indoors hourly using exit traps in huts and outdoor by HLC. *Anopheles gambiae* complex and *An. funestus* group were caught during huts and household experiments were distinguished between sibling species by using PCR. *Plasmodium falciparum* antigens in mosquito salivary glands were detected by ELISA method. Primary outcomes were, 1) number of mosquitoes caught outdoors and indoors, 2) sibling species composition and 3) number of *P. falciparum* infected mosquitoes. Push-pull offered marginal protection against host-seeking mosquitoes, in experimental huts there was a significant 30% reduction in outdoor-biting for *An. arabiensis* (P<0.001), and 41.5% for *Ma. uniformis* (P<0.014). There were no significant biting reductions for other mosquito species. Number of mosquitoes caught inside exit traps between treated and control huts were statistically similar. All *An. gambiae* analyzed by r-DNA PCR were identified as *An. arabiensis*, but for *An. funestus* group, 86.9% were *An. funestus* s.s, 9% *An. rivulorum* and 3.9% *An. leesoni.* No *Plasmodium* infected *Anopheles* were detected. Push-pull provided modest protection against early-biting and outdoor-biting mosquitoes. This approach could possibly contribute to reducing transmission of mosquito-borne infections, if optimized.

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### EFFICACY AND PERSISTENCE OF LL3 AND FOURSTAR MICROBIAL LARVICIDES AGAINST DIFFERENT LARVAL STAGES OF MALARIA VECTORS IN WESTERN KENYA HIGHLANDS

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The chemical based malaria vector control interventions are threatened by development of insecticide resistance and change in behavior of the vectors calling for the need for alternative control methods. Bacterial larvicides have the potential to target insecticide resistant and outdoor biting mosquitoes and safe to the environment. The currently available microbial larvicide formulations have short duration of activity requiring frequent re-applications which increase cost of interventions. This study was designed to evaluate efficacy and duration of activity of two (LL3 and FourStar®) long-lasting formulations of *Bacillus thuringiensis israelensis* (Bti) and *Bacillus sphaericus* (Bs) under field conditions in western Kenya highlands.Three sites were selected for this study in the highlands of western Kenya. In each site, one hundred anopheline larval habitats were selected and randomized into three arms, namely: 1) LL3; 2) FourStar® and 3) untreated control larval habitats. The habitats were sampled for mosquito larvae by using standard dipping technique and larvae found were recorded according to the larval stages of the different *Anopheles* species. The larvicides were applied at manufacturers recommended dosage of 1 briquette per 100 square feet. Both treatment and control habitats were sampled for mosquito larvae just before treatment (day 0), and then 24hrs, 3 days and weekly post treatment for 5 months. Results show that after intervention with the larvicides, larval density in the treatment habitats was significantly reduced as compared with the control habitats. Both larvicides showed a higher impact in larval stages of *Anopheles gambiae* s.l than in *An. funestus.* A higher reduction in *Anopheles* larval density was observed in the abandoned goldmines, pond and abandoned fish ponds with the least reduction observed in drainage channels. The LL3 larvicide had a relatively higher percent reduction than FourStar though not significantly different. This study showed that both LL3 and FourStar® long lasting microbial larvicides were effective in reducing larval of *An. gambiae* complex and *An. funestus* group mosquitoes for three months.

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### DYNAMICS OF MALARIA TRANSMISSION, PREVALENCE AND INCIDENCE RATES IN KORHOGO AREA, NORTHERN CÔTE D'IVOIRE

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Despite the striking successes achieved last decade against malaria, there is a compelling need to find alternative methods for maintaining the effectiveness of mosquito vector control. *REACT* project aims to assess novel malaria vector control strategies in combination with the community-wide coverage of Long-Lasting Insecticidal Nets (LLINs) in 30 villages of Korhogo, northern Côte d'Ivoire. Epidemiological studies in this malaria endemic area need to be updated since the last data was published more than 10 years ago. In an attempt to fill this gap and get baseline data for the REACT randomized control trial, an entomological and epidemiological surveys were carried out in six randomly selected villages. Clinical malaria cases were collected retrospectively in the local health centers records from July 2016 to January 2017. During the rainy and dry seasons, mosquitoes were collected in each village using human landing catch method on volunteers from 5:00 pm to 09:00 am. Anopheles species were morphologically identified and a sub-sample dissected for parity determination based on the tracheolar skeins. Polymerase chain reaction (PCR) analysis were used to ascertain the species of the *An. gambiae* complex, *Plasmodium.sp* sporozoite infection and insecticide resistance mechanisms. Furthermore, malaria active case detection was performed on all individuals aged from 6 months to 14 years in the rainy and dry seasons. Blood samples were collected for malaria detection using Rapid Diagnostic Test (RDT) and positive samples were confirmed by examination of Giemsa-stained thick blood films. We will therefore present the dynamics of malaria transmission, prevalence and incidence in sentinel villages in the North of Côte d'Ivoire.

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### SEASONAL VARIATION IN ABUNDANCE AND BITING BEHAVIOR OF MALARIA VECTORS, *ANOPHELES GAMBIAE S.L.* AND *AN. FUNESTUS* USING CLIMATE DATA IN RURAL TANZANIA

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Malaria prevalence can be highly influenced by climatic conditions that drive the abundance and seasonal dynamics of Anopheles vectors. In particular, rainfall influences the breeding habitat while microclimatic conditions determine the survival and biting behaviours of adult Anopheles mosquitoes. Household data on mosquito abundance and microlimatic conditions from South-east Tanzania were analysed to quantify its effect on *Anopheles* abundance and biting behaviour. Mosquitoes were sampled using human landing catches (HLC) both inside houses outdoor area for 616 nights trap. Climatic information (temperature and humidity) and mosquito were simultaneously collected. Daily rainfalls were aggregated in three time bands 1-2, 2-3 and 3-4 weeks before sampling day. Aggregated and current rainfall records were used to explain mosquito abundance. Generalized additive mixed models (GAMMs) and linear mixed models (GLMMs) were used to estimate the seasonal abundance and proportion of outdoor biting in Anopheles species respectively. *An. gambiae* s.l. was observed to be more abundant during the high rain season, while An.