reporting
CHEWs and CHVs recorded all user interactions in a standard client register, adapted from the Ministry of Health’s Family Planning Register to include data fields relevant to the dispensing of DMPA-SC (see methods below). CHEWs used the registers to record each client encounter. CHVs used a simplified tally sheet to record methods given out to clients; simplified sheets were used to facilitate data tracking by individuals with low literacy. CHEWs collected tally sheets from CHVs every week, data from which was used as the basis of resupply to CHVs.

The DMPA-SC public sector program used additional data tools for monitoring and supervision. IPs used weekly and monthly supervisor forms to track performance by CHEWs and PHCs. IPs also tracked referral slips used by CHVs and CHEWs to record facility visits. IP program managers collected data tools from CHEWs and CHVs at monthly data validation meetings. IP staff entered the raw data and sent aggregated reports to UNFPA each quarter. Supply chain forms were used by program managers to track commodity levels and request resupplies every two months.

Methods
Key performance indicators (KPIs)
During project planning, all participating program partners agreed to a set of KPIs to track during program implementation. To develop these KPIs, each partner outlined monitoring objectives and identified possible metrics for the program given their implementation plans and strategies. KPI focus areas were identified based on common interest across all partners, the feasibility of collecting comparable data across IPs, and their applicability to all implementation strategies. The final set of KPIs included the number of users and services delivered, the number of providers trained, previous use of contraception by program beneficiaries, and the age profile of users. Some KPIs, including percent of new users reached and number of DMPA-SC units administered, had specific targets (20% for new users reached and 325,000 overall DMPA-SC units administered) that were agreed upon by implementing organizations and donors at the outset of the program.

Data sources and analysis
Data inputs for calculating KPIs came from several sources:

1. A client registry containing basic information for all user interactions: date of service; client name; client phone number; client address; age; sex; method(s) provided; quantity of method(s) provided; and additional notes. Registry data were entered into an electronic database by UNFPA and were extracted for quarterly M&E reporting purposes. During the transition of program coordination from UNFPA and IPs to state reproductive health agencies (starting in September 2017), data collection and reporting to UNFPA occurred only on an ad-hoc basis and finally ceased altogether by December 2017. Data contained in Excel for Office 365 MSO 16.0 64-bit spreadsheets were imported into Stata version 15 for analysis. We conducted standard data cleaning procedures for data entry consistency and labeling; inconsistencies were flagged and reconciled in consultation with UNFPA and IPs. From that data, we calculated summary statistics for KPIs according to specific definitions laid out in the M&E Plan.

2. Program documents from IPs were regularly collected. These included field reports from IP program officers, summary quarterly reports detailing program updates and KPI achievements, training attendance records, activity budget spreadsheets, and workplans and timelines. Data from program documents were systematically organized in an Excel spreadsheet by IP and state to facilitate comparisons across settings along important dimensions (e.g., outreach strategies deployed, types of participants recruited). See extended data for the documents used.

3. UCSF research staff conducted periodic interviews with program managers in UNFPA and implementing partners (via teleconference in August and September 2017 and via teleconference and in-person meetings in Nigeria in November and December 2018) to provide additional context for understanding program operations.

A separate phone survey was conducted to obtain a more detailed understanding of users’ experience in care-seeking for DMPA-SC; those findings are reported elsewhere.
and resolving questions about KPI calculations. Most interviews lasted 30–60 minutes and included either one or multiple representatives from each IP. Interviews with each IP were conducted separately, and information across partners was not shared except in summary report format. See extended data for materials used for phone interviews.

KPI data were descriptively analyzed for variation across time, states, and IPs. A subset of KPIs were measured against target outputs set at the beginning of the program. In accordance with populations of interest for program reach, we focused on the following categorizations of users:

(a) By age: under 20, 20 through 24, and 25 and older

(b) By visit type: “new users” who had never used modern contraception before; “repeat visits” who had previously used a modern method including DMPA-SC; and “switchers” who had recently used another modern method and opted for DMPA-SC instead.

We cross-referenced variations in KPIs with information from program documents and personnel interviews to understand their associations with operational strategies deployed. By KPI categories of interest, we organized the emerging program features and contextual factors that facilitated or hindered implementation or influenced program achievement.

Ethical approvals

The Institutional Review Boards at the University of California, San Francisco (IRB# 15-18353) and the Nigeria Health Research Ethics Committee (NHREC/01/01/2007-06/01/2016 and NHREC/01/01/2007-16th/02/2017) approved this research. Periodic interviews with program managers focused on organizational operations and did not require informed consent per human subjects research guidelines.

