Valuing the Health–Biodiversity Trade-off in Mosquito Control: Evidence from a Discrete Choice Experiment in Southern France

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Abstract.

Background. The rapid expansion of *Aedes albopictus* across Southern Europe has increased the risk of autochthonous dengue and chikungunya transmission. While vector control remains the primary preventive strategy, many effective interventions, particularly those relying on insecticides, may entail environmental costs. Little is known about how citizens trade off the health benefits of mosquito control against its potential impacts on the environment and biodiversity.

Methods. We conducted an online discrete choice experiment between September and November 2025 among 1,805 residents of Occitanie and Provence-Alpes-Côte d'Azur, two French regions at the forefront of arbovirus emergence. Respondents repeatedly chose between hypothetical mosquito-control programs differing in six attributes: implementing actor, intervention location, reduction in mosquito bites, reduction in dengue and chikungunya transmission risk, environmental and biodiversity impacts, and monthly household cost. Preferences were estimated using mixed logit and latent class models. Factors associated with respondents' preferences were investigated using the Bolck-Croon-Hagenaars multinomial logit method.

Results. Environmental impact emerged as a major determinant of preferences. On average, avoiding a major negative environmental impact was valued as highly as the largest reduction in dengue and chikungunya transmission risk (€9.13 and €8.50 per month; $p = 0.36$) and more highly than reductions in mosquito nuisance. Among respondents perceiving a low personal infection risk, environmental protection was the most influential non-monetary attribute. Latent class analysis identified four distinct preference profiles: a low-engagement class, an environment-focused class, a cost-driven class, and a balanced class that traded off all program characteristics. Although household cost remained the most influential attribute overall, substantial heterogeneity was observed in the relative importance attached to health and environmental outcomes.

Conclusions. Public support for mosquito-control programs cannot be understood solely through expected health gains. In a context of emerging arbovirus risk, citizens assign considerable value to avoiding damage to the environment and biodiversity and may be reluctant to endorse highly effective interventions when these entail major environmental damage. These findings extend the literature on health-environment trade-offs to vector-borne disease prevention and suggest that environmental consequences should be explicitly considered when designing acceptable and sustainable mosquito-control policies in Europe.