to receive treatment with Coartem (n=267) or Duo-Cotexin (n=269) between September 2013 and December 2015. Chi-squared tests were used to compare rates of adequate clinical and parasitological response (ACPR) for the two ACTs at three and 28 days after initiating treatment. These preliminary data are not genotype-corrected and therefore do not differentiate between treatment failure due to recurrent parasitaemic episodes versus re-infections. ACPR at three days was recorded for 265 patients treated with Coartem and for 266 patients treated with Duo-Cotex ($\chi 2$ =0.194; p=.659). At 28 days, the ACPR was significantly lower for patients treated with Coartem (86.5%) compared to those treated with Duo-Cotexin. (97.4%) ($\chi 2$ =21.03; p<.0001). In conclusion, unadjusted ACPR data indicated that Coartem and Duo-Cotexin were both highly effective at treating children diagnosed with uncomplicated malaria at three days post-treatment; ACPR was 99% for both ACTs. At 28 days, a higher proportion of children who received Duo-Cotexin remained asymptomatic and parasite free compared to those treated with Coartem. This difference between the three- and 28-day results suggests that Duo-Cotexin provides protection against reinfection for longer compared to Coartem. Genotype-corrected data will allow for more robust conclusions to be drawn. Malaria control programs must enact resistance surveillance and mitigation plans to ensure treatments remain effective.

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MOLECULAR DETECTION METHODS TO ESTIMATE *PLASMODIUM FALCIPARUM* GAMETOCYTE CARRIAGE IN NORTHWESTERN CAMBODIA

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Gametocyte carriage and density are critical factors in malaria transmission from human to anopheline hosts, though defining precise transmission risk remains challenging to study. While molecular methods have greatly improved understanding of submicroscopic gametocyte carriage, it is unclear how much these low-density infections contribute to clinical transmission. We compared the burden of microscopic vs. submicroscopic gametocytemia in *Plasmodium falciparum* malaria patients in a randomized, open label clinical trial of atovaquone-proguanil (AP) vs. artesunate + atovaquone-proguanil (ASAP). All patients received a 3 day course of oral therapy with their assigned regimen, as well as a single low dose of 15 mg primaquine on the first day of treatment. Light microscopy (LM) and a nested reverse transcriptase PCR assay (nRT-PCR) targeting Pfs25 RNA expression indicative of mature gametocytes (stage V) was performed on blood samples from 205 volunteers daily for 3 days, and then weekly to estimate gametocyte density and duration of carriage. At screening, *P. falciparum* gametocyte positivity was 25% (51/205) by LM compared to 28% based on *pfs25* RNA detection (57/205). At enrollment, 23% of volunteers had detectable gametocytemia by LM which was reduced to 1% by day 14 in the ASAP group but only 8% in AP group (p=0.03). Volunteers in the AP only group had a longer duration and higher density of gametocyte carriage by LM than those receiving ASAP. Follow-up submicroscopic parasitemia assessments in follow-up remain pending at the time of submission. *P. falciparum* gametocyte carriage at baseline by LM was higher than the rate typically seen in other recent studies performed in this area (approximately 10%). While those receiving ASAP had substantial reductions in risk as well as carriage, 8% of those receiving AP alone remained gametocytemic, even by LM despite receiving primaquine. This suggests that additional studies to more carefully evaluate the efficacy of single low dose primaquine on gametocyte reduction are warranted.

