

## **Utilizing a Campaign Information Management System and high-performance liquid chromatography for improved Quality Control of Indoor Residual Spraying with Actellic 300 CS organophosphate insecticide on Bioko Island of Equatorial Guinea.**

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Quality control of Indoor Residual Spraying (IRS) is necessary to ensure spray operators do not falsify spray records and that they deposit the recommended lethal dose of insecticides on spray walls. Insecticide Quantification Kits (IQK) for in-field quality control of IRS currently detects only concentrations of alpha-cyano pyrethroids and carbamates. IQK kits for in-field quality control with organophosphates are not yet developed though IRS programs are increasingly using organophosphates due to insecticide resistance to pyrethroids and DDT. This study examined the use of an advanced campaign information management system (CIMS) and high performance liquid chromatography (HPLC) for IRS quality control with an organophosphate insecticide. The Bioko Island Malaria Control Project (BIMCP) currently uses Actellic 300CS organophosphate insecticide with pirimiphos methyl as the active ingredient. A total of 17,600 households were sprayed in 2017 using 63 spray operators. The BIMCP instituted a quality control procedure to test houses randomly selected from the CIMS that maps and captures data in real time for houses reportedly sprayed each day. Insecticide samples were tape-lifted from structures reported sprayed and analyzed using HPLC. Spray operators were monitored in 2017 and 2018. During the 2017 monitoring, all the selected houses monitored had the insecticides deposits as detected by HPLC. However, 11.1% of the spray operators deposited less amount of the insecticide ( $<1.0\text{g a.i./m}^2$ ) on the wall, 54.0% deposited the target dose of  $1.0\text{g a.i./m}^2$  and 34.9% deposited over-dose  $>1.0\text{g a.i./m}^2$ . These results were compared with the 2018 monitoring results. The ability to randomly select, locate, and test houses sprayed reportedly within a week via HPLC has markedly improved the quality of IRS on Bioko Island, virtually eliminating falsification, and enabling the project to better evaluate its performance. The results obtained will also form the basis for developing new tool kits for in-field monitoring of organophosphates insecticides.