PMA Agile Sampling and Weighting Memo

Facility Sampling and Weighting Memo

PMA Agile is a continuous data monitoring and evaluation system, collecting data at quarterly intervals each year on the overall health service delivery environment with emphasis on family planning and contraceptive service provision at the health facility and client level in multiple countries, largely in urban areas. The project uses mobile data collection methods to track information on health facility performance and impacts from interventions implemented in survey areas. The PMA Agile system captures information flows on urban reproductive health that is timely, flexible and adaptable, as well as cost-efficient.

The PMA Agile survey offers a unique opportunity to monitor the performance of resource inputs by DKT International and The Challenge Initiative (TCI), by collecting data from the facilities and facility clients on key indicators on a real-time basis. Incorporating the data available from PMA Agile into an indicators dashboard displays trends on an on-going basis aimed to help inform programmatic directions to TCI and DKT.

Sampling Approach

Within each implementing site in a program country, PMA Agile targets a random sample of 200 health facilities and uses official listings from the Ministry of Health, other government agencies, and reference resources provided by TCI and DKT for its frame. When necessary, pharmacy sampling lists were obtained from DKT based on their registration of private retailers in a given site. Allowing for a 10% non-response, a maximum sample of 220 health facilities was targeted. Agile uses a two-stage cluster sampling design, where the first stage is the managing authority, i.e., public or private/ non-governmental sector, and the second stage the facility type. The 220 facilities are evenly divided by managing authority. At the second stage, probability proportional to size sampling was used to select facilities across main facility types that had at least 20 facilities.

Public facilities were government run or state owned and sub-category facility types were hospitals, medical clinics and health centers, and dispensaries. Private or not-for-profit facilities also included facility types such as hospitals and clinics, either owned by private or non-governmental organizations and pharmacies and chemists. The facility type distribution and composition varied by site and country. Generally, four facility type categories were used: general and specialized hospitals, health centers and clinics, health posts or maternity clinics, and pharmacies/retail outlets. The rationale for combining several facility types into one group, whether in the public or private sector, was based on similarity in the level of care, size and service functions offered.

When sites did not have 110 health facilities in either sector, a census was conducted among all available facilities in the sector or type category. For example, if there were 5 hospitals, 30 health centers, and 200 pharmacies, all hospitals would be selected into the sample. The proportionate share of the two other groups (30/230=0.130 and 200/230=.870) was applied to the remaining 105 facilities to arrive at 14 health centers and 91 pharmacies to be randomly selected

from the facility listing. If there were less than 110 facilities in either sector, an oversample of facilities from the other sector was taken to reach the total sample of 220. Thus in Migori, Kenya where only 105 public facilities existed, the shortfall of 5 facilities was added to the private sector target sample of 110 for a total of 115.

The sample weights were constructed to reflect the two sampling stages and basic selection procedures within and across facility types. Where special adjustments were made, the weights were also modified accordingly.

Selection probabilities and weighting procedures

Selection probabilities were calculated based on the sampling procedures and then used to construct facility weights. It was possible that selected facilities could not be located, were no longer in operation or had changed sector or type when listing and selection occurred. Post-enumeration adjustment to the selection probabilities was conducted to address misclassification of facility types or sector and non-response. Overall selection probabilities were calculated and normalized weights were added to the publicly released datasets.

$$\text{Overall selection probability} = \left\{ \frac{\text{sampled \# of facilities}}{\text{total \# of facilities}} \right\} \left\{ \frac{\text{located \# of facilities}}{\text{sampled \# of facilities}} \right\} \left\{ \frac{\text{\#completed interviews}}{\text{\# of facilities located}} \right\}$$

$$\text{Weight} = \frac{1}{\text{Overall selection probability}}$$

After the initial listing and selections were conducted in the first round of the survey, replacement facilities were selected when facilities were not located. Replacement was carried out only in the first round of the survey. In subsequent survey rounds, only facilities that did not refuse interviews were re-contacted and re-consented for interview in the remaining three quarterly rounds. At the end of the first year or after three ensuing survey quarters, all facilities selected and interviewed at baseline were re-contacted for interviews in any scheduled fifth and sixth quarters.

Country-specific sampling details are provided in the next sections.

Please note that the selected sample frequencies, for all countries, may not correspond exactly with the sample frequencies post data collection, due to the possibility of change in facility type over time, or misclassifications in the original listings. These were adjusted during weighting at each round/quarter.

Burkina Faso Specific Sampling Distributions and Categories

Sites: Ouagadougou and Koudougou

Public Facilities:
The Ministry of Health's facility list was provided by TCI's implementation partners in French West Africa.

Types of facilities Include: CHU, HD, CMA, CM, CMU, CSPS, dispensaries and infirmaries (see the table below for key to abbreviated facility types).

