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THE IMPACT OF INSECTICIDE-TREATED NETS ON ACQUIRED HUMORAL IMMUNITY TO *PLASMODIUM FALCIPARUM*

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Acquisition of immunity to malaria is attributed to frequent exposure to the parasite. Lack of exposure can result in loss of immunity, leaving individuals at higher risk for severe disease and death. Intensified malaria control interventions have played a major role in reducing malaria incidence and mortality. An important intervention has been the mass distribution of long-lasting, insecticide-treated bed nets (LLINs). Following implementation of these effective control programs, population immunity is expected to decrease. It is, therefore, important to monitor population immunity to measure the impact of control measures and anticipate future epidemics upon reintroduction of the parasite and vector. We investigated the relationship between the distribution of insecticide-treated bed nets and acquired humoral immunity to *Plasmodium falciparum* in a low malaria transmission area of Macha, Southern Province, Zambia one year after the widespread distribution of LLINs. IgG antibody levels were measured using an enzyme immunoassay against whole, asexual stage *P. falciparum* antigens derived from NF54 strain schizont cell lysate. Seropositivity was defined as an optical density value > 0.57 based on the mean plus three standard deviations from 10 individuals never exposed to malaria. Plasma was extracted from whole blood samples stored as dried blood spots. Samples were collected between March and November 2008 from 313 individuals residing in randomly-selected households in southern Zambia. 56.5% of the study participants were seropositive for antibodies to whole *P. falciparum* antigens. 31% of seropositive individuals reported sleeping under a bed net, compared with 39% of seronegative individuals. Within one year of introducing LLINs for malaria control in southern Zambia, we found no significant reduction in seropositivity to whole P. faliciparum antigens in those who reported sleeping under a bed net compared to those who did not. Further monitoring of changes in population immunity to malaria is warranted in regions implementing accelerated control efforts.

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A SURVEILLANCE SYSTEM TO MEASURE CHILDHOOD MORTALITY AND DRUG RELATED ADVERSE EVENTS IN THREE DISTRICTS IN SENEGAL

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A simplified Demographic Surveillance System (DSS) was established in three health districts in Senegal to measure childhood mortality and for monitoring the incidence of serious adverse events in an area where seasonal IPTc is being implemented. The DSS covers a population of 602,000 people living in rural and semi-urban communities served by 54 health posts in three districts, and includes the area of the long-standing Niakhar DSS. Births deaths and migrations, ITN use and hospitalizations are recorded in 6-monthly household rounds. Verbal autopsies are performed on all deaths in the population served by 12 of the health posts. Mothers of children under 10 years are issued with a DSS card bearing details of all the children in their care. This card is used to record any health interventions delivered at village level including malaria IPT, and to confirm child identity when the child visits a health facility. Incidence of malaria confirmed by rapid diagnostic test was recorded by passive case detection at health facilities. A cluster sample survey of the under-5 population was done at the end of the transmission season to estimate the prevalence of malaria parasitaemia and anaemia. In 2008 there was no evidence of the seasonal peak in deaths from September to November which was characteristic of the pattern of mortality in previous years. A dramatic reduction in under-5 mortality observed in the population maintained under long term surveillance in the Niakhar DSS is borne out in the much larger area covered by the new surveillance system. Incidence of malaria among children <5yrs was less than 1 per 1000. The prevalence of *P. falciparum* parasitaemia at the end of the 2008 transmission season was less than 4%. Very low incidence of malaria in 2008 was associated with substantial improvement in child survival and disappearance of the usual seasonal peak in under 5 deaths associated with malaria transmission, in a large rural population not previously kept under demographic surveillance.

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NOVEL MEMBRANE-ASSOCIATED PROTEIN KINASES IN TRYPANOSOMES

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Protein kinases modulate cellular responses to signals from the environment or from within the cell. Their ATP binding pocket renders them sensitive to small molecule inhibitors, making kinases attractive drug targets. *Trypanosoma brucei* possesses over 150 protein kinases; less than one-fourth of these have been studied in any detail. We have identified nine kinases that bear predicted transmembrane domains and hence could function to regulate processes spanning compartments within the parasite or between the parasite and its external environment. The presence of multiple transmembrane domains in the predicted structures of these kinases is unprecedented, indicating a novel means of signal transduction between the putative sensing and catalytic domains. Surprisingly, these kinases are localized to diverse structures within the parasite, indicating that they have varied cellular functions. One modulates the biogenesis of lipid bodies, organelles than function in intracellular lipid homeostasis. Two kinases localize to the secretory system, although these kinases do not resemble host cell ER kinases. Several of the kinases appear to be essential for bloodstream form viability, suggesting their potential use as drug targets.

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T CELL RESPONSES IN INDIVIDUALS WITH DISCORDANT *TRYPANOSOMA CRUZI* SEROLOGY

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Chagas disease, caused by the protozoan parasite *Trypanosoma cruzi*, is a major cause of morbidity and mortality in Central and South America. Serological diagnosis of *T. cruzi* infection requires positive testing on two of three independent immunoassays. Geographic variations in the concordance of these diagnostic assays suggest that local parasite strain diversity may play a role in the strength of the anti-*T. cruzi* antibody response. Peru in particular has a high rate of discordant serology. To determine whether T cell responses could be used as a surrogate diagnosis in individuals with discordant serology, IFNγ production from peripheral blood mononuclear cells were stimulated with *T. cruzi* antigen was measured by ELISPOT assay. The studies were conducted in the