

Episcopal Relief & Development/ ADDRO PDCU REPORT to AMF

Project Title/Name: Universal LLIN Distribution Campaign in Greater Accra, Northern and Upper West Regions, Ghana



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Introduction

The Anglican Diocesan Development and Relief Organization (ADDRO), in collaboration with Episcopal Relief & Development and with support from the Against Malaria Foundation (AMF), partnered with Ghana's National Malaria Control Program (NMCP)/Ghana Health Service (GHS) and others for a universal Long Lasting Insecticidal Nets (LLINs) campaign in three regions of Ghana, namely: Northern, Upper West and Greater Accra. As part of the LLINs campaign, ADDRO team is to conduct Post-Distribution Check-Ups (PDCU) every 6 months for a duration of 2.5 years. The purpose of the PDCU is to assess the level of continued net use and provide significant data and locally actionable information to the relevant GHS/NMCP leaders and other partners, to contribute to health intervention decisions and planning.

The first PDCU exercise for the Greater Accra Region was carried out from January 11th to February 10th, 2017, employing both the paper based data collection and a mobile data collection. The PDCU report therefore consists of two major sections – the paper based exercise in 11 out of the 12 AMF supported Districts in Greater Accra and the Mobile data collection (Mobile Pilot) in the remaining district (Shai Osudoku District).

SECTION A: PAPER BASED DATA COLLECTION

1.0 Planning for the PDCU

Planning for the PDCU paper based data collection in Greater Accra region followed the same process as was done during the first PDCU in the Northern region. Primarily, this included sampling of households for the PDCU, recruitment and training of enumerators and supervisors among others.

2.0 The PDCU process

The Greater Accra mass LLINs distribution was carried out between July and August 2016. The actual mass distribution (one week exercise) took place from the 5th to 12th July, 2016 with a one month grace period given to enable beneficiaries who could not redeem their nets within the one week period to do so. Accordingly, the first 6-monthly paper based PDCU data collection

was carried out from 11th to 20th January, 2017 in the 11 AMF supported districts. The process of the PDCU was as follows:

2.1 Consultative meetings with GHS

The ADDRO team had consultative meetings with the regional and district health administrations of GHS to brief them on the post distribution activities and to seek their continuous cooperation and support for the post campaign activities, particularly, with the monthly malaria case rate data needed from the twelve AMF supported districts in the region. An official communication to this effect was delivered by ADDRO to GHS on September 14th, 2016. A response was received from the GHS on September 15th, 2016. A scanned copy of the letter is attached to the report.

2.2 Recruitment of Sub-district Supervisors and Enumerators

To effectively carry out the PDCU, ADDRO recruited and trained enumerators and sub-district supervisors for the exercise. The role of the enumerators was to collect PDCU data by administering PDCU questionnaires to the sampled households while the role of the sub-district supervisors was to supervise the PDCU data collection by the enumerators.

The qualification criteria for the engagement of the supervisors and enumerators were outlined and advertised. Copies of the adverts were given to the DHMTs to paste on their notice boards for qualified applicants to apply. The adverts were also announced in the local churches and mosques within the communities and displayed at vantage points such as bill boards, crush walls, etc. The period for recruitment was from 19th December, 2016 to 10th January, 2017.

The qualification for sub-district supervisors were:

- Resident in the sub-district
- Minimum of Senior High School (SHS) Certificate, Diploma or Higher National Diploma (HND) etc. in any related field from any recognized institution
- Experience in supervising enumerators
- Should have good leadership skills
- Excellent written and verbal communication skills
- Ability to implement activities to meet deadlines

- Must be a team player
- Ability to motivate enumerators to carry out planned activities to achieve the desired results
- Age limit 25 years and above

The qualification for enumerators included the following:

- Minimum of Senior High School (SHS) Certificate, Diploma or Higher National Diploma (HND) etc. in any related field from any recognized institution
- Resident and able to speak the local language of the area
- Excellent written and verbal communication skills
- Age limit 25 years and above

Interested applicants were advised to send their applications to the following e-mail address: addroaccra.recruitment@gmail.com or call the following phone numbers: 0200558889, 0246255336 or 0500557973 for clarifications. A total of 299 people were recruited (250 enumerators and 49 supervisors). The number of supervisors were determined by the number of sub-districts in each district; with one supervisor responsible for supervising all enumerators within a sub-district. The number of enumerators were based on the number of sampled households to be visited per a sub-district. Hence, the number of enumerators was determined by the number of sampled households per subdistrict, divided by 25 households per day, for seven days. Table 1 below shows the number of enumerators and subdistrict supervisors recruited from each district.

Table 1: Number of subdistrict Supervisors and Enumerators recruited

District	# of Enumerators	# of Subdistrict Supervisors
Ada East	13	3
Ada West	12	3
Ashaiman	27	6
Ga Central	17	4
Ga East	21	4

Ga South	46	7
Ga West	34	3
Kpone Katamaso	22	4
Lade-Kotapon	17	4
La-Nkwantanang-Madina	21	5
Ningo Prampram	20	6
Total	250	49

Source: PDCU Recruitment December/January, 2016/2017

2.3 Development of data collection tools and sampling

The PDCU form, which is the main data collection tool, was developed by AMF with input from Episcopal Relief & Development and ADDRO. The PDCU form contains six key questions to be administered to each household. See Annex 1 for a sample form.

AMF worked on the sampling of households for the 5% main and 5% checks and generated the household list. An additional 30% household list was generated as “spare” to take care of household heads who might be absent (deceased, relocated, etc.) during the survey. A total of 29,717 households were sampled for the 5% main and 2,132 for the 5% checks for the Greater Accra PDCU exercise.

