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## Diversion of *Anopheles gambiae* from children to other hosts following exposure to permethrin-treated bednets

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### Abstract

#### Summary

Permethrin-treated bednets reduce mortality and morbidity from malaria in Gambian children. However, it is not certain how this effect is achieved, as neither mosquito numbers nor the human blood index of indoor-resting female *Anopheles gambiae* Giles *sensu lato* (Diptera: Culicidae) mosquitoes have been reduced when treated bednets were

introduced into a community. One possibility is that insecticide-treated bednets divert mosquitoes from children to adults. To investigate this hypothesis, a cross-over trial with insecticide-treated bednets was undertaken in two small Gambian villages. To differentiate mosquitoes that had fed on children from those that had fed on adults, all children in the study villages were immunized with rabies vaccine before the trial. Using the detection of rabies antibody in a bloodmeal as an indicator that a mosquito had bitten a child, it was found that the percentage of blood-fed mosquitoes caught indoors that had bitten a child fell significantly from 30.8% to 9.2% and from 28.0% to 6.9% in each village after insecticide-treated bednets were introduced. To investigate the possibility that some diversion to animals had occurred, a PCR analysis for human  $\beta$ -globin DNA was undertaken on selected samples. The results of this investigation were confusing, as some rabies-antibody positive bloodmeals were negative for human DNA. This may have been due to cross-reacting antibodies in animal sera and/or DNA degradation by digestion in the mosquito. Although good evidence for diversion of mosquitoes away from children was obtained, it remains uncertain whether diversion was mainly to adult humans, to animals or to both.