Results

Health worker recruitment and training

IPs recruited and trained providers from November 2016 through February 2017, with most training complete by the end of January 2017. Table 2 shows the number of CHEWs and CHVs trained by IP (see underlying data). In total, the program trained 3,764 providers; 1,649 CHEWs and 2,115 CHVs. ARFH, who had previously managed a program that trained CHEWs to provide injectable contraception, trained approximately 50% more CHEWs than CHVs (940 CHEWs, 600 CHVs). Among the CHEWs recruited and trained by ARFH, a large portion were previously unemployed or under-employed, and thus not formally engaged to staff PHCs; they were able to serve as community-based outreach workers, given the same tasks as most CHVs, with added permission to offer prescriptive contraception to first-time users by virtue of their licensing. In contrast, AHI and PPFN both trained approximately twice as many CHVs as CHEWs (AHI: 375 CHEWs, 740 CHVs; PPFN: 334 CHEWs, 775 CHVs).

Many CHVs engaged by IPs had worked on previous health campaigns (e.g. vaccination campaigns) and had shown a desire to continue working on public health programs. According to personnel interviews, recruiting CHVs with prior

Table 2. Health workers trained and deployed.

<table>
<thead>
<tr>
<th>Implementing partner¹</th>
<th>State</th>
<th>CHEWs²</th>
<th>CHVs³</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>AHI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abia</td>
<td>100</td>
<td>29.0%</td>
<td>245</td>
</tr>
<tr>
<td>Akwa Ibom</td>
<td>140</td>
<td>28.6%</td>
<td>350</td>
</tr>
<tr>
<td>Cross River</td>
<td>135</td>
<td>48.2%</td>
<td>145</td>
</tr>
<tr>
<td>PPFN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benue</td>
<td>50</td>
<td>28.7%</td>
<td>124</td>
</tr>
<tr>
<td>FCT (Abuja)</td>
<td>25</td>
<td>28.1%</td>
<td>64</td>
</tr>
<tr>
<td>Kaduna</td>
<td>259</td>
<td>30.6%</td>
<td>587</td>
</tr>
<tr>
<td>ARFH</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ebonyi</td>
<td>170</td>
<td>58.6%</td>
<td>120</td>
</tr>
<tr>
<td>Gombe</td>
<td>210</td>
<td>63.8%</td>
<td>119</td>
</tr>
<tr>
<td>Kebbi</td>
<td>280</td>
<td>70.0%</td>
<td>120</td>
</tr>
<tr>
<td>Sokoto</td>
<td>280</td>
<td>53.7%</td>
<td>241</td>
</tr>
<tr>
<td>Total</td>
<td>1649</td>
<td>43.8%</td>
<td>2115</td>
</tr>
</tbody>
</table>

¹AHI = Action Health Incorporated; PPFN = Planned Parenthood Federation of Nigeria; ARFH = Association for Reproductive and Family Health
²CHEWs = Community Health Extension Workers; CHVs = Community Health Volunteers

For Figure 1, we tabulated the number of units of DMPA-SC distributed by the program, noting that because some users received more than one dose, the number of cumulative DMPA-SC units administered was incongruous with the number of DMPA-SC users served by the program.
volunteer experience not only reduced training and recruitment costs, but also helped to ensure that volunteers were intrinsically motivated to stay engaged throughout the program.

Contraceptive service delivery
From August 2016 through December 2017, the program reached a cumulative 144,505 clients, including 17,022 men (12% of total clients). Figure 1 displays the trends in cumulative distribution of DMPA-SC over the duration of the project period and delineates the three project phases. From August – November 2016, IPs were primarily engaged in preparatory work, including liaising with state-level government officials and local program managers in the targeted implementation areas. The period of November 2016 – February 2017 was dedicated to recruiting and training CHEWs and CHVs. Although IPs were ready to commence full program activities once trainings were complete, delays in DMPA-SC procurement meant that service delivery did not reach full operational capacity until March 2017.

IPs accelerated service delivery following the procurement delay. From March through August 2017, the program reached 120,455 contraceptive clients (83% of total clients); the program reached 65% of all its clients during the three-month period from April through June 2017. By October 2017, the program surpassed its overall clients reached target (100,000 clients). During the transition period from August to December 2017, as program management was handed over to state reproductive health agencies, an additional 6,674 clients (5% of total) were recorded in the client registry from ad-hoc reporting by IPs.

According to interviews and quarterly field reports, program staff felt that CBD had high utility for reaching contraceptive clients, particularly clients who had not previously been able to connect with reproductive health services. Program staff stressed the importance of both types of community outreach. Public mobilizations, often held in markets, were reported as effective for raising awareness and providing an efficient pathway to reach large numbers of potential users. Staff also reported that visits to individual households were effective for reaching women who may have been underserved by the traditional health system, including those who live in areas with more restrictive cultural norms. Strategies for engaging with women at their homes included framing contraception activities in the general interest of family health and visiting when male partners were not home.

ARFH, which was active in four program states (compared to three states for AHI and PPFN), delivered services to the most clients among IPs (n=80,299; 56% of total clients), followed by AHI (n=35,562; 25%) and PPFN (n=28,644; 20%). Because the size of the catchment area for each state was unknown, we compared the median number of clients reached per state as well as the number of clients reached per trained health worker (CHVs and CHEWs) to assess relative performance. Across all states over the entire program period, the median number of overall clients reached per state and median clients reached per health worker were 15,070 and 44, respectively. On a per-state basis, ARFH also had the highest median numbers of clients reached (19,930), followed by AHI (12,026) and

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1 Missing for sex status variable: n=171
2 100,000 clients reflects revised KPI targets adjusted downward from original KPI targets following procurement delays.