2.4 Printing and distribution of data collection tools

ADDRO Headquarters (HQ) team oriented the Greater Accra regional team to print, sort out and package the household lists and PDCU forms according to sub-districts and communities. Each pack or plastic folder contained one community household list and the PDCU forms based on the number of households sampled in that community. These plastic folders (containing PDCU forms and household list) were given out to enumerators through their supervisors during the training for data collection. Each enumerator was to visit at least 175 households, which is 25 households per day for seven days. Some enumerators had more households than the 175 weekly average. The highest number of households that an enumerator visited was 200 from Anyaa sub-district in the Ga Central Municipality. The lowest number of households an enumerator also

visted was 18 households (though he was assigned 160) from Tatanaa sub-district of the La-Nkwantanang-Madina Municipality. The reason was that he could not find the other households.

3.0 PDCU Trainings

3.1 Staff Training on AMF Data Collection Tool

ADDRO headquarters staff organized a one day Training of Trainers (ToT) for the ADDRO Greater Accra Region staff. This training was held on 9th January, 2017 at the ADDRO regional office conference room. The Monitoring & Evaluation Officer and the Health Coordinator facilitated the training and were given technical support by Episcopal Relief & Development Program Officer. The PDCU data collection form as well as the supervisor's checklist (see annex 2 for the supervisor's checklist) were discussed. The one-day training was carried out using the following methods:

- Going through the PDCU form
- Practice filling PDCU forms using scenarios
- Sharing of experiences, lessons and best practices from Northern Region PDCU exercise.

Strategies for improving upon the data collection exercise were also discussed at the staff training meeting especially ways to avoid or minimize data discrepancy as experienced in the NR PDCU data. It was agreed that the sweeping method (where enumerators and supervisors agree to work together to finish collecting data in one community before moving on to another) would be adopted for the data collection exercise. This was aimed at helping to spot and give timely support to enumerators who might not be on track at the beginning of the exercise. The sweeping method was to be used for the entire duration of the data collection but later it was realized that the method was abandoned by the enumerators and supervisors after the second day of data collection. The reason was that it was tedious and expensive travelling to various communities since some of them live far from some communities.

3.2 Training of Supervisors and Enumerators

The training of supervisors and enumerators on the AMF data collection tool spanned from 11th to 17th January, 2017. The trainings were organized in 9 clusters to cover all the 11 Districts.

During the training, the participants were given brief background information on AMF, Episcopal Relief & Development and ADDRO. The roles and responsibilities of both supervisors and enumerators were clearly outlined to participants. The training strategies used during the supervisors and enumerators training included:

1. Maximum participation by all participants. Each participant was allowed a turn to read at least a line on the data collection tool.
2. Some terms and explanations were translated in the local dialects (Ga, Twi and Dangbe) to ensure maximum understanding.
3. Scenarios were given for all participants to fill the data collection forms with the simulations.
4. As part of the training, participants were divided into groups to visit nearby households to practice filling the forms.

All these strategies were adopted to enhance understanding of the participants. The supervisors were taken through the supervisors checklist (see Annex 2). In a simulation exercise, participants (supervisors) were tasked to:

- 1) Work with ADDRO team to supervise data collection by PDCU enumerators and
- 2) Collect and review PDCU forms submitted by enumerators.

A total of 244 (195 enumerators and 49 supervisors) were trained out of the 299 (250 enumerators and 49 supervisors) that were recruited. Fifty-five (55) enumerators did not turn up for the training and no reasons were given for their absence. The number of households that the enumerators who did not turn up for the training would have visited were added to the enumerators who were going to work in these same communities or nearby communities.

The table below (Table 2) shows the number of supervisors and enumerators that were trained.

Table 2: Number of Supervisors and Enumerators recruited and number trained

District	# of Enumerators Recruited	# of Enumerators trained	# of Supervisors Recruited	# of Supervisors trained	Total # of Enumerators and Supervisors Trained
Ada East	13	9	3	3	12
Ada West	12	8	3	3	11
Ashaiman	27	21	6	6	27
Ga Central	17	12	4	4	16
Ga East	21	17	4	4	21
Ga South	46	37	7	7	44
Ga West	34	30	3	3	33
Kpone Katamaso	22	17	4	4	21
Lade-Kotapon	17	16	4	4	20
La-Nkwantanang-Madina	21	15	5	5	20
Ningo Prampram	20	13	6	6	19
Total	250	195	49	49	244

Source: PDCU Supervisors and Enumerators Trainings; January, 2017

3.3 Training Challenge(s) and Actions Taken

The main challenge encountered during the trainings was difficulty in understanding some sections of the AMF data collection form by enumerators and supervisors. Specifically some enumerators had difficulty in understanding question 2 which has a table for recording the number of nets hanged and number of household members who slept in each net. In order to overcome that challenge, the closing time for trainings was extended to about 4:00 pm to allow more time for practice. The adoption of scenarios, role plays and practical field work was also very useful for participants to deepen their understanding of the exercise.

4.0 Data Collection

The PDCU data collection was done from 13th to 28th January, 2017. The enumerators visited sampled households and completed the PDCU form for each household. After data collection, enumerators educated and demonstrated to the household heads, the correct way to hang a LLIN if the household head did not know how to hang the nets correctly or where the nets observed were not hung correctly. In instances where the nets were available but were not hung, the enumerators encouraged the beneficiaries to hang them. The enumerators were directly supervised by the sub-district supervisors. The supervisors monitored each of their enumerators daily to ensure the data collection was properly carried out. They checked the data collection sheets to find out if they were correctly filled and endorsed them. The sub-district supervisors and enumerators were also supervised and monitored by ADDRO regional and HQ staff and Episcopal Relief & Development Program Officer throughout the PDCU data collection exercise. All the trained 195 enumerators collected data for the 5% main and the 5% checks and supervised by 49 supervisors. Though both the 5% main and 5% checks had to travel far distances, the 5% check needed to travel even further than the 5% main enumerator since s/he covers all the communities the 5% main enumerator visits.

