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# Cohort Profile: The Performance Monitoring for Action (PMA) panel surveys

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**Key Features**

- The Performance Monitoring for Action (PMA) platform is an open cohort with embedded cross-sectional surveys that was established to capture contraceptive use dynamics behaviours and contraception supply-demand factors.
- PMA data are nationally representative in Kenya, Niger, Uganda, Burkina Faso and Côte d'Ivoire; and representative of subnational geographies in the Democratic Republic of Congo (Kongo Central and Kinshasa provinces), Nigeria (Kano and Lagos states) and India (Rajasthan state).
- PMA cohorts were enrolled in late 2019 (Phase 1), with two annual follow-up surveys conducted in each site (Phases 2 and 3). Phase 4 data are forthcoming in Burkina Faso, Côte d'Ivoire, Niger, Nigeria, Uganda and Kinshasa.
- Across the eight countries in PMA, a total of 40 986 women aged 15–49 years participated in Phase 1, 49 184 women participated in Phase 2 and 53 865 women in Phase 3.
- PMA female surveys measure key family planning and reproductive health indicators, along with gender- and other health-related measures. The Service Delivery Point surveys capture information on service quality and contraceptive availability and stock.
- To request access to PMA data and discuss potential collaboration, visit (https://www.pmadata.org/data/request-access-datasets) or email the lead investigator, Dr Philip Anglewicz, at (panglew1@jhu.edu).

## Why was the cohort established?

The Performance Monitoring for Action (PMA) platform was established in 2013, with the initial goal of tracking progress towards the '120 × 20 goal', or 120 million additional contraceptive users by the year 2020[1] through annual cross-sectional surveys. In 2019, PMA entered a new stage and broadened its goals to measure and explain contraceptive use dynamics, and gender-related influences on family planning (FP). Given the scarcity of large-scale representative panel studies on FP in low- and middle-income countries, PMA addresses a notable data gap in the field. It complements other large-scale, cross-sectional surveys such as the

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Demographic and Health Surveys (DHS) and Multiple Indicator Cluster Surveys (MICS) by (i) focusing on contraceptive dynamics, (ii) generating novel measures of FP and (iii) connecting supply- and demand-side features of the FP environment by linking population-based surveys to facility-based surveys. PMA's panel approach is also well-suited for evaluating the effects of FP policies and programs, such as the introduction of new contraceptive methods, or implementation of interventions to increase access to FP services, and the impact of external factors, such as the COVID-19 pandemic.

PMA's design was structured in two stages. The first stage, referred to as 'PMA2020', took place between 2013 and 2019 and consisted of repeated annual cross-sectional surveys among households, women of reproductive age and health facilities (referred to as 'service delivery points'). Data were collected to track national and/or regional FP indicators in Burkina Faso, Côte d'Ivoire, Ethiopia, Ghana, Niger, Nigeria, Democratic Republic of Congo (DRC), Kenya, Uganda, India and Indonesia.[2]

The second stage is the focus of this manuscript. It started in 2019 when PMA shifted its study design to a longitudinal panel with embedded cross-sections to (i) more accurately track changes in FP indicators over time, (ii) explore contraceptive dynamics and associated factors (including gender-related measures) and (iii) study supply and demand factors that underlie contraceptive service utilization. This stage of PMA has been carried out at the national level in Kenya, Uganda, Burkina Faso, Côte d'Ivoire and Niger, and at subnational levels in Nigeria (Kano and Lagos states), DRC (Kinshasa and Kongo Central provinces) and India (Rajasthan state). In all geographies, PMA has conducted a baseline and two follow-up surveys, referred to as Phase 1, Phase 2 and Phase 3 surveys, respectively. A subset of geographies will have a fourth phase of data collection, including Burkina Faso, Niger, Côte d'Ivoire, Lagos, Kano, Kinshasa and Uganda.

## Who is in the cohort?

PMA uses a multi-stage stratified cluster sampling approach to select the household and female samples. The sample size determination was based on estimating the modern contraceptive prevalence rate among all women aged 15–49 years old with a minimum 3% margin of error at the national level, and 5% at the subnational level (where applicable), assuming a response rate of 95% at the household and 95% at the female levels.

