Abstract

Projecting the distribution of malaria vectors under climate change is essential for planning integrated vector control strategies for sustaining elimination and preventing reintroduction of malaria. However, in Kenya, little knowledge exists on the possible effects of climate change on malaria vectors. Here we assess the potential impact of future climate change on locally dominant Anopheles vectors including Anopheles gambiae, Anopheles arabiensis, Anopheles merus, Anopheles funestus, Anopheles pharoensis and Anopheles nili. Environmental data (Climate, Land cover and elevation) and primary empirical geo-located species-presence data were identified. The principle of maximum entropy (Maxent) was used to model the species' potential distribution area under paleoclimate, current and future climates. The Maxent model was highly accurate with a statistically significant AUC value. Simulation-based estimates suggest that the environmentally suitable area (ESA) for Anopheles gambiae, An. arabiensis, An. funestus and An. pharoensis would increase under all two scenarios for mid-century (2016-2045), but decrease for end century (2071-2100). An increase in ESA of An. Funestus was estimated under medium stabilizing (RCP4.5) and very heavy (RCP8.5) emission scenarios for mid-century. Our findings can be applied in various ways such as the identification of additional localities where Anopheles malaria vectors may already exist, but has not yet been detected and the recognition of localities where it is likely to spread to. Moreover, it will help guide future sampling location decisions, help with the planning of vector control suites nationally and encourage broader research inquiry into vector species niche modeling