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TOWARDS MALARIA ELIMINATION: ANALYSIS OF MALARIA SURVEILLANCE DATA AMONG UNDER FIVES IN OYO STATE, NIGERIA (2010 - 2014)

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In Nigeria, malaria among under fives remains a major public health problem in terms of morbidity and mortality. We conducted a secondary data analysis to determine the morbidity, mortality and seasonal variations of malaria among under fives in Oyo State, Nigeria. We reviewed and analysed data obtained from the Integrated Disease Surveillance and Response System for the period; 2010 to 2014. Abstracted data were number of malaria cases among under-5 children disaggregated by Local Government Areas (LGA), year of reporting and season. Incidence, proportion of malaria morbidity and number of deaths across months per LGA were determined. Data were analysed using descriptive statistics while trigonometric regression was used to examine seasonal variations. A total of 404,216 malaria cases were reported between 2010 and 2014. The incidence of malaria among under-5 children per 100,000 population was 5,602 in 2010; 14,005 in 2011, 18,938 in 2012; 14,005 in 2013 and 7674 in 2014. The highest incidence recorded in 2012 accounted for 31.4% of the total malaria morbidity. Incidence was highest from the month of July to August 2013 with an increase from1764 cases per 100,000 in July to 3,129 cases per 100,000population in August. The total number of malaria deathswas 15.A sinusoidal pattern was observed in the monthly distribution with malaria peak rates in June to August and lowest rates in October to December. Seasonal index showed that the peak number of malaria cases was in the second quarter of the year. The annual trend of malaria among under-5 children in Oyo state |showed a gradual rise in incidence from 2010 to 2014 inspite of the scale up of interventions. The findings also suggest that there exists a significant monthly variation in malaria rates in Oyo State, Nigeria.

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USE OF THE IMMUNO-EPIDEMIOLOGICAL BIOMARKER OF HUMAN EXPOSURE TO ANOPHELES BITES IN THE MONITORING OF MALARIA TRANSMISSION IN (PRE) ELIMINATION AREAS

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The burden of malaria is gradually declining in many parts of Africa, and is characterized by spatial and temporal variability that presents new and evolving challenges for malaria control programs. New, sensitive and large-scale monitoring indicators that measure the actual risk of malaria transmission/infection over time and space need to be prioritized in a context of elimination. Here, we present the use of an indicator based on the human IgG antibody responses to the gSG6-P1 peptide of the

Anopheles saliva as a pertinent tool for monitoring malaria transmission in very low malaria transmission areas, which can be considered as a "picture" of a malaria pre-elimination area. Two longitudinal studies that cover different seasons of malaria transmission were carried out in northern and central Senegal. At each visit, entomological, parasitological and sociological data were collected. Parasitological and clinical data were correlated with the quantitative level of IgG responses to the gSG6-P1 salivary peptide in children. In northern Senegal, the biomarker of exposure to Anopheles bites indicated that some children were exposed to Anopheles bites during the dry season that has no or very low Anopheles density. Interestingly, children with *P. falciparum* infection in the dry season had higher levels of anti-gSG6-P1 IgG responses than non-infected ones (P<0.01). This biomarker even seemed to discriminate non-infected children from asymptomatic carriers of the parasite (P<0.01). In central Senegal area, the level of specific IgG level increased significantly within the exposure season in area with very low exposure to Anopheles, determined by classical entomological methods (P<0.01). This increase was observed in 69% of children. The biomarker of exposure to Anopheles bites appears to be a sensitive and relevant tool for detecting a risk of *P. falciparum* transmission and assessing the level and heterogeneity of malaria transmission (hot spots). The use of such an immuno-epidemiological indicator may be essential for monitoring malaria and assessing the effectiveness of vector control strategies in (pre)elimination malaria areas.

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RISK FACTOR ASSESSMENT FOR MALARIA AMONG FOREST-GOERS IN A PRE-ELIMINATION SETTING, PHU YEN PROVINCE, VIETNAM