Sampling started with a selection of primary sample units called enumeration areas defined by the most recent census in each country. PMA chose enumeration areas with the probability of selection proportionate to population size after stratification by region, county, and/or area of residence (rural/urban). Within each selected enumeration area, PMA field staff conducted a mapping and listing of households and health facilities, after which 35 households were randomly selected for interview (40 households were selected in Lagos to compensate for lower response rate). In the household survey, local interviewers enumerated all occupants in the sampled dwellings, and all women ages 15–49 years who were usual members of the household or slept in the household the night before were selected for the female survey. At the end of the female interview, women were consented and enrolled in the panel. Before each female interview, women were asked to provide either verbal or written consent, depending on local IRB procedures (Supplementary Table S2, available as Supplementary data at *IJE* online). Consent was obtained from the woman at each phase, regardless of whether the woman consented to be enrolled in the panel and re-contacted at the previous phase.

Service Delivery Points surveys were administered after the female survey. The primary, secondary and tertiary public facilities serving the selected enumeration area were automatically included in the Service Delivery Point panel sample, and up to three randomly selected private Service Delivery Points within the enumeration area were selected. Client Exit Interviews were also conducted with clients of sampled Service Delivery Points, but are not the focus of this cohort profile (Supplementary Text S1, available as Supplementary data at *IJE* online).

### Mode of interview

Surveys were conducted on smartphones using an ODK (open data kit) app. Most large-scale surveys are conducted by 'outsider' interviewers who are not residents of the communities surveyed. One of the innovations of PMA is that data collection model is conducted by women of reproductive age from within or nearby surveyed communities, who serve as 'Resident Enumerators', an approach that yields better data quality than outsider interviewers.[3,4]

### Response rate

Across the eight countries, 38 585 households completed the Phase 1 household survey (average response rate: 98.0%) and 40 333 women completed the Phase 1 female survey (average response rate: 97.2%) (Table 1). Table 2 provides descriptive statistics for the PMA female panel sample at Phase 1 across geographies. The response rates for cross-sectional survey varied over time but generally remained above 93%. Comparisons of the PMA Phase 1 samples and DHS show that the PMA samples closely match the main sociodemographic and FP characteristics of other nationally representative surveys (e.g. DHS and MICS); and PMA samples remained stable across Phases (Supplementary Text S2, available as Supplementary data at *IJE* online). Other studies that compared PMA and DHS also found similar characteristics between the two surveys.[5,6]

## How often have they been followed up?

Physical structured households form the basis of the panel, and all eligible women within selected dwelling units were followed over time. When an initially sampled dwelling was vacant or demolished, a new dwelling was randomly selected from the new listing to replace the lost one. At the annual follow-ups (Phase 2, 2020–21; and Phase 3, 2021–23), the interviewers returned to the enumeration areas and dwellings selected at Phase 1 (2019–20) to interview all women 15–49 years. This includes women who participated in the Phase 1 survey and were still eligible at follow-up, adolescents who turned 15 and new female residents aged 15–49 years who had moved into the selected households since Phase 1. Women aged out of the sample when reaching 50 years. In addition, enrolled women were interviewed if they resided in the study area, even if they moved to a different housing structure/unit, in line with the follow-up protocol (Supplementary Text S3, available as Supplementary data at *IJE* online). Service Delivery Point baseline data were

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**Table 1.** Performance Monitoring for Action household and female response rates among cross-section dwelling units, 2019–23

