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PMI VECTORLINK KENYA END OF SPRAY REPORT

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ACRONYMS

AIRS	Africa Indoor Residual Spraying
BCC	Behavior Change Communication
BMP	Best Management Practices
CHMT	County Health Management Team
CHV	Community Health Volunteer
DCV	Data Collection Verification
DEC	Data Entry Clerk
DOS	Directly Observed Spraying
ECCL	Environmental Combustions and Consultants Limited
EIA	Environmental Impact Assessment
IEC	Information Education Communication
IRS	Indoor Residual Spraying
M&E	Monitoring and Evaluation
MOH	Ministry of Health
NEMA	National Environmental Management Authority
NMCP	National Malaria Control Programme
PMI	U.S. President's Malaria Initiative
PMT	Performance Management Tracker
PPE	Personal Protective Equipment
PSECA	Pre-Season Environmental Compliance Assessment
SCHRIO	Sub-County Health Records and Information Officer
SCHPO	Sub-County Health Promotion Officer
SCMCC	Sub-County Malaria Control Coordinator
SCPHO	Sub-County Public Health Officer
SOP	Spray Operator
VL	VectorLink

EXECUTIVE SUMMARY

In 2019, the VectorLink (VL) Kenya project conducted IRS campaigns in Homa Bay and Migori counties with a long lasting organophosphate (Actellic® 300CS) while piloting the use of SumiShield® 50WG in one operation site in Homa Bay County. The spray campaign lasted 24 days in Migori County (January 28, 2019 to February 23, 2019) and 30 days in Homa Bay County (February 11, 2019 to March 16, 2019). In total, 551,690 structures were found and out of these, 507,777 structures were sprayed, resulting in a reported 92.0 percent IRS coverage rate across both counties, protecting 2,011,902 people from malaria in 2019.

Table 1 below shows the key results achieved during VL Kenya’s 2019 IRS campaign.

TABLE I: SUMMARY OF 2019 IRS CAMPAIGN RESULTS

RESULT	MIGORI COUNTY	HOMA BAY COUNTY ¹	TOTAL
Number of sub-counties covered by IRS	6	8	14
Insecticide Used (bottles/sachets)	67,978	90,899	158,877
Estimated number of structures targeted	202,830	263,032	465,862
Number of structures found	235,214	316,475	551,689
Number of structures sprayed	221,544	286,233	507,777
Spray coverage (number of structures sprayed divided by number of structures found)	94.2%	90.4%	92.0%
Population protected	886,834	1,125,026	2,011,860
Pregnant women protected	21,326	23,673	44,999
Children under five protected	115,974	133,301	249,275
Number of people trained to deliver IRS ²	1,290	1,684	2,974

¹ A data falsification incident involving two spray teams was uncovered in Magunga operations site during the spray campaign. As such, the affected areas were revisited to ensure all eligible structures in this area were sprayed. Re-spray activities at Magunga operation site, Suba Sub-country, Homa Bay County were completed on June 1. Data for this respray are included in the Homa Bay figure.

² PMI annual indicator for “people trained to deliver IRS” includes team leaders, SOPs, Site Coordinators and supervisors and excludes clinicians, data clerks, IEC mobilizers, drivers, washers, porters, pump technicians, and security guards.

The following are key highlights of VL Kenya's spray campaign in 2019:

- IRS was conducted for a third year using Actellic® 300CS in Migori County and a second year in Homa Bay County. An operation site in Homa Bay County piloted the use of SumiShield® 50WG for the first time in Kenya. In 2019, spray activities began earlier than the previous year to more effectively cover the main transmission season.
- VL Kenya sprayed a total of 286,233 structures in Homa Bay County and 221,544 structures in Migori County. The spray coverage was 90.4 percent in Homa Bay County and 94.2 percent in Migori County. Of the 551,689 structures spray operators (SOPs) found, the teams sprayed a total of 507,777 structures resulting in an overall spray coverage rate of 92.0 percent.
- VL Kenya trained 2,974 people (1,290 people in Migori county and 1,684 in Homa Bay County), 1,180 (39.7%) of whom were women, to deliver IRS in the 2019 IRS campaign. Of those trained, a total of 57 seasonal staff were trained during Magunga re-spray exercise.
- VL Kenya used 155,547 bottles of Actellic® CS 300 and in Kendu Sub County Hospital operations site, 3,330 sachets of SumiShield® 50WG. The insecticide usage ratio was 3.0 structures per bottle for Actellic® CS 300 and 3.0 structures per sachet for SumiShield® 50WG.
- To assess the quality of the spraying, the project's entomology field technicians conducted wall bioassays in five sites: Three sites for Actellic® 300CS: Rongo and Nyatike sub-counties in Migori County and Rangwe Sub County in Homa Bay County and two sites for SumiShield® 50WG in Rachuonyo North sub-county in Homa Bay County. This was done within a period of two weeks post spray. Full mortality (100%) of *An. gambiae* Kisumu exposed to mud and cement walls was recorded within 24 hours post exposure.
- Together with three other VL countries, Kenya successfully transitioned from a Microsoft Access database to the new DHIS-2 based VLCollect database for spray and mobilization data reporting.
- VL Kenya project conducted three pilots during the 2019 IRS campaign: 1) SumiShield® 50WG pilot in Kendu Sub County Hospital, Rachuonyo North Sub County, Homa Bay County; 2) Use of bicycles by SOPs at Rariw Dispensary, Rangwe Sub County, Homa Bay County; and 3) VLCollect mobile reporting pilot among SOPs in Dede Dispensary, Awendo Sub County, Migori County.
- The project continued to adopt and use mobile health (mHealth) applications for quick decision making across spray performance monitoring, compliance monitoring, insecticide tracking, and mobilization progress monitoring.
- For sub-counties whose coverage was only slightly above the target of 85 percent, the leading reasons for non-spray included locked structures and refusals.
- Mobilizers attended various community meetings immediately after spray teams finished their work in communities. Each meeting was called by its respective leaders. For example, church meetings were called by church leaders while barazas were called by chiefs or assistant chiefs. Mobilizers identified non-sprayed structures, collected contact and location details of these structures and names of household heads, and provided this information to inform spray teams' mop up activities.
- During the campaign, VL Kenya reported a total of ten data falsification incidences to PMI, the majority of which were small-scale incidents involving 1-2 SOPs. Of note, a larger-scale incident involving 10 SOPs from two spray team was uncovered at the Magunga operations site. After preliminary investigations, a *mini*PSDQA was conducted which estimated a spray coverage of 48.85% at Magunga, significantly lower than the coverage reported during the campaign. As a

result, the communities in the affected area were re-visited to ensure as many unsprayed eligible structures as possible were covered. The re-spray took place for a period of 12 days (20 May, 2019 to 1 June, 2019), resulting in an overall Magunga operations site spray coverage of 86.3%.

I. COUNTRY BACKGROUND

I.1 BACKGROUND OF IRS IN KENYA

In 2017, as part of the U.S. President’s Malaria Initiative (PMI) in Kenya, through the PMI Africa Indoor Residual Spraying (AIRS) Project, IRS was restarted in Kenya in six sub counties of Migori County (Awendo, Nyatike, Rongo, Suna East, Suna West, and Uriri) after a lapse of five years (2012-2017) (Figure 1). In 2018, PMI supported the second round of IRS implementation and scaled-up with the addition of another county, Homa Bay, with eight Sub-counties, namely Homa Bay Township, Ndhiwa, Rachuonyo East, Rachuonyo South, Rachuonyo North, Rangwe, Suba North, and Suba South (Figure 2). In total 14 sub-counties were targeted in the two counties.

In July 2018, the PMI AIRS project transitioned to the PMI VectorLink (VL) project.

Results of the entomologic surveillance after the first round of IRS in Migori County showed a 95 percent reduction of indoor resting densities of *An. funestus* and densities of this species remained negligible after the second spray round. Similar reductions in population of *An. funestus* were observed in the first round of spraying in Homa Bay County. The insecticide remained potent on sprayed walls, killing over 80 percent of susceptible *An. gambiae* s.s. up to 10 and 11 months after the first and second rounds of IRS, respectively. The vector population from all sites was fully susceptible to Actellic® 300CS and SumiShield® 50WG, but showed varying levels of resistance to pyrethroids.

FIGURE I: LOCATION OF SPRAY AREAS COVERED IN MIGORI COUNTY IN 2019

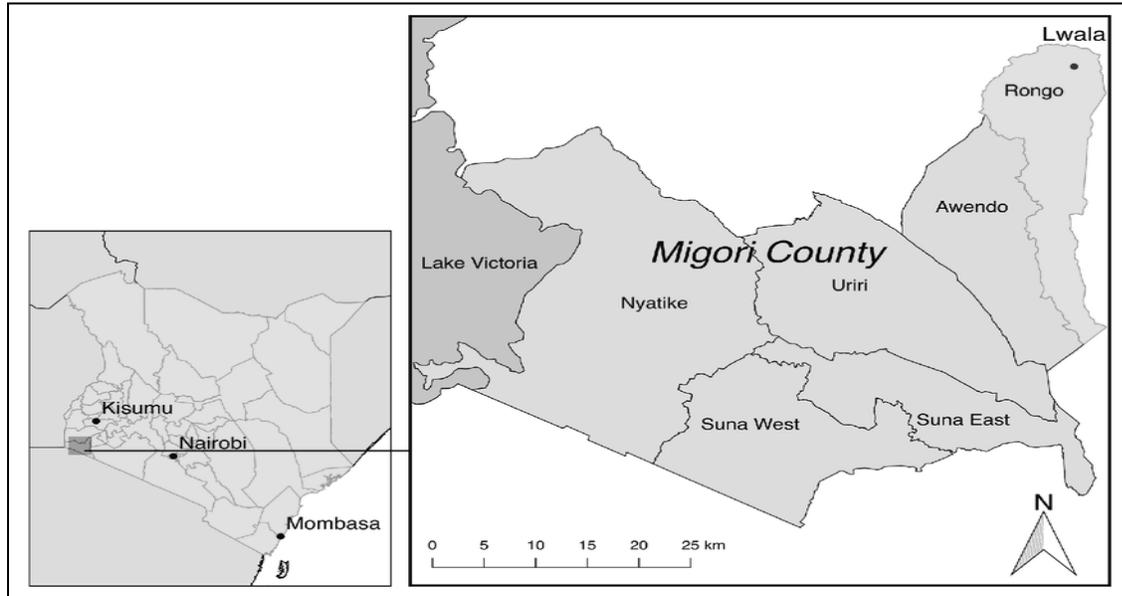
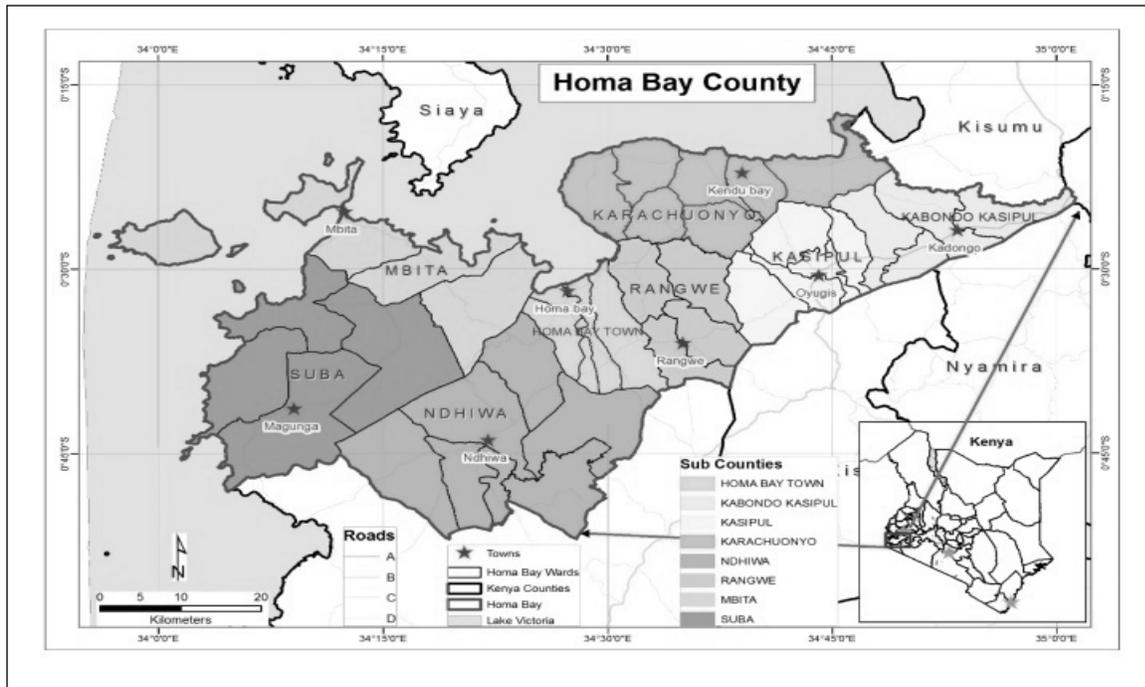


FIGURE 2: LOCATION OF SPRAY AREAS COVERED IN HOMA BAY COUNTY IN 2019



1.2 INTRODUCTION TO 2019 IRS CAMPAIGN

In 2019, the VL Kenya project supported the third year of IRS implementation in Kenya following the successful implementation of IRS in 2017 and 2018 under the PMI AIRS project. In Migori, the sub-counties of Kuria East and Kuria West were not sprayed as the estimated malaria prevalence was low in these sub-counties as advised by NMCP. In Homa Bay County, Mfangan Island was not sprayed in 2019 after the mobilization and logistical challenges, and high levels of community refusals faced during the 2018 spray campaign. Mfangan Island spray coverage was 73.0%.

Based on estimates made in close collaboration with the National and the County Ministries of Health, the project's overall IRS target was 465,862 structures (202,830 in Migori and 263,032 in Homa Bay).

Preparations for the 2019 campaign began at the end of the 2018 IRS campaign when the project held review meetings with staff and stakeholders at different levels to inform planning and decision making for the next campaign. Field preparations started in early July 2018 with a strategic planning meeting to finalize the budget, implementation schedule, and quantification of personnel, equipment, and supplies.

The 2019 IRS campaign planned to achieve the following main objectives:

- Achieve spray coverage of at least 85 percent of the estimated 465,862 targeted structures.
- Ensure compliance with environmental regulations and established best practices for IRS insecticide handling and usage.
- Establish effective monitoring and evaluation of all activities to measure the effect of IRS.
- Conduct monthly entomological surveillance to inform vector control decision making.

2. PRE-SPRAY ACTIVITIES

2.1 IRS CAMPAIGN PLANNING

VL Kenya held a three-day (July 17, 2018 to July 19, 2018) strategic planning meeting to prepare for the 2019 IRS campaign. The main objectives of the meeting were to discuss the 2019 IRS campaign implementation plan, develop the Race to Starting Line (RSL) to map out all key pre-spray activities, review quantification of IRS commodities and personnel requirements, and review the drafted budget. The project shared the activity implementation plan (Annex A) and RSL with the National Malaria Control Program (NMCP), PMI Mission and with County Health Management Team (CHMT) members in Homa Bay and Migori counties.

2.2 SPRAY AREA AND INSECTICIDE SELECTION

The NMCP's IRS Business Plan (2015-2018) and PMI's Malaria Operational Plan guided IRS implementation in Kenya. In Migori County, all sub-counties with estimated parasite prevalence greater than 20 percent were included, leaving out two sub-counties, Kuria East and Kuria West, where estimated prevalence was below 20 percent. All eight sub-counties in Homa Bay County were targeted as the entire county has an estimated parasite prevalence of more than 20 percent.

As with the 2017 and 2018 IRS campaigns under the PMI AIRS project, VL Kenya used an organophosphate, Actellic® 300CS, in both counties in 2019 which has been registered with the Pest Control Products Board (PCPB) for IRS in Kenya (PCPB Certificate of Registration 1233) and the NMCP's Insecticide Resistance Management (IRM) Strategy 2015-2018 permitted the use of organophosphates to manage insecticide resistance in areas where long-lasting insecticidal nets (LLINs) used pyrethroid insecticides. In 2019, VL Kenya piloted the use of SumiShield® 50WG, a neonicotinoid, in one operations site in Homa Bay County. NMCP obtained an experimental license from PCPB dated October 24, 2018 to allow importation and spraying of SumiShield® 50WG.

2.3 GEOGRAPHICAL RECONNAISSANCE

In collaboration with the county government, VL Kenya conducted geographical reconnaissance (GR) in Migori County from August 13 to 17, 2018 and in Homa Bay County from August 20 to 24, 2018. The main objectives were to:

- Reassess the existing 68 operation sites, 28 in Migori County and 40 in Homa Bay County, and document deficiencies for later refurbishment.
- Identify any sensitive ecosystem that requires special attention during the campaign.
- Re-assess availability and accessibility of water sources for spraying.

All 68 operations sites were located in health facilities except three: two were located at chief's camps (Alendo and Ober) and one in the County Health Management Team (CHMT) Headquarters compound. During GR, the names of villages from County MOH and from the provincial administration offices were harmonized.

2.4 MICRO-PLANNING

In collaboration with NMCP and county governments, VL Kenya held micro-planning meetings from October 11– 12, 2018 for Migori County and from October 16 – 17, 2018 for Homa Bay County. The main objectives were to discuss and agree on the IRS implementation plan and finalize the quantification of equipment, materials, and personnel for each operations site. Participants came from the NMCP, Migori and

Homa Bay CHMTs, as well as sub-county officials. Sub-county officials included members of Sub-County Medical Officers of Health (SCMOH), Sub-County Public Health Officers (SCPHO), Sub-County Health Promotion Officers (SCHPO), Sub-County Community Strategy Focal Persons (SCCSFPs), Sub-County Malaria Control Coordinators (SCMCCs) and Sub-county Health Records and Information officers (SCHRIOs). The total number of participants was 62 (46 male and 16 female) for Migori and 77 (56 male and 21 female) for Homa Bay. One officer from NMCP attended the Homa Bay meeting.

2.5 LOGISTICAL NEEDS AND PROCUREMENT

The VL Kenya team conducted a needs assessment in July 2018 to establish the quantity of IRS equipment and materials available for use in stock and determine the needed quantities to procure for both Migori and Homa Bay counties. The project determined which items were to be procured locally or internationally. Annex B gives a summary of the items that were internationally procured.

2.6 HUMAN RESOURCE AND ADMINISTRATION REQUIREMENTS

Based on the long- and short-term needs of the project, VL Kenya categorized its human resources needs into two categories: long term/permanent staff and seasonal workers. Seasonal staff were primarily needed during the 2019 IRS campaign. Based on need, a few seasonal staff were engaged before and after the 2019 IRS campaign period.

2.7 RECRUITMENT OF PERMANENT STAFF

During the transition from PMI AIRS to PMI VL, the project advertised, shortlisted, and interviewed candidates, and hired new staff in all the required cadres by July 2018 including the Chief of Party, Operations Manager, Entomology Technical Manager, Monitoring and Evaluation (M&E) Manager, Finance and Administration Manager, Environmental Compliance Officer (ECO), Procurement Officer, County Coordinators, Finance and Administration Assistants, Drivers, Sub-county Coordinators, Warehouse Managers, Accountant, IEC Coordinator, IT Specialist, Office Manager, Supply Chain Coordinator, Entomology Technicians, Data Entry Clerk (DEC), Entomology Technical Coordinator and Database Coordinator. The last batch of new staff joined the project on January 2, 2019 in time for the 2019 IRS campaign.

2.8 HIRING OF SEASONAL STAFF

The project organized a microplanning session in October 2018 which brought together sub-county officials, CHMT and NMCP. During the microplanning session, the stakeholders agreed on the number of personnel for each cadre required during the campaign. In general, the required number of different categories of personnel was determined by the number of targeted structures. Subsequently, VL Kenya advertised on websites and county and sub-county fora. Seasonal support staff positions advertised included finance assistants, information, education, and communications (IEC) assistants, logistics assistants, M&E assistants, DECs, site coordinators, and storekeepers. The project vetted applications, shortlisted qualified candidates for interviews, and selected final candidates after interviews. The site supervisor, who supervised assigned teams at an operations site, was a county MOH staff seconded to the project for spray supervision. In close collaboration with the MOH, the project selected seasonal spray staff (SOPs, team leaders (TL), and mobilizers) from existing networks of community health volunteers (CHVs). After quantifying staffing needs, preset criteria were used to select the CHVs for SOPs and mobilizers' positions in each sub-county with SCPHOs, SCMCCs, SCHPO and SCCSFP playing a key role in identifying those who met the requirements. All candidates had to be at least 18 years of age with primary education, physically fit, and at least 1.5 meters tall. In general, all candidates had to be of good conduct, able to speak local languages, and able to work with minimal supervision. A simple reading and writing test was administered to all identified candidates to ensure adequate literacy and numerical skills. The pre-set criteria gave priority to CHVs working and living within the

targeted villages on recommendation from local leaders. Recruitment of women was encouraged and, for those women who planned to work as SOPs, they were required to not be breastfeeding or expectant.

2.9 PAYMENT OF SEASONAL WORKERS

VL Kenya hired seasonal county finance assistants and sub-county finance assistants to support the payment process. The staff, having been trained for a period of three days, helped to ensure that the finance team supported the payment process and ensured compliance with financial requirements to facilitate payment throughout the 2019 IRS campaign. These requirements included proper filling of attendance sheets for any meetings or trainings, Mpesa declaration forms, Abt receipts to confirm payment received and the submission of timesheets on a weekly basis. All seasonal workers were paid through Safaricom’s mobile money platform – M-Pesa. M-Pesa was the preferred mobile money platform due to its wide coverage and consistent use in Kenya, which enabled efficient and safe bulk payments to a large number of personnel. All seasonal workers were required to register a Safaricom line if they did not have one, and the project sent the money directly to their phones.

2.10 VEHICLE PROCUREMENT

VL Kenya contracted 232 vehicles for IRS operations: 109 vehicles in Migori County and 123 in Homa Bay County. The project sourced these vehicles from local vendors who formed a total of 17 consortia: 14 consortia, one for each sub-county for SOP transportation at sub-county level, one consortium in each county for supervisory vehicles and a final consortium for supply chain logistics covering both counties. All SOP vehicles and supervision vehicles were hired for 24 days in Migori County and 30 days in Homa Bay County. The logistics vehicles were hired before the campaign for logistics distribution, during the campaign and during the closeout period for reverse logistics and as needed during the campaign. Table 2 shows the number of vehicles assigned to each county.

TABLE 2: IRS 2019 VEHICLE DISTRIBUTION

County/Sub-counties	County Logistics Vehicles	Sub-County supervision Vehicles	Vehicles for Spray Operators	Vehicles for Supervision- County	Total
MIGORI COUNTY					
County Level	3				
Awendo		2	12	1	15
Nyatike		3	18	1	22
Rongo		2	13	1	16
Suna East		2	13	1	16
Suna West		2	12	1	15
Uriri		2	17	1	20
Total Migori-County	3	13	85	7	109
HOMA BAY COUNTY					
County level	4				
Homa Bay Township		2	9	1	16
Rachuonyo East		2	12	1	15
Rachuonyo South		2	12	1	15
Suba North		2	7	1	10

County/Sub-counties	County Logistics Vehicles	Sub-County supervision Vehicles	Vehicles for Spray Operators	Vehicles for Supervision- County	Total
Ndhiwa		3	18	2	23
Rachuonyo North		2	16	1	19
Rangwe		2	8	1	11
Suba South		2	11	1	14
Total Homa Bay County	4	17	93	9	123
Overall	7	30	178	16	232

3. IRS IMPLEMENTATION

3.1 ORGANIZATION OF THE IRS CAMPAIGN

The project had preset criteria for recruitment of spray teams and mobilizers who were mostly CHVs assigned to the various community units. During actual recruitment, this criteria was not strictly adhered to at all times. For example, in a situation where all CHVs were recruited and more CHVs were required to complete mobilization teams, some recruits were hired on referrals from county MoH teams and politicians. The numbers recruited were based on the quantification agreed upon during microplanning. TLs were selected during training based on their performance, leadership qualities, and their familiarity with the ward. Each TL led a team of six spray operators. The total number of teams per operations site varied from 2 to 9 teams based on the number of structures to be sprayed from each individual operation site. One site supervisor supervised up to three teams.

The number of spray personnel by sub-county is presented in Table 3 below.

TABLE 3: NUMBER OF SPRAY TEAMS AND OPERATIONS SITES PER SUB-COUNTY

SUB-COUNTY	NUMBER OF SPRAY TEAMS	NUMBER OF SOPS	SITE SUPERVISORS (MOH STAFF)	NUMBER OF OPERATIONS SITES	SUB-COUNTY SUPERVISORS (MOH)	COUNTY SUPERVISORS
MIGORI COUNTY						
Awendo	23	139	8	4	6	7
Nyatike	33	199	12	7	6	
Rongo	24	142	8	4	6	
Suna East	25	147	9	4	6	
Suna West	21	127	8	4	6	
Uriki	32	185	12	5	6	
Total	158	939	57	28	36	7
HOMA BAY COUNTY						
Homa Bay Township	15	91	6	4	6	7
Ndhiwa	31	172	11	8	6	
Rachuonyo East	20	116	8	4	6	
Rachuonyo North	28	167	10	6	6	
Rachuonyo South	22	129	7	5	6	
Rangwe	18	103	6	4	6	
Suba North	14	82	5	4	6	
Suba South	19	112	7	5	6	
Total	167	972	60	40	48	
Overall	325	1,911	117	68	84	14

Mobilization and spray calendars were developed to guide the team's movement. Every operations site had a catchment area and the project assigned targets based on the structures found in the prior campaign. The sub-county targets during the campaign were based on the total structures targeted in all operations sites within the sub-county.

Every morning before departure to the field, the project provided breakfast to the SOPs, TLs, supervisors, washers, pump technicians, and store personnel. After breakfast, TLs conducted daily health checks and thereafter, spray personnel received personal protective equipment (PPE), insecticides, and other commodities and held a morning mobilization meeting with supervisors and TLs. After morning mobilization, SOPs collected four liters of rinse water from the prior day's end of day clean up and proceeded to board a vehicle. Hired vehicles would then drop spray teams in the areas for spraying. On arrival to the household, the SOP would greet the household owner and inspect whether the structure was ready for spraying. S/he would then request for 7.5L of water for insecticide mixing in the presence of the household owner. The SOP and team leader would enter the structure and would ensure that all windows and doors were closed, all household items that could be removed were taken outside and any bulky household items that could not be removed were covered with a polythene sheet provided to the SOP. The SOP would begin to spray. The SOP would ensure that his/her nozzle was 45 cm away from the wall and would begin spraying from the top of the wall towards the floor while maintaining the correct rhythm as trained to ensure adequate cover. After covering the first swathe, the SOP would take a step to the right and resume spraying from bottom to top while ensuring a 5 cm overlap with each successive swathe. In poorly lit houses, SOPs used a solar light issued by VL. The team leader or supervisor would closely monitor the SOP to ensure that s/he was applying the correct spray technique. Once the structure was sprayed, the SOP would exit the home and would instruct the household owner to keep the home closed for two hours to allow the insecticide to dry. The SOP would further instruct the household owner to aerate the home for an hour thereafter.