As mentioned above, to reduce errors in data collection, ADDRO decided to use the sweeping method – a strategy where each supervisor and his/her enumerators work together in one community to interview all the sampled households and collect data in that community before moving to the next community until all the sampled communities are covered. They agreed on certain days for mop-up visits in communities where they could not meet all the sampled households. Both enumerators and supervisors assembled once in a day to check the data collected, discuss challenges and devise strategies to overcome them before moving forward.

It was noticed that the sweeping method did not continue after the second day of data collection because the supervisors and enumerators reported that it was time consuming and expensive to travel around. A major challenge associated with this strategy of the data collection was that the enumerators had to move from their areas of residence to join the other team members in the communities they agree to work together. Their unfamiliarity with those communities coupled with time needed/resources needed to travel there slowed down the process.

4.1 Data Collection Challenges and Actions Taken

Incorrect house identities: Some of the house numbers, contact names and numbers or locations captured on the community list were incorrect. As a result of the wrong identities, the enumerators and supervisors could not find some of those target respondents.

- Action: the use of the spare list was recommended for this.

Permanent re-location of some sampled household heads: The exercise also revealed that some targeted household heads could not be reached because they had either relocated or were on transfer to other areas far from the reach of the enumerators.

- Action: the use of the spare list was recommended for this.

Nature of settlement (scattered settlements): It was difficult to access and locate some target households heads in the rural districts such as Ada East, Ada West, Ningo Prampram etc. because the communities were not only far apart but the houses in those communities were equally very far apart.

- Action: the use of the spare list was recommended for this.

Haphazard building arrangements: In some urban areas with slums, such as Ashaiman, houses were haphazardly arranged in no particular order making it difficult for enumerators to identify or access the target household heads in those areas.

- Action: enumerators were advised to spend more time to find the target household heads.

Insufficient time for data collection: The supervisors complained that the one week period within which they were expected to collect that data was insufficient to allow them collect as much data as they ought to. The reason was their difficulty in locating the target respondents. We intend to review the number of days for data collection for the Upper West Region PDCU and subsequent PDCUs in the Northern and Greater Accra Regions.

- Action: one more week was added for the enumerators to continue data collection.

5.0 Monitoring and Supervision of PDCU data collection

The monitoring exercise was carried out by two teams made up of Episcopal Relief & Development and the ADDRO staff (a total of 6 people). Monitoring was carried out from the 13th to 28th January, 2017. The teams visited all the 11 districts and had discussions with the

sub-district supervisors and enumerators. During each monitoring visit, the team observed the data collection exercise in some households and corrected any anomalies observed. The team also inspected some of the forms that had already been filled by the enumerators to ensure correctness and emphasize accuracy. Some mistakes such as omission of dates, failure to record zero when nobody slept under nets the previous night, forgetting to let the household head sign, etc. were noticed and corrected on the field. The supervisors with their enumerators were encouraged to pay more attention to correctly filling the forms. Table 3 below shows the number of supervisors and enumerators who were visited during the PDCU exercise in Greater Accra Region.

Table 3: Monitoring - Number of Supervisors and Enumerators visited

District	# of Sub-Districts	# of Sub-Districts Visited	# of Sub-District Supervisors	Supervisors Met	# of Enumerators	Enumerators Met
Ada East	3	3	3	3	9	6
Ada West	3	3	3	3	8	7
Ashaiman	6	6	6	6	21	9
Ga East	4	4	4	4	17	6
Kpone Katamanso	4	4	4	4	17	9
Ga West	3	3	3	3	30	10
Ga South	7	5	7	5	37	6
Ga Central	4	4	4	3	12	5
Madina	5	5	5	3	15	8
Ningo Prampram	6	4	6	4	13	5
La Dadekotopon	3	3	3	3	16	4
Total	48	44	48	41	195	75

Source: PDCU Monitoring & Supervision Exercise, January, 2017

5.1 Observations during supervision by ADDRO Team

The following observations were made during the monitoring and supervision process:

- Some target household heads in slum areas were difficult to find because there was no particular sequence of arrangement of buildings.
- Some of the target household heads were not permanent resident members of the communities where they received the nets. Neighbours explained that some were tenants and had relocated to other communities.
- Part of Azizakope, an island community in the Ada East District was washed away by the Volta River and that negatively affected data collection in the area. Data was collected from 19 out of 37 households.
- In Oshaijie community in the Ga South Municipality, data collection was obstructed by chieftaincy conflict in the community. Due to this problem, data could only be collected for 94 households out of the targeted 220 households. A week after data collection was over, it was still not safe for enumerators to visit these community for a mop up.
- The enumerators in the Ashaiman Municipality moved in pairs to avoid possible attacks, robbery and rape as reported to have happened to some other groups who worked in communities in the municipality.

5.2 Challenges and Actions taken during supervision

The monitoring exercise revealed the following challenges:

Some target household heads could not be traced due to wrong addresses, names, contacts, and house numbers as contained in the HH list provided by AMF.

- Action: the use of the spare list was recommended.

Some targeted respondents had relocated; their neighbours explained that they do not live there anymore. In the military area in the La Dadekotopon Municipality, some of the respondents had gone for peacekeeping while others had gone on transfer.

- Action: For respondents who had relocated from the community, the spare list was also recommended for this.

For security reasons, some respondents were unwilling to disclose their locations/whereabouts when they were contacted on phone. They feared that the enumerators were officials of electricity company finding out bill payment defaulters while others perceived them as bank officials looking out for defaulting debtors to arrest and prosecute.

- Action: Those that were not willing to disclose their locations, the spare household list was recommended.

Unwillingness of some household heads to disclose the number of household members.

- Action: Further explanation was given by enumerators to household heads who did not want to disclose the number of household members, for them to understand and respond appropriately. Some household heads responded positively to this while some few still refused to disclose the number of people in their household.

Demands for extra allowances for call credit and transportation to far places to collect data especially those who had to visit these households more than once before meeting respondents.

