

in 19 districts in Lindi, Mtwara, and Ruvuma, a total of 421,285 ITNs, to classes 1,3,5,7 in primary school and Form 2 and 4 in secondary schools. By August 2016 Tanzania will have implemented four annual rounds of school-based distribution in three Southern regions. SNP2 was implemented in 2014 by NMCP and Research Triangle Institute, delivering 489,099 ITNs to school children, and adding classes 2 and 4 in Lindi. In the third round in 2015, NMCP with JHUCCP's VectorWorks project delivered 494,407 ITNs to 1,919 schools in the 19 districts, targeting classes 1-3, 5, and 7 in primary school in Ruvuma and Mtwara, and classes 1-5 and 7 in Lindi. The 4th round in August 2016 will continue in the three regions in the south and expand to four regions in the Lake Zone; 1,310,000 ITNs will be delivered to 5,054 schools in a total of seven regions. Working with a multi-sectoral task force including Ministry of Health, Ministry of Education, and local officials, enrolment data was gathered from each school, verified, and used to quantify deliveries for each school. After training and delivery of ITNs to schools, teachers distributed ITNs to the eligible students in the targeted classes, and provided behavior change messages on net use, care, and malaria prevention. We will discuss the design, implementation and outcomes of SNP3 and SNP4, including the process of quantifying the ITN needs, training and sensitization activities, data management, and logistics considerations for an ongoing, mass yearly distribution of nets to schoolchildren. We will also discuss changes from SNP1 to SNP4 in the operations management, in particular, decisions to adjust the number of classes targeted each year based on evaluation data, and implications for future national scale-up.

1657

PLANT-MEDIATED EFFECTS ON MOSQUITO CAPACITY TO TRANSMIT HUMAN MALARIA

François Hien¹, Roch K. Dabiré¹, Benjamin Roche², Abdoulaye Diabaté¹, Serge R. Yerbanga¹, Anna Cohuet², Bienvenue K. Yameogo¹, Louis-Clément Gouagna³, Richard Hopkins⁴, Georges Ouedraogo⁵, Frédéric Simard², Jean-Bosco Ouedraogo¹, Rickard Ignell⁶, **Thierry Lefevre**⁷

¹IRSS, Bobo Dioulasso, Burkina Faso, ²IRD, Montpellier, France, ³IRD, St-Denis, France, ⁴University of Greenwich, Chatham, United Kingdom, ⁵Université Polytechnique de Bobo Dioulasso, Bobo Dioulasso, Burkina Faso, ⁶University of Alnarp, Alnarp, Sweden, ⁷CNRS-IRD, Bobo Dioulasso, Burkina Faso

The ecological context in which mosquitoes and malaria parasites interacts has received little attention, compared to the genetic and molecular aspects of malaria transmission. Plant nectar and fruits are important for the nutritional ecology of malaria vectors, but how the natural diversity of plant-derived sugar sources affects mosquito competence for malaria parasites is unclear. To test this, we infected *Anopheles coluzzi*, an important African malaria vector, with sympatric field isolates of *Plasmodium falciparum*, using direct membrane feeding assays. Through a series of experiments, we then examined the effects of nectar from *Thevetia neriifolia* and *Lannea microcarpa*, and fruit from *Barleria lupulina* and *Mangifera indica* on parasite and mosquito traits that are key for determining the intensity of malaria transmission. We found that the source of plant sugar differentially affected infection prevalence and intensity, the development duration of the parasites, as well as the survival and fecundity of the vector. These effects are likely the result of complex interactions between toxic secondary metabolites and nutritional quality of the plant sugar source, as well as of host resource availability and parasite growth. Using an epidemiological model, we show that plant sugar source can be a significant driver of malaria transmission dynamics, with some plant species exhibiting either transmission-reducing or -enhancing activities.

1658

PROCESS EVALUATION OF CONTINUOUS ITN DISTRIBUTION IN ZANZIBAR

April Monroe¹, Mwinyi Khamis², Waziri Nyoni³, Kanuth Dimoso³, Abdullah S. Ali², George Greer⁴, Naomi Kaspar⁴, Joshua Yukich⁵, Hannah Koenker¹

¹JHUCCP, Baltimore, MD, United States, ²Zanzibar Malaria Elimination Programme, Zanzibar, United Republic of Tanzania, ³JHUCCP Tanzania, Dar es Salaam, United Republic of Tanzania, ⁴PMI Tanzania, Dar es Salaam, United Republic of Tanzania, ⁵Tulane University School of Public Health and Tropical Medicine, New Orleans, LA, United States