- In Ouagadougou:
    - We conducted a census among the highest level facilities which were included. This included the 4 CHU/HDs which comprised one sub-category and 3 CMAs which made a second sub-category.
    - Proportional sampling was conducted for the other two sub-categories. CM/CMU/CSPS units (54) were collapsed into one sub-category, and we sampled 42.
    - Proportional sampling was conducted among "Dispensaries and Infirmaries/Youth centers". We sampled 61 of the 69 facilities in this sub-category.
- Koudougou: We conducted a census of all available public facilities in Koudagou. This included 1 CHR, 1 CMA, 31 CSPS and 11 Infirmaries.

Total intended sample size for public facilities within each site: 110

Public Facilities	# Sampling Frame	Selection	# Sampled
Ouagadougou			
CHU/HD (Centre hospitalier universitaire-University teaching hospital/Hopital de district – District Hospital)	4	All (Unity weight)	4
CMA (Centre medical avec antenne chirurgicale-Medical center with surgical services)	3	All	3
CM (Medical center)/CMU (Centre medical universitaire-university medical center)/CSPS (Centre de sante et de promotion sociale-Local level health center)	54	41% of 103	42
Dispensary/infirmary and Centre Jeune (Youth centre)	69	59% of 103	61
Total	138		110
Koudougou			
CHR (Regional hospital)	1	All	1
CMA	1	All	1

CSPS	31	All	31
Infirmaries	11	All	11
Total	44		44

Private Facilities

The public facility lists were obtained through TCI's implementation partners in Burkina Faso, and the regional DKT office.

The types of facilities Include: CSI, CSPS, Cabinet medicaux, CM, CMA, Polyclinic, Dispensary, Infirmaries, and Pharmacies.

- In Ouagadougou,
  - We collapsed CSI, CSPS, Cabinet medicaux into one sub-category and we conducted proportional sampling, selecting 44 of the available 177 within this category.
  - We collapsed CM/CMA/Polyclinic into one sub-category and we conducted proportional sampling, selecting 18 of the available 74 within this category.
  - Infirmaries and Dispensaries were collapsed into one sub-category, resulting in a proportional selection of 7 out of 26 facilities.
  - We proportionally sampled 41 of the available 164 Pharmacies in Ouagadougou.
- Koudougou: We conducted a census among all available private facilities as well. This consisted of 6 CSI/CSPS, 3 Polyclinic/'clinic privee', 1 Infirmary and 6 Pharmacies.

Total intended sample size for private facilities within each site: 110

Private Facilities	# Sampling Frame	Selection	# Sampled
Ouagadougou		%	
CSI Centre de santé intégrés (CSI)/CSPS/Cabinet medicaux (Medical practice)	177	0.40	44
CM/CMA/Polyclinic	74	0.17	18
Dispensary/Infirmary	26	0.06	7
Pharmacies	164	0.37	41
Total	441	1.0	110
Koudougou			
CSI/CSPS	6	All	6
Polyclinic/clinic privee	3	All	3
Infirmaries	1	All	1
Pharmacies	6	All	6
Total	16		16

India Specific Sampling Distributions and Categories

Sites: Firozabad, Shikohabad & Tundla, Indore and Puri

Firozabad and Shikohabad & Tundla are two cities in Uttar Pradesh; Indore is in Madhya Pradesh state and Puri in Odisha state.

Public facilities
- The public facility list/sampling frames were obtained from PSI, India (TCI's implementation partner in India)
- The types of facilities included: Primary health centers, Hospitals and Dispensaries, all of which were managed by the Government of India.

Total intended sample size for public facilities within each site: 110

Public Facilities	# Sampling Frame	Selection	# Sampled
Firozabad City			
Hospitals	2	All	2
Primary Health Center (PHC)	9	All	9
Total	11		11
Indore			
Hospital	6	All	6
PHC	17	All	17
Dispensary	9	All	9
Total	32		32
Puri			
Hospitals	1	All	1
PHC	3	All	3
Total	4		4
Shikohabad and Tundla			
Hospitals	1	All	1
PHC	3	All	3
Total	4		4

Private facilities
- The private facility lists/sampling frames were obtained from PSI, India (TCI's implementation partner in India)
- The types of facilities included: Hospitals, Health Clinics and Pharmacies

Total intended sample size for private facilities within each site: 110

Private Facilities	# Sampling Frame	Selection	# Sampled
Firozabad City			
Health Clinics	17	All	17

Hospitals	13	All	13
Pharmacies	216	80/216	80
Total	246		110
Indore			
Hospitals	145	0.425	47
Health Clinics	31	0.091	10
Pharmacies	165	0.484	53
Total	341	1.0	110
Puri			
Hospitals	9	All	9
Clinics	1	All	1
Pharmacies	91	All	91
Total	101		101
Shikohabad and Tundla			
Health Clinics	4	All	4
Hospitals	3	All	3
Pharmacies	92	80/92	80
Total	99		87

Kenya Specific Sampling Distributions and Categories

Sites: Kericho, Migori and Uasin Gishu
The sample aimed to cover facilities in the urban areas of each of these counties.