- Action: The requests for extra allowances by those enumerators were verified and those that were found reasonable were considered.

6.0 Collection of completed PDCU forms and Transportation to Data Centre

6.1 Collection of completed PDCU forms

The ADDRO team visited each sub-district to collect the completed forms. The team was divided into 2 groups for this purpose. Team 1 was the regional coordinator alone and Team 2 was the volunteer supervisor and the accounts officer. The collection of completed PDCU forms was done from 30th January to 13th February, 2017. The ADDRO Greater Accra Regional team and sub-district supervisors with their enumerators met at locations proposed by the enumerators and their supervisors at the sub-district levels. Each form was checked by the ADDRO team for completeness and wages were paid to enumerators according to the number of successfully completed household forms.

6.1.1 Challenges and Action Taken

The number of PDCU forms completed by enumerators in some sub-districts such as Danfa and Tatana all under the La-Nkwatanang-Madina District were lower than expected. Enumerators for Danfa successfully collected data from 121 of 261 households while that of Tatana collected only 70 out of the 479 sampled households.

- Action: ADDRO team has decided not to engage those enumerators (who recorded low data collection) and their supervisors in subsequent PDCUs.

Some enumerators visited more than the targeted households in a community. This is because they visited all the sampled households including the spare, when they had been trained to only use the spare to replace household heads who are not available for the interview

- Action: The extra forms were cancelled and those enumerators were not paid for the extra forms.

6.2 Transportation of Collected forms to data Centre

The completed PDCU forms were transported to the data centre in Bolgatanga for data data entry in the AMF database. The parcels were sent in 2 batches: on 14th and 15 February, 2017. The filled data collection sheets were packaged according to communities in the plastic folders (my clear bag). The plastic folders were packaged per sub-district in labelled brown envelopes. The brown envelopes were put into labelled small jute bag (each district had one jute bag). About five of the small jute bags were then put into one very big jute bag for easy transportation.

7.0 PDCU Data Entry:

AMF Database for the Greater Accra PDCU entry was used for data entry. Forty seven (47) data entry clerks at ADDRO HQ were involved in the Greater Accra PDCU data entry. The data entry clerks were trained on 14th February, 2017. Data entry started on 15th February, 2017 and ended on 2nd March 2017. A total of 21,181 household data were entered by the clerks as seen in Table 4.

Table 4: Number of Households Entered Per District

District	# Households
Ada East	1,240
Ada West	1,015
Ashaiman	2,527
GA Central	1,285
GA East	1,869
GA South	3,320
GA West	3,192
Kpone Katamanso	2,037
La Dadekotopon	1,943
La Nkwantanang-Madina	1,356
Ningo Prampram	1,397
Total	21,181

8.0 Results of PDCU Data Entry

The AMF database shows that 21,181 households data have been entered, The database also shows that a total of 38,332 LLINs were reported as received during the PDCU survey. Out of this total LLINs received: 84.2% were found hung over sleeping spaces; 10.5% were present in the households but not hung over sleeping spaces; 0.5% were not present in the households (nets worn out hence not usable) and 4.8% not present in the households for other reasons than worn out. Some major reasons (other than nets worn out) respondents gave for nets received but not present in the households were: nets given to wards to take to schools and nets given to other family members in different communities. See Table 5 below for summary of nets received and their status:

Table 5: Number and status of LLINs reported as received during LLIN campaign

		AMF Nets									
	Households	Nets Received	LLINs Hung		Present not hung		Missing		Worn out/not usable		Missing + Worn Out
			#	%	#	%	#	%	#	%	
Region	#	#	#	%	#	%	#	%	#	%	%
Greater Accra	21,181	38,332	32,271	84.2	4,030	10.5	1,842	4.8	189	0.5	5.3

9.0 Malaria Case Rate Data

These are monthly positive malaria cases collected from the various AMF supported district health directorates. Collected over time, this data will help to assess the impact of the LLINs on malaria cases and its trend. See table 6 for details on monthly uncomplicated malaria positive cases in AMF supported districts in Greater Accra region for the period June, 2016 to February, 2017.

Table 6: Malaria Case Rate Data for Greater Accra Region – June 2016 to January, 2017

Month / Year	Age	Ada East	Ada West	Ashaiman	Ga Central	Ga East	Ga South	Ga West	Kpone Katamanso	La Dadekoton	La Nkwantanang	Ningo Prampram	Shai Osudoku	Totals
	Group													
June 2016	U5 years	189	131	857	47	391	262	379	186	26	153	333	297	3251
	5 to 70+ years	619	631	2943	271	1445	914	1411	877	302	664	1137	1306	12520
		808	762	3800	318	1836	1176	1790	1063	328	817	1470	1603	15771
July 2016	U5 years	201	118	841	68	291	360	348	165	63	192	273	236	3156
	5 to 70+ years	607	536	2970	319	794	1178	1422	846	511	893	1031	934	12041
		808	654	3811	387	1085	1538	1770	1011	574	1085	1304	1170	15197
August 2016	U5 years	111	60	898	56	305	330	366	258	26	163	244	337	3154
	5 to 70+ years	542	222	2777	255	1076	1222	1149	1232	314	758	701	780	11028
		653	282	3675	311	1381	1552	1515	1490	340	921	945	1117	14182
September 2016	U5 years	75	53	718	58	330	258	314	112	60	129	254	173	2534
	5 to 70+ years	478	186	2795	344	798	928	1112	789	245	686	676	654	9691
		553	239	3513	402	1128	1186	1426	901	305	815	930	827	12225
October 2016	U5 years	126	72	1352	53	442	307	507	201	41	89	344	201	3735
	5 to 70+ years	454	175	3043	194	799	798	1383	891	306	268	697	606	9614
		580	247	4395	247	1241	1105	1890	1092	347	357	1041	807	13349
November 2016	U5 years	149	79	764	54	312	350	380	182	34	114	229	279	2996
	5 to 70+ years	537	323	1951	291	821	1464	1333	677	379	612	718	917	10023
		686	402	2715	345	1133	1814	1713	859	413	726	947	1196	13019
December 2016	U5 years	138	68	656	72	170	299	244	97	44	91	222	162	2263
	5 to 70+ years	505	305	1812	273	658	1001	886	485	142	459	777	675	7978
		643	373	2468	345	828	1300	1130	582	186	550	999	837	10241

