



# Semi-field evaluation of human landing catches *versus* human double net trap for estimating human biting rate of *Anopheles minimus* and *Anopheles harrisoni* in Thailand

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## ABSTRACT

**Background.** Whilst the human landing catch (HLC) technique is considered the ‘gold standard’ for estimating human-biting rates, it is labor-intensive and fraught with potential risk of exposure to infectious mosquito bites. This study evaluated the feasibility and performance of an alternative method, the human double net trap (HDNT) relative to HLC for monitoring host-seeking malaria vectors of the *Anopheles minimus* complex in a semi-field system (SFS).

**Methods.** HDNT and HLC were positioned in two rooms, 30 m apart at both ends of the SFS. Two human volunteers were rotated between both traps and collected released mosquitoes ( $n = 100$ ) from 6:00 pm till 6:00 am. Differences in *Anopheles* mosquito densities among the trapping methods were compared using a generalized linear model based on a negative binomial distribution.

**Results.** There were 82.80% (2,136/2,580) of recaptures of wild-caught and 94.50% (2,835/3,000) of laboratory-reared mosquitoes that were molecularly identified as *An. harrisoni* and *An. minimus*, respectively. Mean density of *An. harrisoni* was significantly lower in HDNT (15.50 per night, 95% CI [12.48–18.52]) relative to HLC (25.32 per night (95% CI [22.28–28.36]),  $p < 0.001$ ). Similarly, the mean density of a laboratory strain of *An. minimus* recaptured in HDNT was significantly lower (37.87 per night, 95% CI [34.62–41.11]) relative to HLC (56.40 per night, 95% CI [55.37–57.43]),  $p < 0.001$ . Relative sampling efficiency analysis showed that HLC was the more efficient trap in collecting the *An. minimus* complex in the SFS.

**Conclusion.** HDNT caught proportionately fewer *An. minimus* complex than HLC. HDNT was not sensitive nor significantly correlated with HLC, suggesting that it is not an alternative method to HLC.

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Additional Information and  
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