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One of the challenges with controlling and eliminating malaria transmission is being able to estimate where transmission is actually occurring. The gold standard for determining transmission intensity is to use household surveys. However, these are time and cost intensive and are not a viable option as a tool for routine data collection. The use of easy access groups (EAG) such as health facilities, schools, or churches provide a convenient option to quickly collect data on malaria. However, due to issues with selection bias such as access and differing age profiles than the target population present in the EAGs, the resulting estimates of malaria may be biased. Generating malaria risk maps using data collected as part of convenience sampling can be done but how the predicted risk surface compares with those generated using data generated as part of a gold-standard household survey is not known. Data from 6300 participants in 10 health facilities, 25 schools, and 8 churches from the Artibonite valley in Haiti will be integrated into risk maps using Bayesian geostatistical models and compared to risk maps generated using a contemporaneous household survey. Malaria prevalence surfaces according to the convenience and household data are then compared to determine the concordance between the estimates. There is considerable heterogeneity in malaria infection in this area with RDT positivity in health facilities ranging from very low to over 10%. Preliminary evidence suggests that maps generated using an intensive household survey provided a more granular picture compared to the EAG surveys. However, risk surfaces based on all three venue types led to a similar stratification of burden. The ability to quantify these biases and validate the use of EAG surveys to generate malaria risk maps has important implications for malaria control and elimination decision-making.

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THE IMPACT OF PRIMAQUINE (PQ) DEPLOYMENT AND INSECTICIDE TREATED UNIFORMS ON *PLASMODIUM VIVAX* INCIDENCE IN A PILOT MALARIA ELIMINATION STUDY IN CAMBODIA

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Elimination strategies targeting *Plasmodium vivax* (*Pv*) and its hidden hypnozoite reservoir remain elusive. We conducted a two-arm, cluster-randomized, open-label malaria elimination study, to determine the effectiveness of monthly malaria prophylaxis (MMP) with dihydroartemisinin-piperaquine (DP) and weekly primaquine (PQ), against PCR-based monthly screening and treatment (FSAT), over a 6-month period. In the MMP arm (n=534), all volunteers over 12 years old were treated with weekly PQ of 22.5 mg for 12 weeks. In the FSAT arm (n=516), volunteers received radical cure with PQ only if *Pv* positive. Half of volunteers had permethrin treatment of uniforms (ITU), while the other half had sham treatment (sITU). Overall *Pv* failure risk during 6 months of follow up was 19%, 8%, 8%, and 12% in FSAT+sITU, FSAT+ITU, MMP+sITU and MMP+ITU, respectively. The MMP group had a PCR-corrected *Pv* prevalence of 9% on D0 which was highest in the MMP+ITU, high transmission area (12%). At the 6 month follow up, *Pv* prevalence decreased to 5%, further stratified to 3%, 3%, 10%, and 4% for MMP+ITU (low endemic), MMP+sITU (low endemic), MMP+ITU (high endemic), and MMP+sITU (high endemic) interventions, respectively. Volunteers in MMP group who were less than 13 years old and not treated with PQ (n=57) had *Pv* prevalence of 7% on D0 and 4% on month 6. In the MMP arm, *Pv* failure risk was 30% (95% CI: 17-43%) and 7.1% (95% CI: 4.9-10%) in volunteers with and without *Pv* on enrollment, respectively. In FSAT arm, risk of *Pv* infection in children under 18 years old (n=55) was low during 6 months of follow up, with only 3 cases reported. Interventions in FSAT+ITU, MMP+sITU, and MMP+ITU all showed benefit over FSAT+sITU with ARR of 11% (95% CI 5-18%), 11% (95% CI 5-18%), and 8% (95% CI 1-15%), respectively. However, effectiveness of presumptive antirelapse therapy was lower than expected despite the 3 months of weekly PQ in MMP arm. There was no benefit of ITU over drug therapy in MMP arm. In the FSAT arm, the additional benefit of insecticide-treated uniforms was only observed in high endemic area. Multidisciplinary approach is needed for targeting vivax malaria elimination.

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MOSQUITO DIRECT MEMBRANE FEEDING ASSAY: OVERCOME THE FIELD CONSTRAINTS AND ADAPT THE METHOD FOR THE EVALUATION OF MALARIA TRANSMISSION-BLOCKING INTERVENTIONS

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The Direct Membrane Feeding Assay (DMFA) is one of the main methods for measuring human to mosquito malaria transmission. This method is routinely used to evaluate the transmission blocking interventions (TBIs) for malaria control. However, DMFA can be limited by some field and lab constraints. It is usually considered that gametocyte containing blood must be provided to mosquitoes as fast as possible after withdrawal to insure infectivity. This imposes that the volunteers come to the lab which can be distant from their living location. This constitutes a logistic challenge or even an obstacle in some cases. Here we aimed at determining the timeframe between withdrawal of gametocyte containing blood and mosquito blood meal that allows relevant mosquito infection for subsequent experiments. We also tested the effect of blood transportation on *Plasmodium* infectivity in mosquitoes. For each replicate, blood was collected from a gametocyte carrier in heparinized tubes and assigned to one of 5 treatments: immediately used for mosquito feeding (0H) or; kept at 37°C in the lab and provided to mosquitoes 2H, 4H, 6H or 8H afterwards. Fully fed mosquitoes were dissected 7 days-post feeding and oocysts were counted to compare infection levels in the mosquito's groups. Moreover, the effect of blood transportation was tested by comparing infectivity of gametocyte-infected blood either kept at 37°C in the lab or placed in a moving car for 1 to 3 hours before mosquito blood feeding. We found a significant time effect on both the proportion of successfully infected mosquitoes (infection prevalence: $X24=73.5$, $P<0.001$) and on the number of oocyst (infection density: $X24=42$, $P<0.001$). The relationship of these two traits with time followed a bell-shaped curve with maximal infectivity at 2 to 4h post blood drawing. Also, we detected no blood transportation effect on the gametocyte infectivity ($X22=3$, $P= 0.2176$). These findings suggest that delaying and transporting blood for few hours before mosquito blood meal may not prevent the infectivity. Further studies are required to confirm this pattern and explore the proximate mechanisms.