Month / Year	Age	Ada East	Ada West	Ashaiman	Ga Central	Ga East	Ga South	Ga West	Kpone Katamanso	La Dadekoto	La Nkwantanang	Ningo Prampram	Shai Osudoku	Totals
January 2017	U5 years	124	122	516	76	255	424	298	130	24	196	256	273	2694
	5 to 70+ years	506	419	1916	403	987	1313	1171	638	189	678	782	1112	10114
		630	541	2432	479	1242	1737	1469	768	213	874	1038	1385	12808
	TOTAL	5,361	3,500	26,809	2,834	9,874	11,408	12,703	7,766	2,706	6,145	8,672	8,942	

Analysis of Monthly Malaria Cases – Greater Accra Region – June 2016 to January 2017

In analysing the malaria case rate data in the 12 AMF supported districts in the Greater Accra Region as provided in the table above, the general trend shows a decline from June to December, 2016 across the districts and age categories. However, more detailed findings/observation on the data is as follows.

- The Greater Accra LLINs distribution was in July 2016. The malaria case rate data was collected from June to see malaria situation before and after the LLIN distribution. The data shows that overall the 12 AMF districts continue to experience a decrease in malaria cases for both under five and other age groups (5 to 70+ years) from June 2016. In June there were 15,771 malaria cases among children under five and other age groups. This dropped to 15,197 in July, 14,182 in August, and 12,225 in September. However, there was an increase in October (13,349); the reason for this is not readily known. The cases then dropped to 13,019 in November, a sharp decrease of 10,241 in December 2016 and increased to 12,808 in January 2017.
- Rainfall pattern in Greater Accra is bi-modal – the major and minor seasons. The major season spans from April to July and the minor season from August to October. Overall, malaria cases for the 12 AMF districts were relatively higher in June (15,771) and July (15,197) compared to the number of cases reported in August, September and October which were 14,182, 12,225 and 13,349 respectively. Also in the dry season, the number of malaria cases were generally lower than those reported in the rainy season. For instance, in the dry season months of November, December and January the number of malaria cases were 13,019, 10,241 and 12,808 respectively. These variations may be explained by increased availability of clean stagnant waters (providing breeding places for the *Anopheles* mosquitoes) during the raining season.

- From the table, Ashaiman, Ga West and Ga South recorded the highest records of malaria cases from June 2016 to January 2017 (26,809 12,703 and 11,408 respectively) while the lowest malaria cases were recorded in La-Dadekotopon (2,706), Ga Central (2,834) and Ada West (3,500).

SECTION B: MOBILE DATA COLLECTION

1.0 Introduction

In Shai Osudoku District, a mobile technology was employed for data collection. This was a pilot with possible scale-up based on lessons learnt. A mobile data collection system was set up and implemented in sampled communities from the two sub-districts of the Shai Osudoku district. Similar to the paper based PDCU process, 5% of households who benefitted from the LLINs distribution were sampled (main data). Trained enumerators collected data on the selected households on LLIN availability, condition and use amongst others using smart phones set up with Open Data Kit (ODK) data collection software. A second set of data collectors were also trained to collect data from 5% of households visited by the first set of data enumerators, also using smart phones.

2.0 Planning for the PDCU

The planning for the mobile data collection involved the engagement of consultants. Episcopal Relief & Development and ADDRO developed a Terms of Reference (TOR) for the mobile pilot. This was advertised on Episcopal Relief & Development website and in the Ghanaian Daily Graphic newspaper on December 6th, 2016. A total of thirteen applications were received and three shortlisted for interview. The three, DS Dayta Solutions, Justice Ajaari & Co and JMK Consulting LLC, were interviewed by Episcopal Relief & Development and ADDRO team. At the end of the interviews, DS Dayta Solutions was the most qualified and was selected to support ADDRO / Episcopal Relief & Development in the development of the mobile technology and the first mobile pilot PDCU data collection in the Shai Osudoku District.

3.0 Mobile PDCU Process

DS Dayta solutions as consultants, set up an electronic data capture (EDC) system using the Open Data Kit (ODK) software which allows the use of android smart phones to collect and transmit data electronically to a data server.

The processes involved in developing and setting up the mobile data collection system included the following key steps;

- The consultant was taken through the paper based PDCU form to enable them understand the questions before configuring the form to the soft copy
- In the course of configuring the PDCU form into the ODK, the team worked with the consultant to clarify questions they had on the form including; format of the HH ID, net's received in the recent universal coverage campaign, nets distributed prior to the distribution period (July to August, 2016).
- After installing the PDCU in the ODK interface, the consultant together with ADDRO and Episcopal Relief & Development reviewed it a number of times with the Consultant to ensure it captured the correct details of the PDCU form.
- The final ODK interface with the PDCU form was finalized ahead of the trainings and pretested on the field.

3.1 Procurement of Samsung Mobile Devices

The standard procedure for procurement was followed to purchase the mobile devices. As the mobile devices were to meet certain technical specifications, the consultant as part of their deliverables recommended the specifications of the mobile devices to be purchased. They also recommended some vendors for ADDRO to source bids from them. Cellfonic enterprise was selected and ADDRO purchased thirty (30) mobile devices from them. The devices were received from the supplier on the 18th January, 2017. The devices (Samsung mobile tablets), were serially numbered for easy identification and documentation.