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Progressing from malaria control to elimination requires understanding and targeting interventions to populations at high risk. In Vietnam, forest-goers are often not reached by health services. These mobile populations are difficult to test, treat, and track via routine measures. If undiagnosed, forest goers can maintain parasite reservoirs and contribute to ongoing transmission. A case-control study was conducted to identify malaria risk factors associated with forest-goers in Dong-Xuan District, Phu Yen Province. A case was considered anyone residing in the target area with malaria, confirmed by rapid diagnostic test (RDT) or microscopy and had slept overnight in the forest. Controls were healthy neighbors of cases and negative for malaria by RDT. Participants were interviewed face-to-face using a standard questionnaire. Logistic regression was used to calculate odds ratios (ORs) and 95% confidence intervals (CI) for risk factors after adjusting socio-demographic characteristics. In 2015, we found 81 cases of which 66.7% were positive for *Plasmodium falciparum*, 29.6% for *P. vivax*, and 3.7% had a mixed infection. The majority of cases were male (88%) with a mean age of 34.2 years. Cases were less likely to use treated nets (OR=0.3; 95% CI 0.1-0.8), but more likely to sleep in a hut without walls (OR=5.1; 95% CI 1.6-16), work after dark (OR=2.7; 95% CI 1.3-5.6), bathe in the stream after dark (OR=2.6; 95% CI 1.1-6.0) and collect water after dark (OR=2.0; 95% CI 1.1-3.8) as compared to 94 neighborhood controls. Risk factors for malaria among forest-goers in Vietnam are similar to risk factors for malaria in other areas. As Vietnam moves toward malaria elimination, targeted education and malaria prevention strategies are needed for this hard-to-reach group.

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ESTABLISHING NEW LINE OF *PLASMODIUM FALCIPARUM* INFECTED CLONAL STRAINS IN SUPPORT OF CONTROLLED HUMAN MALARIA INFECTION STUDIES

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Malaria causes 212 million new cases and approximately 429 000 deaths in 2015. This far, antimalaria drug resistance has developed for all classes of drugs and no licensed vaccine is in place. However, there are efforts to develop new and/or improved anti-malarial drugs and vaccines. Controlled human malaria infection (CHMI) studies have shown some correlation between natural and experimental infections. Conversely, these experimental infections and challenges are mostly done using laboratory clones obtained > 30 years ago. This limits data interpretation because experimental and natural infections might not correlate because field parasites are highly genetically and phenotypically diverse. The field displays a wide genetic diversity which currently is not represented by available laboratory strains for CHMI. Other strains including the South American 7G8 *Plasmodium falciparum* clone of Brazilian strain IMTM22 have been used in limited volunteers. This study will provide an opportunity to have a new clone with different characteristics that will offer an opportunity for protectiveness, which can lead to further optimization of the vaccine or the candidate drug. Forty field isolates from different regions in Kenya underwent limiting dilution to generate single clones. For each of the 40 parent parasites, 3-10 clones were obtained, generating a total of 212 clones. Of the 212 clones, 80 lines were confirmed to be single clones based on neutral microsatellites. After successful limiting dilution assays, the next phase of super-cloning of these for subsequent single clones is underway.

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TIMELINESS AND COMPLETENESS OF MALARIA CASE NOTIFICATION AND RESPONSE IN ZANZIBAR, 2013-2015

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Zanzibar has made significant progress toward malaria elimination over the past decade and now considered a low transmission setting with the potential to achieve elimination, but challenges still exist. Malaria surveillance plays a key role in identifying new malaria cases rapidly to reduce transmission.This study aimed to assess timeliness and completeness of malaria case notification and response.Timeliness and completeness were assessed using an evaluation tool developed by the University of California, San Francisco.Data collected from 2013 to 2015 through individual case reporting system, the Malaria Case Notification (MCN).Each District Malaria Surveillance Officer (DMSO) was equipped with tablet.Once a new case is notified, a household follow up will be guided through an active case response protocol and data transmitted through the system.Additional case data are entered into the tablet at the facility and household.Each household member is tested and new cases are treated immediately.Timeliness was defined as the number of reactive case detection (RACD) events followed up within 48 hours of notification divided by the total number of RACD events reported within 48 hours.Completeness was defined as the number of individuals screened during the RACD divided by the total number of individuals living in the