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Figure 1. Cumulative subcutaneous depot medroxyprogesterone acetate (DMPA-SC) distribution over time by state. FCT = Federal Capital Territory (Abuja).
PFNF (10,862). Per provider in each state, ARFH also had the highest median number of clients reached (49), followed by PPFN (42) and AHI (29). In three states (Ebonyi, Gombe, and Kebbi) where ARFH had previously managed reproductive health programs with CHEWs and injectable contraceptives, overall users and per-provider clients reached were all above-median. Programs in these three states represented 43% of overall clients reached and, along with PPFN’s Benue program (62 clients reached per provider), had among the highest number of clients reached per health worker (Ebonyi: 57; Gombe: 66, Kebbi: 60).

Clients reached across sex and age groups

Table 3 describes characteristics of clients reached by UNFPA’s public sector program (see underlying data). Among IPs, AHI’s client base had the highest percentage of women (92% of clients reached; n=32,775/35,562), followed by PPFN (91%; n=25,965/28,587) and ARFH (86%; n=68,575/80,188). Among clients reached by the program, 104,738 (74%) were older than 25, 28,115 (20%) were between 20 and 25, and 8,198 (6%) were under 20. Among IPs and overall clients reached, AHI reached the highest percentage of under-20 users (10%; n=3,420/35,562), followed by PPFN (5%; n=1,400/28,528) and ARFH (4%; n=3,378/76,961). Percentages of clients reached by age category were similar among DMPA-SC clients. According to field reports and interviews with program staff, AHI credited a series of operational decisions for their higher youth user rates: they conducted focus group discussions with young people to assess potential uptake of contraception and DMPA-SC; they recruited younger CHVs; they screened providers for potential age bias; and they targeted group mobilizations to youth-dense locations (e.g. university campuses). Whereas ARFH reported no specific focus on youth-oriented programming, PPFN also reported recruiting younger CHVs from

<table>
<thead>
<tr>
<th>Table 3. Program performance.</th>
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<tr>
<td></td>
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<tr>
<td>N</td>
</tr>
<tr>
<td>Users</td>
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<tr>
<td>Sex (excludes 168 missing, 0.12%)</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Male</td>
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<tr>
<td>Age (excludes 3,434 missing, 2.43%)</td>
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<tr>
<td>Under 20</td>
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<tr>
<td>20–24</td>
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<tr>
<td>25+</td>
</tr>
<tr>
<td>Method taken (excludes 84 missing, 0.06%)</td>
</tr>
<tr>
<td>DMPA-SC</td>
</tr>
<tr>
<td>Male condom</td>
</tr>
<tr>
<td>Female condom</td>
</tr>
<tr>
<td>Oral pills</td>
</tr>
<tr>
<td>Other injectable</td>
</tr>
<tr>
<td>LARC</td>
</tr>
<tr>
<td>Visit type (excludes 5,330 missing, 3.83%)</td>
</tr>
<tr>
<td>New user</td>
</tr>
<tr>
<td>Repeat user</td>
</tr>
<tr>
<td>Switcher</td>
</tr>
</tbody>
</table>

1 AHI = Action Health Incorporated; PPFN = Planned Parenthood Federation of Nigeria; ARFH = Association for Reproductive and Family Health
2 DMPA-SC = subcutaneous depot medroxyprogesterone acetate
3 LARC = long-acting reversible contraception

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h Sex data excludes 168 missing observations (0.12%).

i Age category data excludes 3,434 missing observations (2.43%).

j Records of provider ages were not available and could not be confirmed.
existing youth volunteer networks, but did not have other strategies to tailor strategies toward younger populations.

Method choice
Of the 144,505 clients reached by the program, 81% (n=116,614) received DMPA-SC; all DMPA-SC recipients were women and 92% of all women clients (n=116,614/127,315) received DMPA-SC.

For non-DMPA-SC methods, the recipients of which included both male and female clients, 16% (n=23,755) of all clients received male condoms (64% of male condom recipients were male; 36% female), followed by female condoms (3% of all; n=4,298; 11% male; 89% female), pills (2%; n=2,336; 3% male; 97% female), other injectables (<1%; n=986; 100% female) and other LARC methods (<1%; n=136; 100% female). There was minimal variation in uptake of non-DMPA-SC methods across IPs.