| Geography phase[a] | Households selected | Households occupied | Households interviewed | Household response rate | Total eligible women[b] | Eligible women interviewed | Women response rate | Consented to follow-up | Women participation rate |
|---|---|---|---|---|---|---|---|---|---|
| Burkina Faso Phase 1 | 5844 | 5764 | 5695 | 98.8% | 6881 | 6590 | 95.8% | 6418 | 93.3% |
| Burkina Faso Phase 2 | 5881 | 5647 | 5530 | 97.9% | 6837 | 6388 | 93.6% | 6257 | 91.5% |
| Burkina Faso Phase 3 | 5848 | 5536 | 5377 | 97.1% | 6530 | 6078 | 93.1% | 5957 | 91.2% |
| Côte d'Ivoire Phase 1 | 4274 | 4154 | 3988 | 96.0% | 4263 | 4135 | 97.0% | 3989 | 93.6% |
| Côte d'Ivoire Phase 2 | 4311 | 4001 | 3830 | 95.7% | 4112 | 3949 | 96.0% | 3804 | 92.5% |
| Côte d'Ivoire Phase 3 | 4309 | 3930 | 3774 | 96.0% | 4065 | 3873 | 95.3% | 3643 | 89.6% |
| DRC, Kinshasa Phase 1 | 2030 | 2009 | 1968 | 98.0% | 2740 | 2611 | 95.3% | 2553 | 93.2% |
| DRC, Kongo Central Phase 1 | 1995 | 1986 | 1965 | 98.9% | 1975 | 1950 | 98.7% | 1900 | 96.2% |
| DRC Phase 1 | 4025 | 3995 | 3933 | 98.4% | 4715 | 4561 | 96.8% | 4453 | 94.4% |
| DRC, Kinshasa Phase 2 | 2072 | 1962 | 1866 | 95.1% | 2547 | 2369 | 93.0% | 2288 | 89.8% |
| DRC, Kongo Central Phase 2 | 2026 | 1918 | 1891 | 98.6% | 1962 | 1929 | 98.3% | 1713 | 87.3% |
| DRC Phase 2 | 4098 | 3880 | 3757 | 96.8% | 4509 | 4298 | 95.3% | 4001 | 88.7% |
| DRC, Kinshasa Phase 3 | 2072 | 1921 | 1828 | 95.2% | 2475 | 2326 | 94.0% | 2245 | 90.7% |
| DRC, Kongo Central Phase 3 | 2054 | 1887 | 1861 | 98.6% | 1896 | 1856 | 97.9% | 1664 | 87.8% |
| DRC Phase 3 | 4126 | 3808 | 3689 | 96.9% | 4371 | 4182 | 95.7% | 3909 | 89.4% |
| India, Rajasthan Phase 1 | 4690 | 4633 | 4577 | 98.8% | 5513 | 5408 | 98.1% | 5058 | 91.7% |
| India, Rajasthan Phase 2 | 4690 | 4501 | 4421 | 98.2% | 5544 | 5428 | 97.9% | 5217 | 94.1% |
| India, Rajasthan Phase 3 | 4690 | 4459 | 4364 | 97.9% | 5620 | 5481 | 97.5% | 5371 | 95.6% |
| Kenya Phase 1 | 10 780 | 10 581 | 10 378 | 98.1% | 9605 | 9477 | 98.7% | 8825 | 91.9% |
| Kenya Phase 2 | 10 803 | 10 068 | 9727 | 96.6% | 9455 | 9323 | 98.6% | 9201 | 97.3% |
| Kenya Phase 3 | 10 867 | 9966 | 9565 | 96.0% | 9629 | 9489 | 98.5% | 9351 | 97.1% |
| Niger Phase 1 | 3601 | 3557 | 3515 | 98.8% | 3809 | 3633 | 95.4% | 3360 | 88.2% |
| Niger Phase 2 | 3646 | 3466 | 3428 | 98.9% | 3837 | 3696 | 96.3% | 3365 | 87.7% |
| Niger Phase 3 | 3596 | 3374 | 3334 | 98.8% | 3909 | 3794 | 97.1% | 3411 | 87.3% |
| Nigeria, Lagos Phase 1 | 1822 | 1738 | 1619 | 93.2% | 1521 | 1469 | 96.6% | 1394 | 91.7% |
| Nigeria, Kano Phase 1 | 875 | 864 | 857 | 99.2% | 1128 | 1122 | 99.5% | 1094 | 97.0% |
| Nigeria Phase 1 | 2697 | 2602 | 2476 | 95.2% | 2649 | 2591 | 97.8% | 2488 | 93.9% |
| Nigeria, Lagos Phase 2 | 1873 | 1712 | 1598 | 93.3% | 1553 | 1483 | 95.5% | 1447 | 93.2% |
| Nigeria, Kano Phase 2 | 879 | 858 | 854 | 99.5% | 1142 | 1136 | 99.5% | 1038 | 90.9% |
| Nigeria Phase 2 | 2752 | 2570 | 2452 | 95.4% | 2695 | 2619 | 97.2% | 2485 | 92.2% |
| Nigeria, Lagos Phase 3 | 1843 | 1703 | 1588 | 93.2% | 1498 | 1426 | 95.2% | 1372 | 91.6% |
| Nigeria, Kano Phase 3 | 875 | 838 | 834 | 99.5% | 1156 | 1144 | 99.0% | 1112 | 96.2% |
| Nigeria Phase 3 | 2718 | 2541 | 2422 | 95.3% | 2654 | 2570 | 96.8% | 2484 | 93.6% |
| Uganda Phase 1 | 4269 | 4148 | 4023 | 97.0% | 4069 | 3938 | 96.8% | 3820 | 93.9% |
| Uganda Phase 2 | 4939 | 4566 | 4399 | 96.3% | 4537 | 4346 | 95.8% | 4202 | 92.6% |
| Uganda Phase 3 | 5090 | 4597 | 4430 | 96.4% | 4386 | 4227 | 96.4% | 4041 | 92.1% |
| All Countries and Phases | 122 544 | 116 344 | 113 084 | 97.2% | 124 194 | 120 074 | 96.7% | 115 110 | 92.7% |

