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PERSPECTIVE ON THE PERFORMANCE MONITORING AND ACCOUNTABILITY 2020 (PMA 2020) SURVEYS[1]

Amy Tsui

sectors' goals, such as education, gender equality, poverty, and nutrition, as well as expansion to non-FP health areas.

<u>PMA2020 surveys</u>[4]

PMA2020 which began in 2013 is a five-year research project that supports rapid-turnaround surveys to monitor progress in contraceptive access and use and track equity and quality dimensions of family planning service delivery. It also assesses water, sanitation and hygiene environments at the household level. PMA2020 follows the same multi-stage cluster sample design used by the DHS or MICS, obtaining sampling frames from the national statistical office.[5] It conducts surveys at 3 levels: household, eligible female, and health facility. The project uses Android smartphones to efficiently collect and transmit the data to a central cloud server for immediate aggregation and close to real-time tabulation and analysis. The project employs a network of female resident enumerators (REs), recruited from or near sampled clusters, who are trained to use the smartphones to gather survey data from a probability sample of households

there is a one-week Training of Trainers session for supervisors, who then train their assigned REs over a two-week period. This includes familiarizing them with smartphones and ODK. Listing and mapping households and service delivery points (SDPs) follow immediately. Supervisors randomly select 35 to 42 households, depending on estimated eligible female to household ratios and non-response rates, and up to 3 private SDPs from each cluster listing for the RE to interview. Supervisors conduct the public SDP interviews. Each RE's workload is about 40 household and 40 eligible women interviews, plus the randomly selected private health facilities, which are often pharmacies, private clinics and retail providers of contraceptives. Fieldwork is completed in four weeks on average, indicating a total of about 2 to 2.5 months of dedicated time to each PMA2020 round. The two-page brief is generated as soon as 95% or more of the expected interviews are completed.

An important gauge of accuracy is the width of the survey margin of error. For budgetary reasons, the PMA2020 surveys are not powered to provide subnational estimates for provinces or regions, although there have been exceptions (all 10 regions in Ghana, all DHS-defined regions in Uganda, 9 counties in Kenya, and 5 regions in Ethiopia). Table 2 provides the PMA2020 sample sizes, total and modern contraceptive prevalence (mCPR) estimates and 95% confidence intervals for all women ages 15-49 across five countries. Given the semi-annual periodicity of PMA2020 surveys in the first two years, by pooling two rounds of data the sample is effectively doubled and the confidence band interval narrowed allowing for direct comparison with DHS estimates. PMA2020 estimates track rises in mCPRs reasonably well relative to earlier DHS ones. For example, the estimated mCPR in Kenya increases from 32.0% (30.4-33.6%) in the 2008 KDHS to 42.2% (39.9-44.4) with the pooled PMA2020 sample and their confidence intervals do not overlap suggesting a statistically significant change at $p<.05$. In the case of Kinshasa's estimates under PMA2020 Round 1 and a co-timed DHS, the estimates are very close, i.e., the 95% confidence intervals of 32.0-37.7% and 31.5-36.3% overlap, as seen in Figure 1.

Last, trends in mCPR estimates are tracked by the UN Population Division, with time-sequenced confidence bands calculated using a Bayesian probability density function. Trend estimates for the mCPR are presented in Figure 2 for 5 countries, with PMA2020 point estimates displayed alongside those from DHS, MICS and other national surveys. PMA2020 results are in line with prior survey estimates; in Kenya, the estimate for 2014 was higher than might have been predicted from past trends (prior red circles) but the 2014 KDHS released in 2015 arrived at a point estimate that was very similar. Overall, the results with respect to mCPR affirm the potential of using smartphones and resident enumerators for rapid survey monitoring of contraceptive practice. PMA2020 Detailed Indicator Reports also show consistency for WASH indicators compared with those measured in the DHS.

Overall, PMA2020 employs technological innovation at every stage of survey implementation from data collection to aggregation, analysis and dissemination, tapping the capacity of smartphones and other mobile devices, telecommunication networks, and national networks of female numerators based in sample clusters. The PMA2020 platform was inspired by the Indian Sample Registration System which also uses resident enumerators but not the mobile technology. PMA2020's platform's features enable the focused content of its surveys to be fielded in about 30 minutes with the female respondent, have a flexible structure to accommodate modifications in response to programmatic interests and new content modules sponsored by other parties in subsequent, independent rounds, and to be repeated annually for continuous monitoring. Data quality is strong and to date, including consistent patterns in client volumes captured in the SDP survey compared against national service statistics. Possible interviewer bias from REs has also not emerged as a practical or empirical concern.

3. *Sample size and resource considerations*

There are resource considerations that accompany sample size considerations. While sample power calculations and tolerance for margins of error will drive the desired sample sizes for different indicators, and hence the number of clusters and REs, so also does the need for subnational estimates to support development planning. PMA2020's experience has been to encounter strong governmental demand for subnational data to enable local administrators' use of the data for planning and budgeting. As an externally funded project, PMA2020 has often not been able to respond fully to such requests. Instead the response has been selective by identifying one or two states or provinces to oversample in order to show proof of concept for local estimation in hopes that the government or other donors will co-finance any additional expansion. From a cost perspective, PMA2020's sponsor, the Bill & Melinda Gates Foundation, has absorbed the major front-end expenses by investing in building the country infrastructures, i.e., platforms with mobile devices and trained REs.

