Abstract

Vector bionomics and transmission intensities of malaria vectors on Bioko Island over 14 years of integrated vector control

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Entomological surveillance has been an integral part of the Bioko Island Malaria Control Project (BIMCP) since the implementation of the project in 2004. Systematic vector surveillance over the years continued to inform and guide the vector control interventions in attaining remarkable outcomes. This study analyses the trend in the vector bionomics and transmission intensities of the local vectors since the inception of the BIMCP. The feeding and resting behaviors, as well as the compositions of the local vectors, were monitored using window traps, CDC light traps, and human landing catches. Trends in vector densities, sporozoite rates, and the entomological inoculation rates (EIR) were determined. Phenotypic resistance profile of the malaria vectors as well as target-site resistance and metabolic resistance patterns were also monitored. *An gambiae s.s*, (S and M forms) constituted 45% of the local vectors at baseline with *An funestus* 45% and *An melas* 10%. However after two years of IRS *An. funestus s.l.* was eliminated. In 2009, *An gambiae s.s. S*. was also eliminated and as of 2017, *An gambiae s.s. M* (*An. coluzzii)* (70%) and *An. melas* (30%) remained the main vectors on the Island. Biting rates have reduced from an average of 35 bites per person per night in 2009 to an average of 8 bites per person per night in 2017. Vectors biting behavior shifted to more of outdoor biting between 2004 and 2014. The EIR has dropped from 1,214 infective bites person per annum at baseline to 13 infective bites per person per annum in 2017. The frequency of *kdr-w* has increased to over 85% in the vector population in addition to the presence of P450s pyrethroid metabolizers. However, AChE mutations have not been detected. The planning, implementation, monitoring and evaluation of vector control interventions rely on the knowledge of the local vectors for effective programs. Changes in vector behaviors and transmission intensities are essential in directing vector control interventions and measuring the impacts of such interventions.