DRC, Democratic Republic of Congo.
[a] Phase 1 dates: 2019–20; Phase 2 dates: 2020–21; Phase 3 dates: 2021–23.
[b] Eligible women interviewed is defined as the number of women with completed household and female questionnaires, and who slept at the house the night before the survey.

collected at Phase 1 and follow-up data were collected annually at the same facilities, with replacement facilities selected for those that closed over time. PMA surveys timelines are available in the supplementary materials (Supplementary Figure S1, available as Supplementary data at *IJE* online).

### Attrition

Of the 40 986 respondents who completed or partially completed the Phase 1 female questionnaire, 31 714 were followed up at Phase 2—attrition ranged from 8% in Kano, Nigeria to 23% in Côte d'Ivoire—and 12 799 new participants were enrolled in Phase 2. Of the 49 184 who completed or partially completed the Phase 2 female questionnaire, 35 857 completed the Phase 3 panel questionnaire—attrition ranged from 11% in Kano, Nigeria to 28% in Uganda—and 10 227 new participants were enrolled in Phase 3 (Table 3). In most countries, both at Phase 2 and Phase 3, women lost to follow-up were younger, more educated, more often living in urban areas, with a partner, and had a lower parity (Supplementary Tables S8 and S9, available as Supplementary data at *IJE* online).

### COVID-19 subpanel

In addition to the main cohort survey, PMA conducted a phone follow-up survey 6 months after Phase 1 to collect COVID-19-related data to inform outbreak response interventions, policies and messages in Kenya, Burkina Faso, Nigeria and Kinshasa (DRC). All females from the PMA Phase 1 cohort who consented to and provided phone numbers for follow-up were eligible to participate and completed the survey (Supplementary Text S4, available as Supplementary data at *IJE* online).

## What has been measured?

The household questionnaire contains a roster of household members and includes standard items on household assets, structure materials and water and sanitation that are used to create a wealth index. The female questionnaire contains a standard set of questions asked in all geographies, including sections on sociodemographic factors; reproductive history, including pregnancy, and fertility intentions; contraception; sexual activity; and women's and girls' economic and sexual and reproductive health (SRH) empowerment. A summary of

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**Table 2.** Descriptive data of the Performance Monitoring for Action female panel sample at Phase 1, 2019–20