The most common multiple method combination received by clients was DMPA-SC with male condoms (n=6,733 clients; 6% of all DMPA-SC recipients and 5% of all clients). There was considerable variation across states in the distribution of clients who received both DMPA-SC and male condoms. Of the 6,733 male condom and DMPA-SC recipients, 68% were in just three states: Cross River (n=950; 14% of total DMPA-SC plus male condom recipients; an AHI state); Abuja (n=2,407; 36%; PPFN); and Gombe (n=1,198; 18%; ARFH). This pattern was also observed across states with minimal DMPA-SC plus male condom combinations: Abia (n=254; 4% of total DMPA-SC plus male condom recipients; AHI); Kaduna (n=10; <1%; PPFN); Ebonyi (112; 2%; ARFH). Over half of all DMPA-SC clients in Abuja received DMPA-SC and male condoms together (62%; 2,407/3,902). In no other state was the percent of DMPA-SC clients who also received male condoms more than 10%. PPFN program managers reported that this finding was due to the practice of encouraging DMPA-SC recipients to use male condoms for the first week following their initial DMPA-SC injection. That explanation is supported by user category data in Abuja, where 86% (n=2,081/2,405) of DMPA-SC plus male condom recipients were new users, compared to 66% (n=2,578/3,898) as new users among all DMPA-SC recipients in the state. However, it was unclear from interviews with program managers why the provision of multiple methods was so much more prevalent in particular states, even within those managed by the same IP.

New users and switchers
Among women clients reached by the UNFPA program, 80% (n=100,248) were new users of modern contraception, 15% (n=18,785) were repeat users of their previous method, and 5% (n=6,503) had previously used modern contraception but switched to a different method. Among women who switched modern methods, 96% (n=6,285) switched to DMPA-SC.

Discussion
In recent years, despite incremental increases in Nigeria’s mCPR (from 11.1% reported in the 2013 to 17.6% in 2018), unmet need has remained static (16.1% in 2013 and 16.6% in 2018)\(^2\). The introduction of DMPA-SC to Nigeria strengthens the country’s capacity to achieve national reproductive health goals. Program data from UNFPA’s 2016-2017, 10-state public sector DMPA-SC program suggest that using lower-tier health workers in a CBD model to deliver contraceptive services, including DMPA-SC, can reach substantial numbers of new users, especially among traditionally underserved populations. This may positively contribute to reducing unmet need and increasing overall mCPR. Though the depth of information on public sector users reached was limited due to standardized HMIS reporting, the systematic collection of individual, encounter-level data enabled closer evaluation of KPI performance across different implementation contexts (e.g. NGO partners and geographies). We compile these insights into three lessons learned regarding public sector contraceptive service provision including DMPA-SC in Nigeria.

(1) Adding DMPA-SC to Nigeria’s contraceptive method mix, in concert with delivery through CBD, may accelerate progress toward reducing unmet need.

UNFPA’s program delivered DMPA-SC to over 100,000 users in less than six months. The high percentage of DMPA-SC recipients who were new users of modern contraception (80%) suggests that unmet need remains high in Nigeria, particularly among women who use public sector services (e.g. lower-educated and less-wealthy women). The high percentage (92%; n=116,614) of women who selected DMPA-SC suggests DMPA-SC is an attractive addition to Nigeria’s the contraceptive method mix, particularly in the context of CBD. The percentage of new users among DMPA-SC recipients in Nigeria was higher than previous percentages reported in four countries with recent DMPA-SC pilots (range: 24–42%)\(^3\).

Additional research evaluating DMPA-SC’s launch in Nigeria has shown that user satisfaction from DMPA-SC was high (>90%)\(^4\). As the most common non-condom contraceptive product in Nigeria, injectable contraceptives are already in high demand\(^5\). DMPA-SC possesses traits that have been shown to be desirable among contraception users across sub-Saharan Africa: a smaller needle, less painful injections, fewer reported side effects, and the speed of administration\(^6\,7\). These factors together echo the findings of research in Mozambique, which found that connecting injectable contraception to CBD is safe, effective, and a critical pathway to providing health services to communities lacking robust health infrastructure\(^8\). Combined, the evidence thus far makes a compelling case: DMPA-SC with CBD can reach underserved women, DMPA-SC popular among new users of modern contraception, and women are satisfied with DMPA-SC after use.

(2) Strategies that leverage past investments in SRH and public health infrastructure, such as those that find new roles for under-utilized health workers and previously-trained volunteers, can improve the overall effectiveness and cost-efficiency of CBD service delivery, though more examination of sustainability is needed.
CBD has a documented history as a safe and effective delivery strategy for contraception commodities, including injectables\(^{10,20}\). CBD systems expand the reach of traditional reproductive health systems in underserved contexts, particularly in areas where cultural barriers may restrict access to contraceptive services\(^{11,12}\). When women are limited in their ability to leave the home, new access modalities are required, and CBD outreach workers, often age and community peers of potential users, can overcome mobility barriers. Proactive outreach incorporates an element of demand-side generation into the reproductive health system that offers promise for future Nigerian contraception programs given structural and cultural barriers to care-seeking that many women can face.