To ensure a little as possible mixed insecticide is returned to the operation site, the SOPs within a team are instructed to spray the last structures together so that they can use the remaining contents in the spray tank.

At the end of day, on arrival at site, the SOPs reconcile the insecticide with the team leader first before proceeding to the wash area to triple rinse spray tank and clean their PPE as described in section 7.3.

3.2 IRS CAMPAIGN SUPERVISION AND MONITORING

The project developed a master supervision plan to guide supervision teams and organized the general supervision structure into steering committees at the county and sub-county levels. Each 7-member county steering committee provided supportive supervision and oversaw IRS activities at the county level. Each sub-county had a six-member steering committee, which was tasked to coordinate, supervise, and address any mobilization and spray issues within their sub-county. The project team rotated in the two counties weekly.

The spray team targets were determined based on the previous campaign performance and agreed upon during microplanning meeting. The 2019 spray target was 9 structures per day per spray operator. During the campaign, supervisors followed up to ensure each SOP was meeting targets on average. To ensure compliance, both the project and county MOH personnel jointly supervised operations.

During spray personnel training, trainers grouped SOPs into teams of six, each led by one team leader. One site supervisor, a county MOH staffer, supervised three team leaders. Where there were more than three teams, the project deployed two supervisors. In every ward, one supervisor would double up as the ward coordinator. The project also trained site coordinators as trainers which made it possible for them to assist with SOP training and spray supervision. The project hired one IEC supervisor per operations site to coordinate IEC activities and continuously update the teams on which areas were already mobilized and ready for spray.

During the campaign the project held debrief meetings at the county level every Monday, Wednesday, and Friday between project staff and county supervisors. Every Saturday, the project held sub-county meetings at central locations within the sub-counties for all the operations sites. This enabled site supervisors to discuss

issues arising from supervision and agreed on a way forward. At the site level, site coordinators, IEC supervisors, and site supervisors held morning mobilization meetings every day to update the teams, discuss issues, and direct teams to where they were going to spray that day. One storekeeper managed each site store. One site coordinator who was a seasonal support staff managed a site by coordinating and providing oversight on all the administrative and logistics requirements, and team operations at the site. The project relied on the mHealth supervisory reports to flag any gaps noted during supervision, the Performance Management Tracker (PMT) data summaries to track performance, and the incident and accident reports to raise incidents for quick action. More details on this are provided under the mHealth section.

3.3 WAREHOUSES AND INSECTICIDE STOCK MANAGEMENT

VL Kenya took over the warehouses used under the PMI AIRS project: one central warehouse in Kisumu and two county warehouses in Homa Bay and Migori Counties. In addition, the project retained five seasonal insecticide distribution centers, three in Homa Bay County (i.e., the Homa Bay warehouse, Rachuonyo Sub-County Hospital and Ogongo Sub-County Hospital) and two in Migori County (i.e., Kochola Dispensary and Arombe Health Center). The project received all insecticide and the majority of locally purchased materials in the Kisumu central warehouse and distributed them to the county warehouses based on the quantification and distribution plan. Some locally procured items were delivered directly to the county warehouses. During and after the campaign, the insecticide distribution centers also served as a temporary storage for empty insecticide bottles, sachets, and other plastic wastes in transit to the project's Kisumu central warehouse.

The VL Kenya team carefully tracked insecticides, equipment, and other materials from the central warehouse in Kisumu to the county warehouses and subsequently to the operations sites' storage facilities. When insecticide was received in Kisumu warehouse, the team opened each box and verified the contents physically by lifting bottles/sachets one by one and initialing the box to confirm the quantity of bottle/sachets contained in it. During dispatch from the central warehouse in Kisumu, insecticide was counted and recorded in the delivery notes which accompanied insecticide in-transit to the county warehouse. The stock cards and ledger books were then updated accordingly at the central warehouse and county warehouse after dispatch and receipt respectively. After arrival at the distribution centers from the county warehouse, the storekeeper verified the quantity received before signing the delivery note and completing the Goods Received Note (GRN). A copy of the delivery note and original copy of the GRN were returned back to the county warehouse. A similar procedure was used when delivering insecticide to the operations sites from the distribution centers. The team tracked empty insecticide bottles and sachets daily at the operations sites and insecticide distribution centers using a digitized e-inventory system. Storekeepers accounted for insecticide by recording how many insecticide bottles each team leader received and the bottles received by each SOP at the start of the day. At the end of the day, the same reconciliation was done using the insecticide tracking card and team leader insecticide tracker respectively. All commodities were documented on goods-issued notes, stock cards, insecticide distribution tracking sheets, and commodity ledger books.

3.4 BICYCLE PILOT AT RARIW OPERATIONS SITE

For the first time since PMI started supporting IRS in Kenya, VL Kenya piloted the use of bicycles by SOPs. Rariw operations site in Rangwe sub-county in Homa Bay County was identified to implement this pilot since the majority of the SOPs owned and knew how to ride bicycles. A series of meetings were held with the team to prepare them for the pilot. The main objective for this pilot was to test feasibility of the use of this mode of transport as a cost saving measure in IRS without compromising quality and compliance of a spray campaign. Each SOP was expected to wear complete PPE including the helmet when riding the bicycle. Discussions are underway with PMI to set guidance on which PPE to wear when riding a bicycle.

The site supervisor was provided with a weekly allowance to hire motorbike transport services while the site coordinator and sub-county coordinator rode extra hired bicycles for daily field supervision. Each SOP was reimbursed Kenya Shillings (KES) 300 as a stipend for use of their personal bicycles on top of their daily rate of KES 700. Each SOP was provided with a reflector jacket to ensure added visibility while on the roads. SOPs used a wooden box with a cushion lined with polythene to hold the spray tank in place while in transit

to avoid unnecessary spillages due to toppling over (Figure 3). Polythene lining was applied because it could hold any spillages and be wiped easily at the site. SOPs conducted daily decontamination of the bicycles at the end of days' work.

3.4.1 OBSERVATIONS

The teams were motivated and reported early to the site and left for the field early. Leaving early to the field enabled the team to start spraying early and more easily meet expected targets. The community was receptive and offered shelters for the bicycles while SOPs were out in the villages spraying. The shelter served as security for the bicycles. The local administration was very supportive to the teams, raising their morale. For example, local administration provided overnight storage for SOPs who did not want to go home with the bicycles and advised SOPs on the better riding routes.

The first week of the campaign using bicycles was initially tiring since the SOPs were not used to riding for long distances. The SOPs were exhausted at the end of the day with little energy to ride back home. Arrangements were made with the food vendor to provide a beverage and snacks to the SOPs at the end of each day so they could return home on the bikes. While in the field, SOPs teamed up to spray the remaining insecticide in their sprayers so that they had minimal weight while riding back to the operations site. The bicycle reached areas where vehicles could not easily reach, though it was difficult to ride up or down steep slopes found in the area.

Bicycle use was helpful in time management since no time was wasted in the morning and evening after work when the arrival of a hired vehicle was delayed. For this site, progressive mop-up was easy with bicycles. Use of bicycles allowed SOPs to ride in different directions to reach villages to spray missed structures rather than single point drop-off by a vehicle.

In general, SOP performance was unaffected by use of bicycles. SOPs average number of structures sprayed per day at this site was 11.2 structures. Spray coverage was at 87.2 percent. While compared to 90.9 percent in 2018,³ the perceived decline was driven by higher number of structures found in 2019 (8,070 structures) compared to 2018 (5,999 structures). VL attributes the higher number of structures found possibly due to SOP ability to reach structures more easily and faster while on bicycles than on foot. Furthermore, VL continued to emphasize the importance of SOPs recording all eligible structures found, irrespective of spray status, resulting in more complete recording of the eligible structure population. In terms of cost, it would have cost KES 420,000⁴ to hire SOP transportation. The project spent a total of KES 262,000 for the SOP and site coordinator bike allowance, supervisor motorcycle hire and pump holders.⁵ Consequently, VL saved KES 158,000, which is 38% cheaper than SOP vehicle transportation.

FIGURE 3: SOP MOUNTING BIKE



³ In 2018, SOPs found 5,999 structures and sprayed 5,456 structures hence 90.9% coverage. In 2019, SOPs found 8,078 structures and sprayed 7,040 resulting in 87.2% coverage.

⁴ Two SOP transport vehicles at KES 7,000 per day for 30 days.

⁵ SOP bicycle allowance for 25 bicycles at KES 300 per day for 30 days for a total of KES 225,000; Site Coordinator bicycles allowance for 1 bicycle at KES 500 per days for 30 days for a total of KES 15,000; Supervisor motorbike allowance for 1 motorcycle at KES 2,000 for 5 weeks for a total of KES 10,000; Pump holder purchase at total of KES 12,000.

3.5 SUMISHIELD® 50WG PILOT AT KENDU SUB-COUNTY HOSPITAL OPERATIONS SITE

SumiShield® 50WG is a neonicotinoid. Its active ingredient is clothianidin and is a new product recommended by WHO for use along with other insecticides for rotation in spray campaigns. In 2019, SumiShield® 50WG⁶ was earmarked for piloting in Rongo operations site in Migori County. Spraying the area around that site was not possible since the Supplemental Environmental Assessment (SEA) amendment approval was not in place at the time Migori began spraying due to the US government shutdown. This delay led to a decision to change the site for the pilot to Kendu Bay operations site in Homa Bay County with a target of 10,148 structures.

3.5.1 OBSERVATIONS

SumiShield® 50WG is easy to carry and requires significantly less storage space than Actellic® 300CS. The mixing procedure is similar to that of Actellic® 300CS except there is no need to triple rinse insecticide sachets. The insecticide is packaged in granules which dissolve uniformly forming no sediments, which minimizes clogging of control flow valves (CFVs) and nozzles. The insecticide is easily accepted by the beneficiaries because it has no smell and leaves less visible marks on the wall than Actellic® 300CS. However, this posed a challenge since there was no wall residue to show evidence of spray. The sachets are incinerated which saves on recycling costs. Generally, SumiShield® 50WG needs minimal logistics as it can be delivered once for the whole campaign and empty sachets and remaining insecticide can be collected at one time.

⁶ SumiShield® 50WG is manufactured by Sumitomo Company and is packaged in 150g sachets.

4. ENTOMOLOGY

4.1 BACKGROUND

This chapter summarizes the results of the cone and fumigant bioassays carried out within two weeks of spraying in both Migori and Homa Bay counties. In Migori County, spraying was conducted with Actellic® 300CS in all operations sites. In Homa Bay County, one site, Kendu Sub-county Hospital in Rachuonyo North Sub County, piloted spraying with SumiShield® 50WG, while the other sites were sprayed with Actellic® 300CS.

4.2 METHODS

Prior to the assessment, the project team selected 10 houses for bioassays in Rongo and Nyatike sub-counties in Migori County. The team selected 10 houses each from two villages that were sprayed with SumiShield® 50WG in Rachuonyo North Sub-county and 10 houses that were sprayed with Actellic® 300CS in Rangwe Sub-county in Homa Bay County. In each site, the team chose seven mud and three cement houses for evaluation, based on the most common wall types in the area. In each house, cones were set on three different walls at heights of 0.5m, 1.0m and 1.5m and were firmly held using either masking tape (for smooth walls) or pins (for rough mud walls). Ten insectary reared susceptible *Anopheles gambiae* s.s. Kisumu strain, aged two to five days, were gently released into each cone and exposed for 30 minutes. After the 30 minutes exposure, mosquitoes were transferred to a clean paper cup and sustained on 10 percent sugar solution for 24 hours for Actellic® 300CS and up to five days for SumiShield® 50WG. A control cone was set on a plywood board outside of each sprayed house in a shady area.

To determine the airborne fumigant effect of the insecticides, a small cage (20cm x 20cm x 20cm) with 10 *An. gambiae* Kisumu was placed 1m away from the sprayed wall for an exposure of 30 minutes. The number knocked-down was recorded at 30 minutes and 60 minutes, and mortality was recorded at 24 hours post exposure for Actellic® 300CS and up to 5 days for SumiShield® 50WG.

4.3 RESULTS

A total of 895 *An. gambiae* s.s. Kisumu were exposed to Actellic® 300CS sprayed walls, 300 were used in cages to test the fumigant effect and another 300 as controls (Table 4). Full mortality (100%) of *An. gambiae* s.s. Kisumu exposed to mud and cement walls was recorded within 24 hours post exposure for all houses. Mortality in the controls was <5 percent. Knock-down rates were 40 percent after 30 minutes and over 80 percent at 60 minutes post exposure, with 100 percent mortality recorded at 24 hours post exposure.

TABLE 4: NUMBER OF *AN. GAMBAIE* STRAIN EXPOSED TO ACTELIC® 300CS AND PERCENTAGE MORTALITY 24 HOURS AFTER EXPOSURE IN MIGORI AND HOMA BAY COUNTIES.

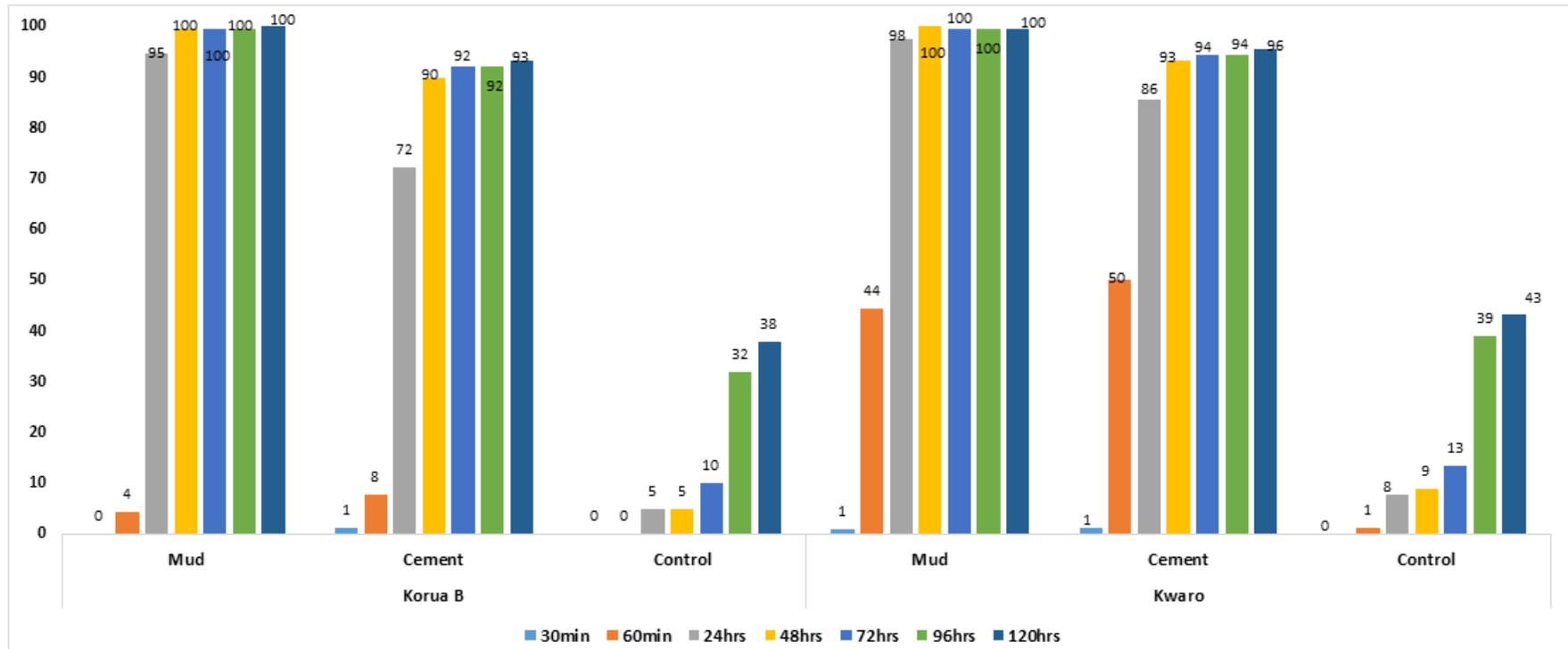
County	Sub county	Wall type	Intervention					Control		Fumigant cage	
			Wall height			No. exposed mosquitoes	24h % Mortality	No. exposed mosquitoes	24h % Mortality	No. exposed mosquitoes	24h % Mortality
			No exposed								
0.5m	1.0m	1.5m									
Migori	Rongo	Mud	67	70	68	205	100	70	0	70	53
		Cement	30	30	30	90	100	30	3	30	57
	Nyatike	Mud	70	70	70	210	100	70	4	70	56
		Cement	30	30	30	90	100	30	0	30	43
Homa Bay	Rangwe	Mud	70	70	70	210	100	70	4	70	86
		Cement	30	30	30	90	100	30	7	30	90
Total			297	300	298	895	100	300	3	300	64

A total of 600 *An. gambiae* s.s. Kisumu were exposed to walls sprayed with SumiShield® 50WG, while 100 were used to assess the fumigant effect and another 190 as controls (Table 5). Greater than 99 percent mortality of *An. gambiae* s.s. Kisumu was observed following cone bioassays on mud walls at both sites within 72 hours (3 days) post exposure. Mortality was slightly lower on concrete at 92 percent in Korua B and 94 percent in Kwaro after 72 hours. Control mortality 72 hours after exposure was within acceptable limits at 10 percent (Korua B) and 12 percent (Kwaro). Mortality on cement walls reached 93 percent and 96 percent by 120 hours (5 days) post exposure in Korua B and Kwaro villages, respectively. However, mortality in the controls were greater than the maximum of 20 percent and reached about 40 percent at both sites within 120 hours (Figure 4).

TABLE 5: PERCENTAGE MORTALITY UP TO 120 HOURS (5 DAYS) AFTER EXPOSURE TO SUMISHIELD® 50WG.

Village name & test	Surface type	No. exposed mosquitoes	Knock down		Mortality				
			30min	60min	24hrs n (%)	48hrs n (%)	72hrs n (%)	96hrs n (%)	120hrs n (%)
Korua B Cone test	Mud	210	0	9	199 (94.8)	209 (99.5)	209 (99.5)	209 (99.5)	210(100)
	Cement	90	1	7	65 (72.2)	81 (90.0)	83 (92.2)	83 (92.2)	84 (93.3)
	Control	100	0	0	5 (5.0)	5 (5.0)	10 (10.0)	32 (32.0)	38 (38.0)
Kwaro Cone test	Mud	210	2	93	205 (97.6)	209 (99.5)	209 (99.5)	209 (99.5)	209 (99.5)
	Cement	90	1	45	77(85.6)	84 (93.3)	85 (94.4)	85 (94.4)	86 (95.6)
	Control	90	0	1	7 (7.8)	8 (8.9)	12 (13.3)	35 (38.9)	39 (43.3)
Korua B Fumigant test	Mud	70	0	0	2 (2.9)	4 (5.7)	14 (20.0)	33 (47.1)	36 (51.4)
	Cement	30	0	0	1(3.3)	1(3.3)	1(3.3)	7(23.3)	8 (26.7)

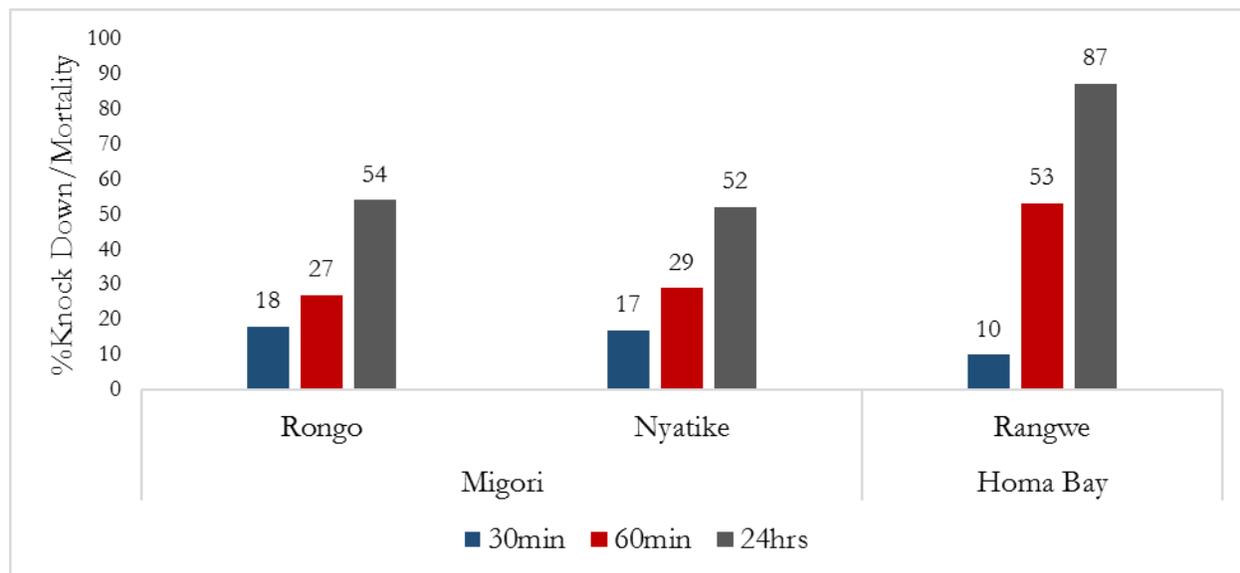
FIGURE 4: KNOCK-DOWN (30 AND 60 MINUTES) AND UP TO 120-HOUR (5 DAYS) MORTALITY OF SUSCEPTIBLE *AN. GAMBIAE* S.S. KISUMU STRAIN EXPOSED TO MUD AND CEMENT WALLS SPRAYED WITH SUMISHIELD® 50WG IN KORUA B AND KWARO VILLAGES, RACHUONYO NORTH SUB COUNTY (N≈300 PER VILLAGE; 210 MUD, 90 CEMENT).



4.4 FUMIGANT EFFECT

Mortality resulting from the fumigant effect of Actellic® 300CS was approximately 50 percent in Rongo and Nyatike sub-counties and over 80 percent in Rangwe Sub-county at 24 hours post exposure (Figure 5).

FIGURE 5: 24-HOUR MORTALITY OF *AN. GAMBIAE* S.S. EXPOSED TO FUMIGANT EFFECT OF PIRIMIPHOS- METHYL FOR 30 AND 60 MINUTES AND 24 HOURS APPROXIMATELY 1M FROM THE SPRAYED WALLS.



Results of the fumigant bioassays effect in houses sprayed with SumiShield® 50WG showed mortality was <20 percent 72 hours after exposure, for houses with cement and mud walls. Beyond this time period control mortality was >20 percent.

4.5 DISCUSSION

Mortality reached 100 percent within 24 hours of conducting the cone bioassay for Actellic® 300CS. This is an indication that spray application was conducted to an acceptable quality level in the selected houses. The contribution of the airborne fumigant effect to mortality of mosquitoes placed in a cage 1 meter away from Actellic® 300CS sprayed walls is an indication that even mosquitoes that enter houses and rest on unsprayed surfaces e.g. furniture are also likely to be controlled.

While high mortality rates were reached within 24 hours, there was a delayed mortality effect with SumiShield® 50WG, and 100 percent mortality was not reached on cement walls 72 hours after exposure. Mortality reached 99 percent within 72 hours of wall bioassay in mud walled houses and 93 percent for cement substrates. In other VL countries that were sprayed with SumiShield® 50WG, 100 percent mortality was generally reached within 24 to 48 hours of exposure shortly after spraying. This does not indicate any issue with performance in Kenya, as SumiShield® 50WG is known to be slow acting and ultimately 100% mortality was reached. Fumigant mortality due to SumiShield® 50WG was <20 percent after 72 hours. Due to the low vapor pressure, it is not anticipated that there will be any significant fumigant effect from SumiShield® 50WG. High control mortality beyond 72 hours was a challenge, and steps have been taken to minimize transport of mosquitoes after bioassay by establishing a field insectary. High control mortality may have been partly due to the high temperatures during this period. Monthly exposures using susceptible *An. gambiae* Kisumu will be performed to monitor insecticide residual efficacy after spraying.

5. MONITORING & EVALUATION

5.1 M&E APPROACH AND OBJECTIVES

The VL Kenya M&E technical team supported, communicated, and ensured compliance with project reporting requirements and data capture procedures. These objectives were achieved through enhancing the accuracy of the data collected and entered by conducting robust training at all levels (from training of trainers (TOTs) to individual seasonal staff) and continuous support to the spray teams, supervisors and data entry clerks (DECs) through M&E assistants and M&E supervisors. Standardized data collection tools and procedures were used across the operations sites. To achieve these objectives, the M&E team worked very closely with the other technical teams during planning and at implementation and held review meetings to get feedback on the systems in place.

In 2019, a total of 76 DECs (i.e., 41 in Homa Bay and 35 in Migori) and 21 M&E assistants (i.e., 8 in Migori, 12 in Homa Bay, and 1 roving across both counties) were recruited to support data collection and reporting.

5.2 DATA COLLECTION TOOLS

SOPs and mobilizers collected data during daily field work. Their immediate supervisors, the TL for spray activities and the IEC supervisor for mobilization, collected and verified all data from them respectively. For spray data, the TL handed over the reports to the site supervisor who then handed over the forms to the site coordinator after verification. The forms were submitted to the M&A assistant assigned to that site who conducted the final verification at the field level to ensure all relevant sections were filled out correctly and the form was signed off. Mobilization data came from the IEC supervisor to the site coordinator, who after verification, handed the data forms to the M&E assistant. M&E assistants ensured that all the spray and mobilization forms reached the data centers through the VL Kenya supervisors within 24 hours from the date of mobilization or the date of spray. Table 6 below shows the summary of the tools at each level of data flow.

TABLE 6: IRS ACTIVITIES AND RESPECTIVE DATA COLLECTION TOOLS

	SPRAY AND MOBILIZATION ACTIVITIES	DATA COLLECTION AND VERIFICATION TOOLS
1	Mobilizer sensitizes the community through door-to-door visits. Mobilizer may fail to sensitize households for any reason.	Mobilization form (Form 1A), IRS sticker, Form 1D for un-sensitized households
2	SOP visits a mobilized structure for spraying	Daily SOP Form and IRS sticker
3	Mobilizers attend community meetings with a goal to identify any non-sprayed structures to ensure follow up at household level and eventual spraying	Mobilizer Community Meeting Form
4	TL directly observes SOP during spray	Directly Observed Spray (DOS) Form
5	M&E assistants visit areas already sprayed by the SOPs to verify spray data at structure level	Data Collection Verification (DCV) Form (Digitized)
6	Team leader reviews the SOP daily form after end-of-day activity, summarizes data from team and submits forms to site supervisor	Team Leader Summary form with in-built logic checks
7	IEC supervisor reviews the mobilization form, updates MMT, and submits forms to M&E assistant	IEC supervisor summary
8	Site supervisor verifies form and hands over to site coordinator	Signs Daily SOP form
9	Site coordinator summarizes data on the Performance Management Tracker (PMT) and sends the report via CommCare	PMT

	SPRAY AND MOBILIZATION ACTIVITIES	DATA COLLECTION AND VERIFICATION TOOLS
10	M&E assistant collects, verifies, and submits data forms to data center (both spray and mobilization).	Error Eliminator (EE) logic check concepts applied
11	Data received at the data center, verified, and entered into the database	Data center tracking form

Since M&E assistants were located at the sub-county level, SOP and mobilization forms were collected each week by VL staff assigned to supervise that sub-county that week. Consequently, the data form collection plan was aligned with the weekly VL supervision plan. By using VL staff to collect data forms from the operations site, VL Kenya was able to save on logistical costs. The data form collection plan had designated a central data collection point, field based M&E assistant contact information and the VL staff assigned to that area that week.

