

## **Defining the ecological and evolutionary drivers of *Plasmodium knowlesi* transmission within a multi-scale framework**

### **ABSTRACT**

*Plasmodium knowlesi* is a zoonotic malaria parasite normally residing in long-tailed and pig-tailed macaques (*Macaca fascicularis* and *Macaca nemestrina*, respectively) found throughout Southeast Asia. Recently, *knowlesi* malaria has become the predominant malaria affecting humans in Malaysian Borneo, being responsible for approximately 70% of reported cases. Largely as a result of anthropogenic land use changes in Borneo, vectors which transmit the parasite, along with macaque hosts, are both now frequently found in disturbed forest habitats, or at the forest fringes, thus having more frequent contact with humans. Having access to human hosts provides the parasite with the opportunity to further its adaption to the human immune system. The ecological drivers of the transmission and spread of *P. knowlesi* are operating over many different spatial (and, therefore, temporal) scales, from the molecular to the continental. Strategies to prevent and manage zoonoses, such as *P. knowlesi* malaria require interdisciplinary research exploring the impact of land use change and biodiversity loss on the evolving relationship between parasite, reservoir hosts, vectors, and humans over multiple spatial scales.