| | Burkina Faso | Cote D'Ivoire | Democratic Republic of Congo | | Kenya | Niger | Nigeria | | Rajasthan | Uganda |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Kinshasa | Kongo Central | | | Lagos | Kano | | |
| *N* | 6532 | 4074 | 2549 | 1902 | 8797 | 3376 | 1399 | 1085 | 5071 | 3843 |
| Age, years | | | | | | | | | | |
| 15–19 | 21.3 | 21.1 | 22.4 | 21.0 | 21.6 | 19.4 | 13.9 | 24.8 | 17.5 | 24.3 |
| 20–24 | 17.5 | 18.3 | 21.4 | 16.5 | 17.9 | 20.9 | 14.0 | 16.4 | 18.1 | 20.0 |
| 25–29 | 15.1 | 16.0 | 16.5 | 16.3 | 16.6 | 19.9 | 16.1 | 18.0 | 17.6 | 17.3 |
| 30–34 | 15.9 | 16.3 | 12.5 | 14.9 | 15.8 | 15.4 | 18.2 | 14.8 | 14.9 | 13.9 |
| 35–39 | 13.0 | 12.9 | 10.5 | 13.8 | 11.8 | 11.1 | 18.3 | 11.9 | 13.0 | 11.0 |
| 40–44 | 11.2 | 10.4 | 10.5 | 10.4 | 9.6 | 9.5 | 13.1 | 8.0 | 11.5 | 8.0 |
| 45–49 | 6.1 | 5.0 | 6.2 | 7.1 | 6.7 | 3.9 | 7.0 | 6.1 | 7.5 | 5.6 |
| Education | | | | | | | | | | |
| None/primary | 77.1 | 66.9 | 7.7 | 40.0 | 50.0 | 84.4 | 11.6 | 65.6 | 50.6 | 61.7 |
| Secondary | 21.2 | 27.4 | 72.9 | 56.8 | 38.0 | 13.4 | 50.6 | 29.6 | 31.9 | 30.2 |
| Tertiary | 1.7 | 5.7 | 19.4 | 3.2 | 12.0 | 2.2 | 37.8 | 4.8 | 17.4 | 8.0 |
| Marital status | | | | | | | | | | |
| Not married | 20.7 | 32.5 | 50.8 | 25.6 | 31.7 | 12.3 | 32.2 | 20.1 | 22.8 | 27.2 |
| In union | 75.9 | 62.6 | 42.4 | 64.1 | 59.8 | 84.1 | 61.8 | 76.1 | 75.1 | 59.6 |
| Divorced/widowed | 3.4 | 4.9 | 6.9 | 10.3 | 8.5 | 3.6 | 6.0 | 3.8 | 2.2 | 13.3 |
| Wealth | | | | | | | | | | |
| Tertile 1 | 33.8 | 29.4 | 30.3 | 29.4 | 36.1 | 31.7 | 28.8 | 29.1 | 27.6 | 30.9 |
| Tertile 2 | 32.9 | 31.3 | 33.7 | 32.5 | 35.4 | 31.9 | 32.4 | 36.4 | 34.4 | 33.3 |
| Tertile 3 | 33.3 | 39.4 | 36.1 | 38.1 | 28.5 | 36.4 | 38.8 | 34.6 | 38.0 | 35.8 |
| Residence, urban | 23.0 | 60.7 | | | 28.7 | 18.9 | | 35.5 | 24.1 | 28.8 |
| Contraceptive use and demand among all women | | | | | | | | | | |
| CPR | 27.9 | 29.3 | 44.0 | 36.6 | 46.5 | 12.4 | 39.1 | 9.5 | 50.8 | 35.5 |
| mCPR | 26.0 | 23.2 | 24.6 | 23.3 | 44.1 | 11.1 | 26.1 | 8.2 | 44.9 | 29.9 |
| Unmet need for FP | 21.1 | 20.4 | 10.8 | 23.7 | 12.3 | 18.6 | 10.7 | 21.6 | 7.6 | 17.5 |

CPR, contraceptive prevalence; FP, family planning; mCPR: modern contraceptive prevalence.
The panel sample includes all age-eligible women who completed or partially completed the female questionnaire at Phase 1 and consented to follow-up.
Percentages are weighted proportions.

**Table 3.** Performance Monitoring for Action sample flow, 2019–23

| | Burkina Faso | Cote D'Ivoire | Democratic Republic of Congo | | Kenya | Niger | Nigeria | | Rajasthan | Uganda |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Kinshasa | Kongo Central | | | Lagos | Kano | | |
| Phase 1, 2019–20 | | | | | | | | | | |
| Full sample[a] | 6790 | 4268 | 2639 | 1970 | 9558 | 3666 | 1507 | 1127 | 5469 | 3992 |
| Phase 2, 2020–21 | | | | | | | | | | |
| Ineligible[b] | 258 | 194 | 90 | 68 | 761 | 290 | 108 | 42 | 398 | 149 |
| Permanently lost to follow-up | 262 | 238 | 257 | 152 | 602 | 154 | 106 | 32 | 158 | 283 |
| Temporarily lost to follow-up | 779 | 719 | 286 | 216 | 1177 | 391 | 163 | 52 | 369 | 518 |
| Attrition (%) | 16 | 23 | 21 | 19 | 20 | 16 | 19 | 8 | 10 | 21 |
| Sample additions[c] | 1764 | 1267 | 972 | 628 | 3134 | 1189 | 473 | 170 | 1082 | 2120 |
| Full sample | 8034 | 5104 | 3264 | 2378 | 11 329 | 4411 | 1766 | 1223 | 5995 | 5680 |
| Phase 3, 2021–23 | | | | | | | | | | |
| Ineligible[b] | 595 | 355 | 274 | 292 | 335 | 499 | 110 | 121 | 397 | 435 |
| Permanently lost to follow-up | 278 | 260 | 184 | 173 | 410 | 174 | 120 | 32 | 148 | 346 |
| Temporarily lost to follow-up | 1516 | 1069 | 442 | 384 | 1742 | 519 | 278 | 92 | 598 | 1148 |
| Attrition (%) | 24 | 28 | 21 | 27 | 20 | 18 | 24 | 11 | 13 | 28 |
| Sample additions | 1473 | 1076 | 866 | 614 | 2168 | 983 | 341 | 218 | 879 | 1609 |
| Full sample[c] | 8639 | 5565 | 3674 | 2527 | 12 752 | 4696 | 1877 | 1288 | 6339 | 6508 |