Public Facilities
- The public SDP list originated from the Kenya Government's Health Information System. Sub-categories include the managing authorities of the Ministry of Health, local community, other public institution.

The total intended sample size for public health facilities: 110
- In Kericho, there were 20 public health centres and hospitals, and all were selected. Sampling was conducted from only among the 129 Dispensaries to select 90 from the frame for a total of 110.

- In Migori and Uasin Gishu, there were fewer than 110 public facilities, including dispensaries, in each site. In both these cases, a census of public facilities was conducted.

Public Facilities	# Sampling Frame	Selection	# Sampled
Kericho			
Dispensary	129	90/129	90
Hospital	8	All	8
Health Centre	12	All	12
Total	149		110
Migori			
Dispensary	75	All	75
Hospital	9	All	9
Health Centre	21	All	21
Total	105		105
Uasin Gishu			
Dispensary	78	All	78
Hospital	4	All	4
Health Centre	21	All	21
Total	103		103

Private Facilities
- All Private Enterprises, Private Practices and Company Medical Services were grouped under Private Health facilities.
- Non-governmental Health Facilities: Christian Health Association of Kenya, Kenya Episcopal Conference-Catholic S, and other Non-Governmental Organizations, Faith Based Institution Owners were grouped under Non-governmental organization (NG) health facilities.
- Pharmacies and Chemists were grouped together.

Total Intended Sampling Size for Private Health Facilities: 110
- The total number of private facilities was over 110 in each of the three counties; thus PPS sampling was performed based on the distributions for each: i.e., Private Health Facilities, Non-governmental Health facilities and Pharmacies and Chemists.
  - The exception to this was if the public facility sample did not reach 110, i.e., when the census fell short of this number, we allocated the difference to the private sample's total to retain the 220 overall total of facilities sampled.
  - For example, in Uasin Gishu and Migori we had fewer than 110 public facilities: 103 and 105 respectively. We oversampled private facilities in Uasin Gishu (117) and Migori (115).

Private/Non-Governmental/Faith Based Facilities	# Sampling Frame	Selection	# Sampled
Kericho			

Pharmacies and Chemists	78	0.565	62
NGO	17	0.123	14
Private Facilities	43	0.312	34
Total	138	1.0	110
Migori			
Pharmacies and Chemists	66	0.455	53
NGO	29	0.200	23
Private Facilities	50	0.345	39
Total	145	1.0	115*
Uasin Gishu			
Pharmacies and Chemists	236	0.733	86
NGO	30	0.093	11
Private Facilities	56	0.174	20
Total	322	1.0	117*

*In Migori and Uasin Gishu, the private sector sample was increased by 5 and 7 respectively, because their public sector census samples were 105 and 103 and below 110. This enabled reaching the target sample of 220 facilities for each county site.

Niger Specific Sampling Distributions and Categories
Site: Niamey

- The public facility list/sampling frames were provided byTCI's implementation partners in Niamey.
- The types of facilities included: CSI, Hospital, Infirmerie, Maternity Clinics, and Pharmacy by the Government of Niger.
- Total intended sample size for public facilities: 110

A census was conducted since only 74 public facilities were available in Niamey.

Public Facilities	# Sampling Frame	Selection	# Sampled
Niamey			
Centre de santé intégrés (CSI)	60	All	60
Hospital	5	All	5
Infirmerie	2	All	2
Maternity	1	All	1
Pharmacy	6	All	6
Total	74		74

Private facilities

- The public facility list/sampling frames were provided by TCI's implementation partners in Niamey.
- The types of facilities included: Hospital, Clinique, Polyclinique, Cabinet de soins, Cabinet médical, Dispensary, Infirmerie, Salle d'accouchement, Salle de soins and Pharmacies owned and run privately. Cabinet de soins, Cabinet médical, Dispensary, Infirmerie, Salle d'accouchement, Salle de soins were grouped and sampled together based on size and similarity in services provided.
- Total intended sample size for private facilities: 110
- In Niamey, a modification was necessary to the original PPS sampling. During field listing and enumeration only 8 facilities outside of pharmacies were found to offer family planning services. It was also uncertain how long quarterly surveys would continue in Niamey. Thus the decision was made to focus more on the pharmacy sub-category. The 63% share for private hospitals/clinics was reduced by half to 31.6% and the balance allocated to pharmacies. Once applied to the 110 target, these resulted in 35 and 75 facilities in the two sub-categories respectively.