3.2 Recruitment of Enumerators for Mobile Data Collection

ADDRO recruited 25 enumerators for the mobile pilot data collection exercise. The recruitment took place from 16th to 20th January, 2017. The criteria for recruitment of enumerators included:

1. Should not be staff of Ghana Health Service

2. Have completed Senior High School education
3. Resident in the communities where the data will be collected
4. Can use android mobile phones
5. Should be at least 18 years

4.0 Training of Staff and Enumerators on Mobile Data Collection

4.1 Staff Training

A one-day training session was organized on 21st January, 2017 at the Episcopal Relief & Development regional office in Accra to train the ADDRO Greater Accra and HQ staff on how to use the mobile devices for data collection. The training was facilitated by the consultants from DS Dayta Solutions. DS Dayta Solutions developed a training guide which was in the form of power point for the training. The following topics were covered during the training:

1. How to use the data collection software to collect data,
2. How to upload the blank PDCU data form on the mobile device (tablet),
3. How to upload completed data form in the mobile device onto the google cloud server
4. How to troubleshoot the data collection devices when any problem occurs.
5. Explanation of the mobile database

At the training, some scenarios were used to test the understanding of the ADDRO team of the data collection exercise with the mobile device.

4.2 Training of Enumerators on Mobile Data Collection

A total of 21 out of the 25 enumerators recruited turned up for the training. The training took place on the 23rd and 24th January, 2017 at the Shai Osudoku Health Directorate conference room. The training was facilitated by the staff of ADDRO and DS Dayta Solutions and was observed by Episcopal Relief & Development team. The enumerators were first trained on how to use the paper PDCU form to collect data by ADDRO staff. This was followed by training them on how to use the the mobile device technology which was carried out by the DS Dayta Solutions team.

Each enumerator was given a mobile device (tablet) and they were taught how to upload the PDCU forms onto the device. They were then taken through a step-by-step procedure on the data collection exercise. Scenarios were used to fill the forms which were inspected by the consultant to ensure understanding by the participants. A pretest was also conducted where all the enumerators were put into groups of 4 to visit nearby households to practice data collection. At the end, experiences and challenges of the pretest were shared and emerging issues were addressed. Some of the issues addressed included: the GPS coordinates not registering. They were advised to provide a clear sky view for the device; move around; and try again after some time if it still proved futile.

4.3 Observation and Challenges during training of enumerators

4.3.1 Observations

Understanding the use of the data collection software and the devices was relatively easy because all the participants were familiar with the use of android/smart phones. Also, few of them had been involved in data collection exercise with other organisations.

4.3.2 Challenges and action taken

Four of the enumerators that were recruited for the data collection exercise did not show up for the training and we did not get any explanation for their absence. For this reason the enumerators who showed up had to be realigned and others asked to back up for those who did not attend the training. That is, three enumerators who had relatively lower number of household visits to complete were tasked to add on that of the absentees.

5.0 Data Collection and Supervision

The mobile data collection started on 25th January through to 10th February, 2017. Episcopal Relief & Development and ADDRO staff monitored the mobile data collection exercise.

For just the first day of the data collection exercise, the enumerators were divided into 4 groups. Each group had a converging point where they were expected to receive their devices before commencing the exercise. These converging points were suggested by the enumerators themselves based on their convenience during the training. The converging points included: Dodowa Health Directorate, Asutsuare junction, Asutsuare CHPS compound and Doryumu Methodist Church.

However, there were some outliers who could not conveniently make it to any of the proposed converging points. For such instances, their devices were sent to them (in their respective communities) by the ADDRO team. These included Kongo, Lardowayo and Agbekotsekpo communities.

After the first day, it was noticed that most of the respondents were farmers who were not at home when the enumerators visited their households. During the mornings and afternoons, the targeted respondents were reported to have gone to their farms and were only available in the evenings. Based on this difficulty, ADDRO team decided that the enumerators should keep the mobile devices/tablets instead of returning them to ADDRO staff at the end of each day as was initially agreed. This enabled them to administer the questionnaire at the convenience of the respondents – that is, early in the mornings and late in the evenings when the farmers could be found at home. The enumerators were cautioned to keep the mobile devices safe and return them to ADDRO team anytime they were demanded for. In that case, the data was uploaded anytime an enumerator was visited during monitoring and supervision.

The entire mobile data collection exercise was supervised by the ADDRO Greater Accra Regional team. The process of data collection involved inputting the correct HHID onto the device which the system automatically provided all other details like the district, sub-district, community, name of HH head, his/her phone number, etc. These information was to be confirmed or edited by the enumerator on the device. The questions similar to the ones on the manual forms were displayed for the enumerator to fill in the details. The software did not accept inconsistent inputs for example mismatches between number of HH members and the number of people who slept under the LLIN the previous night. ODK collect did not require wifi or network connection to input the data. It relied on GPS to mark location of all HHs visited without internet connection.

Procedure for entering the households involved observing the cultural protocol. That is, the enumerators knocked at the door/gate at the entrance of the HH before they entered on permission. Pleasantries were exchanged and then the purpose of the visit explained to the HH head. He/she would then consent before the data would be collected.

At the end of the data collection exercise, a total of 1171 households were successfully visited and data collected successfully by all the 21 enumerators.

6.0 Best Practices

- Anytime the supervisors (ADDRO GAR Team) visited the enumerators, the information on their devices were uploaded to the server to avoid loss of information or any unfortunate occurrence to the data collected.
- Due to farming activities, enumerators resorted to collecting the data very early in the mornings and late in the evenings when the respondents were mostly home.
- The enumerators were made to sign a consent form and were allowed to keep the data collection devices and their chargers with them. This was to allow for the enumerators to be able to administer the questionnaire to respondents who got home late or left very early in the morning.

7.0 Challenges encountered during Mobile Data Collection and action taken

On the first day of data collection, the ODK software did not function very well hence profile/biodata of households could not be displayed on the tablets. This occurred because, after the pretest was done and the soft copy of the PDCU revised, the consultant apparently forgot to update the latest version of the PDCU form in the ODK database. Thus, the enumerators had to manually key in the community profile of each household using the household list. This was cumbersome and slowed down the process.