Because some of the highest-performing states in the UNFPA program (on both an overall and per-provider number of clients reached) were those with previous implementation experience with CBD (e.g. Kebbi and Ebonyi), the data suggests that there is potentially an “infrastructure bonus,” where groundwork laid by previous programs leads to increased effectiveness for future implementation. CBD is a resource-intensive implementation strategy, but if the infrastructure bonus finding is valid, it suggests that initial investment in more expensive reproductive health programming could bear dividends in future cost-efficiency. Kaduna and Sokoto, two northern states with no previous CBD infrastructure, whose programs were administered by PPFN and ARFH, respectively, required high numbers of personnel to reach those users and both states yielded comparatively lower users reached on a per-provider basis. Future program planners will need to balance the clear benefits of CBD with the resource intensity of the implementation model, all informed by a realistic understanding of the existing and previous programming landscape in each state, and with perspective on the potential need for future programming.

Proactive CBD’s relatively higher costs (compared to traditional facility-based service delivery) may remain a barrier to rapid scale-up; similar sustainability concerns have arisen with other CBD-based contraception programs\(^{23}\). In Nigeria’s private sector, resource intensity led a promising CBD-based DMPA-SC program to its early termination\(^{6}\). While the volunteer cadres who worked on the public sector DMPA-SC program helped to ultimately reach clients, it remains unclear how these individuals would be retained over a longer time period. ARFH experimented with a small-scale microfinance scheme in Ebonyi where loans would be granted to market-based health workers, who would also receive training on rudimentary financial practices. However, despite some reported success with the scheme in Ebonyi, attributed by one program manager to the “progressive” nature of the state, the scheme failed to catch on in other states and by other IPs, and was viewed as operationally challenging to sustain, and it remains unknown to what extent microfinance-based financial incentives can contribute to provider retention and efficiency in the contraceptive market.

IPs were able to find some staffing efficiencies by finding volunteers who had previously been engaged in different health programs, reducing recruitment and training costs. Further engaging unemployed and under-employed CHEWs by ARFH also advanced the efficiency of service delivery by increasing the proportion of frontline workers trained and licensed to administer injections, rather than needing to refer interested clients to participating employed CHEWs for administration. More study is needed to identify best practices and pathways for increasing the sustainability of CBD.

(3) Additional strategies are needed to connect younger women to contraceptive services.

Connecting contraception to youth remains a persistent challenge across low- and middle-income countries\(^{24}\). Challenges in Nigeria include conservative cultural norms, pervasive misinformation about contraception, and bias against youth contraceptive use among providers\(^{12,24}\). In other DMPA-SC pilot countries, the percentage of DMPA-SC recipients under age 25 was approximately 44% but in Nigeria the percentage was almost half of that (26%)\(^{25}\). Most DMPA-SC users reached by UNFPA’s program were older than the average contraception user in Nigeria; this finding is also consistent with private sector DMPA-SC program, which also reached low proportions of younger women\(^{6}\).

Recent research described the general ineffectiveness of many traditionally-lauded youth contraception program strategies, such as peer-to-peer outreach and the recruitment of age-peers, though one strategy identified as helpful for reaching youth is the recruitment and training of nonjudgmental and supportive providers\(^{25,26}\). Many UNFPA IPs leaned heavily on strategies like peer-to-peer outreach and the recruitment of youth personnel, one potential explanation for why the proportion of young women served was low.

Ah\(\text{I}\)'s relative success in reaching higher proportions of younger women among UNFPA IPs suggests that some of their strategies may be worth considering in future programming: (a) using younger volunteers to conduct outreach in areas where younger people are (e.g. university campuses), (b) judicious selection of providers and screening for potential age bias, and (c) explicitly focusing programs on reaching young people.

It should be emphasized that many of these lessons learned were only possible because of a more robust internal program M&E system that collected individual-level end-user data for several KPIs. A recent review of the DMPA-SC landscape identified the need for research to disaggregate user data by age and prior contraception use so that researchers, programmers, and donors can to better understand DMPA-SC user profiles\(^{27}\). Delivering granular, client-level data was a challenge for the private sector introduction of DMPA-SC in Nigeria, as it is difficult to collect end-user data in the context of Nigeria’s private sector regulatory framework\(^{27}\). The data tools and collection mechanisms developed and used by the public sector DMPA-SC program entailed small adjustments to standardized government HMIS register forms. While the HMIS for contraceptive services has notable limitations—only a few client characteristics collected, encounters could not
be linked to individual providers—the digitization of these records nonetheless enabled some disaggregated analyses. This electronic system, which collects user data from the ground up, may provide a valuable platform for future reproductive health program scaling in Nigeria.

Limitations
We must note several limitations to the findings presented in this paper. Though the data delivered by UNFPA provided a snapshot of end-user characteristics, some variables were incomplete and had missing observations (2% of age observations were missing; 4% of visit type observations). The short timeline of the program, made even shorter due to the product procurement delay, made it difficult to make inferences about longer trends over time. The user characteristics available were limited in scope; future studies would benefit from expanding user indicators to include information on marital status, parity, education, and wealth. Without data on the providers themselves, we were unable to assess the relationship between provider characteristics and contraceptive uptake. We were unable to conduct analysis on differential delivery by providers because this data was not systematically captured; providers were not universally linked to recorded service interactions. Programmatic activities were reported at the IP level, making it difficult to determine operational differences at the state level. It is important to note that no audit was conducted on informed choice protocols; high rates of DMPA-SC selection could thus be a byproduct of limited options presented by providers.