5.2.1 IMPROVEMENTS TO THE DATA COLLECTION TOOLS

VL Kenya maintained the same spray and mobilization data collection tools used in 2018, under the PMI AIRS project. However, based on feedback and lessons learned, the team made a few modifications.

5.2.2 IRS STICKERS

Following 2018 IRS sticker pilot, VL Kenya scaled up the use of IRS sticker. The sticker had the IRS numbers which uniquely identified eligible structures, geographical location of the eligible structure, and SOP and/ mobilizer codes. In the absence of an IRS sticker, either because a structure has not been mobilized or sprayed, then a chalk door marking would be used instead. IEC supervisors received the stickers from the storekeepers in the satellite stores and issued them to the mobilizers and the TLs.

In 2019, effective use of stickers was affected by (a) poor quality of the adhesive, paper and ink used to print them which resulted in fading IRS numbers and falling off and (b) removal of stickers by household owners. In cases where stickers were removed by home owners, the mobilizers were encouraged to return to re-sensitize the households and to ask them to choose a place of preference for sticking the sticker. For stickers that fell off, mobilizers were encouraged to wipe the surfaces before mounting the stickers. In several situations, the IEC team had to re-mount stickers and complete sticker re-issue -reports. VL Kenya plans to use stickers again and will focus on higher quality stickers during the procurement process.

5.2.3 MOBILIZATION FORMS

VL Kenya introduced three new tools to support monitoring of mobilization progress: the Mobilization Monitoring Tool (MMT), the Mobilization Progress Tracking Sheet (MPTS), and un-sensitized household tracker (Form 1D). IEC supervisors completed mobilization indicators while site coordinator completed spray indicators on the MPTS. MPTS was completed when mobilization and spray activities were completed within a given sub location. The MPTS was designed to track mobilization activities at operations site level with the goal of tracking mobilization progress against the number of target structures and help avoid SOPs from catching up with the mobilizers.

At the end of each day, IEC supervisors summarized data from mobilization form (Form 1A) and community meeting feedback form (Form 1B) from each mobilizer onto the IEC supervisor summary (Form 1C), similar to TL Summary Forms. The IEC supervisor summary is mobile-based. Data from IEC summary form flows into MMT. In the current campaign, mobilization data was summarized at sub-location level and was tracked on a daily basis through the Mobilization Progress Tracking Sheet (MPTS).

The mobilizers filled in Form 1D whenever they encountered households where sensitization could not occur. The tool encouraged supported re-visits as below:

- **Visit 1:** If mobilizer visited the household alone and the household was non-sensitized during regular work, then a second visit would occur.

- **Visit 2:** Mobilizer visited the household with the IEC supervisor to mobilize the household; if household is non-sensitized, a third visit is arranged.
- **Visit 3:** Mobilizer, IEC supervisor, site supervisors visit the structure with the administrative authorities. If on the third visit, no mobilization occurs, the household is deemed non-sensitized.

After each visit, the mobilizer would record information on Form 1D.

If at any given visit above, the household finally gets sensitized, the mobilizer must transfer the record from Form 1D to the mobilization form (Form 1A) after issuing a sticker which has a unique IRS number. If after the three attempted supported visits, the household was still non-sensitized, the record was assigned an IRS number and was transferred to the mobilization form (Form 1A) as a non-sensitized household. This transfer of data from Form 1D to Form 1A would enable both “sensitized” and “non-sensitized” households to be captured in the VectorLink Collect database. A recurring problem was that some mobilizers forgot to transfer details of non-sensitized households to Form 1A while others submitted Form 1D before making the third supported attempted re-visit.

5.2.4 SPRAYING FORMS

To support accurate data collection, the project increased the size of the Daily SOP form to allow for reporting of up to 15 structures, up from 10. SOPs were encouraged to take more than one SOP data form as they left for the field. A new column was added to capture structures during a re-visit. TLs summarized spray data from the daily SOP form onto a daily TL form. In prior campaigns, the Error Eliminator (EE) tool was not well utilized. This tool was supposed to reduce logic errors on SOP forms. In 2019, the EE form was merged with the daily TL form into a single document, the TL summary.

5.2.5 ERROR TRACKING LOG

To better track forms that needed to return to the field for correction, the project introduced a digital tool, error tracking log, to augment the data center tracking sheet at the data center. The data center tracking sheet kept track of all forms received from the field and those returned to the field for correction. The error tracking log, which was filled by the M&E assistants, tracked forms with errors in the field and their stage of correction. The log contained details of the errors identified, IRS number of affected record, the VL supervisor who collected the form from the data center, the M&E assistant issued with the form in the field, and the specific field staff who was working on the form to correct issues in the field. The error tracking log made it easier to track the corrections needed and led to most forms being returned to the data centers within the 24 hour return time and at most three days for errors that required physical re-visits to the structures.

5.3 VECTORLINK COLLECT DATABASE

In 2019, VL Kenya transitioned from the MS Access database to the new VectorLink Collect (VLC) database. The VLC database was developed using the District Health Information Software 2 (DHIS-2) system, for mobilization and spray data entry, cleaning, and reporting. The new system had multiple advantages including the ability to have real time view of data entry progress, development of powerful dashboards, and pivot tables to track performance and remote interaction with the system from any location. The project granted access to the stakeholders in the MOH – SCHRIOS, SCMCCs and the CHRIOs and CMCCs for both Homa Bay and Migori counties, the NMCP, PMI Mission office and the VectorLink project staff.

Before the start of the campaign, the M&E and operations teams worked together to gather the needed metadata that would enable roll out of the database (i.e., geographical information to village level, personnel codes which uniquely identify the seasonal staff in the program, and spray targets to sub location level). These were then set up into the system prior to the start of the campaign to enable entry and reporting.

VLC has four main event programs that reflect the mobilization and spray hardcopy data collection forms. These include spray details, spray totals, mobilization details, and the mobilization totals. The details

represented each observation on the spray and/ or mobilization data form as a row and the totals represented the summation of the contents of each observation per row.

The database had additional built-in tools to enhance reporting:

- Desktop Event Capture: An offline data entry platform with in-built validation checks to ensure accurate data entry even in places with no internet connectivity. It was installed in every data entry clerk machine, pointing to the live server where data was synced at the end of each day. DECAs were not supposed to log out of the system until the end of the campaign.
- Duplicate Finder: An application run after the data entry to identify any duplicated IRS numbers that were not as a result of re-visits in the field (i.e., true duplicates of IRS numbers either from data entry errors or errors from the field).
- Mop up Tool: A tool used to mark any re-visited structures in the system as reported in the daily SOP form, to retain the “updated” event in the database to prevent double counting of eligible structures.
- Variance Reports: A custom, HTML report within the VCL identified data inconsistencies resulting from mismatches between the details and the totals programs for both spray and mobilization.

Data cleaning was a progressive exercise, with DECAs at each data center dedicated to this role. All forms that were identified to have errors were returned back to the field. Duplication of IRS numbers was the most common error identified mainly due to mobilizer and SOP as they recorded IRS numbers. To resolve these errors, after confirmation with the hardcopy forms, the field teams went back to the structures for verification. For cases where the correct IRS numbers were retrieved, the corrections were made in the database. Some of the spray data duplicates were as a result of revisited structures not indicated as re-visits in the daily SOP forms; once identified, ‘revisit’ was indicated on the daily SOP form and an edit was made in the system.

The VLC worked well for mobilization and spray data reporting. In rare instances, power outages resulted in locally stored, offline data lost when the desktop machines shut off in the middle of data entry. After thorough investigation, it was discovered that the few affected computers had confounding software/hardware issues that likely contributed to the data loss. On these occasions, data had to be re-entered. Overall, the M&E team ensured all the data entry machines had internet connectivity with increased bandwidth and a power back-up generator throughout the campaign to ensure consistent, reliable data entry and reporting throughout the 2019 IRS campaign.

5.4 VECTORLINK COLLECT MOBILE PILOT

As part of the cost saving and efficiency models, VL Kenya project piloted the use of mobile devices for direct SOP reporting at point of spray. The pilot was rolled out at Dede operations site, Awendo Sub County, Migori County. The site met the criteria of having 30 SOPs and electricity both at the training venue and at the satellite store. SOPs, TLs, and their supervisors were given a one and a half day practical training on how to use the DHIS-2 based mobile system for reporting. The daily spray operator form was digitized to collect data on three event programs: structures sprayed, structures not sprayed and insecticide used. All these event programs were inbuilt with all the metadata required for each structure including the geographic details, GPS coordinates information and date and time of data collection. No hard copy forms were used along with the mobile reporting. The hard copy SOP forms were carried to the field only as back up in case the phone failed at the time of spray. The team leaders continued to summarize the SOP data in the daily SOP team leader summary form except that they left the logics check section blank. This is because the mobile application had validation rules built into the digitized daily spray form.

Spray operators filled in details of the structures in the relevant event program depending on whether the structures were sprayed or not. For all structures that were sprayed, they filled the insecticide event program

DHIS-2 in 2018/2019. Following the regional training, the Kenya M&E team trained the internal teams on the new database concepts, all the data collection tools, and reporting requirements. This included the ToTs and support staff who later cascaded the training to the seasonal staff. Key M&E trainers comprised SCHRIOs, M&E assistants, and high performing DECs. They were taken through a one day refresher training a day before the seasonal worker trainings and were assigned specific operations sites to train. The field-based M&E assistants continued to support and mentor the teams in the field throughout the campaign.

5.6 DATA QUALITY ASSURANCE AND VERIFICATION

Standardized data collection tools were provided across every operations site. These tools were coupled with intense training for all data collectors and supervisors at each level. Trained SOPs and mobilizers received unique numbers which tracked both the M&E data and acted as the finance payroll number. The protocol for seasonal worker replacement required the site coordinators to notify the Sub County Coordinators (SCC) on the seasonal staff changes on the ground for relevant updates in the databases. The VectorLink Collect, had built-in data quality check tools described in section 5.2 above.

The TL Summary had logic checks embedded to aid the team leaders in assessing any logic errors in the SOP forms. On the back of the TL Summary is Directly Observed Spray (DOS) Form which covers a set of spray quality indicators spanning from the mixing of the insecticide to the actual spraying activity. This was a supervision checklist for the TLs as they observed spray at structure level. The Data Collection Verification (DCV) Form focused on verifying the details of a structure one to two days after it had been sprayed. M&E assistants and VL supervisors completed the DCV form during field visits. The IEC Supervisor Form was used by the IEC supervisor to summarize mobilization data for door-to-door activities and community meetings at sub-location level. During the community meetings, mobilizers used the Mobilizer Community Meeting Tool to track non-sprayed structures and their locator details and to document any IRS concerns and possible solutions for further action by the sites.

Despite having been taken through training sessions that emphasized the need to document both sprayed and non-sprayed eligible structures, non-documentation of unsprayed structures was still a challenge in some sites. During supervision, VL supervisors noted the reluctance by SOPs to spend time in documenting the non-sprayed structures as they felt they were not part of their daily target. Further discussions have been held with the IRS supervisors to focus more on spray quality as opposed to the constant pressure on achieving targets.

5.7 MAGUNGA DATA FALSIFICATION

On March 6, VL Kenya uncovered a data falsification incident at the Magunga operations site, which was reported to PMI. This resulted in the termination of ten spray operators together with their team leaders. Further investigations were launched including a *mini*-PSDQA that estimated a low spray coverage of 48.85%. Based on these results, PMI approved a re-spray campaign for the affected areas.

For the re-spray campaign, VL Kenya applied recommendations made in the EOSR as follows: (i) VL Kenya assigned specific villages to specific mobilizers and spray teams including their supervisors (both VL and MOH) to increase accountability; (ii) A VL staff sat in the recruitment committee, ensuring that all those who were selected met the criteria. Team leaders were interviewed separately to assess their competence and leadership qualities; (iii) More VL direct hired supervisors were assigned to directly oversee the spray exercise; (iv) For this targeted exercise, the M&E team designed form 1E (mobilizer unsprayed structure register) to collect information on all structures found by mobilizers that were not sprayed during the recently completed campaign. This information was used to guide SOPs to target specifically identified unsprayed structures; and (v) DCVs are being conducted more frequently and closer to the time of spray given that all supervisors (not just M&E assistants) have been assigned a DCV role and target.

During the re-spray campaign, VectorLink Kenya targeted for spray an estimated 4,575 eligible, non-sprayed structures, based on conservative data projections from the data falsification investigations, over 12 operation days from 20 May to 1 June, 2019. In the initial campaign, Magunga operations site, Gwassi South Ward, Suba South Sub-county, Homa Bay County had an overall spray target of 9,150 structures. The re-spray target

of 4,575 was 50% of the target based on the mini-PSDQA's 48.85% coverage estimate. Because of the unique scenario where VL did not have a detailed enumeration to serve as the denominator of missed eligible structures during the 2019 campaign, the project relied more on mobilization data than it normally does to inform progress towards reaching all eligible structures. Mobilizers identified a total of 4,036 structures that were not sprayed during the 2019 campaign. This represents 88.2% of the estimated 4,575 targeted structures. Of these 4,036 identified unsprayed structures, spray operators visited 3,886 of them (96.3%).

Following the successful re-spray exercise, the overall spray coverage (Re-spray + IRS 2019) achieved for Magunga Operations site catchment area was 86.3% of all eligible structures found. Specific to the re-spray campaign, VL Kenya had a spray coverage of 71.8%. The key reasons for non-spray were locked structures and refusals from eligible unsprayed structures. A total of 10,264 people were protected from malaria during the re-spray exercise; 1,661 children below 5 years of age and another 115 pregnant women. Table 7 below gives a summary of the performance by sub location:

TABLE 7: MAGUNGA OPERATION SITE OVERALL SPRAY COVERAGE

Sub Location	Found			Sprayed			Re-spray Spray Coverage	Overall (IRS2019 + Re-Spray) Spray Coverage
	IRS 2019	Re-Spray	Total (IRS2019 + Re-Spray)	IRS 2019	Re-spray	Total (IRS2019 + Re-Spray)		
Kibwer	1,472	485	1,957	1,412	366	1,778	75.5%	90.9%
Kisaku	1,343	492	1,835	1,313	358	1,671	72.8%	91.1%
Lwala	1,736	589	2,325	1,460	432	1,892	73.3%	81.4%
Magunga	948	340	1,288	750	248	998	72.9%	77.5%
Samba	1,545	537	2,082	1,429	381	1,810	70.9%	86.9%
Seka	1,339	677	2,015	1,164	442	1,606	65.3%	79.7%
Tonga	2,047	766	2,813	2,029	564	2,593	73.6%	92.2%
Magunga Operations Site	10,430	3,886	14,315	9,557	2,791	12,348	71.8%	86.3%

5.8 KEY SPRAY RESULTS

The M&E plan tracks performance and progress across the different components of the project on the following key objectives: implementation of Malaria Vector Control Interventions, Entomological and Epidemiological Data to Drive Decision-Making, Procure insecticides for IRS and support the delivery and storage of IRS and other malaria vector control products and innovation. Annex C shows the M&E plan indicator matrix shows how VL Kenya has performed against these indicators.

To monitor IRS performance, the key indicators tracked throughout the campaign included structures targeted, structures found, and the proportion of structures sprayed out of those targeted (spray progress) and those found sprayed (spray coverage). During spraying, the project collected population details to establish the populations protected. This included the total population disaggregated by gender and special groups such as pregnant women and children under five. Table 8 provides a summary of key results.

TABLE 8: SPRAY COVERAGE BY SUB COUNTY

Sub County	Structures found	Structures sprayed	Structures not sprayed	Spray Coverage	Target Overall Population	Population protected					Population not protected				
						General Population			Special Group out of General population		General Population			Special Group out of General population	
						Males	Females	Total	# Pregnant women	# Children <5 years	Males	Females	Total	# Pregnant women	# Children <5 years
MIGORI COUNTY															
Awendo	35,453	32,754	2,699	92.4%	130,531	62,078	61,701	123,779	2,664	14,642	2,757	3,177	5,934	102	805
Nyatike	47,832	44,914	2,918	93.9%	197,727	90,635	95,802	186,437	5,851	26,446	3,721	4,335	8,056	157	1,152
Rongo	34,764	33,395	1,369	96.1%	135,857	67,210	66,489	133,699	2,433	15,937	1,958	2,087	4,045	72	632
Suna East	35,916	33,872	2,044	94.3%	137,545	68,276	68,193	136,469	2,821	16,871	2,620	2,778	5,398	101	748
Suna West	33,148	30,461	2,687	91.9%	113,305	58,641	61,973	120,614	3,387	16,860	3,253	3,641	6,894	135	1,057
Urii	48,101	46,148	1,953	95.9%	185,836	93,828	92,008	185,836	4,170	25,218	2,890	3,057	5,947	117	926
Sub Total	235,214	221,544	13,670	94.2%	900,801	440,668	446,166	886,834	21,326	115,974	17,199	19,075	36,274	684	5,320
HOMA BAY COUNTY															
Homabay Township	27,577	23,734	3,843	86.1%	100,380	49,375	50,355	99,730	2,686	11,637	2,990	3,368	6,358	86	899
Ndhiwa	58,182	52,078	6,104	89.5%	185,371	102,884	101,649	204,533	5,521	30,012	9,248	9,758	19,011	372	2,892
Rachuonyo East	37,298	35,128	2,170	94.2%	122,972	70,235	67,133	137,368	1,875	12,643	2,184	2,457	4,641	65	521
Rachuonyo North	55,932	50,905	5,027	91.0%	105,961	96,484	98,309	194,793	2,799	21,459	4,836	5,511	10,347	117	1,232
Rachuonyo South	40,155	35,282	4,873	87.9%	129,924	68,667	68,253	136,920	2,997	15,173	5,722	6,395	12,117	196	1,665
Rangwe	30,852	28,255	2,597	91.6%	173,005	58,362	60,155	118,517	2,630	14,118	3,698	4,134	7,832	141	1,053
Suba North	27,859	26,333	1,526	94.5%	87,108	51,521	52,315	103,836	1,540	11,775	1,461	1,595	3,056	32	419
Suba South	38,620	34,518	4,102	89.4%	118,800	63,160	66,169	129,329	3,625	16,484	3,073	3,363	6,436	126	941
Sub Total	316,475	286,233	30,243	90.4%	102,3521	560,688	564,338	1,125,026	23,673	133,301	33,212	36,581	69,798	1,135	9,622
Grand Total	551,689	507,777	43,912	92.0%	1,924,322	1,001,356	1,010,504	2,011, 860	44,999	249,275	50,411	55,656	106,072	1,819	14,942

5.8.1 INSECTICIDE USAGE AND SOP PERFORMANCE

SOPs were given a daily target of nine structures per day at the start of the campaign. Spraying activities started in remote areas, progressing closer to the operations sites in the field. Toward the last days of the campaign, many of the SOPs were spraying urban areas. Institutions were targeted for the last days of the campaign. The project used 158,877 insecticide bottles/sachets to spray 507,777 structures (Table 9).

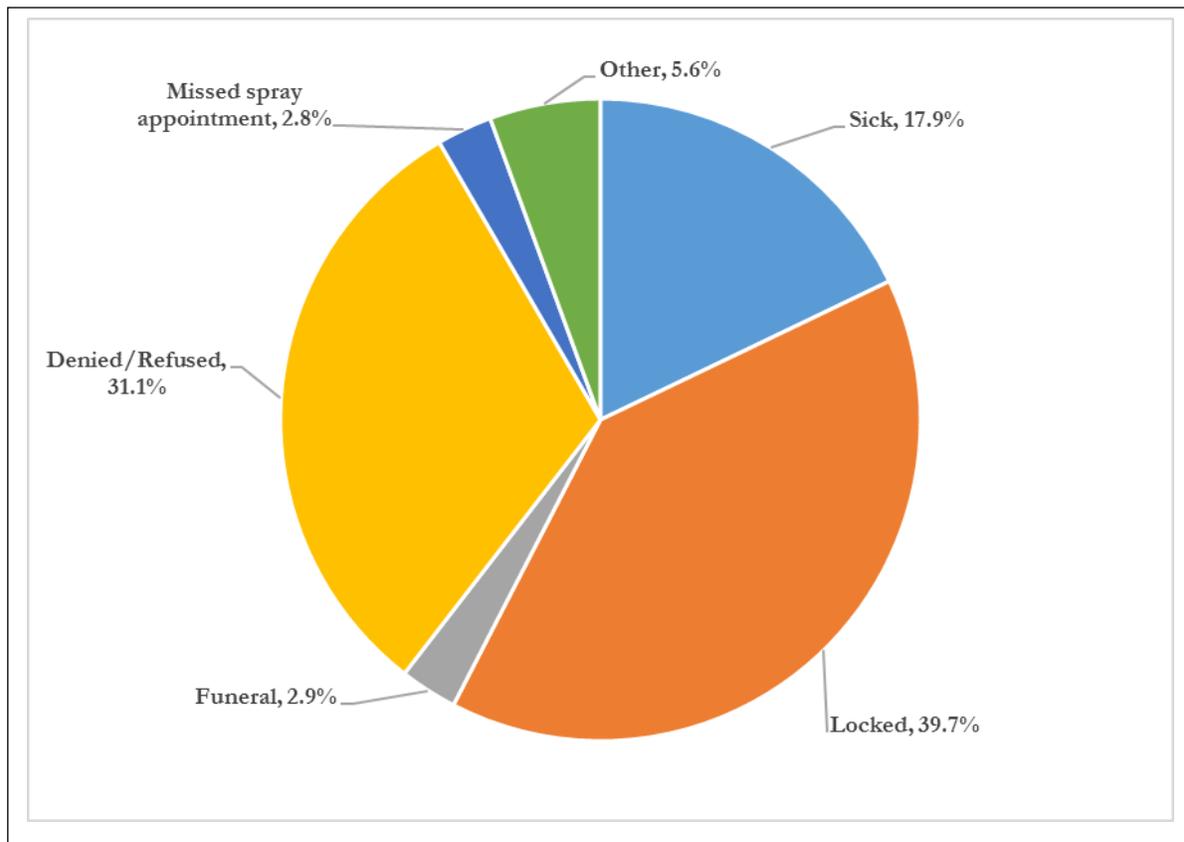
TABLE 9: INSECTICIDE USAGE AND SOP PERFORMANCE

Sub County	Number of SOPs	Structures Sprayed	Insecticide Used	Average Number of Structures Sprayed by SOP per Day	Average Number of Structures Sprayed per Bottle/sachet
MIGORI COUNTY					
Awendo	139	32,754	8,877	10	3.7
Nyatike	199	44,914	17,115	9	2.6
Rongo	142	33,395	8,904	10	3.8
Suna East	147	33,872	9,615	10	3.5
Suna West	127	30,461	9,424	10	3.2
Uriri	185	46,148	14,043	10	3.3
Migori	939	221,544	67,978	10	3.3
HOMA BAY COUNTY					
Homa Bay Township	91	23,734	7,855	9	3.0
Ndhiwa	172	52,078	14,865	10	3.5
Rachuonyo East	116	35,128	11,371	10	3.1
Rachuonyo North	167	50,905	16,467	10	3.1
Rachuonyo South	129	35,282	12,273	9	2.9
Rangwe	103	28,255	8,772	9	3.2
Suba North	82	26,333	8,556	11	3.1
Suba South	112	34,518	10,740	10	3.2
Homa Bay	972	286,233	90,899	10	3.1
Overall	1911	507,777	158,877	9	3.2

5.8.2 REASONS FOR NON-SPRAY, 2019

VL Kenya did not spray 43,912 structures in total; 31.1 percent, or 13,670, of these structures were in Migori County while 68.9 percent, or 30,242 structures were in Homa Bay County. The key reason for non-spray in both counties was locked structures on the spray day (39.7%) followed closely by refusals (31.1%). Nyatike and Suna West sub-counties had high refusal rates compared to the other sub counties in Migori County. Homa Bay Township, Ndhiwa, Rachuonyo North, and Rachuonyo South sub-counties all registered high cases of locked structures and/or refusals in Homa Bay County. Ndhiwa Sub-County also stood out with many structures where sick people were present who could not be moved out for the spray to take place. Figure 7 below gives the breakdown for the reasons for non-spray by sub-county.

FIGURE 7: REASONS FOR NON – SPRAY

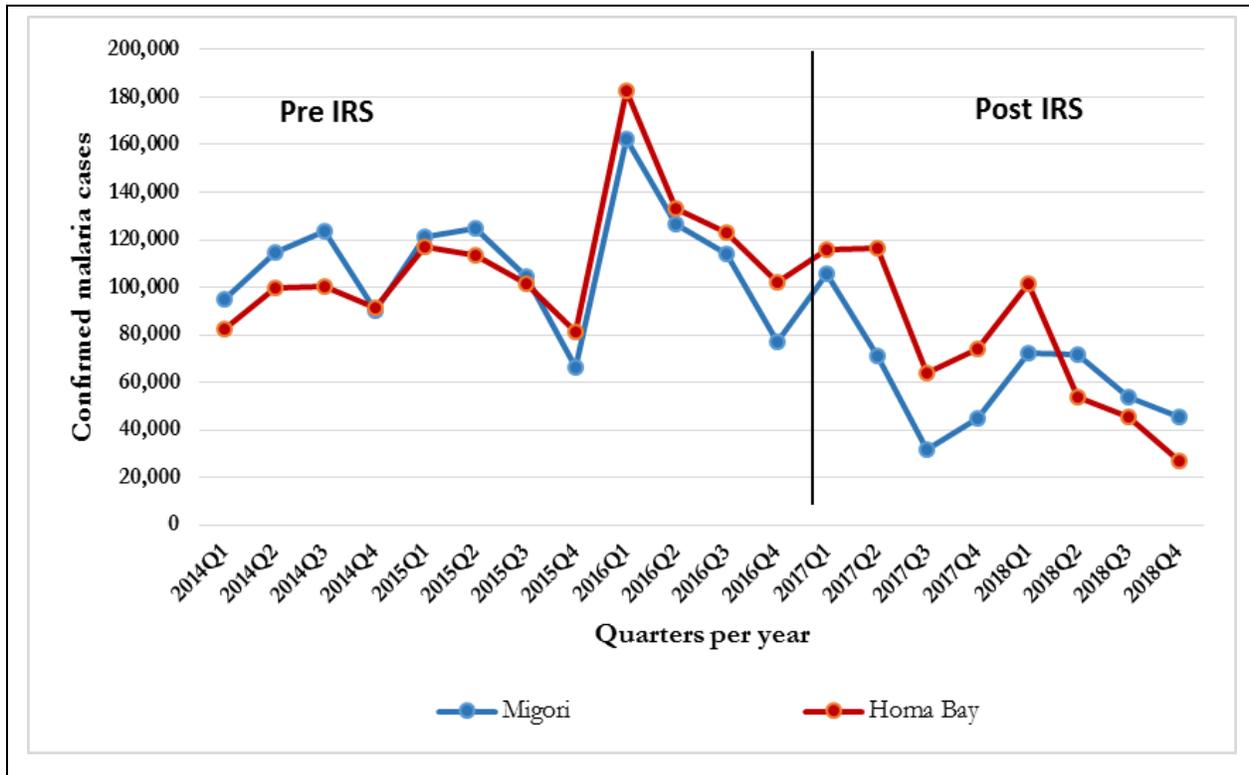


5.9 HEALTH FACILITY SURVEILLANCE

To assess the impact of IRS across the areas of implementation, VL Kenya collected malaria reported cases in both Migori and Homa Bay counties. As a starting point, this data was initially physically collected directly from the registers at the health facilities and keyed into an MS Access database. The process was tedious and various gaps were identified. The gaps were caused by health care workers not willing to document the data, misunderstanding of the malaria indicators, non-uniform ways of recording the data and some facilities missing the registers or improvising data capture tools. As a result, a meeting was convened with other malaria program implementing partners. At that meeting it agreed, going forward, all malaria epidemiological data would source from the Kenya Health Information System (KHIS).

