Filming the Unseen: Building Malaria Out by Addressing Mosquito Flight

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Background
• There is a growing set of evidence that some housing features (e.g. open eaves) are associated with increased densities of Anopheles mosquitoes and increased risk of malaria, including recent studies in Malawi. This has led to increased interest in structural house improvement as a malaria intervention (Figure 1).
• Few studies have compared the behavioural responses of mosquitoes to different combinations and types of house entry point modification. Depending on the main factors that drive mosquito behaviour around houses, different modifications may yield widely different results.
• By filming mosquito behaviour around house entry points (Figure 2), we obtain valuable information about the flight behaviour of mosquitoes when approaching a house, and how this leads to finding and entering house entry points.

Objectives
• Characterize mosquito flight paths near a house
• Determine the effect of eave closure or screening on these mosquito flight paths, including house entry

Methods
• One experimental house inside a screen house at field station in Malawi (Figure 3).
• Five different treatments will be applied to the experimental house (Figure 4).
• Anopheles gambiae colony: 500 mosquitoes released per night.
• Two volunteers will sleep inside experimental house each night.
• 3-D tracking from 20:00 - 06:00; six nights per treatment.
• We will describe the spatio-temporal distribution of mosquitoes in relation to the house (Figure 5) and compare these distributions among the five treatments.

Implications
• This study will provide information about the flight behaviour of mosquitoes when approaching a house, and how this leads to finding and entering house entry points.
• Our results could lead to optimized designs for house improvements that will consequently reduce malaria burden through reduced vector-human contact

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