Conclusion
Our analysis of the Nigeria public sector DMPA-SC program suggests that the combination of DMPA-SC and proactive CBD can accelerate contraceptive uptake and reduce unmet need in Nigeria. Investment should continue in the CBD approach, along with future analysis to address concerns about the approach’s sustainability. There is potential for CBD and other reproductive health programs in the use of volunteer and other nontraditional health cadres (e.g. unemployed CHEWs). High demand for and satisfaction of DMPA-SC suggests that it can quickly become a normalized, effective component in Nigeria’s contraceptive method mix; a potential next step would be a transition towards user empowerment, autonomy, and self-injection. And though overall uptake was high, more work is needed to connect younger users with contraception in Nigeria.

Data availability
Underlying data
Harvard Dataverse: Monitoring and evaluation data from the introduction of DMPA-SC in Nigeria’s public and private sectors. https://doi.org/10.7910/DVN/XCLNIS

This project contains the following underlying data:
• UCSF DMPA-SC Dataverse
  ○ UNFPA data file guidance.docx (A guide and blueprint to the types and locations of all relevant data within the UNFPA data registry)
  ○ AHI_October_data_updated – deidentified.xlsx (Contains AHI data through Q3 2017)
  ○ Consolidated UNFPA KPI code 19Jun18.do (Stata do file for KPI analysis)
  ○ DMPA_SC-DATA_29082017 – deidentified.xlsx (Contains ARFH and PPFN data through Q3 2017)
  ○ October – December data – deidentified.xlsx (Contains program data for Q4 2017)
  ○ DMPA-SC Scale-up phone survey.dta (Contains UNFPA phone survey data)

Extended data
Harvard Dataverse: Monitoring and evaluation data from the introduction of DMPA-SC in Nigeria’s public and private sectors. https://doi.org/10.7910/DVN/XCLNIS

This project contains the following extended data:
• UCSF DMPA-SC Dataverse
  ○ Phone Survey.docx (Contains phone survey questionnaire)
  ○ DMPA-SC Scale-up phone survey codebook.xlsx (Contains phone survey codebook)
  ○ M&E Plan Scale-up Phase_2Dec2016_FINAL.pdf (Contains M&E plan for UNFPA phase of M&E)
  ○ DMPA-SC Scale-up in Nigeria_Final report_final draft_23May18.pdf (Contains final program report)
  ○ M&E Report 2016 Q4.docx (Contains Q4 2016 M&E report)
  ○ M&E report 2017 Q1-Q2.docx (Contains Q1 & Q2 2017 combined M&E report)
  ○ M&E report 2017 Q3.docx (Contains Q3 2017 M&E report)
  ○ M&E report 2017 Q4.docx (Contains Q4 2017 M&E report)

Data are available under the terms of the Creative Commons Zero “No rights reserved” data waiver (CC0 1.0 Public domain dedication).

Grant information
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Julie Hernandez
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The proposed manuscript is a very detailed presentation of various models scaling up the provision of DMPA-SC by various cadres of community health workers in Nigeria. As global initiatives such as Access Collaborative are currently exploring the modalities of scaling-up the provision of DMPA-SC at the community level (after a few years of piloting the feasibility and acceptability of this delivery strategy in various environments), this is an interesting contribution to the growing body of evidence on this topic.

However, the reviewer feels that some modifications could strengthen the scientific value of this manuscript, which, in its current form, reads more like a program report.

The Background section should position this paper with regards to the opportunities and successfully tested models of DMPA-SC provision at the community level. Multiple studies have been published attesting that community health workers (be they paid health extension workers, nursing school students or other) are capable of providing DMPA-SC in their community and that, in pilots, this usually results in a greater uptake of the method among FP users.

The paper would also benefit from a clearer definition of what “scaling-up” means. Is this simply replicating the same model(s) in a greater number of states or are there issues arising specifically from the “scale-up” process? The manuscript evokes “sustainability” of the model without specifying which components might be threatened in the long run: is it the use of volunteers? The price point per dose of DMPA-SC?

Similarly, current research on “scaling-up” the provision of DMPA-SC at the community level are exploring issues of waste management, supply chains, private sector provision and self-injection, which the manuscript does not or barely mentions. The Discussion section could be strengthened by integrating these aspects in the issues surrounding scaling-up DMPA-SC.

More specific issues throughout the paper
The authors use the term “New users” (and “switchers” p.6) without always specifying if the routine statistics system in country homogeneously records “new users” “per method”, or “to modern methods”, or “to FP altogether”

There is also no discussion of continuation rates among “new” adopters

The manuscript does not specify if/when the DMPA-SC doses were provided for free or for a nominal fee or at market price. If the doses were offered for free then “new users” might be an opportunistic spike due to the affordability of the method rather than an informed choice trend.