VL Kenya has obtained and analyzed total malaria confirmed cases at the health facilities from the year 2014 all the way to the year 2018, for the months of January through December. This analysis was to identify trends before IRS and after IRS in 2017 and 2018 in both Homa Bay and Migori counties. Generally, malaria cases reported take a downward gradient through the months and across the years. A summary of reported confirmed malaria cases is depicted in the graph below (Figure 8) since the start of IRS in 2017 to 2018.

FIGURE 8: MIGORI AND HOMA BAY COUNTY MALARIA TREND



6. M-HEALTH

6.1 COMM CARE APPLICATIONS

In 2019, VL Kenya continued to employ the use of m-Health applications to support quick decision making across different components of the program, and to complement the CommCare tools used across the project. The complementary m-Health tools were designed in Open Data Kit (ODK), which is open source.

6.1.1 SUPERVISORY FORM

Digitized checklists were designed and used for supervision across the program. These included (a) morning mobilization and transport vehicle inspections to assess compliance before teams depart for fieldwork in the morning; (b) home owner preparation and SOP performance to assess the passing of key messages and observe spraying at structure level; (c) storekeeper performance checks to ensure compliance with storage requirements and record keeping at the stores for all the stock keeping records; and (d) at the close of the day, the end of day clean-up inspections were conducted to check compliance at the wash area. All project supervisors at different levels were issued phones to support supervision. For any gaps noted during supervision, the digitized checklists would generate daily alerts (red flags) to all supervisors and decision makers who would then take the necessary action. The sub-county coordinators followed up with the respective supervisors within their sub-counties of jurisdiction for action and/or support. During the campaign, especially in the first few days, it was noted that some supervisors were not carefully reading the questions in the checklists before responding. This resulted in a number of false red flags. On-the-job training and immediate feedback was provided to supervisors directly, via WhatsApp fora, morning mobilization meetings, and during the debrief meetings.

6.1.2 PERFORMANCE MANAGEMENT TRACKER (PMT)

Daily submission of key operations data via PMT SMS provided key indicators on campaign progress and performance through automated email reports. Each of the 68 site coordinators received a mobile phone to submit the daily reports to CommCare HQ via Telerivet. After data verification with the SOPs, TLs, and site supervisors, the site coordinators submitted the data as summarized on the TL forms to the CommCare HQ platform. The same data was updated on the performance tracking sheet posted at every site. The key indicators reported in this system included: the number of SOPs that worked for the day, number of structures found, number of structures sprayed and the number of insecticide bottles/sachets used during the campaign.

6.1.3 JOB AID MESSAGES

The M&E manager and the technical team designed messages sent as job alert aides to the different cadres of seasonal staff. These messages spanned different aspects of the project, including finance and administration, IEC BCC, operations, M&E, environmental compliance, and gender and were sent out via SMS. The main objective was to reinforce and enhance compliance during the campaign. In 2018, job aid messages went out in Dholuo, which created challenges since Dholuo is not the only language spoken in the two counties and is not standardized especially when it comes to pronunciation and the written language, as one travels across the Nyanza region. Following feedback from the recipients on the languages used, and challenges faced with Dholuo and Swahili in previous campaigns, messages were sent out in English only except for the SOPs and mobilizers whose messages were translated to Dholuo. As in the 2018 campaign, two mobile gateways were used to handle Job Aid messages and PMT reports respectively, to good effect.

6.1.4 OTHER COMPLEMENTARY M-HEALTH APPLICATIONS

The project adopted other m-Health applications to support the decision-making and developed the applications using ODK. VL Kenya took advantage of the mobile phones distributed to supervisors, site coordinators, and VL staff in the program to disseminate additional applications. These applications included:

- **E-inventory tracker:** Storekeepers submitted the required store indicators daily using the ODK application installed on the VL mobile phones after reconciling their books to the county warehouse manager. The warehouse manager aggregated this data in e-inventory tracker and used that information to make prompt decisions on replenishment. For each satellite store, storekeepers and site coordinators tracked insecticide distribution and usage by reporting on bottles issued to SOPs and bottles returned at the end of the day (returned, emptied, and lost bottles). They also tracked full bottles in stock, the insecticide received from the main county warehouses, and the collection of empty bottles/ sachets. This tool was valuable especially in the last few weeks of the campaign for insecticide redistribution from one site to another to curb stock outs.
- **Incident and accident reports:** All incidents and/ or accidents are on mobile application for instantaneous documentation during campaign. The project modified the incident form to include the geographic details and the mobile number of the reporter. This additional information made it easier for the ECO to follow up and obtain details on any reported incidents or accidents. These mobile forms were installed in all the phones across the sites and for all supervisors in the program.

6.2 MOBILIZATION MONITORING TOOL (MMT)

This tool summarizes mobilizers' door-to-door sensitization activities, follow-up community meetings attended by the mobilizers, and any replacements or absenteeism from work as reported by IEC supervisors. It also helped track the IRS stickers per site in relation to the identified structures. This tool was useful in assessing mobilization progress in relation to the targets, tracking IRS sticker accountability and to avoid spray operators catching up with the mobilizers.

6.3 CAPACITY BUILDING ON M-HEALTH

The project reviewed training materials and content, received from Dimagi, and aligned them with 2019 reporting requirements. In preparation for the trainings, remote refresher sessions were arranged between Dimagi and the Kenya team to acquaint both parties on the changes in the system. Before the start of the campaign, the M&E team took advantage of the different trainings to train seasonal personnel on the m-Health applications and reporting requirements. A support staff training held in December 2018 focused on the m-Health applications content and targeted 72 storekeepers, 68 site coordinators, and 20 M&E assistant and IT/m-Health assistants. For the first time, two seasonal workers were hired as IT/ m-Health assistants and proved to be a big asset with trainings, preparations for the campaign, data center support, phone and computer issuance and tracking under M&E during the campaign. During spray and IEC ToTs, a day and a half was set aside for CommCare supervisory tools training for all the participants and the IEC supervisors. The M&E and IT/m-Health assistants continued to support the teams in the field in reporting using mobile devices.

6.4 HARDWARE FOR M-HEALTH REPORTING

A total of 471 Samsung Galaxy mobile phones (150 procured and 321 in inventory from prior campaign) were installed with all the m-Health applications and a secure applications lock software which prevented misuse of phones. Three phones for each county were put aside for any visitors while two were set as the gateways (one purely for job aids and the other for data reports). IEC assistants and M&E assistants used mobile phones for both reporting and conducting DCV.

7. ENVIRONMENTAL COMPLIANCE

In December 2016, USAID approved a nationwide Supplemental Environmental Assessment (SEA) for the period 2017-2021 authorizing the use of four classes of pesticides: pyrethroids, organophosphates, carbamates, and when pre-qualified by the World Health Organization (WHO), chlorfenapyr. In January 2019, USAID approved an amendment to the 2017-2021 SEA for IRS in Kenya, authorizing the use of clothianidin, a new IRS insecticide that was WHO/PQ-listed in 2017, in addition to combination clothianidin/deltamethrin.

The Kenya Environmental Management and Coordination Act, EMCA, (CAP 387 Rev 2015, Part VII section 68) mandates annual environmental audits (initial and subsequent self-audits) and environmental monitoring for all projects specified in the Act that are likely to have significant effect on the environment. These annual environmental audits strengthen enforcement and compliance with conditions for the Environmental Impact Assessment (EIA) license issued by NEMA.

As required by law, the VL Kenya project contracted the Safe Global Consultancy Firm Limited to conduct the Environmental Audits (EAs) for IRS activities in Migori and Homa Bay counties in accordance with the EIA & Audit Regulations, 2003. The EA reports for both counties were submitted to NEMA in January 2019. After review, NEMA recommended the registration of IRS activities at the Directorate of Occupational Safety and Health Services (DOSHS) for full compliance with the Occupational Health and Safety Act, 2007. The VL Kenya project, through Safe Global Consultancy Firm Limited submitted a risk assessment report of IRS activities to both NEMA and DOSHS on May 6 2019 to fulfill this requirement.

Annex D provides details on the Environmental Mitigation and Monitoring Report.

7.1 PRE-SPRAY ENVIRONMENTAL COMPLIANCE ASSESSMENTS AND INSPECTIONS

7.1.1 ENVIRONMENTAL ASSESSMENTS DURING GEOGRAPHICAL RECONNAISSANCE (GR)

The project team carried out a GR and needs assessment in Migori and Homa Bay counties between August 13 and August 24, 2018. The visits aimed at identifying potentially compliant storage rooms for IRS insecticides, PPE, and other commodities; determining the best available routes for transportation of insecticides and SOPs; determining the suitability of soak pits/wash areas used in the previous IRS rounds; and locations for new soak pits, wash areas, and water collection points, especially from roof catchments. GPS locations for all 68 operations sites are in Annex E.

Data gathered from the GR and needs assessment guided the VL Kenya project in setting up two new operations sites and eliminating two other operations sites that were used during the 2018 IRS campaign. The two new sites were set up at Tom Mboya Sub-county Hospital (SCH) in Mbita Sub-county and Nguku dispensary in Ndhiwa Sub-county, both in Homa Bay County. The two sites on Mfangano Island (i.e., Ugina and Wakula operations sites) were eliminated, as the island was not sprayed in 2019. With recommendations from the needs assessment, the project retained 62 storerooms used from 2018 campaign and refurbished 4 new storerooms for the 2019 IRS campaign. These four new storerooms are located at Macalder, Rabondo, Anjengo and Ndhiwa SCH operations sites. In Migori County, all 28 soak pits were overhauled after the prior two rounds of spraying to ensure effective performance in handling IRS effluent wastes. For Homa Bay, the soak pit at Omboga operations site was overhauled and a secondary retention soak pit was set up to address performance issues reported during the 2018 spray campaign at that site. Operations sites refurbishment and

repairs in Migori and Homa Bay County were carried out between September 3 and September 15, 2018. Figure 9 shows a typical operation site.

FIGURE 9: TYPICAL VECTORLINK OPERATION SITE



Storeroom with roof water-collection system



Fenced-off wash area with warning sign and an adjacent soak pit



Separate temporary bathing structures (blue structures) for male/female spray team members

7.1.2 INITIAL, SECOND AND FINAL PRE-SEASON ENVIRONMENTAL COMPLIANCE ASSESSMENTS (PSECAs)

The project Environmental Compliance Officer (ECO), accompanied by officials from NEMA and county MoH conducted initial smartphone-based PSECAs of all the selected 68 operations sites from September 17 to October 4, 2018 to ensure that all operations sites in Homa Bay and Migori counties met the requirements provided for by the PMI BMPs. The PSECAs were used to assist in identifying items needed for both the storerooms and wash areas/soak pits as follows:

- Lack of privacy for temporary wooden bathing structures set up at the sites. Need for provision and installation of canvas covers over the bathing structures to ensure complete privacy of seasonal workers when they take a shower at the end of each spray day.
- Lack of PPE, soap, and wash tubs and other IRS consumables at the site stores. The project would deliver these items before delivery of insecticide and commencement of IRS operations.
- Provision of insecticide health and safety sheets and spill and emergency response procedures for site storerooms and for vehicles transporting the insecticide.
- Lack of fire extinguishers, thermometers, first aid and spill response kits for the site stores. The items needed to be available before delivery of the insecticide.
- Lack of labelled containers for storage of contaminated wastes at the site stores as well as triple rinse barrels.
- Need for training of storekeepers on environmental compliance for IRS operations at the site storerooms prior to commencement of spraying.
- Lack of antidotes (atropine) ampoules to health facilities nearest to the operations sites.
- Need for medical examination and pregnancy testing for seasonal workers.
- Need for installation of drying lines in the wash areas for hanging overalls and other PPE after cleaning.

- Lack of hazardous warning signage on the stores and wash areas. Delivery and installation of all mandatory site warning signs is required prior to IRS operations.

A site repairs and refurbishment work plan with clear action points to address the above deficiencies at all operations sites was developed. Repairs and refurbishments were completed between October 2018 and January 2019. Timely procurement and delivery of IRS commodities and equipment at the sites was completed by January 11, 2019 including delivery of fire extinguishers, first aid kits, spill response kits, thermometers, health, and safety and warning signage. By mid-January 2019, VL Kenya had made progress in addressing many of the issues identified during the initial PSECA. This paved the way for the second and final PSECA between January 14 and January 31, 2019 in both counties. All pending non-compliance issues identified in the second PSECA were addressed within the same period and VL Kenya received a green light to conduct IRS at all operations sites in Migori and Homa Bay on January 25 and February 5, 2019, respectively. The green lighting process was facilitated by the VL Home Office in Rockville.

7.1.3 IRS SUPERVISION, SOPs AND TRANSPORT VEHICLES INSPECTION

The VL EC team, supported by other VL supervisors, supervisors from NEMA and MOH, led enforcement and compliance to the PMI BMPs for IRS. The team made use of the digitized supervision checklists described in Chapter 6 to monitor compliance.

The VL Kenya ECO and the environmental compliance assistants (ECAs) conducted the pre-contract transport vehicle inspection for IRS supervision, logistics, and SOP transportation vehicles between December 3 and December 14, 2018. The inspection was a general assessment of the condition of vehicles to ensure they were road worthy, had valid insurance and technical inspection documents from the National Transport and Safety Authority (NTSA), and the drivers had valid licenses. Vehicle vendors whose vehicles were found non-compliant to the provisions of the PMI BMP for IRS transportation were given three weeks to comply either by repairing the vehicles or providing required documentation as per the Kenyan Traffic Laws (CAP. 403)

The project re-inspected the vehicles between January 7 and January 12, 2019 to ensure that the vendors had fixed vehicles recommended for repair and that all the vehicles met the safety and transportation requirements for IRS operations. The ECO supported by ECAs inspected and certified 232 vehicles to support operations in Migori and Homa Bay for the 2019 campaign.

7.1.4 MEDICAL EXAMINATION AND PREGNANCY TESTING FOR SPRAY TEAMS

The project conducted a health worker training in Migori and Homa Bay counties on January 17 and January 25, 2019 respectively. The health workers were selected from health centers where IRS sites are located and from other health facilities located in administrative locations where spray teams would be working. These teams of health workers supported medical screening of IRS seasonal workers and were also on standby to address IRS related incidents and accidents in the course of spray operations. To ensure a healthy work force during the IRS campaign and proper duty assignment, the project carried out medical examinations for all IRS seasonal workers who would directly be in contact with the insecticide. For female workers, a pregnancy test was conducted only once at the appropriate time in each of the counties so that the test results were valid for 30 days. The examinations took place in both counties between January 18 and January 29, 2019. The cadre of seasonal workers selected for medical screening and pregnancy testing comprised SOPs, washers, pump technicians, and storekeepers. Medical officers examined the groups at selected health centers, within a radius of 1 km from IRS operations sites. Antidotes were also stocked at these health centers to address incidents of adverse reactions to the insecticide. The seasonal workers gave a declaration of their medical and occupational histories and underwent checkups on their general health, visual acuity, allergic reactions, and cardiovascular and respiratory conditions. The physicians submitted their recommendations based on the fitness levels of each individual. Out of a total of 2,647 seasonal workers who were examined, 26 were found unfit and were not recommended for spray operations. All those found unfit to carry out roles that required direct interaction with the insecticide were either re-assigned to mobilization roles or replaced with new recruits.

7.2 CAPACITY BUILDING ON ENVIRONMENTAL COMPLIANCE

EC guidelines, procedures and best practices for IRS operations were incorporated in the VL Kenya training of all cadres recruited to support the 2019 campaign. The training was a three tier model starting with TOT, VL support staff training, and seasonal worker training. The goal was to enable supervisors who attended TOT as well as VL support staff to attain the desired knowledge and skills on IRS EC and cascade the knowledge down during the training of TLs, SOPs, pump technicians, mobilizers and suit washers with the help of training materials and guides. VL Kenya staff trained security guards, health workers, and drivers who were to transport SOPs and the insecticide. The M&E assistants as well as finance assistants were trained on safety measures while using motorcycles. Details of the training for IRS seasonal workers are in Annex F1 and F2.

7.3 ENVIRONMENTAL COMPLIANCE ACTIVITIES DURING THE CAMPAIGN

The VL Kenya project contracted food vendors in each operations site to prepare breakfast for the SOPs each morning. A menu was developed to detail the type of breakfast required to enable SOPs to perform their job. This breakfast was meant to sustain the SOPs while in the field and prevent them from carrying or asking for food in the villages while working with the insecticide. IRS supervisors at all levels visited the SOPs at their food joints each morning, a short distance from each operation site, to ensure that the quality and quantity of food offered was adequate.

The supervisors also took advantage of morning mobilization forums with the SOPs to address key challenges and recommend best practices. They also checked on SOP transportation vehicles to ensure that the roll cages were intact, seats were firm, and the drivers had all necessary paper work required of them including valid driving licenses. Each morning, the TLs and site coordinators ensured that the SOPs collected three to four liters of leftover insecticide from barrel 1 and rinse water from barrels 3 and 5 prior to boarding IRS transport vehicles. The leftover insecticide reconstituted with contents from barrel 3 and 5 was collected by SOPs for reuse in the field as the first mixing water. Each SOP vehicle had capacity to transport 12 SOPs and 2 TLs. This was checked by supervisors to ensure there was no overcrowding. Each TL was required to have a first aid kit and to board the vehicle only after completing the daily TL health checklist to confirm that his team's SOPs were fit for day's work and submitting to the storekeepers for filing.

Full PPE use was adhered to by the SOPs when they were mixing insecticide, while spraying and during wash-up activities at the end of the spray day. Supervisors also donned full PPEs while with the SOPs in the field and carrying out directly observed spraying to check on effectiveness of spray techniques applied by the SOPs. In the field, supervisors also checked on SOPs to ensure that they were triple rinsing empty insecticide bottles after mixing. At the site, washers did a second wash of the empty bottles and separated the lids from the bottles while puncturing them to render them unusable.

An inspection of site storerooms was carried out on a daily basis to determine storekeepers' performance with frequent checks on the general arrangement, inventory records, and physical verification of items, including insecticides, empty bottles, new and used nose masks, etc., to ensure that the physical count matched figures documented in store records. Storekeepers were also required to segregate waste generated at the sites. Supervisors checked on this requirement to ensure that plastic wastes were separated from paper and cardboard wastes, and that all contaminated wastes were stored in a separate room together with the insecticide. Storekeepers were interviewed to ensure they were trained on the symptoms of insecticide exposures and measures to take in case of such incidents.

At the sites, the project clearly displayed warning signs, EC procedures, and guidelines. Frequent checks were conducted to confirm correct posting of and adherence to warning signs at the sites; proper maintenance of fire extinguishers, first aid kits, and hand wash barrels; and that the site teams were appropriately prepared to respond to emergency cases related to potential incidents, accidents, and exposures to the insecticide.

In the field, supervisors supported household preparation to ensure removal of items from eligible structures and that immovable items were covered with a polythene sheet before spraying. TLs and supervisors monitored SOP performance to ensure correct swathing and application of the insecticide on desired surfaces. Beneficiaries were also interviewed to ensure that they had been informed on what to do before, during, and after spraying.

At the end of the day, when the SOPs returned to their sites, TLs and site supervisors would ensure that the SOPs continued to use their PPE in the wash areas, correctly performed the progressive rinsing of the sprayer pumps, and at the very least, washed their hands and faces with soap and water if for one reason or the other an SOP could not take a shower. Separate temporary bathing units covered with canvas sheets were provided for male and female SOPs so they could shower and have a change of clothes.

7.4 VL KENYA INCIDENT MANAGEMENT

VL Kenya relied on m-Health supervisory and reporting tools together with the incident and accident reporting form, to monitor and flag incidents and accidents that occurred during spray operations in Migori and Homa Bay counties. Annex G presents a summary of the incidents that were reported during the 2019 spray campaign in both counties.

7.5 POST-SEASON ENVIRONMENTAL COMPLIANCE ACTIVITIES

Close out of operations sites in Migori and Homa Bay counties began in the week of February 25, 2019 and March 19, 2019 respectively. The specific activities carried out during this close out time period included:

- Proper and thorough cleaning of PPE and other IRS commodities at the sites with enough soap, water and disinfectants.
- Reverse logistics for cleaned PPEs, unused insecticide, empty bottles, IRS uncontaminated wastes, material and equipment used during spraying. All these items went back to the county central warehouses for storage.
- Cleaning and decontamination of IRS site storerooms.
- Separate collection of all IRS contaminated wastes from the site stores for central holding at one central store for both counties prior to collection by the incineration company.
- Covering of all 68 soak pits in both counties with soil placed over a heavy gauge polythene sheet lining to prevent growth of vegetation over the filter material during the off-season and allow for effective biodegradation of the insecticide content adsorbed by the charcoal in the soak pit (Figure 10).
- Securing the wash area by locking gates to restrict access by humans or animals during the IRS off-season period and ensuring the wash area surrounding was left clean.

FIGURE 10: COVERING OF SOAK PITS AND SECURING THE WASH AREA



At each operations site, the project staff were given storerooms by the respective facility administrators mainly MoH and a few were in the Chiefs' camps. Some of the storerooms used for IRS operations usually serve as offices, staff houses, and meeting halls. For this reason, the project cleaned and decontaminated these storerooms by washing the floors with soap and water. The project repaired and painted storerooms whose walls had been damaged after the installation and removal of wooden hangers for pumps and PPE. VL Kenya made a formal request to those in charge of the facilities to provide adequate security for the locked-up wash areas and soak pits to prevent vandalism during the off-season period. A post-IRS EC inspection of all the 28 operations sites in Migori County was conducted from March 11 to March 15, 2019 and all the 40 sites in Homa Bay County from March 26 to March 29, 2019.

7.6 IRS CAMPAIGN WASTE COLLECTION AND DISPOSAL

All liquid waste generated as a result of the use of the insecticide was handled at the wash areas. Left-over insecticide that could not be used in the field was collected at the site in barrel number 1. Wash water from progressive rinsing of sprayer tanks was collected in barrel numbers 3, 5, and 7. As the content in barrel 7 was clear, indicating only minute traces of the insecticide, it was directly discharged through the soak pits. Re-use of contents in barrels 1, 3, and 5 was enforced the following spray day as a best environmental management practice for IRS waste water. VL Kenya emphasized source segregation of IRS solid waste at the operations sites, a task that was bestowed upon each storekeeper. The storekeepers categorized solid wastes that were generated at the sites either as contaminated or uncontaminated. Contaminated wastes comprised of used paper nose masks, soil/sand/sawdust used to clean spillages, empty sachets for SumiShield® 50 WG, and household items contaminated by the insecticide at beneficiaries' homes. All used dry cells batteries for megaphones and thermometers were stored together with the contaminated wastes. The project separated uncontaminated waste and stored them in labelled gunny bags, grouped as polythene/plastic wastes or ordinary paper/carton wastes. The plastic wastes comprised of all cleaned and punctured Actellic® 300CS bottles. At the end of spray operations and site close out activities, the logistics team organized transportation of all uncontaminated wastes collected from the sites to the Kisumu main warehouse for temporary storage before final disposal. Contaminated wastes collected from all sites in Migori and Homa Bay counties were transported to Kochola Operations site in Rongo Sub-County, Migori County, for temporary storage in a shipping container prior to final disposal. Thermal destruction of all contaminated wastes at Environmental and Combustion Consultants Limited (ECCL), Buhembu incineration facility was carried out between April 5 and April 7, 2019 under oversight of the VL Kenya ECO. The ECO witnessed the recycling of both IRS plastic and paper/carton wastes at VINTZ Plastics and Kamongo Waste Paper Limited from April 8 to April 13, 2019. Certificates of disposal are on file and available on request.

8. IEC AND COMMUNITY MOBILIZATION

8.1 MOBILIZATION METHODOLOGY

VL Kenya employed various mobilization methodologies to prepare the community for IRS. Based on lessons learned, mobilization activities began about two months into the spray campaign to enhance retention among the various stakeholders. The activities began with sensitization meetings in early November and continued until February 8, 2019 in Homa Bay County and January 21, 2019 in Migori County. Mobilizers are normally recruited by the county Ministry of Health staff, using a criteria set by VL and agreed upon during microplanning. To promote the government community strategy, community health volunteers (CHV) are given first priority during recruitment. During the 2019 IRS campaign, from Migori, there were a total of 1,103 mobilizers, of which 886 were CHVs while from those recruited 1,032 worked in the villages that they came from. In Homa Bay, VL had a total of 1,493 mobilizers, of which 1,482 were CHVs and 1,231 of those recruited worked in their villages. Mobilizers were paid a stipend at the end of the campaign. They conducted door-to-door visits of the targeted households allocated to them in their villages, passing key messages. They also conducted community meetings at the end of the spraying in their villages to identify those structures that had been missed and make a plan for mop up together with their supervisors and spray teams. To increase awareness and demystify myths, radio advertisements and promotions coupled with radio talk shows were aired, where listeners had an hour to call in and express their concerns or share any ideas. This year, the VL Kenya project procured T-shirts for the seasonal staff and stakeholders. Posters and banners were produced and posted at the operations sites. In both counties, the project had an IRS launch which brought together partners, stakeholders, and staff to raise awareness on IRS and inform the community that the campaign had kicked off. The launches in both counties were graced by the governor in Migori County and a senior member from the governor's office in Homa Bay County. This gave the community members confidence in the project.