- Action Taken: the monitoring teams quickly went round the communities and helped the enumerators to upload the final version of the PDCU form onto the mobile devices which worked perfectly well.

The selected households in the Osudoku sub-district were very far apart from one another. This means the enumerators had to walk very long distances to access them. This happened possibly because of the AMF process of randomization. With the AMF randomization process, 25% of the communities were selected and given their specific numbers of households in that community. The

percentage required to be visited to equal 5.5% of the entire sub-district's HHs was calculated. Then the number of HHs for each community was calculated and randomly selected. The process did not factor in distances between communities. Furthermore, there was no proper address system to facilitate the work of the enumerators. The enumerators had to ask for directions to specific household heads when they did not personally know them.

- Action Taken: It was suggested to the enumerators to call the respondents on phone to arrange for a meeting with them at specific time while they allowed reasonable time intervals. In that way, they would be able to map out their movement plans before they set out from their various homes. This helped to significantly reduce the distances they had to cover each day as compared to not mapping out their routes for the day. The enumerators were advised to replace households they could not find from the spare list to avoid walking long distances in vain after they tried to reach them on several unsuccessful times.

There was no mobile network coverage in some areas in the Osudoku sub-district. Because of this, it was very difficult to find the enumerators for monitoring (calling them on phone for their location). Again when it was time to upload their data unto the server, very long distances had to be covered with the devices before mobile network coverage could be accessed.

- Action Taken: For the enumerators who worked in communities where there was no mobile network coverage, specific time and places were pre-arranged to meet them for monitoring and data upload.

As a result of the deplorable nature of the roads, some communities were not accessible by the vehicle. Only motorbikes could ply those roads at high costs to the three enumerators who used their motor bikes. Such enumerators complained that they had to use their money to pay for the transportation cost.

Some of the communities in the District such as Volivo and Kasunya do not have connecting routes. One has to drive back out of the community from the same entrance before accessing the adjoining communities. This would have otherwise been easier, less expensive and less time consuming if there were connecting routes.

There were reports of many instances when the enumerators walked long distances to the respondents' households several times without meeting the expected respondents to be interviewed.

- Action Taken: Additional money was given to enumerators with genuine problems on transportation cost to compensate and motivate them for the exercise.

8.0 Recommendations on Mobile Device

Generally, it appears that using mobile device technology to collect the PDCU data could produce more quality data than the paper based method because the advantages of the mobile data collection are more than the paper based data collection. See table 8 below for the advantages of mobile data collection vrs paper based data collection. It is therefore recommended that the electronic data system should be extended to cover more of the AMF supported districts in the three regions.

Table 8: Comparison of the mobile data collection and the paper based data collection

CRITERIA	MOBILE PILOT	PAPER BASED
ACCURACY OF DATA	The software does not allow for inconsistent data to be entered because of the checks eg. The # of HH members cannot be less than the total number of people in the household who slept in LLINs the previous night	Inconsistent data can be collected and entered
MONITORING	Enumerators were required to record the GPS of the HH location after data collection. With this, the supervisor can tell if the enumerator actually went to the respondents' HH	There is no way to tell if the enumerator actually went to the respondent's HH to conduct the interview unless following up to each of the households which is costly and time consuming.
DUPLICATION OF DATA	The system could tell the enumerator whether or not a particular HH's information had been collected. It did not allow for duplication of data collection	The enumerators could easily duplicate the data collected with the aim of making more money which could go unnoticed
INCOMPLETE DATA	The system prompted the enumerator to complete filling the form for any respondent. It would not accept any incomplete data into the database.	Enumerators could leave some spaces blank on the paper.
PICTURE/VISUALS	The device allows one to take pictures or even record respondents when necessary.	The paper system does not permit any of these.
PORTABLE AND CONVENIENT	The device is not only portable but also more convenient when using it.	With the paper-based, enumerators have to carry sheets of questionnaires, files, pens, pencils, erasers, etc.

CRITERIA	MOBILE PILOT	PAPER BASED
COST OF DATA COLLECTION	There is no need for the services of another person to be engaged as a supervisor. The ADDRO staff did all the supervision and monitoring at the same time.	There was the need for a paid supervisor who supervised and checked the sheets to ensure the data was properly recorded.
	Data collected on the devices was easily uploaded unto the data base without transporting the devices to the data centre for data entry clerks to enter data at a cost.	Extra resources are needed to transport the forms to the data centre for upload.
REAL TIME INFORMATION	One is able to tell the volume of data collected by each enumerator daily	With the paper, the forms need to be manually counted; thus consuming time.

Conclusion

The Greater Accra PDCU was generally successful. There has been improvement in data accuracy in terms of the accuracy of the number of LLINs given and received at distribution and PDCU and the number of people in households at distribution and PDCU. The improvement is attributed largely to the application of lesson learnt especially data discrepancies detected from the Northern Region PDCU. With the experience and lessons learnt from the PDCUs in Northern and Greater Accra regions, it is our hope that there will be much more improvements in the upcoming Upper West Region PDCU.

ANNEXES

Annex 1: PDCU Form



POST-DISTRIBUTION CHECK-UP OF MOSQUITO NET USAGE

Country/Region: GHANA/NORTHERN	District name:
Date of distribution: APR – MAY 2016	Sub-District name:
Date of this survey:	Community name:

Form Number: PLEASE WRITE IN CAPITALS

To the Household Head In the past, you received mosquito nets for free in a community distribution. We are conducting a survey of randomly selected households to assess net usage and condition. We would like to ask you permission to enter your home to gather this information.