In 2013, Zanzibar designed a continuous ITN distribution strategy to maintain high levels of ITN ownership and use. ITNs are given to pregnant women and caretakers of young children through free distribution at 1st ANC visit and 9 month measles vaccination, respectively. At the community level, households request a coupon from the sheha to redeem for a LLIN and then exchange the coupon at a health facility for a new ITN. Coupons are then returned to ZaMEP. In addition, coupons can be issued by district malaria surveillance officers during case investigations if LLIN need is identified. From June 2014 to January 2016, the Zanzibar Malaria Elimination Program (ZaMEP) reported that 289,661 ITNs were distributed through continuous distribution: 65,325 to pregnant women at ANC, 60,507 to caretakers at EPI clinics, and 163,829 through the community channel. A total of 40 semi-structured interviews took place in early April in a convenience sample of 8 shehias and 16 distribution points on Unguja and Pemba Islands, Central, West B, Chake Chake, and Mkoani districts. Interviews took place at distribution points for coupons and for LLINs, with central level stakeholders, and with health facility staff and shehas at community level to identify implementation bottlenecks and best practices. Record reviews of LLIN distribution, stock data, and costs were done at central, district, shehia, and health facility level. Ten observations of coupon/ITN redemption were made. Preliminary findings indicate that overall, the CD channels are functioning, with challenges in stockouts of both ITNs and coupon-books at certain health facilities and shehias, and in adequate storage facilities for ITNs at health facilities. Stakeholders at all levels felt the program has made a positive contribution to malaria control, but there is a need for clarity in reporting systems and increased supportive supervision and refresher training, particularly at the shehia level. Additional findings, including estimates of ITN ownership and access resulting from the continuous distribution, and cost per-ITN-distributed, will be presented after the data is fully processed and analyzed.

1659

ASSESSMENT OF MALARIA TRANSMISSION FROM HUMAN TO MOSQUITOES IN SEASONAL MALARIA CHEMOPREVENTION IN THE WESTERN REGION OF BURKINA FASO

Rakiswendé Serge Yerbanga¹, Bienvenue K. Yaméogo¹, Franck A. Yao¹, Seydou Y. Ouattara¹, Thierry Lefèvre², Dari Da¹, Issaka Zongo¹, Frederic Nikiéma¹, Yves-Daniel Compaoré¹, Roch K. Dabiré¹, Paul Milligan³, Irene Kuepfer³, Daniel Chandramohan³, Brian Greenwood³, Anna Cohuet², Jean Bosco Ouedraogo¹

¹Institut de Recherche en Sciences de la Santé, Direction régionale de l'ouest, Bobo Dioulasso, Burkina Faso, ²MIVEGEC (Maladies Infectieuses et Vecteurs: Ecologie, Génétique, Evolution et Contrôle), UMR IRD 224-CNRS 5290-Université de Montpellier, Montpellier, France, ³London School of Hygiene & Tropical Medicine, London, United Kingdom

Seasonal malaria chemoprevention (SMC) can reduce malaria cases up to 80% in sahelian region. However the impact of SMC on human to mosquito malaria transmission is currently unknown. Here, we evaluated the infectiousness to mosquitoes of volunteers receiving SMC by membrane feeding assays. Children over the age of 2 years, participants of a SMC clinical trial were randomly selected. They were invited to participate after

a clinical examination and irrespective of their parasite carriage status. Blood sample were collected in 5 sites (4 under SMC treatment and 1 control) over a period of 4 months from August to November 2015. In total 301 children were involved, 204 children in SMC group and 77 in control group. For each blood sample, 80 female *Anopheles* mosquitoes were provided a blood meal through a parafilm membrane. On day 7 after feeding, mosquitoes were dissected and midguts were screened for the presence of oocysts. Generalized linear mixed models were used to compare mosquito infection in treatment and control group and to estimate intervention efficacy. Results showed that gametocytemia was lower in the SMC groups with respect to the control: month 1 ($X_{22}=6.14$, $p=0.046$), month 2, 3, and 4 ($X_{21}=57.3$, $p<0.0001$). There was a strong impact of SMC on both oocyst prevalence with a 93 % reduction in mosquitoes that received blood from SMC patients ($X_{22}=182$, $p<0.0001$), and oocyst density with a 86% reduction ($X_{22}=70.6$, $p<0.0001$). In conclusion, in an area of seasonal malaria transmission, chemoprevention highly reduces human to mosquitoes malaria transmission.

1660

COMMUNITY ENGAGEMENT AROUND THE IMPLEMENTATION OF TRIAL OF INSECTICIDE-TREATED WALL LINING FOR MALARIA CONTROL IN RURAL TANZANIA

Peter E. Mangesho¹, Donald S. Shephard², Yara A. Halasa², Aggrey R. Kihombo², Joseph P. Mugasa¹, George Mtove¹, Louisa Messenger³, Mohamed Seif¹, Ruth Mnzava¹, Robert Kihomo², William N. Kisinza¹

¹National Institute for Medical Research, Muheza, United Republic of Tanzania, ²Heller School, Brandeis University, Waltham, MA, United States, ³Faculty of Infectious Tropical Diseases, London School of Hygiene & Tropical Medicine, London, United Kingdom