8.1.1 SENSITIZATION MEETINGS.

Together with the Homa Bay and Migori County and Sub-County MOH teams, VL Kenya organized sensitization meetings from the county to the ward level. The project held one county meeting in each county and in 14 sub-counties (6 in Migori and 8 in Homa Bay) and held 68 ward meetings (28 in Migori and 40 in Homa Bay) between October 31, 2018 and November 8, 2018. At the county level, 70 participants were targeted (30 in Migori and 40 in Homa Bay) drawn from key ministries at the county level (e.g., health, national environment management authority (NEMA), education, county police representatives, water, and the governor's office. At the sub-county level, a total 420 participants from both counties participated. They were drawn from the sub-county health teams (i.e., the sub-county NEMA team, representatives from key ministries (e.g., education, gender, social services, water, youth and those living with disability), and 5,440 participants from the wards. At the ward level, 80 participants were targeted from each of the 68 wards in both counties. These participants were mostly village elders and assistant chiefs and a few chiefs. The chiefs and their assistants pledged to coordinate with the local village elders and support mobilization activities to reduce refusals. This worked in most areas. The assistant chiefs were very supportive in addressing refusals although a few of them were not as supportive as they had committed.

Closer to the campaign period, sensitization meetings targeting assistant county commissioners, deputy county commissioners, chiefs and assistant chiefs were held. The main objective of these meetings, which were held in each of the sub counties, was to get the buy-in of these key stakeholders, share with them the

spray and mobilization calendars, request their support in addressing refusals by encouraging the locals to accept IRS. Commissioner and chiefs were issued IRS branded t-shirts. Furthermore, chiefs were given a fuel allowance to support their movement in the community as they conducted community meetings. In both counties, a total of 39 assistant commissioners, 14 deputy county commissioners, 398 assistant chiefs and 166 chiefs were reached. From all these meetings, the following themes emerged:

- a) There was a general agreement that Actellic® 300CS reduced mosquitoes drastically and malaria was no longer common.
- b) A number of households had abandoned the use of mosquito nets after the spray campaign. This required an increased focus on reminding the community members to continue sleeping under treated mosquito nets.
- c) Stakeholders indicated they wanted to play a key role in recruiting seasonal staff and requested for the advertisements to pass through their offices to ensure that those living with disability are given an opportunity to work in the campaign and that adverts were widely circulated.
- d) Some stakeholders still felt that the Actellic® 300CS had a strong smell that may deter some community members from accepting the spray exercise.
- e) Others felt that the Actellic® 300CS left a bad stain on their walls.
- f) The issue of bedbugs and how they can be eliminated was raised. The myth that insecticide used in IRS brings bedbugs has been demystified in several forums, including radio programs and talk shows, sensitization meetings and during door to door mobilization. Community members have always been informed that (i) the insecticide does not bring bedbugs, and (ii) bedbugs can be present in the house even before the house is sprayed, are usually unseen since they hide in crevices due to light sensitivity and only come out at night to feed. They can also stay for long periods (up to 3 months) without feeding. Because of this behavior, the household owner may not know he/she has bedbugs. The IEC messaging states that when the house is sprayed, bed bugs get irritated and come out of their hiding places and are exposed to sunlight when items are removed outside. Due to this active behavior at this time, the household owner thinks the insecticide brought bedbugs, which is inaccurate.

8.1.2 IEC MATERIALS

IEC materials used during the campaign included 7,344 t-shirts, 73 banners, and 10,710 posters which gave the project visibility. The t-shirts developed were for all the seasonal staff engaged in IRS, all IRS supervisors, project staff, key stakeholders and visitors from PMI and NMCP. Banners were hung in all the 68 sites and 2 were used along the streets during the IRS launch in both counties. Posters were also delivered to the operations sites to display in public places and attach to vehicles used in the campaign. All the IEC materials had been developed in 2017 with the participation and support from NMCP and MOH. Every mobilizer received a mobilizer pocket guide, which contained brief guidelines on the key messages to emphasize during household visits and frequently asked questions and possible responses. Mobilizers also received a branded bag to carry the mobilizer data forms and IRS stickers, which the mobilizer issued to every mobilized structure. Unlike the cards, IRS stickers did not contain key messages due to their size. The feedback received from the stakeholders concerning IEC materials was that all of them should include key messages in the local Dholuo language.

8.1.3 RADIO PRESENTATIONS

In 2019, two radio stations were engaged based on the previous years' feedback. Radio Ramogi, a national Dholuo radio station, had 12 days of radio promotions and advertisements between 10 a.m. and 1 p.m. daily, two weeks before the Migori IRS campaign began and another 6 days, 2 weeks before the Homa Bay campaign began. For the radio talk shows, Radio Nam Lolwe was engaged for a total of eight weeks beginning one week before the Migori spray campaign began until the last week of the Homa Bay spray campaign. Each of the counties alternated in sending two representatives to the radio station representing

different sub-counties. The county MOH officials who participated in the talk shows were mostly the sub county health promotion officers. The one hour talk show took place between 9:30 p.m. and 10:30 p.m. every Wednesday. Listeners were able to call in and air their concerns which were adequately addressed. The callers were not only from Migori and Homa Bay but also other counties who had heard about IRS. Feedback received was that the timing was too late and most listeners had slept through the programs. VL Kenya will also share the radio schedule well in advance with all key stakeholders to enable them to plan well and to tune in.

8.1.4 MOBILIZER TRAINING

The project trained 1,076 mobilizers in Migori County on January 14 - 16, 2019 and 1,541 mobilizers in Homa Bay County on January 21 - 23, 2019. The trainings took place across all operations sites. IEC supervisors and public health officers from the sub-counties who received training during the IEC TOT training facilitated the trainings. For the three days, mobilizers received training on how to mobilize households, how to promote acceptance of IRS, key messages, door-to-door marking protocol, and filling of data-collection tools. The training included practical sessions and role plays. However, with the introduction of new data tools, it emerged that the participants needed an additional day for training especially for practical sessions. Trainers expected the mobilizers to conduct role plays and group work to ensure that they understood the sessions but the time was limited to carry this out effectively and comprehensively. M&E assistants and DECAs from the M&E department supported the training on data-collection tools and this created uniformity across the sites.

8.1.5 DOOR-TO-DOOR MOBILIZATION

Door-to-door mobilization began two weeks before the spray campaign to give mobilizers more time to cover all the allocated households before the spray teams arrived on the ground. The staggered approach ensured that only villages to be sprayed in the next two weeks were mobilized. This meant that only mobilizers from the villages to be sprayed within those two weeks began working during that specific period. Spray and mobilization calendars guided the teams as they moved from one village to another. In case the IEC Supervisor realized that the spray team was catching up with the mobilization team, they had the option of calling more mobilizers to cover more villages to boost mobilization irrespective of the spray and mobilization calendars.

The mobilization approach used is quite effective but needs some refining to ensure maximum acceptance and less refusals. This can be done by ensuring that all mobilizers recruited are CHVs who are acceptable in the community and can support mobilization activities with a clear understanding of the village, rather than recruiting outsiders. CHVs know very well when household owners in a particular village are out in the farm or away in the market unlike a foreign mobilizer. CHVs, from a particular village, can also find time late in the evening or very early in the morning to visit household owners who were not present during the day. When there were not enough CHVs to be recruited as SOPs and mobilizers, then village elders should be given second priority since they also command respect in the community. Chiefs and their assistants should also be brought on board early and constantly updated to ensure that they continuously reach out to the community members to encourage them to allow SOPs to spray their structures. Those household owners who work long hours and are rarely home to open their doors for the spray operators like the gold miners and fishermen, should be targeted through their leaders, since they all have groups that they subscribe to. The leaders can work with them to identify an appropriate date and time when their members can be available to allow SOPs to spray their structures. This discussion should begin early during sensitization meetings so that if they have any concerns these can be addressed in good time. Mobilizers had 10 active days to work, but they were on standby for the entire spray period in case they were required to support mop up activities. The 10 active days were broken into the following segments: the first five days for the mobilizer to visit all the allocated households, pass the key messages, issue an IRS sticker and mark the door after filling the data forms. For households that the mobilizers did not find anyone at home, they had up to three opportunities to come back before the spray operators arrived. Each time mobilizers missed the household owners, they recorded data in Form 1D (non-sensitized household tracker), and every successive re-visit captured on the same form. In

situations when the home owners were finally found, sensitized, and a sticker mounted, the details were shifted to Form 1A from Form 1D. If by the end of both spray and mobilization activities in that village, the household was not sensitized, the details were transferred from Form 1D to Form 1A as non-sensitized household. On the sixth day of work, one day before the spray campaign, the mobilizer using a megaphone went around the village informing the households that the SOPs would be on the ground the following day. For the next two days (days 7 and 8), they accompanied the SOPs, walking ahead of them just to ensure the households were properly mobilized and an adult was on standby to receive the SOPs and offer them 7.5 liters of water for mixing the insecticide. It was also emphasized at this point that if the SOPs had leftover insecticide from the previous household they did not need to mix more. During the final two days, after the mobilizer's village had been sprayed, the mobilizer had to attend community meetings either at the chief's baraza, youth group meeting, or women's group meeting or in the churches to find out if there was any structure that missed being sprayed. They filled these details in Community Meeting Feedback Form (Form 1B) which they handed over to the IEC supervisors. In the feedback meetings, it emerged that engaging all CHVs in a community unit would be more beneficial and increase acceptance since the mobilizers would be working in their respective villages and would also support in household preparation. Some mobilizers, who had not been picked for the exercise, were reported to be demobilizing the households and increasing refusals.

IEC supervisors were expected to attend morning mobilization activities before the spray team left for the field every morning to inform them on villages that had been mobilized and ready for spraying. The IEC supervisors took this opportunity to issue IRS stickers to team leaders just in case they came across structures not initially mobilized. The team leaders would mobilize households and fill Form 1A and issue stickers. In some cases, household owners or children removed the IRS stickers. To curb this, mobilizers were encouraged to ask household owners where they preferred the stickers placed. Table 10 below gives a summary of the mobilization results.

TABLE 10: MOBILIZATION RESULTS

Sub County	Households			Eligible structures identified	Population reached (12 years and above)			Acceptance of IRS	Non-acceptance of IRS
	Sensitized	Not sensitized	Total		Males	Females	Total		
MIGORI COUNTY									
Awendo	32,059	36	32,095	44,386	35,984	44,227	80,211	31,857	202
Nyatike	40,991	99	41,090	56,356	41,291	53,219	94,510	40,579	412
Rongo	34,220	108	34,328	43,693	48,124	54,187	102,311	34,192	28
Suna East	33,720	33	33,753	42,416	43,321	52,309	95,630	33,630	88
Suna West	30,861	43	30,904	40,599	33,636	42,865	76,501	30,465	396
Uriri	40,351	2	40,353	55,398	36,640	49,393	86,033	40,346	5
Sub Total	212,202	321	212,523	282,848	238,996	296,200	535,196	211,069	1,131
HOMA BAY COUNTY									
Homabay Township	25,447	-	25,447	32,268	31,344	39,210	70,554	25,192	254
Ndhiwa	51,151	-	51,151	65,879	61,861	73,709	135,570	50,904	245
Rachuonyo East	32,540	167	32,707	46,130	38,844	46,969	85,813	32,503	36
Rachuonyo North	48,409	2	48,411	66,252	51,294	64,368	115,662	48,251	156
Rachuonyo South	33,850	-	33,850	45,524	30,924	42,325	73,249	33,253	596
Rangwe	29,376	-	29,376	37,789	31,325	41,158	72,483	29,182	192
Suba North	20,309	-	20,309	26,479	20,734	27,116	47,850	20,238	70
Suba South	37,356	2	37,358	50,208	42,063	50,903	92,966	37,151	194
Sub Total	269,523	171	269,694	358,040	295,460	371,811	667,271	267,760	1,742
Grand Total	481,725	492	482,217	640,888	534,456	668,011	1,202,467	478,829	2,873

8.2 SPRAY LAUNCH

In Migori, the launch took place on January 29, 2019 on the second day of the spray campaign at Piny Oyie Market in Nyamaraga, Suna West sub-county while in Homa Bay the launch took place on February 11, 2019 on the first day of the spray campaign at Magina grounds in Ndhiwa sub-county. Ndhiwa was picked because of its accessibility and availability of the public grounds to be used for the function. Suna West was picked because of low spray coverage rates during the last campaign hence the need to increase mobilization activities in the area and use the local leaders to encourage the residents to accept IRS.

In Migori County the guest of honor was Governor Okoth Obado who lauded the efforts of PMI VectorLink in reducing the malaria burden and pledged to work with the team and support the initiative. He reiterated that his office recognizes the fact that IRS plays a critical role in effective prevention of malaria which is the leading cause of morbidity and mortality in the county. He encouraged the residents to embrace IRS as a government initiative. In Homa Bay, the guest of honor was County Executive Committee member of Health, Dr. Richard Muga, who lauded the IRS campaign saying that the Homa Bay County Government was committed to the fight against malaria. He urged Homa Bay residents to open their doors for SOPs. In Homa Bay, the launch event was also attended by chiefs and assistant chiefs, village elders, and community members. However, turnout for the Homa Bay event was relatively low due to venue choice, unlike in Migori where the venue was next to a market center. In both counties, representatives from PMI and NMCP, county directors of health, county malaria coordinators, VL Kenya Chief of Party, and representatives from all the sub-counties attended. In their speeches, the guests highlighted the importance of IRS and why the community should embrace it. In Migori, school children from two primary schools presented poems and songs on malaria prevention.

In both counties the launch began with a processional march to the venue with mobilizers and SOPs wearing their full attire, with one of them using the public address system to sensitize the community about IRS. Later, the team conducted an actual demonstration on how the spray exercise is carried out in a nearby house, preparing it for spraying and demonstrating spraying. The counties felt that in future, every sub-county should have their own mini launch event as the major launch event was taking place. Having sub-county launches would help in sensitizing the community and informing them that the campaign has kicked off.

9. GENDER MAINSTREAMING

During the 2019 campaign, overall the VL Kenya project employed 54.3 percent women (57.2% Homa Bay and 50.9% Migori). This was a slight drop compared to last year where 56% were women across Homa Bay and Migori Counties (59% in Homa Bay, and 52% in Migori). Drivers were the only cadre of personnel with no women. (Annex H1 and H2).

To produce these results, the project sensitized all stakeholders on the importance of recruiting women in IRS campaigns, and recruiters gave priority to women who met the requirements over men. It was a requirement that all female workers regularly exposed to insecticides-- SOPs, storekeepers, and washers – receive pregnancy tests before being involved in the campaign. After testing, those who did not qualify were assigned other roles.

To make women comfortable in their work, the project:

- Ensured every woman received the correct sizes of coveralls and boots.
- Provided disposable and reusable sanitary towels for use while in the field.
- Constructed separate bath shelters for males and females, properly labeled and well separated for privacy.
- Ensured at least two women worked per team in a “buddy system”.
- Encouraged women to report any sexual harassment.
- Paid all seasonal workers via Mpesa so women can have freedom in how they spend their money.

The project incorporated gender awareness and sexual harassment training in all the trainings conducted before the campaigns started. Participants learned about the importance of gender equity and equality for the success of the spray campaign, and for women’s empowerment in the society.

During the campaign, site coordinators posted gender awareness and sexual harassment guidelines in each operations site. A one pager addendum on code of ethics was added to the contracts and was signed by every seasonal worker. No complaints or incidents related to sexual harassment were reported to the project gender focal point.

10. CAPACITY BUILDING

The project's capacity building strategy seeks to build vector control capacity equally at the local and national levels. This strategy aligns with Kenya's national devolution strategy. Beginning at the micro-planning stage of the project, VL Kenya invited officials from NMCP to receive training not only on how to deliver IRS, but on how to become co-trainers in resource planning, spray techniques, creation of data collection strategies and tools, and other key areas. The County and sub-county MOH team were informed that the VectorLink Collect system would be rolled out in 2019. NMCP officials attended the IRS launch in both counties and stayed on for extra day to conduct IRS supervision in the spray areas.

Migori and Homa Bay County malaria control coordinators, directors of health, and the 14 sub-county malaria control coordinators worked closely with the VL Kenya staff to recruit seasonal workers, lead trainings at operations sites, and provide daily supportive supervision. Specifically, VL Kenya developed the job adverts based on the agreed selection criteria and participated in shortlisting and interview process. In addition, MOH staff joined project and PMI staff at the regularly held debriefing meetings to discuss challenges and best practices observed during supportive supervision, and to collectively troubleshoot and identify effective strategies to overcome challenges on the ground.

To consolidate feedback and strengthen capacity at the sub-county level, the project led weekly debriefing meetings at sub-county offices with all sub-county MOH officers, site coordinators, and site supervisors. These meetings ensured coordinated strategy across the county and built sub-county-level capacity.

II. POST-SPRAY ACTIVITIES

II.1 IRS MATERIALS AND EQUIPMENT

During trainings and throughout the spray campaign, the project issued all IRS personnel required commodities, including insecticides, spray pumps, PPE, and other assorted items. SOPs and mobilizers were issued bags to keep the assorted commodities. Personnel received the commodities every morning and returned them to the operations site store in the evening. Storekeepers tracked all the issued items daily in stores records. On the last day of the campaign, SOPs, TLs, mobilizers, drivers, site supervisors, and sub-county and county supervisors returned all spray equipment, PPEs, and other IRS materials to the stores. Each seasonal worker signed a clearance form upon returning the assigned items. Any losses recorded clearly indicated the total surcharge, which was deducted from wages. Site coordinators sent clearance forms to the finance department for final payment processing.

Immediately after the campaign was over, the close-out process began at all operations sites with thorough cleaning of PPE and other commodities commencing on February 22-27, 2019 for Migori and March 15-20, 2019 for Homa Bay. Thereafter, all the items were returned to the central warehouse following the predetermined close-out plan. The logistics team collected all solid wastes and returned it to the field distribution centers at Rabondo, Kochola, and Arombe for Migori County and to the central warehouse for Homa Bay County. The centers temporarily stored the waste awaiting collection and distribution to respective disposal facilities. The project transported plastic wastes to the Kisumu central warehouse, to be transported to Nairobi for disposal.

II.2 POST-SPRAY INVENTORY

A total of 1,711 bottles of Actellic® 300CS remained after the 2018 IRS campaign. Twelve bottles were issued to NMCP on September 15, 2019 with permission from PMI Mission for susceptibility test. The project warehouse team labelled these cartons with red x's to ensure the logistics team distributed them first, using the first-to-expire, first-out (FEFO) stock management principle. In 2019, the project procured 167,484 bottles of Actellic® 300CS and received an additional 10 bottles free of charge for a total of 167,494 and 3,330 sachets of SumiShield® 50WG. The procured insecticide received the UNITAID co-payment through the Next Generation IRS project (NgenIRS).

A total of 158,877 bottles/ sachets of insecticide were used during the campaign. The project used 67, 978 and 87,569 insecticide bottles in Migori and Homa Bay respectively. This leaves 13,646 bottles of Actellic® 300CS available for next year. This closing stock is in the Kisumu warehouse and comprises seven batches BSN812280, BSN812782, BSN812680, BSN812880, BSN812080, BSN812180 and BSN812183 with a manufacturing date of September 2018 and a shelf life of two years. All SumiShield® 50WG sachets were used leaving zero balance in the warehouse. A complete post spray insecticide reconciliation summary is in Table 11.

TABLE 11: POST SPRAY INVENTORY RECONCILIATION 2019

Insecticide	Opening stock	Issued to NMCP	Balance Available for spray	Purchased Stock	Bottles Used/sachets	Damaged/ Loss	Stock on Hand
Actellic® 300CS	1,711	12	1,699	167,494	155,547	0	13,646
SumiShield® 50WG	0	0	0	3,330	3,330	0	0
Total	1,699	12	1,699	170,824	158,877	0	13,646

11.3 POST-SPRAY REVIEW MEETINGS

The project held post-spray review meetings to discuss the preliminary spray results, best practices, lessons learned, challenges, and recommendations for the next spray campaign.

Post-spray meetings with the spray personnel and supervisors occurred on February 23, 2019 for Migori and March 23, 2019 for Homa Bay at each operations site. VL Kenya, county and sub-county supervisors attended these meetings to collect feedback from the teams before their departure. The project also held meetings with IEC supervisors and IEC assistants in both counties to get their feedback on mobilization strategies on March 18 and March 21, 2019 in Migori and Homa Bay, respectively. M&E assistants and DECs held their meeting on March 4 and March 25, 2019 in Migori and Homa Bay, respectively. The project hosted the final post-spray review meetings in Kisumu with PMI, project staff, county and NMCP officials on April 1-2, 2019 for Homa Bay County and on April 4 - 5, 2019 for Migori County.

All meetings were well attended by all the required staff and they were able to articulate the issues that they faced during the campaign. During these meetings, the seasonal staff also received certificates of appreciation for the good work that they had done. The meetings were attended by not only the county malaria coordinators, but also the project's county coordinators, IEC Assistants, M&E Assistants and Sub-County malaria coordinators together with their public health counterparts. Based on discussion and feedback from these post spray meetings, key challenges and recommendation for future IRS implementation were identified.

12. CHALLENGES, LESSONS LEARNED AND RECOMMENDATIONS

12.1 CHALLENGES AND LESSONS LEARNED

- **Recruitment:** Despite sharing the recruitment criteria, which instructed the County MOH team to prioritize recruiting CHVs as SOPs and mobilizers, a number of SOPs and mobilizers were selected by politicians. This interference resulted in the project having to deal with disciplinary cases that resulted in some being discharged from their duties.
- **Supervision:** As both a technical approach to capacity building and at times a political mandate, the VL Kenya project has always relied on a collaborative supervision approach with the MOH. This involves having the VL project supervisors work with MOH supervisors at every level of supervision during IRS implementation. MOH supervisors directly supervised TLs, mobilizers, and SOPs. MOH supervisors have the mandate to recruit or dismiss them. While this approach has been largely successful with many MOH supervisors proving capable, trustworthy, and dedicated, this MOH supervision proved to be a weak link with some supervisors not executing their duties as required.
- **Data falsification and insecticide pilferage:** Some SOPs were caught in the process of falsifying data stemming from the pressure from their supervisors to meet the spray targets. In these instances, the SOPs were not documenting “found, unsprayed” structure as they felt such data did not count towards the day’s target. In a few cases, SOPs falsified data to cover up misuse and/ misappropriation of insecticide. At one site, ten SOPs together with their TLs colluded to falsify data.
- **Magunga Re-spray:** VectorLink Kenya had to re-spray the catchment area served by Magunga operations site. The following challenges were experienced:
 - Since the re-spray was essentially a mop up exercise, the challenge was to identify specific unsprayed structures. To do so, VL re-purposed its community meeting feedback form (Form 1B back side) into a special form (Form 1E) for the mobilizers to collect information (e.g. location, household contact information) on unsprayed structures that they found.
 - While trying to identify unsprayed structures, mobilizers came across households with missing stickers or faded IRS numbers making it difficult to determine the spray status without speaking to household owner or neighbor.
 - Generally, the areas around Magunga operation site are extremely hilly and rocky with structures located miles away from each other. Spray teams walked for long distances before reaching structures which slowed down spray progress.
 - The re-spray activity began mid-May which coincided with the onset of rainy season. Consequently, some spray teams were forced to return early to the sites. Muddy terrain slowed down progress.

- Since most of the mobilizers and SOPs recruited had not worked in a prior spray campaign, they had challenges correctly filling spray forms in the first days.
- ***Delayed international procurement lead time:*** Due to lack of the signed USG-Kenya bilateral agreement, lead times for receiving internationally procured supplies and materials (other than insecticides) increased significantly. This was because the project was subject to importation requirements, which USAID-funded projects were exempted under previous USG-Kenya bilateral agreements e.g. pre-shipment inspection. While working with Kenya Medical Supply Authority (KEMSA) mitigated some of these requirements (e.g. exemption from Pharmacy and Poison Board licensing and duty free importation), pre-shipment inspection (PSI) for the personal protective equipment (PPE) and entomology supplies could not be avoided. PSI for PPE took two months resulting in significant delay in shipping from USA. The PPE did not arrive in time for the SOP and TL trainings and arrived a few days before the start of the spray campaign. In addition, there was a long delay in customs clearance and onward delivery of the Actellic® 300CS shipment from Mombasa to Kisumu Central Warehouse. This was because KEMSA did not have the appropriate type and level of insurance coverage to cover the insecticide while in transit from Mombasa to Kisumu. PMI Mission's intervention brokered a solution for the insurance coverage issue.
- ***Project pilots:*** The project implemented three pilots, of which two have potential costs saving measures, as indicated below each with its unique challenges:
 - ***Bicycle pilot:*** Riding bicycles in rough and hilly terrain is cumbersome and slows down the teams. Rough and rocky roads are not friendly to the bicycle and led to tire punctures forcing SOPs to push bicycles back to the sites. Vehicles can be used or a bicycle technician can accompany the teams to the field in such places. Partial use of vehicle and bicycles might result in less costs for vehicle hire. Unfortunately, most of the potential SOPs who could not ride bicycles were women. This meant that potential female SOPs were left out of IRS campaign thereby reducing the participation of women.
 - ***SumiShield® 50WG pilot:*** VL ran out of stock for SumiShield® 50WG and had to shift to use Actellic® 300CS for the last two sub-locations within the Kendu Bay operation site catchment area. VL purchased 3,330 sachets of SumiShield® 50WG to spray the area around Rongo sub-county hospital with an estimated 11,774 targeted structures. At the start of the campaign, the team had to change the location for the pilot due to the timing of the approval of SEA amendment and selected Kendu Bay operation site, which had 10,178 targeted structures. While insecticide usage was as expected, SOPs were finding and spraying more structures than the target which was an overall trend in this year's campaign. In consultation with vector control, entomology and M&E teams, VL decided not to spray the two yet to be sprayed sub-locations with the remaining SumiShield® 50WG and, instead, sprayed Actellic® 300CS to avoid having two insecticides within one sub-location and reserving the last few SumiShield® 50WG sachets for mop up activities in the areas already sprayed with SumiShield® 50WG.
 - Since the residents were already aware that a different insecticide was being used, some refused to have their houses sprayed when they realized Actellic® 300CS was being used. SumiShield® 50WG has no exito-repellancy effects. This means mosquitoes and other insects can land and crawl on the sprayed surface which may make the beneficiary think the insecticide is not working. SumiShield® 50WG is also slow in action as was reported by some beneficiaries. Lack of smell caused some beneficiaries to think that their houses were not sprayed with insecticide.
 - ***VectorLinkCollect mobile pilot:*** There were five main challenges during the mobile pilot: (a) power was crucial in charging the phones in preparation for the next day. There were instances where power was not consistent; (b) some mobile devices were not able to record

GPS coordinates. Unfortunately, contrary to training, SOPs were advised to proceed and record the other data elements. However, this led to a larger problem with SOPs failing to record the GPS coordinates altogether. It was therefore made clear to the SOPs that GPS coordinates recording was mandatory; (c) SOP codes in a drop down menu were not numerically sequenced leading to some SOPs picking the wrong codes; (d) The system captured data in three different programs as structures sprayed, structures not sprayed, and insecticide usage. In some instances, SOPs remembered to record data in the sprayed and unsprayed programs, but forgot to record the insecticide used for the villages they visited; and (e) some respondents were reluctant to give household information thinking that their photos were being taken.

