and biological implications of co-administration of drugs. In the Solomon Islands, trachoma MDA with azithromycin was implemented in nine out of 10 provinces. When a decision was made to extend the program to the province of Choiseul, we had an opportunity to investigate the feasibility, safety and efficacy of co-administering ivermectin to control scabies and impetigo, diseases that were recognised as endemic in a number of countries of the Pacific region. The drug delivery infrastructure was established using the framework for trachoma. The MDA regimen was a single dose of oral azithromycin combined with a single dose of oral ivermectin. A second dose of ivermectin was given a week later to ensure elimination of scabies eggs that may have been present at first visit. Participants in 10 randomly selected villages were asked to undergo skin examination to collect scabies and impetigo baseline data. The study enrolled 26,188 participants, 99.3% of the total resident population. Of those, 98.2% received azithromycin and 98.5% received a first dose of ivermectin. A second dose of ivermectin was received by 83.7% of participants. In the survey villages, baseline scabies prevalence was 18.7% and highest in children aged 5-9 years (34%). Impetigo was present in 24.8% of participants, and highest in the 5-9 age group (46.4%). There were no serious adverse events. Adverse events were noted in 2.6% of the entire study population and 4.3% of participants in the more closely monitored skin survey sites. At present, this is the world's largest scabies MDA and the first large scale co-administration of Ivermectin and Azithromycin. Co-administration of ivermectin and azithromycin appears to be safe, well tolerated and feasible.

1213

ADDING TSETSE CONTROL TO MEDICAL ACTIVITIES ALLOWS CONTROL OF SLEEPING SICKNESS IN THE MANDOUL FOCUS (CHAD)

Jean Baptiste Rayaisse[1], Hissene M. Mahamat[2], Mallaye Peka[3], Mahamat A. Toko[3], Justin Darnas[3], Guihini M. Brahim[2], Ali B. Alkatib†[2], Wilfrid Yoni[4], Inaki Tirados[5], Fabrice Courtin[6], Cyrus Nersy[2], Steve J. Torr[5], Mike J. Lehane[5], Idriss O. Alfaroukh[2], Philippe Solano[7]

[1]CIRDES, Bobo - Dioulasso, Burkina Faso, [2]Institut de Recherche en Elevage pour le Développement (IRED), Ndjamena, Chad, [3]Programme National de Lutte contre la Trypanosomiase Humaine (PNLTHA), Ndjamena, Chad, [4]Centre International de Recherche Développement sur l'Elevage en zone Subhumide (CIRDES), Bobo - Dioulasso, Burkina Faso, [5]Liverpool School of Tropical Medicine, Liverpool, United Kingdom, [6]Institut de Recherche pour le Développement, Bouaké, Côte D'Ivoire, [7]Institut de Recherche pour le Développement, Montpellier, France

Gambian sleeping sickness or HAT (human African trypanosomiasis) is a neglected tropical disease caused by *Trypanosoma brucei gambiense* transmitted by riverine species of tsetse. A global programme aims to eliminate the disease as a public health problem by 2020. The Mandoul area of Chad is a persistent focus of Gambian sleeping sickness where more than 100 HAT cases are still diagnosed and treated annually. Up to 2013, control of HAT relied solely on case detection and treatment, and did not lead to a clear and consistent decrease in the annual incidence of HAT despite annual screening of the population. We assessed whether the addition of vector control to case detection and treatment could reduce annual incidence of HAT in Mandoul. In particular, we investigated the impact of deploying 'tiny targets' which attract and kill tsetse. Before tsetse control commenced, a census of the human population was conducted and their settlements mapped. A pre-intervention survey of tsetse distribution and abundance was implemented in November 2013 and 2600 targets were deployed in the riverine habitats of tsetse in early 2014 and 2015. Impact on tsetse and on the incidence of sleeping sickness was assessed through six tsetse monitoring surveys and four medical surveys of human population in 2014 and 2015. The census indicated that a population of 26600 inhabitants lived in the vicinity of the Mandoul focus. Within this focus, the vector is *Glossina fuscipes fuscipes* and the mean catch of tsetse from traps was 0.7 flies/trap/day (range, 0-26). The catch of tsetse from 44 sentinel biconical traps declined after target deployment with only five tsetse being caught in five surveys giving a mean catch of 0.009 tsetse/trap/day. Simultaneously, HAT transmission declined from a mean of 127 cases/year between 2009 and 2013, to 52 cases in 2014 and only 25 new cases in 2015 with a similar medical effort.