I agree to allow you to enter my home, in my presence, to assess the use and condition of my mosquito nets. Signature of Household Head

Name of the Household Head First name: Last name:
 Contact Number:

- How many regularly used sleeping spaces are there in the household?
- Please complete the following table for all nets found hanging in the household. (If there are no nets/any hanging, skip to question 3)

Sample	Brand of net (<input type="radio"/> G (Gideon))			Net distributed in random order?	Net condition (<input type="radio"/> G (Gideon))			How many sleep under this net last night?				Net condition Very Good Have more than 2 holes (Holes than 2cm each)
	Good	Fair	Poor		Very Good	OK	Fair	1-2 sleepers	3-4 sleepers	5-6 sleepers	7-8 sleepers	
net 1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					OK Have more than 10 small holes
net 2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					Fair Have more than 10 small holes or 1 big hole, larger than 10cm
net 3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					Poor Have more than 10 small holes or 1 big hole, larger than 10cm
net 4	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					Phenazone Have more than 10 small holes on another hole and mark/bath mark
net 5	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					
net 6	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					
net 7	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					
net 8	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					
net 9	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					
net 10	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					

3. Of the nets received in the recent universal coverage campaign ONLY:

Number originally received	Hung sum of <input type="checkbox"/> ticked above	Present but not hung \blacklozenge	Not present	
			Worn out	Other \blacklozenge
	=	+	+	+
\blacklozenge Reason:				

- Does the household head know how to hang and use a net correctly? Yes / No
Ask the household head to demonstrate how the net is used or right if not able to hang the net hanging
- How many people in this household have had blood-smear diagnosed malaria in the last month?
- How many people are there in this household?

CERTIFICATION:
I certify the information in this form is correct

Supervisor's name and position:

Form Number: PLEASE WRITE IN CAPITALS

To the Household Head In the past, you received mosquito nets for free in a community distribution. We are conducting a survey of randomly selected households to assess net usage and condition. We would like to ask you permission to enter your home to gather this information.

I agree to allow you to enter my home, in my presence, to assess the use and condition of my mosquito nets. Signature of Household Head

Name of the Household Head First name: Last name:
 Contact Number:

- How many regularly used sleeping spaces are there in the household?
- Please complete the following table for all nets found hanging in the household. (If there are no nets/any hanging, skip to question 3)

Sample	Brand of net (<input type="radio"/> G (Gideon))			Net distributed in random order?	Net condition (<input type="radio"/> G (Gideon))			How many sleep under this net last night?				Net condition Very Good Have more than 2 holes (Holes than 2cm each)
	Good	Fair	Poor		Very Good	OK	Fair	1-2 sleepers	3-4 sleepers	5-6 sleepers	7-8 sleepers	
net 1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					OK Have more than 10 small holes
net 2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					Fair Have more than 10 small holes or 1 big hole, larger than 10cm
net 3	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					Poor Have more than 10 small holes or 1 big hole, larger than 10cm
net 4	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					Phenazone Have more than 10 small holes on another hole and mark/bath mark
net 5	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					
net 6	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					
net 7	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					
net 8	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					
net 9	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					
net 10	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>					

3. Of the nets received in the recent universal coverage campaign ONLY:

Number originally received	Hung sum of <input type="checkbox"/> ticked above	Present but not hung \blacklozenge	Not present	
			Worn out	Other \blacklozenge
	=	+	+	+
\blacklozenge Reason:				

- Does the household head know how to hang and use a net correctly? Yes / No
Ask the household head to demonstrate how the net is used or right if not able to hang the net hanging
- How many people in this household have had blood-smear diagnosed malaria in the last month?
- How many people are there in this household?

Supervisor's name and signature: Official Stamp

Annex 2: Checklist for PDCU Supervision

GHANA AMF SIX-MONTHLY PDCU - SUPERVISORY CHECKLIST

COMMUNITY LEVEL SUPERVISION

FOR USE BY SUB-DISTRICT SUPERVISORS

Instruction for sub-district supervisors: Fill form for each enumerator during the PDCU data Collection.

District _____ **Sub-district** _____

Community _____ **Date** _____ **Time** _____

Name of supervisor _____ **Signature** _____

1. Does the enumerator have adequate number of PDCU forms needed for the day's work? Yes/No
.....If No, why?.....
2. Observe the enumerator collect data in one household from start to finish and record the following:
 - 2.1. Record the start time here (e.g. 2.43pm)
 - 2.2. Did enumerator greet the household head? Yes/No
 - 2.3. Did enumerator explain the purpose of the visit? Yes/No
 - 2.4. Did enumerator ask for household head's Consent before interview? Yes/No
 - 2.5. Did enumerator ask household head to sign or thumbprint PDCU form? Yes/No
 - 2.6. Did enumerator fill the details of HH head (names & phone number) Yes/No
 - 2.7. Did enumerator check the number of LLINs household received during campaign? Yes/No
 - 2.8. Did enumerator ask of the condition of LLINs in the HH? Yes/No
 - 2.9. Did enumerator ask of number of people who slept under LLINs the previous night Yes/No
 - 2.10. Did enumerator ask of nets hung, not present etc Yes/No
 - 2.11. Did enumerator ask if HH head know how to hang and use nets correctly Yes/No?

2.12. Did enumerator ask how many people in HH had blood-test diagnosed malaria in the last month?

Yes/No?

2.13. Did enumerator ask how many people are in the HH Yes/No?

2.14 Record the finish time here (e.g. 2.57pm)

(Explain to the enumerator any corrections and improvements required in private.)

3. Select one completed PDCU form and follow-up to the HH and verify the following information:

4. Ask the head of the household if enumerator visited the household

5. If yes to 4 Ask/check the following

5.1. The number of LLINs received.....

5.2. The number hanging.....

5.3. The number of people in the HH.....

6. Does 5.1, 5.2 and 5.2 agree with information on completed form Yes/No.? If no find out why.

7. What problems were observed and what corrective actions were taken? Use the following table below.

No	Problems observed	Corrective action taken

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7. Enumerate 2 key observations/lessons learnt

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