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LONG-LASTING INSECTICIDAL MOSQUITO NET USAGE IN EASTERN SIERRA LEONE - THE SUCCESS OF FREE DISTRIBUTION

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In eastern Sierra Leone, Médecins Sans Frontières (MSF) has run a malaria control project that includes mass distribution of free, long-lasting insecticidal mosquito nets (LNs) with demonstration of correct use. In 2006 and 2007, more than 65 000 LNs were distributed, targeting children under five years and pregnant women. The aim of this survey was to measure utilization and coverage and of LNs in the population. Heads of 900 randomly selected households in 30 clusters were interviewed regarding LNs in their household using a standardized questionnaire. The condition of the LNs in the household was also checked. Of the 4997 study persons, 67.2% (3356, CI 59.1-74.3) reported sleeping under an LN the night before the study took place. This included 76.8% (926/1206, CI 69.8-82.6) of children under five and 73% (100/137, CI 59.8-83.1) of pregnant women. Of the 900 households, 751 (83.4%, 95%CI 78.5-88.4) reported owning at least one LN. Of the 16.6% who did not own an LN (149/900, CI 11.6-21.5), 91.9% did not participate in the MSF LN mass distribution. In the 751 households reporting LNs, 94.1% (707/751) were observed to have them hanging correctly over the bed. Of the 1135 correctly hanging LNs, 52.7% (598/1135) did not have any holes and another 22.6% (256/1135) had less than 10 finger size holes. The main reasons for not hanging LNs were that they were currently not yet used/still in original packaging (38.2%, 109/286) or that the LNs were used to wrap the mattress as bedbug protection (34.6%, 99/286). The average age of the LNs was two years and 99% were washed less than 20 times. The most common source of LNs was MSF (75.2%). Our study indicated that MSF achieved very good coverage with LNs in the catchment area. It is one of the few areas where utilization results surpassed the targets set in 2000 by Roll Back Malaria, namely having at least 60% of pregnant women and children under five using LNs. The condition of the LNs was also in line with recommendations from the WHO for washing and duration of usage.

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A NEW ANTI-MOSQUITO INSECTICIDE PAINT: EVALUATION OF ITS FIELD EFFICACY AGAINST ANOPHELES GAMBIAE AND CULEX QUINQUEFASCIATUS OVER 12 MONTHS

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Malaria remains a major public health concern in West Africa. The increasing resistance of anopheline vectors to insecticides suggests the need for new strategies against malaria vectors. We studied the efficacy of an insecticide paint containing two organophosphates and one IGR, against pyrethroid resistant populations of *Anopheles gambiae* and *Culex quinquefasciatus* in experimental huts in Cotonou, Benin. In early morning collections, the twelve-month trial showed an overall mortality of 90-100% for up to 6 months. 9 months after treatment, rates remained high (65-75%) in huts painted with two layers. 12 months after treatment, mortality rates were still significant, but below operational levels. No deterrent or excito-repellent effect was observed. In the WHO 30-minute bioassays, a residual efficacy of 100% on all huts against Cx.

quinquefasciatus was observed after 6 months. 100% mortality rates were observed in *An. gambiae*. By 12 months, residual efficacy of 60-80% was observed in both species. Mosquito-release experiments performed at T0 showed reductions in blood-feeding of 82-97% on treated huts. In the distance tests, mortality at distances of 1 m was 96-100% in both species for up to 12 months. The lethal effect observed in both species is noteworthy. Killing was not only high but also quick enough to reduce blood-feeding even in the absence of a physical barrier. Results obtained in the distance tests point at a possible mass effect. In view of these promising results, further research is being done on the profile of this product. In addition to the efficacy observed, the insecticide paint has operational advantages over long-lasting impregnated nets and tools like indoor residual spraying, because no training is needed for its application or day to day use and homes would gain in appearance and, more importantly, hygiene. Given the nature of the product and characteristics surrounding African cities, it appears that urban areas and public buildings could benefit from the protection conferred by the paint.

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PHARMACOKINETICS (PK) AND PHARMACODYNAMICS (PD) AND SAFETY OF ARTESUNATE (AS) AND DIHYDROARTEMISININ (DHA) FOLLOWING A SINGLE ORAL DOSE OF ARTESUNATE DURING THE 2ND AND 3RD TRIMESTER OF PREGNANCY

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Safety and pharmacokinetic data supporting the use of Artemisinin-based combinations in pregnancy are urgently needed. Because of a lack of these data, in many countries, Sulfadoxine-pyrimethamine is still used for intermittent presumptive treatment of malaria during pregnancy despite a high level of resistance. We hypothesized that there are lower levels of AS and DHA in pregnant women compared to controls, particularly during the third trimester. A 200 mg oral dose of AS was administered to pregnant women with falciparum malaria infection between 22-26 weeks (n=13) and 32-36 weeks gestation (n=13). Venous blood samples were drawn at 0, 15, 30, 45, 60 and 90 minutes and 2, 3, 4, 6 and 8 hours after dosing for PK determination; capillary blood was collected at 0 minute, 12, 24, 30, 36, 42, and 48 hours for PD determination. For control data, blood sampling was repeated at 3 months postpartum in these subjects and in 25 non-pregnant women (external control). PK samples were centrifuged immediately and plasma was stored at -80 °C before being analyzed for total and free levels of AS and DHA, using liquid chromatography-mass spectroscopy. The distributions of parasite density were comparable in pregnant and external control groups (median [min, max]: 528 [211, 3420] vs 807[208, 32262] parasites per μ L, p=0.21). There were no stillbirths and no congenital abnormalities. The median birth weight was 3025 (2130, 3620) grams; 2 (7.7%) infants weighed \leq 2500 gms. There were no adverse events related to the study drug. Conventional non-compartmental modeling on the total and free AS and DHA levels are being performed and the results will be presented.