Closing comments

Rapid advances in telecommunications and mobile technologies will benefit data collection and monitoring efforts in ways that are not possible to imagine at present. The challenge is not only to conceptualize the possibilities but to plan smartly to take advantage of the growth in these information technology opportunities to generate strong data, measurements, and analyses and support evidence-based policy decisions to improve the human condition and physical environments in a sustainable manner. PMA2020 has a "softer side" in empowering more than 1000 female enumerators, often residing in rural sites, with periodic but long-term employment, smartphone skills, and growing personal confidence for public interactions. The annual dissemination of PMA2020 results to stakeholder groups has enabled immediate program responses to service gaps or user needs in a number of settings.

The population-based nature of PMA2020 survey design coupled with the speed of telecommunications transmission and large database computations are quickly leading to the building of big data systems of a demographic nature. Capitalizing on the household enumeration stage of PMA2020 surveys can help launch CVR systems to cover large populations. Data visualization will promote the consumption of observed patterns and relationships; the project has yet to tap into the potential linkages with video production and video-streaming to promote community-level dissemination. Other technologies, such as drones for aerial surveillance, can speed ground-truthing of clusters for listing and mapping, or internet expansion efforts, such as by Google with weather balloons or Facebook's internet.org initiative, promise unprecedented and transformational information access by low-income populations. The challenge will be not just to bring equity in benefits experienced by populations with the achievement of the Sustainable Development Goals in 2030 but to ensure that demographic data systems are themselves enduring, replenishing, comparable and long-serving.

Table 1. Comparison of design elements for Demographic and Health Surveys and Performance Monitoring and Accountability Surveys		
Design element	**DHS**	**PMA2020**
Smart device	Paper, PDA, tablets of different specifications over the years	Mobile/smart phone using Android OS 4.1 or higher with GPS and camera
Human resources	Supervisors and interviewers recruited, trained and deployed for dedicated fieldwork time	Resident enumerators--a female residing in/near selected enumeration area of about 200 households; trained to use ODK forms on smartphone and in survey procedures similar to DHS
Survey Instruments	Household Female Male Service provision assessment	Household Female -- Health facility
Survey respondent(s)	Eligible female 15-49 years Eligible males 15-59 years Health facility manager	Eligible females 15-49 years -- Health facility manager
Measurement	Personal interview of >1 hour duration Biomarkers Anthropometry	Personal interview for 30 minute duration on average
Sample design	Probability sample of households Occupants enumerated to identify eligible female and male respondents Health facilities survey (SPA) independently conducted using master list of health facilities, largely public sector	Probability sample of households Occupants enumerated to identify eligible female respondents Health facilities identified through listing/mapping and interviews with local public health authorities

Table 2. Estimates of total and modern contracepti 1 Tf0 44.6994 Te prev

Figure 1. National estimates of modern contraceptive prevalence rates for married women age 15 to 49, and 95% confidence intervals, in six countries: PMA 2013-2014 and latest DHS
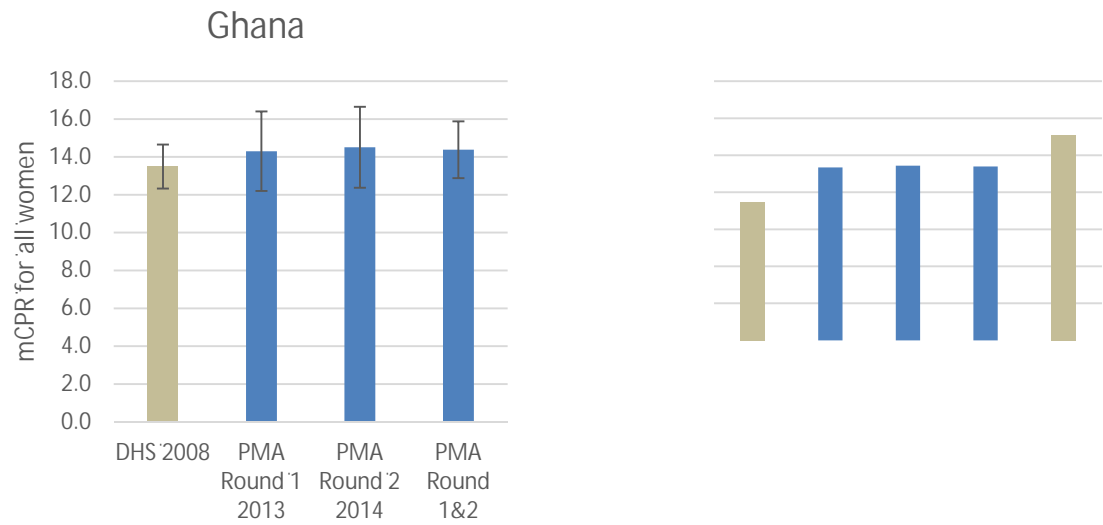
Figure 2. United Nations Model-based Estimates of Modern Contraceptive Prevalence Rates for Burkina Faso, Ethiopia, Ghana, Uganda, and Kenya