- **Household preparation:** In many places, spray operators had to assist in household preparation, resulting in more time spent at each structure. Given that spray operators had an option to cover heavy immovable items at the center of the eligible structures, some decided not to remove movable items and preferred to cover the items. A clear message was emphasized by mobilizers to help ensure all items were removed before the house is sprayed.
- **Door Marking:** Stickers were not durable. Some stickers fell off or information on them was faded. Some homeowners expressed a preference for placing the sticker inside their homes rather than outside on the door or wall. Chalk door markings had faded, been washed away by rain or rubbed off by homeowners themselves. Consequently, when SOPs came across a locked structure, they could not record information from the stickers.
- **Mobilization and spray coordination for specific communities:** Some areas like Suba have high refusals due to the non-traditional nature of the communities. For example, the gold mining, urban working communities and fishing communities are known to be challenging as they are often away working during regular mobilization and spray time periods. Mobilization strategies must be contextualized to each target community, whether rural or urban, fishing or farming, or traditional or non-traditional. Moving forward, different strategies will be employed to target different community members. For example, for fishermen and miners, VL shall engage their leaders much earlier before the spray campaign begins so that spraying can be scheduled at an appropriate day and time.
- **Accurate recording of unsprayed structures:** Unrelated to data falsification, some SOPs were simply not recording eligible “found, not sprayed” structures. The rationale was that they thought such structures did not count toward their daily targets.

12.2 RECOMMENDATIONS

Recruitment:

- VL Kenya project shall take the lead in the all SOP, mobilizer and TL recruitment process through the development of sub-county recruitment committees that include the VL Sub-county Coordinator (SCC) as a member. This will ensure adherence to the selection criteria as well as documentation of the recruitment proceedings. VL shall obtain in advance of the recruitment drive an official list of CHVs to ensure that CHVs are given priority.
- Stakeholder meetings should begin two weeks before advertising for seasonal worker positions to allow for clear understanding of the recruitment requirements, selection criteria, and ensure appropriate timelines for people to apply.
- Leverage the Community Health Strategy (CHS) for accountability and responsiveness by CHVs and CHCs to avoid interference from politicians. Any deficits can be filled with the village elders who can read, write, and do simple arithmetic.

- Change the criteria for selection of TLs and strictly adhere to it so that the right individuals with leadership qualities are selected. Recruit TLs separately from SOPs by advertising TL position and conducting TL interview separately from SOPs.

Supervision:

- Establish a tier of supervisors hired directly by, and accountable to, the project and reduce the number of MOH supervisors. To enhance accountability, operations sites need to be assigned to the county and sub-county supervisors with a clear schedule showing supervision at certain areas and by whom. Vehicles assigned for supervision will be shared between MOH and VL supervisors to maximize proper use of supervisory resources.
- Vet all MOH supervisors involved in IRS by working closely with MOH leadership. MOH supervisors who did not perform well this year shall be ineligible for supervision in all future years. Any MOH supervisors not adhering to procedures should be brought to the Director's attention for disciplinary action which can include suspension and termination where applicable. A sub-county disciplinary committee could be formed to include the police commander and provincial administration.
- For areas that are far away from the county offices, supervisors from the county and within the sub-counties (where applicable), the project can pay for their lodging to reduce time wasted in travel time and maximize interaction with and guidance to the spray teams.
- All seasonal workers and supervisors shall sign the code of conduct as part of their contracts. Such terms have been included previously in seasonal worker contracts, but for future campaigns seasonal workers and supervisors shall be required to sign a separate, standalone code of conduct.

Data Falsification:

- Many data falsification issues arose from pressure to meet targets. Supervisors will be encouraged to ensure spray quality (technique and mixing procedures) and accurate recording of spray data as opposed to conducting purely target-based monitoring. This emphasis on quality should reduce the pressure felt by the SOPs who sometimes collect data in areas with different challenges such as refusals. To further reduce the pure focus on targets, performance reports will be shared specifically with the relevant area of operation both at sub-county and operation site level.
- The code of conduct that will be signed by all supervisors and seasonal workers will reinforce ethics around data reporting and insecticide misuse together with disciplinary measures.
- Allocate teams to specific villages to raise accountability and responsibility. This allocation means that whatever happens in that village is solely attributed to the spray team assigned. Such an approach may require rethinking the preparation of spray and mobilization calendars.
- Consider enlisting village elders to validate the data collected in their villages before submission to the data centers. Village elders know the families in their villages and can confirm the beneficiary data recorded on the SOP form. This has a deterrent effect on falsification of data and pilferage of insecticide.
- Involve all supervisors (VL and MOH) to conduct DCV in the sprayed areas. Explore the option of having the TLs conduct DCVs as well. This may mean scaling down on the DOS for TLs.
- IRS household number duplicates were numerous from the field teams both for mobilization and for spray. Supervision of mobilizers and SOPs should be enhanced to ensure accurate recording of data. SOPs and mobilizers should be encouraged to confirm the IRS numbers with the details on the IRS stickers to enable accurate reporting.

Insecticide pilferage

- Sensitize the community on EC, and ask them to be vigilant and report any illegal insecticide in the community. The community should also be informed of the consequences of holding/using a stolen insecticide.
- Enhance management of insecticide in the field by introducing a pull system to replace the push system. SOPs shall be given less insecticide than what they need, which will force them to request for more if needed.

Delayed procurement lead time

- In the absence of the signed USG-Kenya bilateral agreement, the international procurement process should begin two months earlier than previous international procurements with an active bilateral agreement bearing in mind the additional importation requirements.
- Consider consigning international procurements to USAID Mission instead of KEMSA.

Project pilots:

- Bicycle pilot: Further investigation is needed to determine cost effectiveness of the bicycle use compared to the use of vehicles. In deciding whether to scale up, the terrain needs to be considered carefully. For those who cannot ride bicycles, both training and an alternative means of transport needs to be considered especially to avoid leaving out women in the program.
- SumiShield® 50WG pilot: Revise key messages to reflect the unique qualities of SumiShield® 50WG
- VectorLink collect mobile pilot: VL Kenya plans to scale up use of mobile data collection after the successful pilot that confirmed efficiency e.g. on sub-county level. However, for a successful large scale implementation, there would be need to shift away from heavily-staffed data centers, to having increased M&E supervisors on the ground to oversee data capture on each device. This has cost implications, in addition to the data bundles, mobile devices and an extra day for training the spray operators. Additionally, for sites where the system is adopted, there is need for constant and stable power supply. Although the process makes data processing easier and faster, the data quality issues at the point of collection still need close attention. There is need for further troubleshooting of the system to identify why for some devices were not recording GPS. To resolve the mismatch in SOP codes, the system could be configured in a way to sequentially arrange the SOP codes or to display one SOP code at a time on the user interface.

Household Preparation: Intensify training particularly during practical sessions to illustrate that a well prepared household ready for spraying. During mobilization, greater emphasis on household preparation by homeowners. Building greater demand for IRS among household heads will result in greater ownership within the community and homeowner's motivation for household preparation.

Door marking: Proper sensitization for the home owner on the purpose of the door marking and why it should not be removed or rubbed off. Also, higher quality stickers shall be procured with longer lasting adhesive. Use of more permanent marker on the sticker and/ in lieu of chalk so that information does not fade.

Mobilization and spray coordination: Active and proactive scheduling of spraying for specific communities e.g. a non-work day. Where possible, teams should adjust their timing to arrive very early. In areas where the residents are involved in mass economic activities like mining or fishing, their leaders will be met to schedule spray dates in those communities. VL Kenya should involve the area chief, village elders to mobilize their own communities immediately before and during the spray time to convince residents to accept IRS.

Accurate recording of unsprayed structures: VL Kenya shall dedicate more time to data recording during training and include it in the practical sessions.

ANNEX A: 2019 IRS IMPLEMENTATION PLAN

COMPONENT	ACTIVITY	PERSON/ PARTNER RESPONSIBLE	PLANNED DATE	OUTPUT	IMPLEMENTATION DATE
Pre-spray activities/ mobilization	Micro-planning meetings	Abt/NMCP	Migori: October 11-12, 2019 Homa Bay October 16-17, 2018	Sub-county IRS plans, stores, and locations and recruitment modalities concluded	Migori: October 11-12, 2019 Homa Bay: October 16-17, 2018
	Recruitment of spray personnel	Abt/NMCP	October 22 - November 9, 2018	List of short-listed personnel	October 22- November 9 2018
	Medical fitness tests for spray	Abt/NMCP	January to February 2019	List of medically fit and unfit staff submitted to ECO	January to February 2019
	TOTs, and spray operator/spray personnel training	Abt/NMCP	TOT: Migori December 10-15, Homa Bay December 17-22,2018 SOP: Migori January 21-25, 2019; Homa Bay: February 4-8, 2019	Trained spray personnel	TOT: Migori December 10-15, Homa Bay December 17-22, 2018 SOP: Migori January 21-25, 2019; Homa Bay: February 4-8, 2019
	Training of health workers on insecticide poisoning	Abt/MoH		Trained clinicians on insecticide poisoning	
	Refurbish sub-county offices and stores	Abt	August to September 2018	Sub-county offices and stores refurbished	September 2018
	Conduct pre-season environmental assessment	Abt /NEMA	December 2018	EC pre-inspection done	January 2019
Procurement and logistics	Conduct logistics needs assessment – local and offshore procurement	Abt	July-August 2018	Insecticides, PPE, and equipment procurement	July-August 2018
	Deliver insecticide, PPE, and equipment to targeted counties	Abt	January 2019	IRS commodities delivered to counties	January 2019

COMPONENT	ACTIVITY	PERSON/ PARTNER RESPONSIBLE	PLANNED DATE	OUTPUT	IMPLEMENTATION DATE
IEC development and implementation	Advocacy meetings with key regional and sub-county stakeholders	Abt/NMCP	November 5, 2018-February 8, 2019	Buy-in of regional and county government	November 5, 2018-February 8, 2019
	Disseminate IEC messages via radio, including community dialogues	Abt	October 2018 to March 2019	IEC activities conducted	October 2018 to March 2019
Spray operations	Conduct spray operations	Abt	January 28- March 16, 2019	Spraying completed	January 28- March 16, 2019
	Supervision of spray operation	Abt/NMCP/cou nty officials	January 28- March 16, 2019	Supervision of IRS campaign	January 28- March 16, 2019
	Conduct mid-season environmental inspection	Abt/NEMA	Abt/NEMA	January to March 2019	EC mid-season inspection done
Monitoring & Evaluation	mHealth phone set up		Abt	November to January 2019	January 2019
	Data center set up	Abt	December 2018	Abt	December 2018
	Capacity building for M&E seasonal staff	Abt	November 2018	Abt	November 2018
	Data collection and reporting	Abt	January to March 2019	IRS data collected & reporting done	January to March 2019
	Close-out of the data centers, and inventory summary handover to warehouse managers	Abt	April 2019	Inventory of both IT and data items	April 2019
	Archiving of the data files	Abt	April 2019	Data files stored in the data archiving room	April 2019
	EOSR submitted to client	Abt	April 2019		
Entomological monitoring and surveillance	Conduct entomology surveillance	Abt	September 2017 to October 2018	Entomology surveillance reports submitted to PMI	September 2017 to October 2018

COMPONENT	ACTIVITY	PERSON/ PARTNER RESPONSIBLE	PLANNED DATE	OUTPUT	IMPLEMENTATION DATE
Post-spray operations	IRS operations closeout	Abt	March 25 - April 15 2019	Equipment and supplies recaptured	March 25- April 15 2019
	Maintenance of equipment	Abt	April 2019	IRS spray pumps repaired and stored	April 2019
	Inventory assessment	Abt	April 2019	Post-spray inventory completed	April 2019
	County IRS evaluation meetings	Abt/NMCP/county officials	April 2019	IRS review meetings held	April 2019
	Demobilization of short-term sub-county personnel	Abt	March-April 2019	Spray operations teams demobilized	March-April 2019
	IRS waste disposal	Abt/NEMA	April 2019		April 2019
	Post-season inspection	Abt/NEMA	March to April 2019		March 2019

ANNEX B: INTERNATIONAL PROCUREMENTS

Item	Opening Balance	Total received	Total Used	Total Balance
Actellic® 300CS	1,699	167,494	155,547	13,646
SumiShield® 50WG	0	3,330	3,330	0
Complete Control Flow Valve (CFV) with seals	0	140	140	0
Spare Parts Kit	0	90	78	12
Nozzle Tip	2,032	311	1,017	1,088
Male fitting for strainer housing	600	288	314	513
Plunger assembly Complete	10	44	25	0
Washers/Polyethylene Nozzle Gasket	0	199	158	41
Pump shoulder straps	768	0	111	657
Lance. Extension Tube	231	250	163	308
Pressure gauge	381	138	466	53
Venom 8" x 15.5" x .060" Clear Polycarbonate Faceshield, 10/bx	171	2,500	2,504	167
Yellow PVC/Polyester Apron, 35" x 47", 35mm, Attached Ties, 50/cs	169	100	268	1
"22-mil Green Nitrile Nitri-Solve, 19"" Chemical Glove,72pr/cs, Unlined, Size 8	0	864	864	0
22-mil Green Nitrile Nitri-Solve, 19" Chemical Glove,72pr/cs, Unlined, Size 9	1,103	2,448	369	3,182
22-mil Green Nitrile Nitri-Solve, 19" Chemical Glove,72pr/cs, Unlined, Size 10	0	864	864	0
26" Long Nitrile Glove, Rough Textured, Elastic & Grommeted End, Medium	0	72	52	20
26" Long Nitrile Glove, Rough Textured, Elastic & Grommeted End, Large	0	216	82	134
26" Long Nitrile Glove, Rough Textured, Elastic & Grommeted End, XL	0	72	52	20
N95 Disposable Respirator w/Exhalation Valve, Adjustable Nosepiece, 10/bx, 12 bx/cs	8,080	82,960	87,200	3,840
USAID Stickers A4	2000	0	850	1,150
USAID Stickers A5	2,000	0	200	1,800
USAID Stickers A6	2,500	0	1,420	1,080
Storekeepers Pocket Guides	0	73	73	0
TL pocket guides	0	455	386	69
Spray operators pocket guides	0	2,009	1,937	72

ANNEX C: MONITORING AND EVALUATION PLAN INDICATOR MATRIX

#	Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
				Year 1		Year 2		Year 3		Year 4		Year 5	
				Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
Objective 1: Implementation of Malaria Vector Control Interventions													
1.1	Successfully execute IRS and other malaria vector control programs												
1.1.1	Number and percentage of complete annual country work plans developed and submitted on-time	Project records Annually	Country	1	1	1		1		1		1	
1.1.2	Number of eligible structures targeted for spraying	Project records Annually	Country	465,862	551,689	TBD		TBD		TBD		TBD	
1.1.3	Number of eligible structures sprayed with IRS	Project records Annually	Country	395,983	507,777	TBD		TBD		TBD		TBD	
1.1.4	Percentage of total structures targeted for spraying that were sprayed with a residual insecticide (Spray Coverage)	Project records Annually	Country	85%	92.0%	85%		85%		85%		85%	
1.1.5	Number of people protected by IRS	Project records Annually	Country Sex Pregnant women Children <5	1,914,537	2,011,860 Male: 1,001,356 Female: 1,010,504 Pregnant women: 44,999 Children<5: 249,275	TBD		TBD		TBD		TBD	
1.1.6	Number and percentage of vector control project country programs submitting an EOSR within 45 days after the end of spray (including completing MEP and EMMR)	Project Annually	Country	1	1	TBD		1		1		1	

#	Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
				Year 1		Year 2		Year 3		Year 4		Year 5	
				Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
1.1.7	Number of IRS country programs that conduct a Post-spray Data Quality Audit within 90 days of spray completion	Data Collection Forms Annually	Country	NA	NA	NA		1		NA		1	
1.1.8	Number of Insecticide Treated Nets (ITNs) distributed, by channel	Project Records Annually	Country Channel	NA	NAs	TBD		TBD		TBD		TBD	
1.1.9	Number and percentage of ITN country programs that conduct at least one process assessment of the quality of ITN distribution planning, the quality of household registration, and or ITN distribution implementation during a mass ITN distribution campaign	Project Records Annually	Country Channel	NA	NA	TBD		TBD		TBD		TBD	
1.1.10	Number and percentage of ITN country programs with operational routine monitoring systems for continuous ITN distribution, disaggregated by channel	Project Records Annually	Country Channel	NA	NA	TBD		TBD		TBD		TBD	
1.1.11	Number and percentage of countries completing ITN durability monitoring data collection on time as planned in a given project year	Project Records Annually	Country	NA	NA	TBD		TBD		TBD		TBD	
1.2	Provide technical assistance and planning support for IRS and other integrated malaria vector control activities												
1.2.1	Number of VC project training workshops targeting NMCP and other host country staff	Project Training Records Annually	Country Technical Area Job Function	1	0	TBD		TBD		TBD		TBD	
1.2.2	Number of NMCP and other vector control host country staff accessing DHIS2	DHIS2 Logs Annually	Country Job Function	734	34	TBD		TBD		TBD		TBD	

⁷ 14 SCMCCs, 14 SCHRIOs, 2 CMCC, 2 CHRIO, 1 National M&E and 1 National program officer

#	Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
				Year 1		Year 2		Year 3		Year 4		Year 5	
				Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
1.3	Ensure safe and judicious use of insecticides and other malaria vector control products												
1.3.1	Number of vector control personnel trained in environmental compliance and personal safety standards in vector control implementation	Project Records Annually	Training Country Sex (# and %) Job Function	8267	9 6,535 Male: 3,035 (46.4%) Female: 3,500 (53.6%)	TBD		TBD		TBD			
1.3.2	Number of health workers receiving insecticide poisoning case management training	Project Records Annually	Training Country Sex (# and %)	264	10199 Male: 110 (55.3%) Female: 89 (44.7%)	TBD		TBD		TBD		TBD	
1.3.3	Number of adverse reactions to pesticide exposure documented	Incident Forms Annually	Report Country Type of Exposure	0	0	0		0		0		0	
1.4	Strengthen capacity of NMCPs, vector control personnel, and other institutions to implement and manage IRS and other vector control activities												
1.4.1	Total number of people trained to support VC in targeted areas	Project Records Annually	Training Country Sex (# and %) VC Intervention Type	6,545 ¹¹	6,751 ¹² Male: 3,154 (46.7%) Female: 3,597 (53.3%)	TBD		TBD		TBD		TBD	
1.4.2	Number of people trained during IRS Training of Trainers	Project Records Annually	Training Country Sex (# and %)	295	304 Male: 220 (72.4%) Female: 84 (27.6%)	TBD		TBD		TBD		TBD	

⁸ 208 supervisors, 2,111 SOPs, 325 spray operator TLs, 2617 mobilizers, 111 IEC supervisors, 4 IEC assistants, 70 storekeepers, 66 site coordinators, 66 pump technicians, 170 washers, 134 security guards, 241 drivers, 31 M&E assistants, 108 DECs, 2 EC assistants, 2 Logistics assistants, 3 warehouse assistants,

⁹ 215 supervisors, 2,158 SOPs, 325 spray operator TLs, 139 standby SOPs, 2596 mobilizers, 87 IEC supervisors, 4 IEC assistants, 72 storekeepers, 68 site coordinators, 7 standby site coordinators, 68 pump technicians, 179 washers, 137 security guards, 232 drivers, 21 M&E assistants, 10 standby M&E Assistants, 2 IT/mHealth assistants, 76 DECs, 10 standby DECs, 2 EC assistants, 2 Logistics assistants, 2 warehouse assistants (Magunga Re-spray: 8 supervisors, 42 SOPs, 7 SOP TLs, 46 mobilizers, 2 IEC supervisors, 1 storekeeper, 1 site coordinator, 1 pump technician, 4 washers, 2 security Guards, 5 drivers, 1 M&E assistant, 3 DECs)

¹⁰ Plus 2 HCWs at Magunga re-spray

¹¹ 208 supervisors, 2,111 SOPs, 325 spray operator TLs, 2617 mobilizers, 111 IEC supervisors, 4 IEC assistants, 70 storekeepers, 66 site coordinators, 66 pump technicians, 170 washers, 134 security guards, 241 drivers, 31 M&E assistants, 108 DECs, 2 EC assistants, 2 Logistics assistants, 3 warehouse assistants, 14 F&A clerks, 264 HCWs

¹² 215 supervisors, 2,158 SOPs, 325 spray operator TLs, 139 standby SOPs, 2596 mobilizers, 87 IEC supervisors, 4 IEC assistants, 72 storekeepers, 68 site coordinators, 7 stand by site coordinators, 68 pump technicians, 179 washers, 137 security guards, 232 drivers, 21 M&E assistants, 10 standby M&E Assistants, 2 IT/mHealth assistants, 76 DECs, 10 standby DECs, 2 EC assistants, 2 Logistics assistants, 2 warehouse assistants, 17 F&A clerks, 197 HCWs (Magunga Re-spray: 8 supervisors, 42 SOPs, 7 SOP TLs, 46 mobilizers, 2 IEC supervisors, 1 storekeeper, 1 site coordinator, 1 pump technician, 4 washers, 2 security Guards, 5 drivers, 1 M&E assistant, 3 DECs, 2 HCWs)

#	Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
				Year 1		Year 2		Year 3		Year 4		Year 5	
				Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
1.4.3	Total number of people hired to support VC in target districts	Project Records Annually	Country Sex (# and %) Job Function VC Intervention Type	¹³ 6,012	¹⁴ 6,326 Male: 2,893 (45.7%) Female: 3,433 (54.3%)	TBD		TBD		TBD		TBD	
1.4.4	Number of government/district officials who acted as supervisors during VC campaigns	Project Records Annually	Country VC Intervention Type	¹³ 208	¹⁶ 223	TBD		TBD		TBD		TBD	
1.5	Promote gender equality in all facets of planning and implementation												
1.5.1	Number of women hired to support VC campaigns	Project Records Annually	Country Returning female seasonal workers hired in a more senior capacity	¹⁷ 3000	¹⁸ 3,433	TBD		TBD		TBD		TBD	
1.5.2	Number and percentage of women hired in supervisory roles in target areas for vector control activities	Project Records Annually	Country VC Intervention Type Job Function	¹⁹ 247	²⁰ 206 (40.1%)	TBD		TBD		TBD		TBD	

¹³ 208 supervisors, 1913 SOPs, 325 SOP TLs, 21 M&E Assistants, 70 Store keepers, 66 Site Coordinators, 66 pump technicians, 2 Logistics assistants, 3 warehouse assistants, 76 DECAs, 2617 mobilizers, 78 IEC supervisors, 170 washers, 134 security guards, 241 drivers, 14 F&A clerks, 4 IEC Assistants, 2 EC assistants, 2 E-inventory Clerks

¹⁴ 215 supervisors, 1991 SOPs, 325 SOP TLs, 139 standby SOPs, 21 M&E Assistants, 72 Store keepers, 68 Site Coordinators, 68 pump technicians, 2 Logistics assistants, 2 warehouse assistants, 76 DECAs, 2596 mobilizers, 87 IEC supervisors, 179 washers, 137 security guards, 202 drivers, 17 F&A clerks, 4 IEC Assistants, 2 EC assistants (Magunga Re-spray: 8 supervisors, 42 SOPs, 7 SOP TLs, 46 mobilizers, 2 IEC supervisors, 1 storekeeper, 1 site coordinator, 1 pump technician, 4 washers, 2 security Guards, 5 drivers, 1 M&E assistant, 3 DECAs)

¹⁵ 108 site supervisors, 84 sub county supervisors, 14 county supervisors, 2 CMCCs

¹⁶ 119 site supervisors, 86 sub county supervisors, 16 county supervisors, 2 National supervisors

¹⁷ 50% of the total number hired cutting across each cadre

¹⁸ 21 Site coordinators, 22 storekeepers, 18 Security guards, 53 supervisors, 130 SOP TLs, 819 SOPs, 67 Alternate SOPs, 169 washers, 1957 mobilizers, 45 IEC supervisors, 15 pump technicians, 8 finance assistants, 3 IEC assistants, 1 EC assistant, 1 Logistics assistant, 7 M&E Assistants, 42 DECAs (Magunga Re-spray: 1 supervisor, 1 SOP TL, 18 SOPs, 29 Mobilizers, 1 IEC Supervisor, 3 washers, 2 DECAs)

¹⁹ 162 SOP TLs, 33 Site coordinators, 39 IEC supervisors, 11 M&E assistants, 1 Logistics assistant, 1 warehouse assistant,

#	Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
				Year 1		Year 2		Year 3		Year 4		Year 5	
				Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
1.5.3	Number and percentage of staff (permanent and seasonal) who have completed gender awareness training	Project Training Records Annually	Country Sex Job Function	²¹ 6058	²² 6,358 (99.95%) Male: 2,915 (45.8%) Female: 3,446 (54.2%)	TBD		TBD		TBD		TBD	
1.5.4	Number and percentage of women in senior leadership roles in VectorLink country offices	Project Records Annually	Country Sex (# and %)	3	²³ 3 (42.8%)	TBD							
1.6	Implement and support social behavioral change communication and mobilization activities												
1.6.1	Number of radio spots and talk shows aired	Project Records Annually	Country VC Intervention Type	²⁴ 513	²⁵ 6	TBD		TBD		TBD		TBD	
1.6.2	Number of print materials disseminated	Project Records Annually	Country VC Intervention Type	²⁶ 472,013	²⁷ 28, 583	TBD		TBD		TBD		TBD	
1.6.3	Number of people reached with vector control and/or SBCC messages via door-to-door messaging	Project Records Annually	Country VC Intervention Type Sex	²⁸ 1,397,613	1,202,467 Male: 534,456 Female: 668,011	TBD		TBD		TBD		TBD	

²⁰ 130 SOP TLs, 21 Site coordinators, 45 IEC supervisors, 7 M&E Assistants, 1 Logistics assistant (Magunga Re-spray: 1 SOP TL, 1 IEC supervisor)

²¹ 208 supervisors, 1913 SOPs, 325 SOP TLs, 21 M&E Assistants, 70 Store keepers, 66 Site Coordinators, 66 pump technicians, 2 Logistics assistants, 3 warehouse assistants, 76 DECs, 2617 mobilizers, 78 IEC supervisors, 170 washers, 134 security guards, 241 drivers, 14 F&A clerks, 4 IEC Assistants, 2 EC assistants, 36 permanent staff

²² 215 supervisors, 1991 SOPs, 325 SOP TLs, 139 standby SOPs, 21 M&E Assistants, 72 Store keepers, 68 Site Coordinators, 68 pump technicians, 2 Logistics assistants, 2 warehouse assistants, 74 DECs, 2 E-inventory DECs, 2596 mobilizers, 87 IEC supervisors, 179 washers, 137 security guards, 202 drivers, 17 F&A clerks, 4 IEC Assistants, 2 EC assistants, 35 permanent staff, (Magunga Re-spray: 8 supervisors, 42 SOPs, 7 SOP TLs, 46 mobilizers, 2 IEC supervisors, 1 storekeeper, 1 site coordinator, 1 pump technician, 4 washers, 2 security Guards, 5 drivers, 1 M&E assistant, 3 DECs)

²³ Operations Manager, M&E manager, Procurement officer out of 7 possible senior roles

²⁴ 1 Talk show per week per county, 1 radio spot per day per hour for three weeks

²⁵ 1 Talk show per week for 8 weeks (Radio nam lolwe), 1 radio spots 4 times per day for 12 days (Radio Ramogi).