[a] Full sample: number of women potentially eligible for next round. The full sample includes women who partially or fully completed the female survey, women who slept at the household the day before the survey and usual members of the household.
[b] Ineligible: women who aged out of the survey (>49 years) and those who did not consent to follow-up.
[c] All women who entered the survey at a given Phase, regardless of consent to follow-up.

the measures in the household and female surveys is listed in Table 4. Questionnaires were adapted at each phase based on prioritization of indicators or the performance of the survey items in the previous survey phases. Separate add-on modules, such as infertility, migration and gender-based violence were available at certain phases and included in the female survey. New questions on community-based gender norms and female genital mutilation (Nigeria and Burkina Faso only) were added at Phase 4. The Service Delivery Point survey measures items like contraceptive method availability

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**Table 4.** Performance Monitoring for Action household and female surveys content, 2019–23

| Domain[a] | Measure/scale | Number of questions (range) | Survey cycle availability (C=Core; A = Add-on module/question) | | |
|---|---|---|---|---|---|
| | | | Phase 1 | Phase 2 | Phase 3 |
| Household data (HQ) | Household roster information | 10–12 | C | C | C |
| | Household characteristics (assets and building materials) | 7 | C | C | C |
| | Water, sanitation and hygiene | 2–5 | C | C | C |
| Sociodemographic factors (FQ) | Age; overall health; education; marital/relationship status; current living situation | 17 | C | C | C |
| | Husband/partner's level of education | 1 | na | C | C |
| | Relationship history | 6 | C | C | C |
| | Migration history | 8 | A | na | na |
| Reproduction, Pregnancy and Fertility Preferences (FQ) | Menstrual, pregnancy and birth history | 11–12 | C | C | C |
| | Fertility intentions | 8–10 | C | C | C |
| Contraception (FQ) | Knowledge of contraceptive methods | 16–18 | C | C | C |
| | Current contraceptive use | 7–10 | C | C | C |
| | DMPA-SC[b] self-injection | 2–6 | A | A | A |
| | Partner involvement in and support of contraceptive decisions | 4–6 | C | C | C |
| | Implant use | 7 | A | A | A |
| | Sterilization information | 1 | A | A | A |
| | Contraceptive source | 5 | C | C | C |
| | Perceived stigma related to obtaining contraception | 2 | C | C | C |
| | Non-users (future contraceptive intentions, reasons, decision-makers) | 8 | C | C | C |
| | Method information index plus[c] | 4 | C | C | C |
| | Provider pressure | 2 | na | C | C |
| | Contraceptive use history | 4–6 | C | C | C |
| | Family planning counselling, outreach, media and social norms | 16–20 | C | C | C |
| | Life goals among adolescents | 7–14 | C | C | C |
| | Health insurance | 2 | C | C | C |
| Sexual activity (FQ) | Sexual history | 5–6 | C | C | C |
| | Contraceptive use at first sex with current partner | 2 | C | C | C |
| | Contraceptive use at last sex | 3 | C | C | C |
| Women's and girls' empowerment (FQ) | Current employment and income | 3 | C | C | C |
| | Household decision-making related to household purchases and medical care | 3 | C | C | C |
| | Economic empowerment (household decision-making related to clothes purchases and earnings use; land ownership; earnings level compared with partner; income generating activities) | 6 | A | A | A |
| | Finance (savings accounts; level of financial literacy; financial goals) | 2–5 | A | A | A |
| | Internet access | 4–5 | na | na | C |
| | Personal beliefs on consequences family planning use | 6 | C | C | C |
| | Reproductive and sexual autonomy | 10–20 | A | A | A |
| Gender-based violence (FQ) | Sexual coercion | 4 | A | A | A |
| | Pregnancy coercion | 5 | na | C | C |
| | Intimate partner violence; household violence; help-seeking behaviour | 15–19 | na | A | A |
| Infertility (FQ) | Infertility (knowledge, experience, care) | 9–14 | na | na | A |
| COVID-19[d] (FQ) | Knowledge of; life impact; level of concern | 15–18 | C | na | na |

FQ, female questionnaire; HQ, household questionnaire.

[a] Additional modules that were phase-specific and included in only certain country surveys are not included in this table. Add-on modules and questions included in this table have been offered to all Performance Monitoring for Action geographies during at least one phase of data collection.