Table 1 is very informative, and the manuscript reflects the rich variations of community-based distribution programs. However, for the clarity of the paper, it might be better to limit the description of the various cadres of providers to the differences that are actually analyzed in the paper. E.g. the data analysis does explain if there’s a difference in number of clients served for community workers who are permitted first injection vs. those who are permitted only re-injection.

In this perspective, considering the variety of models and the size of the sample, it would have been interesting to conduct sensitivity analysis to determine whether some cadres of providers (or some models of provision) are more successful in recruiting “new users” or in reaching out to youth and adolescents.

p.5 Setting “targets” in terms of number of DMPA-SC doses provided raises some ethical questions in terms of informed choice by the clients, that should be discussed in the study limitations. How did training of the various cadres of providers (or how does their compensation model) ensure that there are no incentives to “push” DMPA-SC over other contraceptives?

p.7 (and in the background section) What was the method mix in Nigeria before this effort to scale-up DMPA-SC? Did DMPA-SC widen the method mix or did it substitute previously used methods?

As a general note, and maybe to be included in the Discussion section, not all countries (and not even all Sub-Saharan Africa countries) are “injectable” countries, in environments where implants are the preferred method, the opportunities leveraged by scaling-up DMPA-SC are limited because the method mix is different.

p.9 Discussion of the provision of multiple methods variation across states: could it be explained by socio-cultural differences around the use of condoms (or urban / rural differences), greater prevalence/fear of HIV/STI resulting in higher use of double protection (contraceptive + barriers) or programmatic variations in the community health workers training?

p.9 “The percentage of new users among DMPA-SC recipients in Nigeria was higher than previous percentages reported in four countries with recent DMPA-SC pilots” needs to be discussed as to why this might be: were the delivery models similar (campaigns vs. routine provision, free doses, etc…)? Also, were “new users” defined the same way (and reasonably correctly reported) in all countries?
- p.9 “DMPA-SC possesses traits that have been shown…” This statement belongs in the background section. It is by now well-established why many FP users in SSA tend to find DMPA-SC adapted to their contraceptive needs and preferences.

- p.10 The discussion section mentions “proactive CBD” without clearly defining who they are: paid health workers? Committed volunteers? It has been a recurring finding of literature on community-based programs over the past thirty years (and recently over their specific use for contraceptive provision) that CBD programs tend to be resource intensive, not only to ensure the continuous engagement and proactivity of the CBD, but also to monitor their activities, ensure routine service statistics reporting and limit stock-outs.

- The Limitations section briefly mentions this issue (“procurement delay”) but it would be worth discussing further as CBD programs, while extending the theoretical coverage of FP services can only be effective to their full potential if contraceptive supply chains support them properly.

Conclusion

This is an interesting manuscript because of the volume of data and the diversity of community-based service delivery models presented. However, the main conclusions (“(1) Adding DMPA-SC to Nigeria’s contraceptive method mix, in concert with delivery through CBD, may accelerate progress toward reducing unmet need”) do not add to the well-established evidence (since roughly 2015) on the opportunities for extended FP access leveraged by the provision of DMPA-SC at the community level.

It would be more beneficial for researchers interested in this area of study to refocus the paper on the specific challenges facing the scale-up process and successful components of the various models implemented in Nigeria as the country moved from pilots to scale. In this sense, the authors are uniquely positioned, by virtue of the wealth of data and the size of the sample they are presenting here to analyze and discuss how and why findings from the “pilots” literature may or may not hold true when these models are brought to scale.

Is the work clearly and accurately presented and does it cite the current literature?  
Partly

Is the study design appropriate and is the work technically sound?  
Yes

Are sufficient details of methods and analysis provided to allow replication by others?  
Yes

If applicable, is the statistical analysis and its interpretation appropriate?  
Partly

Are all the source data underlying the results available to ensure full reproducibility?  
No

Are the conclusions drawn adequately supported by the results?  
Yes

Competing Interests: No competing interests were disclosed.
**Reviewer Expertise:** Family planning, community-based programs, healthcare access, Sub-Saharan Africa

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

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**Ellen MacLachlan**
International Training and Education Center for Health, University of Washington, Department of Global Health, Seattle, WA, USA

**Abstract:**
- I see “proactive CBD” throughout, do you consider this a model? If so I would use it throughout.
- In background SP should have the copyright symbol
- Methods: Use its proportions of new users if you are referring to the program
- In Results: Nobody knows what it means if they “chose DMPA-SC”, instead of DMPA_IM? Make it clear that it is from an array of method choices. Last sentence, consider “many credited the proactive CBD model…”
- Make it clear this is provider injection not self injection

**Introduction:**
- In paragraph 1 you mention all of Nigeria’s family planning challenges except access; shouldn’t you mention access in light of this large CBD DMPA_SC that was implemented?
- Paragraph 2: Include a reference for total market approach
- Paragraph 2: Last sentence: “expanded contraceptive services in the public sector…”
- What is role of UCSF? UCSF is brought up later and the reader has no idea what their role was on the project, technical assistance?
- Paragraph 3: First sentence, word missing.
- Paragraph 4: 2nd sentence- this information was given already. You have methods in here that can be deleted and put in methods section, “We analysed information…”
- Paragraph 4: Last sentence ok.