1214

THE IMPACT OF MASS DRUG ADMINISTRATION ON REDUCTION OF NTD PREVALENCE IN RWANDA

Corine K. Karema[1], Irenee Umulisa[1], Eugene Ruberanziza[1], Jamie Tallant[2], Warren Lancaster[2], Noella Umulisa[3], Jean Baptiste Mazarati[4], Alan Fenwick[5], Agnes Binagwaho[6]

[1]Malaria and Other Parasitic Diseases Division, Kigali, Rwanda, [2]The END FUND, London, United Kingdom, [3]Maternal and Child Survival program/ JHIEPGO, Kigali, Rwanda, [4]Biomedical Services Department-RBC, Ministry of Health, Kigali, Rwanda, [5]Schistosoma Control Initiative, London, United Kingdom, [6]Department of Global Health and Social Medicine at Harvard Medical School; Ministry of Health, Kigali, Rwanda

Worldwide an estimated 6 billion of the world's most impoverished people, including 875 million children are affected by Neglected Tropical Diseases (NTDs) which cause severe pain, long-term disability, and are the cause of death for over 500,000 people per year. In 2008, 65.8% of Rwandan schoolchildren were affected by Soil-Transmitted Helminth (STH) infections. Rwanda Ministry of Health in collaboration with its partners had started to implement large-scale NTD control through regular Mass Drug Administration (MDA) against these infections as per World Health Organization guidelines. Two national mapping surveys were conducted in 2008 and 2014 in order to assess schistosomiasis and STH prevalence at national level and geographic distribution. In 2008, a total of 8,313 schoolchildren aged between 10 and 17 years were tested for STH and schistosomiasis using Kato-Katz method. Prevalence of urinary schistosomiasis was established by testing for micro-haematuria using dipsticks and urine filtration technique. In 2014, a total of 9,250 schoolchildren aged between 8 and 18 years were tested for STH and schistosomiasis using Kato-Katz method while 19,371 schoolchildren were tested for schistosomiasis also using Circulating Cathodic Antigen (CCA) urine Assay. We carried out trend analysis for schistosomiasis and STH data from 28 schools that were randomly selected in both mapping surveys. All 28 schools are located in districts that reached at least 75% MDA therapeutic coverage for all treatment campaigns. For schistosomiasis, eleven (11) schools are located in areas that received praziquantel. Of these 11 schools 7 had 100% reduction in prevalence; three (3) had reduction between 39.4% and 93.0%. The comparison for STH infections showed a remarkable reduction in prevalence for only hookworm with 10 schools having 100% reduction and 17 schools with a reduction between 39.4% and 96.4%. These data demonstrate an encouraging quick impact of MDA in controlling schistosomiasis and STH and call for continuous support to NTD control programs of endemic countries.

1215

TARGETTING MALARIA HOTSPOTS IN SENEGAL: RESULTS OF A CLUSTER-RANDOMIZED TRIAL

Abdoulaye Diallo[1], Badara Cisse[1], El Hadj Ba[2], Fassiatou Tairou[1], Ousmane Sy[1], Cheikh Sokhna[2], Jules-Francois Gomis[1], Ousmane Faye[1], Colin Sutherland[3], Catherine Pitt[3], Clare Flach[3], Oumar Gaye[1], Paul Milligan[3]

[1]Universite Cheikh Anta Diop, Dakar, Senegal, [2]Institut de Recherche pour le Developpement, Dakar, Senegal, [3]London School of Hygiene & Tropical Medicine, London, United Kingdom