[b] DMPA-SC refers to self-injection of subcutaneous depo-medroxyprogesterone acetate.

[c] Method Information Index Plus is a score based on a set of four questions clients are asked at the end of a contraceptive visit. It gives insight into the type of information women receive during counselling and the extent to which women are informed about side effects and alternate methods.

[d] At Phase 1, COVID-19 questions were integrated into the FQ for Group B countries only (Uganda, India (Rajasthan), Niger, Côte d'Ivoire), as Group A countries (Kenya, Nigeria, Democratic Republic of Congo, Burkina Faso) had already finished collecting Phase 1 data by March 2020.

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and costs, provider training in FP services, FP client volume and FP service integration (Supplemental Text S5, available as Supplementary data at *IJE* online).

In addition to standard key indicators of FP and reproductive health, PMA survey has introduced innovative reproductive health measures, tracking knowledge of, attitudes towards and use of subcutaneous depot medroxyprogesterone acetate (DMPA-SC) (brand name Sayana Press), including self-injection. Implant use and removal questions have been added in countries with high implant use. Women and girls' empowerment is studied across all PMA countries, with a focus on sexual, reproductive and economic empowerment.[7,8] PMA also developed an adolescent module in Rajasthan to explore girls' SRH competencies, including autonomy in marriage and sexual decision-making; indicators were subsequently scaled to all PMA geographies in Phases 1–3. Given the potential for COVID-19 restrictions to increase gender-based violence, countries could opt into a gender-based violence mini-module beginning in 2020. The module includes questions on prevalence and intensity of intimate partner violence and household violence, as well as help-seeking behaviours.

## What has it found?

With innovative measures and a longitudinal panel design, PMA has contributed to methodological advancements while providing new insights into key SRH topics like abortion, adolescent SRH, contraceptive dynamics, quality of FP care, women's empowerment and reproductive coercion. Some of the more prominent findings are described below, and a full list of manuscripts published with PMA data can be found at the project's Google Scholar site: https://scholar.google.com/citations?user=gYAacPsAAAAJ&hl=en&authuser=1

### Methodological contributions

PMA has investigated the reliability of the contraceptive calendar, a widely used tool for key FP measures that has rarely been evaluated due to the lack of longitudinal panel data. The flexibility and frequency of PMA implementation allowed for a comprehensive assessment, revealing a 'moderate to substantial' level of reliability in nearly all PMA geographies, though less so for women using short-acting methods or women using contraception covertly from their partners.[9]

PMA also employed an anonymous third-party reporting technique (i.e. the 'confidante' method) in conjunction with innovative question framing to improve estimates of abortion incidence and safety in several countries and reporting of premarital sexual intercourse in Rajasthan.[10–15]

### Contributions to sexual and reproductive health and rights knowledge base

Using longitudinal data, PMA data have been used to examine the impact of the COVID-19 pandemic on FP and contraceptive use. Many predicted that COVID-19 would have a severe, detrimental impact on contraceptive use in sub-Saharan Africa. PMA provided the only population-based evidence in sub-Saharan Africa on the impact of COVID-19 on fertility intentions, contraceptive use and FP service provision early and after 1 year into the pandemic, looking at the impact on service delivery and on both population- and individual-level use of and demand for contraception. Contrary to the prevailing expectations, researchers using PMA data did not find a deleterious effect of COVID-19 in the earliest stages of the pandemic, extending to the first year into the pandemic, either at the individual- or population level; in fact, more women adopted than discontinued contraceptive use in Kenya and Burkina Faso.[16–19]

PMA's work on women and girls' SRH empowerment, which involved mixed-method research in four geographies, underscores the dynamic nature of SRH empowerment, which works as a process starting with goal setting, followed by the ability to translate these goals into action and ultimately achieve SRH desired outcomes. The research also finds SRH empowerment is multidimensional as women may be empowered to make FP decisions but have no power in sexual decision-making. These results have informed the development of a cross-national SRH empowerment indicator, implemented in all PMA geographies, that can serve to track progress towards achieving the United Nations' Sustainable Development Goal of gender equity and women's empowerment, while also informing FP programs.[7,20,21]