²⁶ 465,862 IRS stickers, 69 banners, 2617 mobilizer pocket guides, 3465 posters

²⁷ 706,282 IRS stickers, 73 banners, 2748 mobilizer pocket guides, 10710 posters (8,770 IRS stickers during re-spray)

²⁸ 73% of targeted population to be reached, based on 20% improvement over the achievement in 2018 IRS campaign

#	Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
				Year 1		Year 2		Year 3		Year 4		Year 5	
				Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
1.6.4	Number and percentage of people who feel that the proposed action (sleeping under an ITN/accepting IRS) will reduce their risk of malaria	Project Records Annually	Country	NA	NA	NA		TBD		TBD		TBD	
1.6.5	Number and percentage of people with a favorable attitude toward the practice/product (i.e., ITNs, IRS)	Project Records Annually	Country VC Intervention Type	NA	NA	NA		TBD		TBD		TBD	
1.6.6	Number and percentage of people who believe that the majority of their friends and community members practice the behavior	Project Records Annually	Country VC Intervention Type	NA	NA	NA		TBD		TBD		TBD	
1.7	Environmental compliance												
1.7.1	Number and percentage of SEAs (with EMMPs) or Letter Reports submitted at least 60 days prior to the commencement of vector control campaigns	Project Records Annually	Country	1	1 (100.0%)	TBD		1		1		1	
1.7.2	Number and percentage of permanent and mobile soak pits inspected and approved prior to IRS campaigns	Project Records Annually	Country Soak Pit Type	66	68 (100.0%)	TBD		TBD		TBD		TBD	
1.7.3	Number and percentage of storehouses inspected and approved prior to IRS campaigns	Project Records Annually	Country Storehouse Type	70	70 (100.0%)	TBD		TBD		TBD		TBD	
1.7.4	Number and percentage of fixed soak pits that are compliant with PMI's Best Management Practices	Project Records Annually	Country	66	68 (100.0%)	TBD		TBD		TBD		TBD	
2. Entomological and Epidemiological Data to Drive Decision-Making													
2.1	Vector control activities monitored via entomological and epidemiological data												
2.1.1	Number and percentage of project-supported entomological sentinel sites established to monitor vector bionomics and behavior (vector species, distribution, seasonality, feeding time, and location)	Entomological Reports Annually	Country VC Intervention Type	24	22 (91.7%)	TBD		TBD		TBD		TBD	

#	Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
				Year 1		Year 2		Year 3		Year 4		Year 5	
				Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
2.1.2	Number and percentage of entomological monitoring sentinel sites measuring all five basic PMI entomological monitoring indicators (i.e., species composition, abundance, and seasonality of malaria vector; insecticide susceptibility and resistance intensity; mechanism of resistance; quality assurance and residual efficacy monitoring of IRS programs; or vector behavior: feeding time & location)	Entomological Reports Annually	Country VC Intervention	24	7 (70%)	TBD		TBD		TBD		TBD	
2.1.3	Number and percentage of entomological monitoring sentinel sites measuring at least one advanced PMI indicator (i.e., identification of mosquito infectivity; parity rates; or blood-meal analysis)	Entomological Reports Annually	Country VC Intervention	24	22 (91.7%)	TBD		TBD		TBD		TBD	
2.1.4	Number and percentage of insecticide resistance testing sites that tested at least one insecticide from pyrethroid, organophosphate, carbamate, clothianidin, and chlorfenapyr insecticides	Entomological Reports Annually	Country Insecticide Type	12	7 (70%)	TBD		TBD		TBD		TBD	
2.1.5	Number of wall bioassays conducted within 2 weeks of spraying to evaluate the quality of IRS	Entomological Reports Annually	Country	40	50 (100%)	TBD		TBD		TBD		TBD	
2.1.6	Number and percentage of cone bioassays conducted within two weeks of spraying with greater than 98% test mortality recorded	Entomological Reports Annually	Country	40	50 (100%)	TBD		TBD		TBD		TBD	
2.1.7	Number of wall bioassays conducted after the completion of spraying at monthly intervals to evaluate insecticide decay	Entomological Reports Annually	Country Insecticide Type	40	50 (100%)	TBD		TBD		TBD		TBD	
2.1.8	Number of vector susceptibility tests for different insecticides conducted in selected sentinel sites	Entomological Reports Annually	Country Insecticide Type	30	28 (93.3%)	TBD		TBD		TBD		TBD	

#	Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
				Year 1		Year 2		Year 3		Year 4		Year 5	
				Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
2.1.9	Number of countries with an integrated vector control analytics dashboard available for decision making	Project Records Annually	Country	NA	NA	TBD		TBD		TBD		TBD	
2.1.10	Number of staff (VectorLink-contracted or non-VectorLink) trained in entomological monitoring	Project Training Records Annually	Country Sex (# and %) Job Function	4	4 males (CHVs participating community-based entomological surveillance)	TBD		TBD		TBD		TBD	
2.2	NMCPs develop country-level IRS and other malaria vector control strategies												
2.2.1	Number and percentage of countries with an integrated malaria vector control strategy, including a plan for monitoring and managing insecticide resistance supported by the project	Project Records Annually	Country	N/A	NA	TBD		TBD		TBD		TBD	
2.2.2	Number and percentage of countries with integrated data and visualization landscaping for vector control decision making complete	Project Records Annually	Country	NA	NA	TBD		TBD		TBD		TBD	
2.2.3	Number and percentage of countries that implement sub-national insecticide as part of an IRM strategy	Project Records Annually	Country	1	1 (100%)	TBD		TBD		TBD		TBD	
2.3	Build capacity of NMCPs and local institutions to collect, analyze, and use data for strategic malaria control decision-making												
2.3.1	Number of individuals trained from NMCPs and national institutions to review and interpret data for integrated vector control decision making	Project Training Records Annually	Country Job Function Organization	NA	NA	NA		TBD		TBD		TBD	
2.3.2	Proportion of targeted individuals who report using new analytical tools and/or skills in their planning, resourcing, implementation, or measurement activities	Capacity Assessments Thrice Over Project Life	Country Job Function Organization	NA	NA	NA		TBD		TBD		TBD	
3. Procure insecticides for IRS and support the delivery and storage of IRS and other malaria vector control products													
3.1	Cost-effective procurement mechanism established												
3.1.1	Number and percentage of insecticide procurements that had a pre-shipment QA/QC test at least 60 days prior to spray campaign	Procurement Records Annually	Country Insecticide Type	2	2 (100.0%)	TBD		TBD		TBD		TBD	

#	Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
				Year 1		Year 2		Year 3		Year 4		Year 5	
				Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
3.1.2	Number and percentage of insecticide procurements received on-time to allow for the initiation of spray operations as scheduled	Procurement Records Annually	Country Insecticide Type	2	2 (100.0%)	TBD		TBD		TBD		TBD	
3.1.3	Number and percentage of targeted countries with international equipment procurements, including PPE, received on-time to allow for the initiation of vector control campaigns as scheduled	Procurement Records Annually	Country VC Intervention Type	1	1 (100.0%)	TBD		TBD		TBD		TBD	
3.1.4	Number and percentage of targeted countries with local procurements for PPE received on-time to allow for the initiation of spray operations as scheduled	Procurement Records Annually	Country	1	1 (100.0%)	TBD		TBD		TBD		TBD	
3.1.5	Number and percentage of countries with PPE procured according to workforce composition	Procurement Records Annually	Country	1	1 (100.0%)	TBD		TBD		TBD		TBD	
3.2	Robust inventory management and logistics systems established												
3.2.1	Number and percentage of logistics and warehouse managers trained in vector control supply chain management	Project Training Records Annually	Country VC Intervention Type Sex	3	3 (100.0%)	TBD		TBD		TBD		TBD	
3.2.2	Number and percentage of operations site warehouses where physical inventories can be verified by daily stock records	Inventory and Stock Records Annually	Country Insecticide Type	70	72 (100%)	TBD		TBD		TBD		TBD	
3.2.3	Number and percentage of IRS countries that successfully completed spray operations without an insecticide stock-out	Inventory and Stock Records Annually	Country Insecticide Type	1	1 (100.0%)	TBD		TBD		TBD		TBD	

#	Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
				Year 1		Year 2		Year 3		Year 4		Year 5	
				Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
4. Innovation													
4.1 Conduct operational research or monitoring to scale up new tools, methods, and approaches													
4.1.1	Number of operational research studies on promising new tools or new methods/approaches to existing tools that are implemented	Project Records Annually	Type of Innovation	1 ²⁹	NA	TBD		TBD		TBD		TBD	
4.2 Create and share knowledge through dissemination of best practices and lessons learned													
4.2.1	Number of innovations, best practices, and other data or lessons learned shared with other partners or international institutions for global reporting on the Vector Learning Exchange	Project Records Annually	Country Technical Area	TBD	NA	TBD		TBD		TBD		TBD	
4.2.2	Number of individual members who use the Vector Learning Exchange	Project Records Annually	N/A	40	41	TBD		TBD		TBD		TBD	
4.2.3	Number of symposia and/or presentations submitted to and accepted at global conferences	Project Records Annually	Country Technical Area	TBD	1 ³⁰	TBD		TBD		TBD		TBD	
4.2.4	Number of success stories written or videos produced and shared on the VectorLink project website	Project Records Annually	Country	1	0	TBD		TBD		TBD		TBD	
4.2.5	Number of peer-reviewed journal articles submitted and accepted	Project Records Annually	Technical Area	TBD	TBD	TBD		TBD		TBD		TBD	
4.2.6	Number of critical guidance, standards, or plans that incorporate disseminated findings/best practices	Project Records Annually	Technical Area	TBD	0	TBD		TBD		TBD		TBD	
4.3 Develop and deploy cost-savings approaches													
4.3.1	Number of innovative or novel approaches implemented to achieve cost savings in IRS and integrated malaria vector control programs	Project Records Annually	Country VC Intervention Type	TBD	2 ³¹	TBD		TBD		TBD		TBD	

²⁹ Small scale house screen pilot under Section 8.3

³⁰ The DHIS-2 mobile pilot, awaiting confirmation

³¹ DHIS 2 mobile pilot for reporting at Dede dispensary and Bicycle use at Rariw

#	Performance Indicator	Data Source(s) and Reporting Frequency	Disaggregation(s)	Annual Targets and Results									
				Year 1		Year 2		Year 3		Year 4		Year 5	
				Target	Result	Target	Result	Target	Result	Target	Result	Target	Result
4.3.2	Number of cost effectiveness assessments of existing approaches in the implementation of IRS and integrated malaria vector control programs	Project Records Annually	Country VC Intervention Type	³² 1	³³ 2	TBD		TBD		TBD		TBD	
4.4	Cultivate public-private partnerships												
4.4.1	Number of private sector entities engaged with to establish public private partnerships to increase the quality and coverage of malaria vector control activities globally	Project Records Annually	Country Private Sector Organization	TBD	0	TBD		TBD		TBD		TBD	

³² Data from Kenya will be incorporated into the global project-level cost assessment

³³ Bicycle use at Rariw and DHIS 2 mobile pilot for reporting at Dede dispensary

ANNEX D: ENVIRONMENTAL MITIGATION AND MONITORING REPORT

MITIGATION MEASURE	STATUS OF MITIGATION MEASURES	OUTSTANDING ISSUES RELATING TO REQUIRED CONDITIONS	REMARKS
1a. Pre-contract inspection and certification of vehicles used for insecticide or spray team transport	Pre-contract inspection of vehicles used for IRS operations was conducted at the sub-county level at selected operations sites between December 3 and 14, 2018. The vehicles were re-inspected prior to certification between January 7 and 12, 2019, for compliance with PMI VectorLink Project requirements. A total of 232 supervision, spray operator transportation, and logistics vehicles were hired to support IRS operations.	During the campaign, some vehicle vendors replaced IRS certified vehicles with new ones, failing to report the change in a timely manner to the EC. As a result, turnaround time for site inspection of a replacement vehicle, in some cases took up to a day.	Each vehicle vendors should provide at least three standby/back-up vehicles for inspection and certification up front. This will eliminate the need for site inspections of new replacement vehicles, since vendors can easily pick a replacement from a pool of inspected standby vehicles. This would prevent delays in movement as well as inconveniences to the spray teams and site operations.
1b. Driver training	The drivers' safety training took place on February 9, 2019 in Homa Bay and on January 26, 2019 in Migori. All 232 drivers and 10 standby drivers were trained on safety issues related to IRS operations, including observing speed limits, maximum vehicle carrying capacity, proper use of PPE, spill and emergency response procedures as well as Abt's policy on motor vehicle use during the IRS campaign. The project sexual harassment guidelines were also incorporated in the drivers' training.	Some of the trained drivers failed to turn up for the spray operations. However, the ECO and the EC assistants conducted on-job safety training for all the replacement drivers. Some drivers were reluctant to decontaminate their vehicles at the end of each spray day, forcing the site coordinators to personally oversee compliance.	Training stand-by drivers aided smooth IRS operations especially when some drivers dropping out in the course of the campaign.

MITIGATION MEASURE	STATUS OF MITIGATION MEASURES	OUTSTANDING ISSUES RELATING TO REQUIRED CONDITIONS	REMARKS
1c. Cell phone, personal protective equipment (PPE), and spill kits on board during pesticide transportation	All drivers including standby drivers provided their cell phone contacts which were shared with the site coordinators at each operations site. Out of the 232 active drivers, 186 were given PPE and spill response kits for logistics and spray team vehicles. County and Sub-county supervision vehicle drivers were to use PPE on a needs basis.	Some drivers reported not to have been issued with PPE and complete spill kits from the site stores. Central warehouse managers in Homa Bay and Migori were tasked to ensure that all site storekeepers issued complete spill kits and PPE to each spray team and logistics vehicle drivers.	
1d. Initial and 30-day pregnancy testing for female candidates for jobs with potential insecticide contact	All female spray operators, storekeepers, pump technicians, and washers in Migori and Homa Bay counties underwent pregnancy tests between January 18 and January 29, 2019 respectively at selected health centers. Those who were found pregnant were either re-assigned to positions that did not expose them to the insecticide, mostly as mobilizers or replaced in their teams by other women.		VL Kenya project relied on medical practitioners at the respective health centers where operations sites are located to carry out the pregnancy tests. Turnaround time took longer than expected.
1e. Health fitness testing for the spray teams	All spray operators, washers, pump technicians, and storekeepers underwent a medical fitness examination at selected health centers between January 18 and January 29, 2019. They were checked for physical fitness, signs of respiratory problems, and allergic reactions to the insecticide.		VL Kenya project relied on medical practitioners at the respective health centers where operations sites are located to conduct medical checks. Turnaround time took longer than expected. Twenty six potential seasonal workers were found unfit after medical screening.
1f. Procurement of, distribution to, and training on the use of PPE for all workers with potential pesticide contact	Local and international procurement (with exception of PPE from USA) was done in good time prior to the training of IRS seasonal workers on matters of safety, hygiene, and personal protection against potential insecticide exposures, incidents and accidents.		

MITIGATION MEASURE	STATUS OF MITIGATION MEASURES	OUTSTANDING ISSUES RELATING TO REQUIRED CONDITIONS	REMARKS
1g. Training on mixing insecticide and the proper use and maintenance of spray pumps	<p>Correct insecticide mixing procedure, as well as triple rinsing of insecticide bottles, was included in all trainings from TOT workshop through to the spray operators training. Pump technicians in Homa Bay and Migori Counties were trained on pump maintenance and repair between November 12 and 23, 2018.</p> <p>Out of a total of 1881 inspections conducted for Homeowner preparation & SOP performance in both Counties, there was no incident of incorrect insecticide mixing while only 53 inspections reported on pumps that required servicing.</p>	Faulty spray pump parts, resulting in spillage, were reported in two sub-counties.	For future campaigns, emphasis shall be on basic maintenance of the pump, especially the insecticide discharge process, for pump technicians, TLs, supervisors, and spray operators, to ensure that the shut-off cock, thrust-less shut-off, and lance are tightly secured to avoid leakages or malfunctions.
1h. Provision of adequate facilities and supplies for end-of-day clean-up	<p>All 68 operations sites had fenced-off wash area with an adjacent soak pit. Two separate temporary bathing units covered with canvas sheets were provided, for male and female spray operators. After PPE cleaning, washers set up seven progressive rinse barrels at each wash area for the triple-rinsing of pumps. A basin with enough soapy water was provided at the wash area to facilitate cleaning of rubber hand gloves, face shields, and helmets. Enough plastic basins, soap, and water were provided for spray operators to take a shower as part of end-of-day clean-up. Out of 352 inspections conducted for the end of day clean-up process, 33 reported on potential non-compliances and the issues raised were addressed immediately by the site supervisors.</p>	Some spray operators were reluctant to take a shower at the bathing units, with cold water. TLs, supervisors, and site coordinators were tasked to ensure that all spray operators at the very least washed off their hands and faces with soap and water.	Provision of slippers for spray operators would ease the whole process of taking a shower while standing on gravel that was placed at the pits dug in the bathing units.

MITIGATION MEASURE	STATUS OF MITIGATION MEASURES	OUTSTANDING ISSUES RELATING TO REQUIRED CONDITIONS	REMARKS
1i. Enforce spray and clean-up procedures.	Directly observed spraying and end-of-day clean-up was conducted daily by TL and field supervisors (i.e. VL Kenya, NEMA, sub-county and county MOH teams). Out of the 352 end of day clean up inspections carried out in both Counties, 19 reported on issues of TLs not supervising the clean-up process.	M-Health supervision reports indicated that some team leaders were busy compiling daily summary reports instead of monitoring their team members during the end-of-day clean-up.	Site coordinators were tasked to ensure that TLs and/or site supervisors were at the wash areas to supervise the end of day clean-up process. For future IRS campaigns, there is need to reinforce importance of supervision of spray and clean up procedures during ToT and TLs training.
2a. IEC campaigns to inform homeowners of responsibilities and precautions	IEC campaigns were carried out using two primary approaches: door-to- door visits by mobilizers, and information through media. Local Dholuo radio stations played a key role in disseminating key information. IEC strategies focused on key messages about homeowner responsibilities before, during, and after spraying.	There were a number of reported incidents of dog attacks and bites to spray operators or mobilizers in both counties.	In future, IEC messaging has to emphasize on caging of all domestic animals prior to spraying. Spray team members shall be advised to call out on home owners to cage or shoo their dogs before entering a beneficiary's homestead. Spray operators shall be trained on how to manage the situation when a dog is out and about.

MITIGATION MEASURE	STATUS OF MITIGATION MEASURES	OUTSTANDING ISSUES RELATING TO REQUIRED CONDITIONS	REMARKS
2b. Prohibition on spraying houses that are not properly prepared	SOPs were taken through a comprehensive and thorough five days' training. They were given clear guidelines on proper household preparation. They were directed on how to identify eligible structures and eligible surfaces for spraying. Household preparation entailed removing food and other belongings, covering immovable household items, and not spraying rooms used as food stores, as well as not spraying structures with sick people who could not be moved outside. Out of 1881 inspections conducted for Home owner preparation and SOP performance, 151 reported on structures that had not been well prepared for spraying. Such structures could only be sprayed once the outstanding non-compliance issues had been resolved with the guidance of spray supervisors in the field.		In both counties, some households had maize harvests kept in the eligible structures, either in food stores, in the bedrooms, or in sitting rooms. The VL Kenya instructed the spray operators not to spray food stores. Where large amount of the food items were stored in eligible rooms and could not be moved outside, the VL Kenya advised the spray operators not to spray such rooms. In some structures, SOPs had to remove household items by themselves and prepare the structure, which was time consuming and physically exhausting making it difficult for them to meet their daily targets. In morning mobilization forums, SOPs were reminded to ensure proper household preparation prior to spraying. There is also need for an enhanced IEC/BCC messaging on household preparation by home owners such that it is not left as one of the roles for the SOPs.
2c. Two-hour exclusion from house after spraying.	Mobilizers, SOPs, TLs, and field supervisors constantly reminded homeowners to stay away from sprayed structures for two hours, and only re-enter after the two hours to open doors and windows for aeration, and then to stay away for an additional 30 minutes before occupying such structures again. Of the 1881 inspections conducted for the home owner preparation and SOP performance, only one reported on a home owner not informed of the 2 hours exclusion time from the house after spraying.		

MITIGATION MEASURE	STATUS OF MITIGATION MEASURES	OUTSTANDING ISSUES RELATING TO REQUIRED CONDITIONS	REMARKS
2d. Instruct homeowners to wash itchy skin and go to health clinic if symptoms do not subside	<p>Mobilizers, SOPs, TLs, and field supervisors worked together to instruct homeowners to wash itchy skin with soap and water and then go to the nearest health center if symptoms occurred persistently.</p> <p>Out of the 1881 inspections conducted for the home owner preparation and SOP performance, 12 reported on home owners who had not been informed of washing itchy skin and seeking medical attention when symptoms of exposure persisted.</p>	<p>A number of supervisors raised erroneous red flags on potential insecticide exposures to SOPs and home owners as a result of incorrect responses with the use of m-Health reporting tools. Follow up phone calls with the supervisors who made such errors was done on a daily basis for re-confirmation.</p>	<p>An on job training for proper filling of m-health tools and checklists was done for supervisors who repeatedly submitted erroneous reports.</p>
3a. Indoor spraying only	<p>VL Kenya, NEMA, and MOH teams emphasized on strict adherence to spraying of eligible structures and surfaces only. Of the 1881 inspections carried out by supervisors, there was no reported incident of outdoor spraying in both Counties.</p>		
3b. Training on proper spray technique	<p>SOP training on proper swathing, spray distance, spray speed, pump agitation, and 5cm spray overlap was conducted between January 21 and 25, 2019 in Migori and February 4 and 8 in Homa Bay County. Out of the 1881 inspections conducted by various supervisors, 34 reported issues to do with improper spray techniques. These issues were addressed during morning mobilization forums with the SOPs.</p>		
3c. Maintenance of pumps	<p>All 68 operations sites had a pump technician whose main role was to service spray pumps and fix any pump- related problems. The pump technicians were equipped with tools and spares parts such as screwdrivers, screw spanners, pliers, and oil. The pump technicians accompanied SOPs to the field each spray day. Field inspections by various supervisors identified 53 spray pump related issues that required servicing in both Counties.</p>	<p>Faulty spray pump parts, resulting in spillages, were reported in two sub-counties.</p>	

MITIGATION MEASURE	STATUS OF MITIGATION MEASURES	OUTSTANDING ISSUES RELATING TO REQUIRED CONDITIONS	REMARKS
4a. Choose sites for disposal of liquid wastes, including mobile soak pit sites, according to PMI BMPs.	.. All 28 operations sites used in Migori for the 2018 campaign were retained for use in the 2019 campaign. In Homa Bay, two sites in Mfangano Island were left out since spraying had not been planned for the Island. Two new sites were set up in Suba North and Ndhiwa sub-counties to further decentralize IRS operations in Homa Bay. Total number of sites used in Homa Bay County were 40. A total of 68 operations sites in both Counties were assessed and greenlighted by for the 2019 IRS campaign.		Tom Mboya site in Suba North and Nguku operations site in Ndhiwa were the two newly set up sites in addition to the 38 existing sites in Homa Bay. The two sites dropped in Mfangano Island were Ugina and Wakula operations sites.
4b. Construct fixed and/or mobile soak pits with charcoal to adsorb pesticide from rinse water	Fixed soak pits were used to manage waste water. In Migori, all the soak pits were overhauled prior to the start of campaign to ensure an effective filter media. Charcoal and wood shavings were replaced while stones and gravel were reused. In Homa Bay, two new soak pits were set up at Tom Mboya and Nguku sites while the soak pits in Omboga site was overhauled to address drainage issues encountered last year.		This year, soak pit drainage issues were reported at Bware, Omboga, Nyalkinyi and Nyamrisra operations Sites. These four soak pits will be overhauled to resolve issues with design or workmanship in time for next year campaign.
4c. Maintain soak pits as necessary during season.	All soak pits and wash area surroundings were cleared of vegetation. Each plastic pipe retrofitted onto the soak pits was unclogged regularly to ensure uniform distribution of effluent over the filter media. Filter vent caps were also installed on newly constructed wash areas, to prevent vegetation and mud passing through and clogging the plastic pipe that channels water to the soak pit.	There were four soak pits not adequately draining the effluent (i.e. Bware, Omboga, Nyalkinyi and Nyamrisra operations sites.) The puddle on the soak pits was primarily the result of excessive use and wastage of water during cleaning of pumps.	All 68 soak pits were covered to allow biodegradation of adsorbed insecticide. Grounds men and women have been identified to ensure that wash and bathing areas at the cleared of vegetation periodically.

MITIGATION MEASURE	STATUS OF MITIGATION MEASURES	OUTSTANDING ISSUES RELATING TO REQUIRED CONDITIONS	REMARKS
4d. Inspection and certification of solid waste disposal sites before spray campaign	In October 2018, the VL ECO visited, and inspected, Kamongo Waste Paper Ltd and VINTZ Plastics Limited, both in Nairobi, to determine their suitability for paper/carton and plastics wastes recycling, respectively. The project then formally entered into separate MOUs with the two waste recycler companies. The ECO visited and inspected ECCL, Buhembu incineration facility in Migori. An MOU was also agreed upon and signed between the VL Kenya and ECCL for thermal destruction of all 2019 and future IRS-contaminated wastes.		
4e. Monitoring waste storage and management during campaign.	Solid wastes were segregated and stored separately at the site store rooms. Proper documentation for the wastes was also kept, including stock/bin cards and goods issue notes, when transferring the wastes from such stores to the central warehouses in Migori and Homa Bay.	Accumulation of empty insecticide bottles was reported in some site stores. Site coordinators were requested to liaise with the logistics team to have the empty insecticide bottles and other solid wastes at the stores collected every two weeks.	Use of gunny bags (sacks) to collect segregated wastes worked well. The gunny bags were sizeable and more durable.
4f. Monitoring disposal procedures post-campaign	The VL ECO oversaw the destruction and recycling process for all uncontaminated paper and carton wastes at Kamongo Wastepaper Ltd on 12 th April 2019. From 8 th to 13 th April 2019, all cleaned empty insecticide bottles and other assorted plastic wastes were recycled at VINTZ Plastics Limited, a facility licensed by NEMA and certified by the Directorate of Occupational Safety and Health Services. The ECO oversaw IRS plastic waste recycling. At ECCL Migori, a private facility licensed by NEMA to incinerate hazardous wastes, all IRS contaminated wastes were thermally destroyed under the ECO's oversight from 5 th to 7 th April 2019.		