In Senegal scaling-up of control measures has reduced the incidence of malaria but transmission persists and new tools are needed to move towards elimination. We evaluated a targeted approach, employing IRS and chemotherapy implemented in transmission hotspots, on a large scale. 40 clusters (health posts) were randomized. In 30 clusters, hotspot villages were targeted to receive IRS with Actellic 300CS in July, followed

in 15 clusters by MDA with dihydroartemisinin-piperaquine (DHA-PQ) administered to all persons except pregnant women and children under 3 months of age, at the end of August and again in October. In the other 15 clusters, persons were screened using a malaria RDT and positives treated with DHA-PQ. 10 clusters served as controls. In all three arms, health promotion encouraged care seeking for fever, and a free LLIN was provided to each malaria patient at health facilities. The intervention strategy was delivered over two years. Primary outcomes were malaria incidence, and the prevalence of parasitaemia just after the main peak of transmission, in year 2. Adherence to treatment, and adverse events, were monitored after each round. Acceptability was investigated using in-depth interviews, and provider costs of the interventions were assessed. The year before intervention, malaria incidence was 11 per 1000, and parasitaemia prevalence by microscopy 1.9%. Interventions reduced annual incidence within hotspots by 46% (IRS+MDA) and by 52% (IRS+MSAT). Incidence in non-target communities within 2km of treated hotspots reduced by 41% (IRS+MDA) and 24% (IRS+MSAT). The overall efficacy against malaria (including target and non-target villages) was 37% (95% CI 31%,44%) in the IRS+MDA arm and 44% (38%,49%) in the IRS+MSAT arm. The strategies were well accepted and achieved high coverage. The cost of MSAT was 30% higher than for MDA. Adding IRS approximately doubled the cost. Where scaling-up of existing policies has reduced malaria transmission but additional measures are needed for elimination, targeted control with IRS and MDA or MSAT could be used to reduce transmission, but MDA was cheaper and slightly more effective than MSAT.

1216

COMPARISON OF MASS DRUG ADMINISTRATION VS. MASS SCREENING AND TREATMENT HIGH-RISK, MILITARY MOBILE POPULATIONS TO SUPPORT MALARIA ELIMINATION IN CAMBODIA

Somethy Sok[1], Mariusz Wojnarski[2], Satharath Prom[1], Soklyda Chann[2], Michele Spring[3], Panita Gosi[2], Rathvicheth Bun[2], Sovanveasna Kin[1], Nillawan Buathong[2], Mali Ittiverakul[2], Sabaithip Sriwichai[2], Worachet Kuntawunginn[2], Huy Rekol[4], Muth Sinoun[4], Thay Khengheng[4], Mary So[1], Jessica Lin[5], Kong Saly[1], Jessica Manning[6], David Saunders[7], Philip Smith[2], Mark Fukuda[2], **Chanthap Lon**[2]

[1]Ministry of National Defense, Department of Health, Phnom Penh, Cambodia, [2]U.S. Armed Forces Research Institute of Medical Sciences, Bangkok, Thailand, [3]Walter Reed Army Institute of Research, Silver Spring, MD, United States, [4]National Center for Parasitology, Entomology and Malaria Control, Phnom Penh, Cambodia, [5]Division of Infectious Diseases, University of North Carolina School of Medicine, Chapel Hill, NC, United States, [6]National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, MD, United States, [7]U.S. Army Medical Materiel Development Activity, Fort Detrick, MD, United States