## What are the main strengths and weaknesses?

PMA's unique design fills several significant gaps in the field. Large-scale, nationally representative panel data in low-resource settings are rare in the FP/SRH field, but extremely valuable in permitting (1) more accurate measurement of change over time in reproductive and contraceptive outcomes for individual women and (2) sophisticated modelling of cause-and-effect relationships, contraceptive/reproductive trajectories and more. PMA also produces precise nationally and/or sub-nationally representative estimates of key FP/SRH indicators and do so more frequently than other large-scale population-based surveys. PMA has advanced measurement of FP/SRH and gender-related concepts by testing new approaches to measurement and assessing the reliability of standard measures. PMA includes both supply and demand side measures of the FP environment, by surveying both women and facilities that provide FP services in the same geographic context.[22] Finally, PMA ensures that the data and results are tied to in-country policies and programs, which have been used extensively to develop and assess FP/SRH programs and policies in all geographies.

Some of PMA's weaknesses relate to attrition between phases and implementation challenges during COVID-19 pandemic. First, although relatively low in all contexts, panel attrition is often selective, requiring post-stratification weights to reduce selection bias. Inverse probability weights partly address differential attrition, but do not account for differences in unmeasured characteristics. Second, COVID-19 delayed data collection by 6–9 months in several sites, including, Niger, Uganda, India, Côte d'Ivoire. Third, while collection of data from both demand (women) and supply (facilities) side is a rare feature for large-scale surveys, the PMA sampling of health facilities is not designed to be representative. Instead, the sampling is designed to capture both public and private facilities that serve the women in the PMA sample.

## Can I get hold of the data? Where can I find out more?

Survey data are available for all countries at the PMA website (www.pmadata.org). Datasets are free to download and

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available to the public, but users are required to register and provide a description of the proposed research or analysis before data download (https://www.pmadata.org/data/request-access-datasets).

## Ethics approval

PMA has been approved by the Institutional Review Board at the Johns Hopkins Bloomberg School of Public Health (IRB14702; MOD18860; MOD3903; MOD4748); the Comité d'Éthique pour la Recherche en Santé of the Ministère de l'Enseignement Superieur, de la Recherche Scientifique et de l'Innovation and the Ministère de la Santé, Burkina Faso (30-2019/CEIRES; 2020-11-258; 2021-11-253); the Comité National d'Ethique des Sciences de la Vie et de la Santé, Côte d'Ivoire (052-20/MHSP/CNESVS-km; 150-21/MHSP/CNESVS-km; 128-22/MSHPCMU/CNESVS-kp); the Comité d'Éthique de l'École de Santé Publique de l'Université de Kinshasa (ESP/CE/030B/2019; ESP/CE/160/2020; ESP/CE/159B/2021; ESP/CE/159C/2024); Indian Institute of Health Management Research University Institutional Committee for Ethics and Review of Research (IRB00008833); Kenyatta National Hospital—University of Nairobi Ethics and Research Committee (P801/09/2019); Comité national d'éthique pour la recherche en santé, Niger (034/2020/CNERS; 078/2021/CNERS); Health Research Ethics Committee of the Ministry of Health, Kano State (NHREC/1703/2018); Research Ethics Committee, Aminu Kano Teaching Hospital (NHREC/28/01/2020/AKTH/EC/3651), LASUTH Health Research and Ethics Committee, Lagos State University Teaching Hospital (LREC/06/10/1276; LREC/06/10/2215); Higher Degrees, Research and Ethics Committee, Makerere University, College of Health Sciences, School of Public Health (805).

## Data availability

See 'Can I get hold of the data?' above.

## Supplementary data

Supplementary data are available at *IJE* online.

## Author contributions

S.R., Sa.A., Y.C., W.B., P.A., A.T., L.A.Z., E.G., C.M., C.K., S.W. and S.O.B. were responsible for the PMA study conception and design, or PMA sub-studies (e.g. abortion, adolescent, women's and girls' empowerment). G.G., R.M., F.R., P.A., A.K., P.G., M.T., S.A., S.O., E.O., F.M.O., M.S.Z., F.M. and S.P.S.K. supervised data collection in their respective geographies. A.S. and D.S. performed statistical analysis for this manuscript. A.S., M.E.B. and P.A. prepared the first draft of the manuscript. G.G., R.M., F.R., P.A., A.K., P.G., M.T., S.A., S.O., E.O., F.M.O., M.S.Z., F.M. and S.P.S.K. are Performance Monitoring and Action Principal Investigators and reviewed and assisted in finalizing the manuscript. All authors reviewed and approved the final manuscript.

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## Conflict of interest

None declared.

## Use of artificial intelligence (AI) tools

No AI tools were used.

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Cohort Profile