**UNFPA public sector DMPA SC program in Nigeria**
- Paragraph 1, first sentence, consider “UNFPA’s public sector DMPA-SC program was based on results from a previous, small-scale…”
- Give a few basics about the previous model, it just says it was promising
- Paragraph 2: last sentence has available twice
- Table 1, consider adding numbers of workers, put annotation for LGA, CHV, CHEW
- Operational Model: did they mobilize all ages of women or certain age groups?
- Make it clear earlier that CHEWs are part of the health sector/associated with a facility. Your description of CHEWs is not clear.
- You say CHVs are health workers, strictly speaking this isn’t true for CHVs correct?
• Again I can’t tell at this point if CHEW are injecting women or training them to self inject, or a combination of the two.
• How many units are given to the women? This doesn’t come through in the paper. How is it determined?
• Health worker training: Paragraph 2: You mention nothing about CHVs being trained to inject DMPA-SC! I hope they were.
• I don’t think the information about the microfinance scheme is relevant here
• You make no mention of the sex of CHEWs and CHVs

Methods
• Make a clear distinction what is on paper and electronic, the client registry is on paper? And then entered by UNFPA into Exel.
• Point 3 is first mention of UCSF, spell out? See earlier comment that UCSF role not explained.
• Even though not considered research by the IRB I would put the number of interviews done with program staff, so the reader has an idea if it is 2-3 or 20-30, for example. How did you analyse the interviews? They are rather long so it is a lot of information.

Results
• First paragraph, the last two sentences totally confused me, I’m not sure what you are saying. By this point in the paper I still don’t totally understand the role of CHEWs in the health sector, maybe that is the problem
• Contraceptive service delivery: third paragraph, what does “Program staff stressed the importance of both types of community outreach”, what types??
• Wow, a median of 44 users reached in 10 months seems low to me. I would comment in discussion about sustainability of numbers of CHVs and CHEWs hired – it would be more efficient to hire fewer and expect a higher yield per worker (I assume)
• In Figure 1 there are nine states, though you mention 10? You should explain this to the reader.
• You mention the highest median clients reach (19,930)(12,026) etc. but don’t say where. I would include the name of the state.
• Table 3: you do not explain where # of users denominator came from, or I missed it, is this an estimate based on demographics?
• I don’t know what this means “Percentages of clients reached by age category were similar among DMPA-SC clients”. Is this by IP?
• Method choice: Paragraph 1: according to your table the figure is 82.7% not 81%.
• I don’t understand the point about the states with low DMPA-SC/condom choice

Discussion
• Third paragraph: last sentence “DMPA-SC is popular…”
• The 4th paragraph doesn’t connect with your argument in preceding paragraph, the 5th paragraph does…consider moving.
• See my suggestion about proactive CBD above, you should “own” this term more and consider in the discussion what future research should compare it to? What if proactive CBD could be compared with passive CBD, including the costs, compared to the relative output of new users of FP? This could help policy makers estimate how many fewer users they may get with a less intensive model (or maybe it wouldn’t be that much less?)
• Could Nigeria’s youth be less sexually active than other countries? Not likely but you may want to mention that in the discussion about low youth uptake. I expect it is mostly cultural.
• I don’t understand the argument about peer to peer outreach ---are you saying that because of other research showing that provider training is influential that the peer to per outreach the IPs did was obsolete? I wouldn’t make such a sweeping generalization about peer to peer, its always going to be in the mix.
- What is your take away about the HMIS, did the program use public sector tools with only small changes? That should be lauded more, it isn’t coming through when you say “the digitization of these records nonetheless enabled some disaggregated analyses”. When you say this electronic system could be used for future program scaling, are you talking about HMIS or the program’s system? This part needs to be clear and how M&E can be sustained.

Nice work overall, what a huge program! It is hard to know I’m sure what aspects to cover in detail, etc. My main points is to make it more clear what CHEWs do in Nigeria, that they were injecting women at facilities, etc. and not training them to self-inject. Do they do outreach too or only the CHVs? Spend more time thinking about what next steps you would advise for DMPA-SC in Nigeria.

**Is the work clearly and accurately presented and does it cite the current literature?**
Yes

**Is the study design appropriate and is the work technically sound?**
Yes

**Are sufficient details of methods and analysis provided to allow replication by others?**
Partly

**If applicable, is the statistical analysis and its interpretation appropriate?**
Yes

**Are all the source data underlying the results available to ensure full reproducibility?**
Yes

**Are the conclusions drawn adequately supported by the results?**
Yes

**Competing Interests:** No competing interests were disclosed.

**Reviewer Expertise:** HIV and sexual reproductive health, also STIs

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.