MITIGATION MEASURE	STATUS OF MITIGATION MEASURES	OUTSTANDING ISSUES RELATING TO REQUIRED CONDITIONS	REMARKS
5a. Maintain records of all pesticide receipts, issuance, and return of empty sachets/bottles	An elaborate supply chain system was established by the project to manage receipt and dispatch of insecticide right from the Kisumu main warehouse down to the Homa Bay and Migori Central warehouses down to the 68 site stores. The same system tracked dispatch and receipt of empty bottles and other IRS commodities. Stock keeping documents maintained at the various levels include ledger books, GRNs, delivery notes, GIN, stock cards, and insecticide tracker sheets and booklets.	Late updating of the ledger book and stock cards was a key noncompliance issue among few storekeepers, which was addressed on a daily basis by supervisors, who carried out physical verification of insecticide stocks through the storekeeper performance inspections.	
5b. Reconciliation of number of houses sprayed vs. number of sachets/bottles used	MOH site supervisors and VL site coordinators carried out a daily check of the spray performance tracker sheet to verify insecticide use rate. The performance monitoring tracker sheet was updated on a daily basis to keep track with reconciliation of number of structures sprayed vs. number of bottles/sachets used by the SOPs.		
5c. Visual examination of houses sprayed to confirm pesticide application	Supervisors drawn from VL Kenya staff, MOH and NEMA, conducted DOS on SOPs as well as DCVs in beneficiaries' structures, looking out for evidence of spray and insecticide residues on the walls, ceilings and eaves(where applicable).		

MITIGATION MEASURE	STATUS OF MITIGATION MEASURES	OUTSTANDING ISSUES RELATING TO REQUIRED CONDITIONS	REMARKS
5d. Perform physical inventory counts during the spray season	Physical verification of insecticide stocks, empty bottles, and other commodities was carried out on a daily basis by all supervisors at the site stores, and was guided by the storekeeper performance checklist, an m-Health tool, to aid supervision and timely reporting.	In a few site stores where physical verification did not tally with figures on the record documents, it was established that the challenge arose as a result of less-experienced storekeepers, most of them being new to IRS. Site supervisors corrected such anomalies, and the concerned storekeepers were tasked with updating their records accordingly, on a daily basis. There were a few losses reported at some site stores e.g. coveralls, neck covers, towels, etc. Individuals were surcharged as part of end of spray check out.	Storekeepers need sufficient training on recordkeeping, as well as focused supportive supervision in conducting physical inventory verification. An additional day is required during the storekeepers training for them to interact with and adequately familiarize themselves with inventory tools and documents.

ANNEX E: LOCATION OF VECTORLINK KENYA OPERATIONS SITES

Country	County	Sub-County	Ward	Number of Operations Sites	Operations Site	Latitude - S	Longitude - E	Elevation (m)
Kenya	Migori	Rongo	Central Kamagambo	4	Rongo Sub county Hospital	-0.45449	34.35991	1355
			East Kamagambo		Kochola Dispensary	-0.42473	34.33759	1353
			North Kamagambo		Minyenya Dispensary	-0.41523	34.37184	1433
			South Kamagambo		Ongo Health Centre	-0.54594	34.36500	1591
		Awendo	Central Sakwa	4	Awendo Sub county Hospital	-0.53923	34.32096	1454
			South Sakwa		Mariwa Health Centre	-0.58334	34.34485	1488
			West Sakwa		Rabondo Dispensary	-0.50812	34.29066	1443
			North Sakwa		Dede Dispensary	-0.49012	34.31916	1428
		Uriri	Central Kanyamkago	5	Uriri Health Centre	-0.57128	34.30777	1531
			North Kanyamkago		Othoro Sub county Hospital Mgr	-0.53437	34.23208	1297
			West Kanyamkago		Lela Dispensary	-0.56824	34.24988	1358
			East Kanyamkago		Oyani Health Centre	-1.02264	34.35226	1475
			South Kanyamkago		Bware Dispensary	-1.00055	34.31626	1523
		Suna East	God Jope	4	Osingo Dispensary	-1.04675	34.32099	1546
			Kwa		Suna Rabuor Health Centre	-1.05185	34.35119	1492
			Kakrao		Anjego Dispensary	-1.00963	34.26592	1368
			Suna Central		Migori County Referral Hospital	-1.03836	34.28572	1382
		Suna West	Suna Wasimbete	4	Nyamaranga Health centre	-1.06971	34.20852	1389
			Wasweta 2		Bondo Dispensary	-1.05899	34.24071	1400
			Oruba Ragana		Suna Ragana Dispensary	-1.06334	34.28317	1381
			Wiga		Arombe Dispensary	-1.02086	34.21056	1331
		Nyatike	North Kadem	7	Agenga Dispensary	-0.55130	34.14044	1165

Country	County	Sub-County	Ward	Number of Operations Sites	Operations Site	Latitude - S	Longitude - E	Elevation (m)	
			Kanyarwanda		Macalder Sub County Hospital	-0.57788	34.17144	1387	
			Got Kachola		Wath Onger Dispensary	-0.57068	34.12487	1148	
			Kachieng		Karungu Sub County Hospital	-0.50844	34.09413	1137	
			Kanyasa		Alendo Chief's Camp	-0.48679	34.13110	1301	
			Muhuru		Muhuru Health Centre	-1.00775	34.07888	1154	
			Kaler		Nyandago Koweru Dispensary	-1.036527	34.254975	1235	
			Homa Bay		Homa Bay Township	Homa Bay Central	4	CHMT Offices	-0.525784682
	Homa Bay East	Marindi Health Center		-0.652619866		34.52008731		1355	
	Homa Bay East	Nyalkinyi Health Center		-0.532818532		34.49296462		1133	
	Homa Bay East	Pala Masogo Health Center		-0.640115883		34.52995452		1358	
	Rachuonyo (Kabondo)	East		Kabondo East	4	Othoro Sub County Hospital Hbay	-0.435055581	34.95552863	1542
				Kabondo West		Kabondo Sub County hospital	-0.420909154	34.8740497	1487
				kojwach		Ringa Health Center	-0.47363336	34.84582991	1504
				Kokwanyo Kakelo		Ober Kakelo Chiefs camp	-0.487638266	34.81076274	1408
	Rachuonyo (Kasipul)	South		Central Kasipul	5	Koywech Dispensary	-0.447509758	34.72869681	1368
				East Kamagak		Sino Health Center	-0.446347917	34.76655354	1341
				South Kasipul		Ombek health Center	-0.568435909	34.6640523	1387
				West Kamagak		Rachuonyo Sub County Hospital	-0.506232759	34.73352096	1397
				West Kasipul		Nyangiela Sub County Hospital	-0.538147932	34.70689671	1381
	Suba North (Mbita)			Gembe	4	Kitare Health Center	-0.505910967	34.33057889	1188
				Lambwe		Ogongo Sub County Hospital	-0.573561776	34.37182316	1283
				Rusinga		Tom Mboya SCH	-0.400315522	34.164090001	1134
			Kasgunga	Mbita Sub County Hospital		-0.42262834	34.20786151	1141	
	Ndhiwa		Kologi	8	Malela Dispensary	-0.587510956	34.39323284	1240	
			Kologi		Okok dispensary	-0.682837553	34.42873774	1339	
			Kosewe		Ndhiwa Sub County Hospital	-0.728265798	34.36676252	1310	
			Kwabwai		Got Kojowi Health Center	-0.761291996	34.26509993	1415	
			North Kabuoch		Magina health centre	-0.698302673	34.5185516	1313	
North Kabuoch			Ombo Kachieng		-0.733547717	34.45549842	1288		
Kanyadoto			Nguku Dispensary		-0.803003517	34.36603720	1282		

Country	County	Sub-County	Ward	Number of Operations Sites	Operations Site	Latitude - S	Longitude - E	Elevation (m)
			South Kabuoch		Pala Dispensary	-0.804998445	34.44449221	1349
		Rachuonyo North	Kanyadholuo	6	Omboga Dispensary	-0.439239561	34.62319988	1221
			Kindu town		Kendu Sub county Hospital	-0.371560096	34.65093902	1129
			North Karachuonyo		Wagwe Dispensary	-0.349426801	34.57394676	1150
			Wang chieng		Chuthber Dispensary	-0.398961667	34.72353167	1349
			West Karachuonyo		Homa Bay hills health centre	-0.353765379	34.46418332	1121
			West Karachuonyo		Okiki Amayo health centre	-0.412172504	34.51181103	1289
		Rangwe	East Gem	4	Rariw Dispensary	-0.580965775	34.61745685	1414
			Kagan		Ndiru Health Center	-0.522434189	34.57793888	1262
			Kochia		Nyagoro Health Center	-0.515274214	34.53464634	1186
			West Gem		Rangwe Sub County Hospital	-0.600942439	34.58115493	1335
		Suba South (Suba)	Gwasssi North	5	Nyandiwa Health Center	-0.724616309	34.05122449	1140
			Gwasssi South		Magunga Health Center	-0.689847381	34.14990767	1346
			Kaksingiri West		Nyamrisa Health Center	-0.570409159	34.0965403	1137
			Kaksingiri West		Suba sub county Hospital	-0.537744448	34.16802427	1119
			Ruma Kaksingiri East		Nyatoto Health Center	-0.556542786	34.27202955	1183

ANNEX F1: NUMBER OF SEASONAL WORKERS TRAINED – MIGORI COUNTY

Categories of Persons Trained	Training on IRS Delivery										Other Trainings																
	ToT for Spray Operators		Spray Operator		Data Entry		Logistics		IEC Mobilization		Public Health Training		Data Collection		PPE Washers		Financial Training		Storekeepers		Security		Environmental Compliance Training		m-Health		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
MIGORI COUNTY																											
Spray operators			531	408							531	408	531	408	531	408								531	408	21	9
Standby spray operators			27	32																				27	32		
Team leaders			94	64							94	64	94	64	94	64								94	64		
Training of trainers	96	32									96	32	96	32										96	32	96	32
M&E assistants			5	3	5	3					5	3	5	3										5	3	5	3
Standby M&E Assistants			2	3	2	3					2	3	2	3										2	3		
IT/mHealth Assistants			1	0	1	0							1	0										1	0		
DECs IRS					14	19							14	19										14	19		

Categories of Persons Trained	Training on IRS Delivery										Other Trainings																			
	ToT for Spray Operators		Spray Operator		Data Entry		Logistics		IEC Mobilization		Public Health Training		Data Collection		PPE Washers		Financial Training		Storekeepers		Security		Environmental Compliance Training		m-Health					
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F		
Standby DECs					3	2								3	2												3	2		
E-inventory DECs							0	1											0	1					0	1	0	1		
Storekeepers			23	7			23	7			23	7			23	7			23	7			23	7	23	7				
Site coordinators	23	5	23	5			23	5	23	5	23	5	23	5	23	5			23	5			23	5	23	5	23	5		
Standby Site Coordinators	3	1	3	1			3	1	3	1	3	1	3	1	3	1			3	1			3	1			3	1		
Supervisors	73	27	73	27					73	27	73	27	73	27	73	27							73	27	73	27	73	27		
Logistics assistants	0	1	0	1			0	1			0	1			0	1			0	1			0	1			0	1		
Warehouse assistant	1	0	1	0			1	0			1	0			1	0			1	0			1	0			1	0		
Mobilizers									360	743	360	743	360	743									360	743						
IEC assistant	0	2	0	2					0	2	0	2	0	2									0	2	0	2				
IEC supervisor									18	16	18	16	18	16									18	16	18	16				
EC Assistant			1	0			1	0	1	0	1	0	1	0	1	0			1	0			1	0	1	0				
Washers			7	77													7	77					7	77						
Drivers																							109	0						
Security guards																						51	5	51	5					

ANNEX F 2: NUMBER OF SEASONAL WORKERS TRAINED -HOMA BAY COUNTY

Categories of Persons Trained	Training on IRS Delivery										Other Trainings																			
	IoT for Spray Operators		Spray Operator		Data Entry		Logistics		IEC Mobilization		Public Health Training		Data Collection		PPE Washers		Financial Training		Storekeepers		Security		Environmental Compliance Training		m-Health					
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F				
HOMA BAY COUNTY																														
Spray operators			766	495										766	495											766	495			
Standby spray operators			45	35										45	35											45	35			
Team leaders			107	67										107	67											107	67			
Trainer of trainers	124	52	124	52			124	52	124	52			124	52	124	52	124	52	124	52	124	52	124	52	124	52	124	52		
M&E assistants			10	4	10	4	10	4					10	4	10	4					10	4			10	4	10	4		
Standby M&E Assistants			4	1	4	1	4	1					4	1	4	1					4	1			4	1				
IT/mHealth Assistants			1	0	1	0							1	0											1	0				
DECs IRS					21	23							21	23											21	23				

Categories of Persons Trained	Training on IRS Delivery										Other Trainings																
	ToT for Spray Operators		Spray Operator		Data Entry		Logistics		IEC Mobilization		Public Health Training		Data Collection		PPE Washers		Financial Training		Storekeepers		Security		Environmental Compliance Training		m-Health		
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
Standby DECs					4	1							4	1									4	1			
E-inventory DECs							0	1											0	1			0	1	0	1	
Storekeepers	28	15	28	15			28	15										28	15			28	15	28	15		
Site coordinators	26	15	26	15			26	15					26	15	26	15			26	15			26	15	26	15	
Standby Site Coordinators	2	1	2	1			2	1					2	1	2	1			2	1			2	1			
Supervisors	96	27	96	27							96	27	96	27									96	27	96	27	
Logistics assistant	1	0	1	0			1	0										1	0			1	0	1	0		
Warehouse assistant	1	0	1	0			1	0										1	0			1	0	1	0		
Mobilizers			296	1243					296	1243			296	1243									296	1243			
IEC assistant	1	1	1	1																			1	1	1	1	
IEC supervisors	25	30	25	30																			25	30	25	30	
EC Assistant			0	1			0	1	0	1	0	1	0	1	0	1		0	1			0	1	0	1		
Washers			4	95										4	95								4	95			
Drivers			128	0																			128	0			
Security guards			69	14																69	14			69	14		

Categories of Persons Trained	Training on IRS Delivery											Other Trainings														
	ToT for Spray Operators		Spray Operator		Data Entry		Logistics		IEC Mobilization		Public Health Training		Data Collection		PPE Washers		Financial Training		Storekeepers		Security		Environmental Compliance Training		m-Health	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Health workers for poisoning case management			75	61																			75	61		
Financial assistants	6	4	6	4													6	4								
Pump technicians			29	12																			29	12		
% of women trained	32.10%		54.20%		48.20%		31.50%		75.50%		22.30%		56.90%		50.60%		30.10%		31.50%		25.50%		53.10%		33.70%	
% of men trained	67.90%		45.80%		51.80%		68.50%		24.50%		77.70%		43.10%		49.40%		69.90%		68.50%		74.50%		46.90%		66.30%	
Total	310	145	1844	2173	40	29	196	90	420	1296	96	28	150	196	170	169	130	56	196	90	193	66	186	219	312	146
Grand total	455		4017		69		286		1716		124		3467		339		186		286		259		4057		458	

ANNEX G: INCIDENT SUMMARY

INCIDENT ID	BRIEF DESCRIPTION OF INCIDENT	LOCATION
KEN-012819-001	Suspected Fraud - A female SOP poured a bottle of Actellic® 300CS into a pit latrine	Suna Ragana operations site, Migori County, Suna West Sub-county, Kenya.
KEN-012919-002	Health Safety - A female mobilizer was hit by an over speeding motorbike just outside the gate leading to the operations site	Kendu Bay sub county hospital operations site, Homa bay County, Rachuonyo North sub county, Kenya
KEN-013119-003	Fraud- Two SOPs falsified spray data and misappropriated insecticide	Rongo Sub-county Hospital (SCH) Operations site, Rongo Sub-county, Kenya.
KEN-013119-004	Health Safety – SOP was bitten by a dog.	Ageng’a operations site, North Kadem ward, Nyatike Sub-county, Migori County, Kenya
KEN-013119-005	Insecticide exposure –Insecticide splash on an SOP's face due to loose joint on sprayer	Uriri SCH operations site, Central Kanyamkago ward, Uriri Sub-county, Migori County, Kenya
KEN-020719-006	Health Safety – Mobilizer was bitten by a dog	Atego Village, Kadera Kwoyo Sub-Location, North Sakwa Ward, Migori County, Kenya.
KEN-020719-007	Health Safety –Mobilizer was bitten by a dog	Atandi Village, West Kamagak ward, Rachuonyo South sub county, Kenya, Homa Bay County, Kenya
KEN-021119-008	Health Safety – TL was bitten by a dog	CHMT site, Central Ward, Homa Bay County, Kenya
KEN-021119-009	Health Safety – Mobilizer was bitten by a dog	Sino Health Center site, East Kamagak ward, Rachuonyo South Sub-county, Homa Bay County, Kenya
KEN-021319-010	Health Safety - SOP had forgot an empty insecticide sachet at a beneficiary’s home, which was later recovered although partially destroyed by fire as home owner tried to discarded it by burning.	Kendu Bay SCH, Rachuonyo North Sub-County Homa Bay County, Kenya
KEN-021319-011-	Fraud – Insecticide theft and misuse together with data falsification to cover it by one SOP.	Rabondo site, Awendo Sub County, Migori County, Kenya.
KEN-021419-012	Health Safety –TL was bitten by a dog	Nayoke Village, North Kamagambo Sub-Location,South Kamagambo Ward, Rongo Sub County, Migori County.

INCIDENT ID	BRIEF DESCRIPTION OF INCIDENT	LOCATION
KEN-021619-013	Health Safety - Two SOPs were attacked by an unidentified man from a nearby homestead wielding a machete	Rangwe Sub County operations site, Rangwe sub county, Homa Bay county, Kenya.
KEN-021819-014	Health Safety – SOP was bitten by a dog	Korony Village, Kolouch Sub-location, East Kamagambo, Rongo Sub County, Migori County, Kenya
KEN-021919- 015	Transport Accident - A site MoH supervisor was involved in a motorcycle accident when he ran into a cow which was tied near the road side.	Muhuru operations site, Nyatike Sub county, Migori County, Kenya,
KEN-021919-016	Health Safety - Mobilizer was bitten by a dog	Rachuonyo sub county hospital operations Site, West Kamagak ward, Rachuonyo South Sub county, Homa Bay County, Kenya
KEN-022019-017	Insecticide Exposure - An SOP did not use a nose mask when mixing insecticide resulting in mildly exposed to insecticide	Magunga operations Site, Gwasi North Ward, Suba South Sub-county, Homa Bay County, Kenya
KEN-022119-018	Health Safety – SOP was bitten by a dog	Rachuonyo Sub county hospital site, West Kamagak ward, Rachuonyo South sub county, Homa Bay County, Kenya.
KEN_022619_019	Health Safety - SOP was bitten by a dog	Kokelo Kokwanyo ward, Ober site, Rachuonyo East Sub county, Homa Bay County, Kenya.
KEN_022719_020	Health Safety - An SOP sprayed a beneficiary’s mattress and a carpet.	Suba SCH Operations site, Kaksingri West Ward, Suba South Sub-County, Homa Bay County, Kenya.
KEN-022719- 021	Health Safety – A TL was bitten by a scorpion while assisting an SOP and the home owner in household preparation.	Suba SCH Operations Site, Kaksingri West Ward, Suba South Sub-County, Homa Bay County, Kenya
KEN-030219-022	Health Safety - A SOP sustained a cut on his head as a result of a low roof truss. The SOP was entering the structure to check on household preparation and did not have his helmet on.	Wagwe operations Site, Rachuonyo North Sub-County, Homa Bay County, Kenya.
KEN-030519-023	Health Safety - While delivering SBCC messaging, a SOP was chased by a furious husband wielding a machete as he was angry that his structure had been sprayed despite his wife’s consent	Ndiru Operations Site, Rangwe Sub-County, Homa Bay County, Kenya.
KEN-030519-024	Theft Fraud - A SOP falsified data to cover up insecticide theft. A TL gave IRS stickers to this SOP against protocol, which aided the falsification.	Kalanya Kanyango sub-location, CHMT operations site, Homa Bay Township Sub-County, Kenya.
KEN-030719-025	Theft Fraud - 10 SOPs and their two TLs falsified data... County MoH staff seconded as a site supervisor did not adequately supervise assigned teams.	Magunga operations Site, Suba South Sub-County, Homa Bay Kenya

INCIDENT ID	BRIEF DESCRIPTION OF INCIDENT	LOCATION
KEN-030719- 026	Theft Fraud - Two SOPs falsified spray data. No insecticide theft or misuse found.	Nyandiwa operations site, Suba South Sub-County, Homa Bay County, Kenya
KEN-030819-027	Theft-Fraud - Two female SOPs falsified spray data.	Ndiru Operations Site, Rangwe Sub-County, Homa Bay County, Kenya.
KEN-030819-028	Fraud - Two SOPs were found to have falsified data. No insecticide theft or misuse found.	Lower Kwandiko Sub-location, Ndhiwa Sub-county, Homa Bay County, Kenya
KEN-030819-029	Theft Fraud - An SOP falsified spray data indicating and was not able to account for the bottles of insecticide that he had received that morning. TL revealed SOP was under influence of hard drugs. TL has not reported the drug use and had been signing off on SOP spray data form.	Othoro operations site, Rachuonyo East Sub-County, Homa Bay County, Kenya
KEN-031119-030	Health Safety - An SOP had sprayed a poorly prepared structure, with drinking water inside and mosquito nets hanging on the wall.	Nyandiwa township, Nyandiwa sub-location, Suba South Sub-county, Homa Bay, Kenya.
KEN-031119-031	Theft Fraud – Two SOPs had falsified data to cover up insecticide theft.	Nyagoro Operations site, Kamenya Sub Location, Rangwe Sub County, Homa Bay County, Kenya
KEN-031419-032	Theft Fraud - Three SOPs sprayed commercial premise, an ineligible structure, for a fee.	Nyang'ela Operations Site, Kasipul Sub-County, Homa Bay County, Kenya.
KEN-031419-033	Insecticide Spill - An SOP spilt a small amount of insecticide when a bottle slipped from his hands while opening it.	Mbita SCH operations site, Kasungu Ward, Suba North Sub-County, Homa Bay County, Kenya
KEN-031619-034	Fraud Spill - A SOP falsified data to cover up insecticide spill~ insecticide poured into a termite hole.	Ombek operations site, Rachuonyo South Sub-county, Homa Bay County, Kenya

ANNEX H1: NUMBER OF SEASONAL WORKERS HIRED-MIGORI COUNTY

MIGORI COUNTY														
Position	County		Awendo		Nyatike		Rongo		Suna East		Suna West		Uriri	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Site coordinators	23	5	4	0	5	2	3	1	3	1	3	1	5	0
Storekeepers	23	7	3	1	7	0	2	3	3	1	3	2	5	0
Security guards	51	5	7	1	14	0	7	1	7	1	6	2	10	0
Supervisors	73	27	10	4	18	0	8	6	10	5	8	6	14	4
Team leaders	94	64	13	10	22	11	14	10	18	7	11	10	16	16
Spray operators	531	408	83	56	112	87	74	68	86	61	67	60	109	76
Alternate spray operators	27	32	6	2	9	5	2	5	1	8	5	3	4	9
Drivers	109	0	15	0	22	0	16	0	21	0	15	0	20	0
Washers	7	77	0	12	1	16	0	13	2	11	0	12	4	13
Mobilizers	360	743	47	136	63	149	56	120	59	95	61	110	74	133
IEC supervisors	18	16	4	1	6	2	3	2	1	4	3	2	1	5
Pump technicians	25	3	4	0	6	1	2	2	4	0	4	0	5	0
Logistics assistant	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Finance assistants	3	4	1	0	1	0	0	1	0	1	1	0	0	1
IEC assistants	0	2	0	0	0	0	0	0	0	0	0	0	0	0
EC assistants	1	0	0	0	0	0	0	0	0	0	0	0	0	0
M&E assistant	5	3	1	0	1	1	1	0	0	1	0	1	1	0

MIGORI COUNTY

Position	County		Awendo		Nyatike		Rongo		Suna East		Suna West		Uriri	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Warehouse assistant	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Data entry clerks (DECs)	14	19	0	0	0	0	0	0	0	0	0	0	0	0
E-inventory DECs	0	1												
Total	1365	1417	198	223	287	274	188	232	215	196	187	209	268	257
Percentage women	50.90%		52.90%		48.80%		55.20%		47.70%		52.80%		49.00%	
TOTAL	2782		421		561		420		411		396		525	

ANNEX H2: NUMBER OF SEASONAL WORKERS HIRED – HOMA BAY COUNTY

HOMA BAY COUNTY																		
	County		Homa Bay Township		Kabondo		Kasipul		Mbita		Ndhiwa		Rachuonyo North		Rangwe		Suba	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Site coordinators	25	16	0	4	3	1	3	2	2	2	8	0	2	4	4	0	3	3
Store keepers	28	15	4	0	3	1	3	3	2	3	5	3	4	2	3	1	4	2
Security guards	70	13	4	4	8	0	9	2	8	0	14	2	7	5	8	0	12	0
Supervisors	96	27	6	3	5	3	6	1	3	2	5	6	9	1	4	2	7	0
Team leaders	107	67	9	6	15	5	13	9	9	5	16	15	16	12	9	9	20	6
Spray operators	665	429	64	35	68	56	78	61	47	43	124	64	105	74	58	53	121	43
Alternate spray operators	45	35	2	6	4	4	5	5	5	3	10	6	5	7	6	2	8	2
Drivers	98	0	9	0	12	0	12	0	7	0	18	0	16	0	8	0	16	0
Washers	4	95	1	8	0	12	0	12	1	6	18	0	0	16	0	10	2	13
Mobilizers	296	1243	33	109	26	164	22	169	12	103	62	195	32	233	41	123	68	147
IEC supervisors	25	30	3	3	1	4	3	3	1	3	5	5	5	4	4	2	3	6
Pump technicians	29	12	3	1	2	2	3	2	4	0	6	2	4	2	3	1	4	2
Logistics assistant	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

HOMA BAY COUNTY

	County		Homa Bay Township		Kabondo		Kasipul		Mbita		Ndhiwa		Rachuonyo North		Rangwe		Suba	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Finance assistants	6	4	1	1	1	0	1	0	1	0	0	2	1	0	0	1	1	0
IEC assistants	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
EC assistants	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
M&E assistants	10	4	2	0	0	1	0	1	1	0	1	1	2	0	1	0	2	1
Warehouse assistants	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Data entry clerks (DECs)	21	23	21	23	0	0	0	0	0	0	0	0	0	0	0	0	0	0
E-inventory DECs	0	1																
Total	1528	2016	165	205	148	253	158	270	103	170	292	301	208	360	149	204	271	225
Percentage women	57.20%		55.30%		63.10%		63.10%		61.90%		50.80%		63.40%		57.80%		44.80%	
TOTAL	3544		370		401		428		273		593		568		353		496	