The Cambodian government has set a goal for malaria elimination by 2025. However, the effectiveness of elimination strategies in hard-to-reach mobile populations, including the military, is largely unknown. We are conducting a two-arm, controlled, cluster-randomized, open-label pilot study to determine the effectiveness of monthly malaria prophylaxis (MMP), using dihydroartemisinin-piperaquine (DP) and weekly primaquine (22.5 mg), compared to monthly focused screening (microscopy and PCR) and treatment (FSAT) of malaria positive subjects according to the national treatment guidelines. After 3 months of interventions, both arms will be actively followed for 3 more months to assess malaria incidence in the rainy season when malaria usually peaks. Of 1,114 active duty military and dependents screened in Oddor Meanchay province near the Thai-Cambodian border, 1,050 volunteers were enrolled into 8 clusters. We noted reductions of malaria incidence within 2 months in both arms from a baseline prevalence of 53/516 (10.3%; 39 cases of *Plasmodium falciparum* (*P.f*), 13 cases of *P. vivax* (P.v) (*P.v,* 1 cases of mixed) and 91/534 (17.0%; 45 cases of *P.f*, 38 cases of *P.v,* 8 cases of mixed) malaria positive at screening in the FSAT and MMP arms, respectively. In the first month, 8/509 (1.6%) subjects from the FSAT arm and 2/529 (0.4%) from the MMP arm had a *P. falciparum* requiring an unscheduled visit, with an additional 10/509 (1.9%) in the FSAT and 16/529 (3.0%) in the MMP being malaria positive on the day 30 follow-up visit (p=0.906). On day 60 follow up, only 6/489 (1.2%; 0 cases of *P.f* and 6 cases of *P.v*) and 2/504 (0.4%; 1 cases of *P.f*, 0 cases of *P.v*) subjects were malaria positive by microscopy or PCR in FSAT and MMP arms, respectively, showing low parasitemia in both treatment arms (p=0.172), reaching statistical significance by month 3 follow-up, with 20/472 and 0/502 cases of malaria in FSAT and MMP arms, respectively (p<0.001). The number of subjects withdrawn or lost to follow up remains low at around 3% in each arm. Most malaria cases in the MMP arm occurred within 1 month of follow-up and likely represent *P.f* treatment failures of DP. Final outcome data from 6 months of follow-up will be presented.

1217

RELATIVE CONTRIBUTION OF GENERALIZED EARLY DIAGNOSIS AND TREATMENT AND OF TARGETED MASS TREATMENT TO ELIMINATION OF *PLASMODIUM FALCIPARUM* MALARIA IN EASTERN MYANMAR

Jordi Landier[1], Daniel M. Parker[1], Aung Myint Thu[1], Ladda Kajeechiwa[1], May Myo Twin[1], Stephane Proux[1], Khin Maung Lwin[1], Saw Diamond Khin[2], Ed Marta[3], Gilles Delmas[1], François Nosten[1]

[1]Shoklo Malaria Research Unit - Mahidol Oxford Tropical Medicine Unit, Mae Sot, Thailand, [2]Karen Department of Health and Welfare, Mae Sot, Thailand, [3]Karen Department of Health and Welfare, Hpa'an, Myanmar

Plasmodium falciparum (PF) malaria elimination is on the agenda of 19 countries. In the Greater Mekong Sub-region, elimination is of particular interest and urgency because of the threat of spreading artemisinin resistance. In coordination with community-based health organizations and the Myanmar National Malaria Control program, the Malaria Elimination Task Force was set up to develop strategies and to implement a regional approach towards PF elimination in 4 districts of Eastern Myanmar. Malaria Posts (MP) were deployed in each community of the target area to provide access to early diagnosis and treatment of malaria. MP reported PF and *P. vivax* (PV) case data weekly. Village-level malaria prevalence was measured in surveys analyzed by ultrasensitive qPCR. Hotspots of asymptomatic malaria prevalence were defined by malaria prevalence > 40% with PF representing >20% of all malaria infections. Hotspots were addressed by 3 rounds of targeted mass treatment (TMT) using dihydroartemisin-piperaquine. A generalized linear mixed model adjusting for season and location was used to analyze PF case counts, monitor trends in PF incidence and determine the relative contribution of MP and TMT to malaria elimination. From May 2014 to April 2016, >800 villages were equipped with MP and reported weekly data. Out of 218 surveys performed, 43 hotspots were identified and addressed with 3 consecutive months of TMT between January 2015 and March 2016. The probability of an MP declaring ≥1 PF case during its first month of operation was 26% and decreased to below 10% after 18 months, while the probability of declaring ≥1 PV case remained stable around 30%. The PF incidence rate ratio (IRR) for 10 additional weeks of MP operating in a village was 0.78 (95%CI=0.74-0.82). Before TMT IRR for hotspot villages compared to non-hotspot villages from the same area was 2.6 (95%CI=1.3-5.0). After TMT incidence in hotspot villages was similar to non-hotspot villages (IRR=1.4; 95%CI=0.6-3.5). Over 24 months of follow-up, the deployment of an MP network in 4 districts triggered a strong decrease of PF incidence rate. TMT proved to accelerate the decrease in high prevalence villages.