Private Facilities	# Sampling frame	PPS	Modification to Sampling PPS	# Sampled
Niamey				
Hopital, Clinique, Polyclinique	43			
Cabinet de soins, Cabinet médical, Dispensaire, Infirmerie, Salle d'accouchement, Salle de soins	146	0.63	31.6	35
Pharmacies	110	0.37	68.4	75
Total	305			110

Nigeria Specific Sampling Distributions and Categories

Sites: Kano, Lagos and Ogun

Kano and Lagos are large city states in the north and southwest regions. The urban areas of Ogun state in the southwest region were targeted, which included the capital city of Abeokuta.

Public Facilities
- The public facility list originated from the government's Health Information System. In general, Nigeria is divided into 20 Local Government Areas (LGAs) which in turn govern 57 Local Council Development Areas (LCDA).
- The sampling frame for public facilities was obtained from the MOH, Nigeria
- In Lagos, subcategories or types of public health facilities included Primary Health Centres, Hospitals, Tertiary Facilities and Health Posts.

- o   Where the number of facilities in a sub-category was 20 or less, a census was conducted.
- In Kano, subcategories or types of public health facilities included: Dispensaries/Health Posts; Health Clinics/Health Centers/Maternity Homes; and Hospitals.
  - o   Given there were few hospitals in each site, all were selected.
- In Abeokuta/Ogun, the sample frame consisted of 221 Health Centers, Health Posts, Health Clinics and Hospitals and Probability Proportional Sampling was applied.

Total intended sample size for public health facilities: 110

Public Facilities	# Sampling Frame	Selection	# Sampled
Lagos			
Primary Health Centers	248	70/248	70
Health Posts	18	All	18
Tertiary Facilities	4	All	4
Hospitals	18	All	18
Total	288		110
Kano			
Dispensaries and Health Posts	69	0.439	44
Health Clinics, Health Centers and Maternity Homes	88	0.561	55
Hospitals	11	All	11
Total	168		110
Ogun			
Health Centers	145	0.656	72
Health Posts	32	0.145	16
Health Clinics	31	0.140	15
Hospitals	13	0.059	7
Total	221		110

Private Facilities

- Private facility sampling frames were obtained from the MOH, and supplemental lists provided by DKT/Nigeria.
- In Lagos, the proportionate shares of three main types of facilities were calculated and allocated across the 110 target sample.
  - There were both specialty hospitals and general private hospitals, both of which were grouped together and a sample of 51 was randomly selected.
  - There were three types of clinics: Individual Clinics, Medical Clinics and Special Clinics, all of which were grouped and a sample of 15 was randomly selected.
  - Forty-four pharmacies were randomly selected.
- In Abeokuta/Ogun, maternity homes and health clinics were grouped together as the Health Clinic sub-category.

Private Facilities	# Sampling Frame	Selection	# Sampled
Lagos			
Pharmacies	1124	0.400	44
Clinics			
Individual Clinics	31		
Medical Clinics	323		
Special Clinics	36		
Sub-total	390	0.139	15
Hospitals			
General	1168		
Specialty	130		
Sub-total	1298	0.462	51
Total	2812	1.0	
Kano			
Health Clinic	74	0.244	27
Hospitals	43	0.142	15
Maternity Homes	24	0.079	9
Dispensary+Health Centre+Health Post/Other	16	0.053	6
Pharmacies	146	0.482	53
Total	303	1.0	110
Ogun			
Hospital	124	0.252	28
Health Center	57	0.116	13
Maternity Home+ Health Clinics	204	0.415	45
Pharmacies and Chemists	107	0.217	24
Total	492	1.0	110

Client Sampling and Weighting Memo

Sampling
Clients are recruited as they exit the sampled SDPs and are sampled systematically. A skip pattern is used to reach the assigned quota of 10 clients (male or female) per sampled facility. The information recorded from the baseline SDP survey on the average daily number of clients is needed to determine the skip pattern to obtain ten clients. For example, if an SDP reports an average client volume of 20 clients per day, the skip interval will be 2 (=20/10). The data collector will approach every other, or second, client to screen them for eligibility. Eligible and consenting clients are interviewed until the quota of 10 clients [with completed interviews] per facility is reached. Data collectors are asked to spend up to two consecutive days at each facility to complete the quota of ten consenting clients. However, they may finish in one day or fall short of the ten after two days depending on client flow and cooperation.

Client Selection Probabilities and Weighting
The client selection probability is derived from the selection probability of the facility at which they are sampled and the average client volume reported by the facility in its SDP Baseline Interview. Because the number of clients approached to be consented for interviewed was not recorded, the client weight is not adjusted for non-response.

$$\text{Client selection probability} = \left\{ \text{facility selection probability} \right\} * \left\{ \frac{\text{\# of clients recruited}}{\text{Average client volume}} \right\}$$

$$\text{Client weight} = \left\{ \frac{1}{\text{Client selection probability}} \right\}$$