Community engagement (CE) during community trials is a complex social phenomenon that defies simple explanation or mechanization. We present findings from an assessment of the sensitization process, experiences, and challenges in improving understanding and subsequent acceptance of an insecticide-treated wall lining (ITWL) program. The initial project sensitization plan relied on the traditional approach of inviting villagers to meetings with researchers. However, meeting schedules coincided with farming activities and Tanzania's presidential elections, resulting on poor attendance. Sensitization was re-strategized to add door-to-door sensitization using local advocates, announcements using a megaphone, and designing and distributing brochures detailing the study objectives and consenting process. The process continued during the ITWL installation phase. Following re-strategizing of sensitization, the ITWL acceptance rose to 86.4%. However, some clusters still had some refusals. Reasons included gender and consent, for example, in some houses the head of house (generally a man) refused installation after the wife had accepted. Old rumors resurfaced that ITWL contributed to male impotence. Some installers, initially unprotected, developed skin rashes. In one case, one resident's skin rashes spread fear to a whole hamlet. Households with better socio-economic status cited personal ability to control malaria and feared damage to their walls by the installation process. Directives that children should not touch the wall liners and confusion from installation delays all fed into refusal rates. Rumors of side effects from the ITWL contributed much on project challenges including refusals. Re-strategizing sensitization plus continuous sensitization throughout and after the official installation period increased ITWL acceptance. Future projects should incorporate continuous sensitization and consider using specialized village research committees for improved CE.

1661

SMALL SOLAR POWERED 'BOKO' FANS IMPROVE COMFORT INSIDE MOSQUITO NETS IN SOUTHERN GHANA

Olivier J. Briet¹, Collins K. Ahorlu², Joshua O. Yukich³, Constanze Pfeiffer¹, William Miller⁴, Mulako S. Jaeger¹, Nitin Khanna¹, Samuel Oppong⁵, Peter Nardini⁴, Joseph A. Keating³

¹Swiss Tropical and Public Health Institute, Basel, Switzerland, ²Noguchi Memorial Institute for Medical Research, University of Ghana, Accra, Ghana, ³Tulane University School of Public Health and Tropical Medicine, New Orleans, LA, United States, ⁴Green World Health Net, Albuquerque, NM, United States, ⁵National Malaria Control Programme, Accra, Ghana

In rural Greater Accra, in 2014, 49% of people didn't use mosquito nets despite having access to a space under one. Discomfort due to heat is the most stated reason, but this problem is largely unaddressed. With advancing electrification and dropping price of solar power, 'Boko' 0.8 W net fans equipped with a 0.1 W LED could improve comfort inside nets and be affordable to populations in malaria endemic areas. Ninety-two households (HHs) from rural communities in Greater Accra, divided into three groups, participated in a 10-month randomized cross-over trial, where fan systems (one fan per HH member in Group 1) were crossed over with water filters between Groups 1 and 2, while Group 3 served as control. Intervention HHs participated in fortnightly surveys on HH's practices related to mosquito nets, fans and water filters, while control HHs were questioned only at start, mid-point and study end. Further, key-informant interviews were held before mid-point (cross-over), and willingness to pay for fans was assessed in individual auctions at study end. Baseline net use conditional on access in the study communities was unexpectedly high at 92, 93, and 87% for Groups 1, 2 and 3, respectively, and increased to 99 and 99% at cross-over and 97 and 90% at end-point in intervention Groups 1 and 2, respectively, while it reduced to 81 and 84% in the control Group 3 at cross-over and end-point, respectively, indicating a Hawthorne / study effect. Stated fan use was 88-100% depending on the fortnight of survey. The main reason for using fans was heat, but it was also mentioned that they drove mosquitoes away. Key informants suggested they slept less exposed outside due to the fan during part of the night during the dry season. Despite the low power rating, nine out of 13 key informants stated that they placed the fan outside the bed net explaining that the air produced by the fan was enough to reach them through the net. The average bid price per fan was GH¢ 55 (~US\$ 13.5), and in total 98 Boko fans were sold to participating HHs. Small electric fans were accepted and desired in the study community and may be an affordable innovation to improve comfort inside mosquito nets in hot climates.

1662

DIHYDROARTEMISININ-PIPERAQUINE AS INTERMITTENT PREVENTIVE TREATMENT FOR MALARIA IN A REFUGEE CAMP, ADJUMANI, UGANDA

Matthew E. Coldiron¹, Estrella Lasry², Céline Langendorf¹, Daniel Nyehangane³, Juliet Mwanga³, Malika Bouhenia¹, Debashish Das¹, Richard Mathela⁴, Leon Salumu², Greg Elder², Rebecca F. Grais¹

¹Epicentre, Paris, France, ²Médecins Sans Frontières, Paris, France, ³Epicentre, Kampala, Uganda, ⁴Médecins Sans Frontières, Kampala, Uganda

An intermittent preventive treatment (IPT) program using dihydroartemisinin-piperaquine (DP) was implemented between March and July 2015 in a refugee camp in Adjumani District, Uganda. To our knowledge, this is the first implementation of IPT in the setting of a humanitarian emergency. Weight-dosed DP was offered to all children aged 6 months-14 years in the camp in March, May, and July 2015, at eight-week intervals. On average, 13 537 children received each distribution. To evaluate malaria incidence, reported cases were compared to the same 6-month period from 2014 taking into account population changes. To evaluate malaria prevalence, in the week prior to each