ACTs. Cobly CHWs treated more children through ProACT (658) than with the passive approach (307); Nati CHWs treated similar numbers of children through the ProACT (296) and passive (335) approaches. This pilot demonstrated that ProACT can increase the number of children who are tested and treated for malaria by CHWs when compared to standard passive malaria case detection.

**946**

## SIMPLE CALCULATION TO IMPROVE ROUTINE HEALTH FACILITY MALARIA INCIDENCE ESTIMATES

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With the increased emphasis on malaria surveillance as an intervention, malaria incidence as reported through health information systems is increasingly used to understand trends in malaria burden and to target and monitor interventions. However, incidence data are sensitive to changes in rates of testing of suspected cases, care-seeking rates, and reporting completeness, and must be interpreted with care. Burden estimates have historically relied on community-based prevalence surveys or modeling, which are neither available frequently nor practical for programmatic decision making. We derived an algebraic formula to convert crude incidence rates to a corrected estimate of incidence. It applies a correction factor to adjust for differential testing of febrile illness by care providers, and uses the ratio of community incidence of non-malaria fever to health facility-reported incidence of non-malaria fever to account for care-seeking rates and data completeness. This formula was applied to district level data from Guinea and Mozambique from 2016-2018, and to aggregate data from sub-Saharan African countries for 2015 to estimate corrected incidence and continent-wide needs for malaria tests and treatments, assuming universal testing of febrile illness and current care-seeking rates. Maps of corrected incidence were more consistent with maps of survey prevalence than was crude incidence in Guinea and Mozambique. In areas prioritized for case management support, crude incidence showed increases from 2016-2018 (+11% annual increase in Guinea and +16% in Mozambique), while the corrected incidence showed the opposite trend (-7.2% in Guinea, -2.5% in Mozambique). Countries in southern and eastern Africa reporting recent increases in malaria incidence generally had lower corrected incidence than countries in central and west Africa. The unmet need for malaria tests was 160 M (IQR: 139-188) and for malaria treatments was 37 M (IQR: 29-51 M). Malaria incidence should be interpreted in the context of biases in testing and care-seeking rates. Adjusting for these biases provides insight into true spatiotemporal trends of malaria burden.

**947**

## LONGITUDINAL OBSERVATIONAL STUDY EXAMINING COMMUNITY DYNAMICS OF MALARIA TRANSMISSION IN MALI

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In 2018 a three-year longitudinal cohort study was initiated in the villages of Bancoumana and Doneguebougou in Mali to assess transmission dynamics. Approximately 1500 individuals aged 6 months to 65 years of age across the two communities were enrolled into two distinct cohorts: Direct Skin Feeding (DSF) cohort and Parasite Surveillance (PS) cohort. All individuals are seen monthly for malaria smears in conjunction with live and spray mosquito collections in/around residencies while DSF participants also undergo a single direct skin feeding assay at each visit using insectary-raised mosquitoes. In the first year of the study valuable parasitemia data through the dry and rainy seasons was generated indicating that children aged 11-17 years old carry the highest burden of infection throughout the year with parasitemia levels over 10% even in the dry season. This preponderance of infection is borne out in DSF data where positive skin feeding assays were observed most frequently in children aged 11-17 years old. To date, almost 7000 DSF have been completed and 73% of the positive skin feeds have been observed in 9-18 year olds, 13% in 5-8 year old children and 13% in adults. Over 7000 mosquito collections have been conducted with >4000 live bloodfed mosquitoes collected and dissected for infection. In this presentation we will examine dynamics of natural malaria infection and transmission over time in different age groups, the relationship between transmission measured by DSF assays of laboratory-raised mosquitoes, and by speciation assessment of live wild-caught mosquitoes.

**948**

## STRONG PROTECTIVE EFFECT OF MEDITERRANEAN TYPE GLUCOSE-6-PHOSPHATE DEHYDROGENASE DEFICIENCY AGAINST VIVAX MALARIA

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G6PD deficiency (G6PDd) is the most common enzyme abnormality of humans (prevalences across the malaria endemic world as high as 35%). G6PDd is X-linked so males are either normal or deficient while women can be normal, fully deficient (homozygotes) or partially deficient (heterozygotes). The high prevalence in tropical areas suggests protection against malaria but this is controversial. Claims have been made that there is protection in female heterozygotes only, in hemizygotes only, in both or in neither! We conducted a retrospective analysis of data from clinical studies on vivax malaria and epidemiological studies of G6PDd conducted over the past ten years in Afghanistan where G6PD "Mediterranean" variant is the main cause of G6PDd. We conducted a meta-analysis using all previously published data on G6PDd in people of Pashtun ethnicity living in malaria endemic areas mainly in the eastern Afghanistan, where the clinical malaria studies were conducted. Samples were tested on site by the fluorescent spot tests, stored and transferred to MORU Thailand for genotyping of G6PD Mediterranean variant (563C>T) by PCR-RFLP. The proportions of G6PD Mediterranean male hemizygotes and female homozygotes and heterozygotes were significantly lower in vivax malaria patients than in controls (people visiting clinics or vaccination centers who did not have vivax malaria). In patients with *P. vivax* malaria 2.9% (95% CI 1.3-4.7) were male hemizygotes compared with 7.3% (5.3-9.9) in controls. For the female heterozygotes the respective proportions were 7.4% (5.1-10.2) vs. 13.6% (10.1-17.8). Thus there was a gene dose related protective effect of G6PD "Mediterranean" variant against vivax malaria; in male hemizygotes and female homozygotes 60.4% (28.7-82.2) versus 45.2% (15.6-65.2) for heterozygotes.