Playing catch-up

We know little about monkey malaria's transmission dynamics.

THE best defence we have moving forward against monkey malaria is to gather data that will help us figure out the best control strategies.

To do that, Malaysian scientists are trying to find out which monkeys are infected and where; which mosquito vectors carry monkey malaria; and whether or not their biting behaviours put people at risk of infection.

Some of these pockets of researchers recently presented their findings at the Malaysian Society of Parasitology and Tropical Medicine conference held in Kuala Lumpur recently.

One group, based at the Institute for Medical Research (IMR), looked at the susceptibility of different *P. knowlesi* vectors to chemical insecticides and found that mosquito populations from different areas exhibit a variation in resistance to different chemicals – useful information for localised control strategies.

Another collaborative effort led by Universiti Malaysia Sabah in the state's Kudat district found that one of the primary *P. knowlesi* vectors – *Anopheles balabacensis* – did not show any preferred sites.

Again, this sort of localised data has important implications for control.

A. balabacensis is an early-night biter (6pm-9pm) active throughout the year, so understanding the behavioural preferences of vectors is crucial to knowing which control measures will work.

In this case, targeted residual spray may have limited effects.

Some work also points to greater potential for the use of geographic information system (GIS) tools in shedding light on the transmission dynamics of *P. knowlesi*, including the temporal and spatial distribution of vector populations.

A collaborative effort by IMR and Universiti Malaya used surveys to identify mosquito breeding sites and the occurrence of larval habitats of *A. crascens* (an important monkey malaria vector on the peninsula) in *P. knowlesi*-endemic areas to establish the dispersal probability of the mosquito across villages and the forest fringe landscape.

A map of malaria transmission risk was developed using a combination of field data, satellite image analysis and GIS technique.

This sort of approach offers a more rational basis for strategic planning and management in the control of such an endemic disease.

There are other unknowns, too.

Another report published last year, for example, described the first known case of naturally acquired *P. cynomolgi*, another strain of monkey malaria.

The story unfolds in a similar fashion to that of *P. knowlesi* – morphologically, *P. cynomolgi* is almost indistinguishable from the human malaria *P. vivax* under the microscope.

UPM's Dr Reuben Sharma says his team is currently about to embark on a mass molecular screening of old *P. vivax* slides to determine how much of them might actually be misdiagnosed strains of *P. cynomolgi*.

This last decade has been a game of catch-up for scientists.

Currently, most of the fresh data is coming out of Malaysia, but sporadic cases of monkey malaria have been reported across the region.

The fact that monkey malaria cases have gone virtually undetected for an undetermined amount of time means we know little about the parasite's transmission dynamics.

Malaysia is the only place to have really carried out large-scale epidemiological studies using molecular detection methods.

For much of the rest of South-East Asia, there is a black hole of information.

Given this imbalance, simply drawing up a map of reported cases would likely misrepresent the extent of the disease.

Which is why an international group of researchers collaborated on a study aimed at mapping the potential geographical range of the parasite reservoir capable of infecting humans.

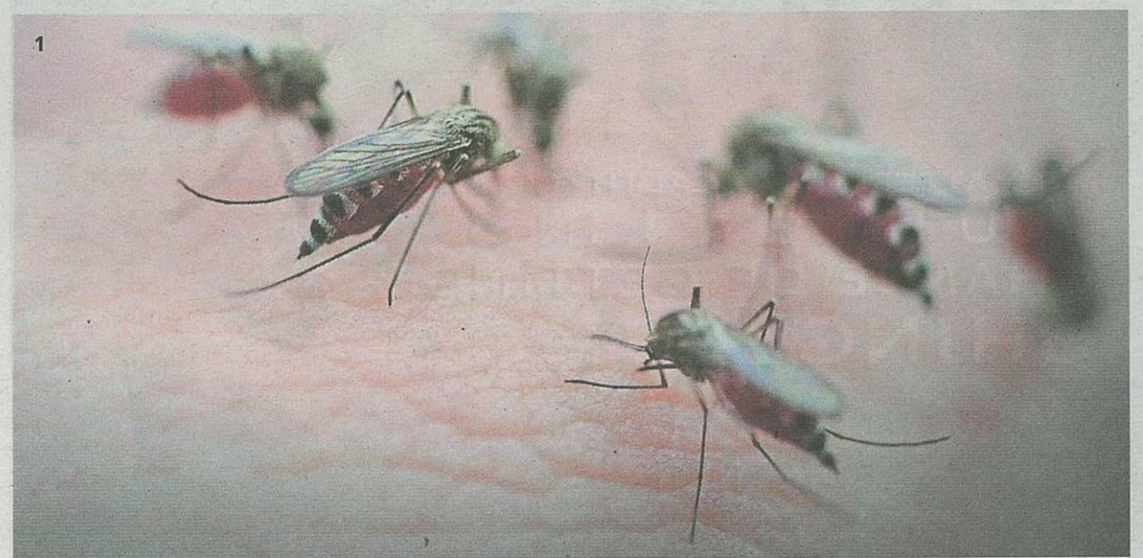
Indonesia (Kalimantan, Sumatra, part of Java and parts of Sulawesi), parts of the Philippines, Cambodia, southern Thailand, southern Myanmar and southern Vietnam were highlighted as areas known to "support" identified *P. knowlesi* hosts and vectors. They are also listed as obvious new location targets for further studies into parasite infection and disease prevalence.

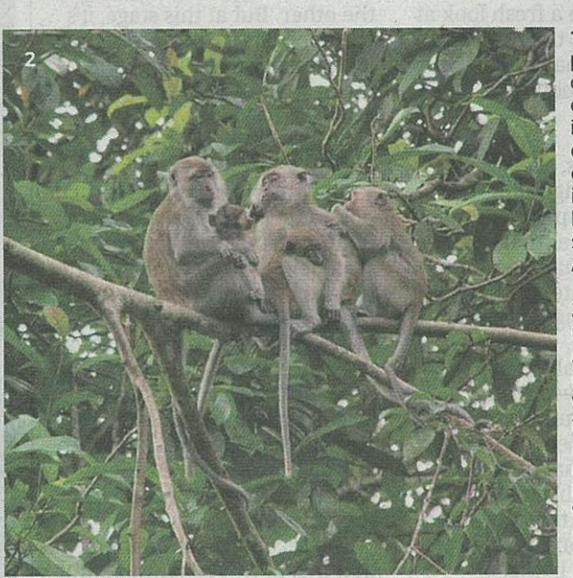
Future research in these areas should prove interesting, given that human malarias remain the primary concern in many locations.

Other mathematical modelling studies simulating conditions where *P. knowlesi* transmission may occur and the potential impact of control measures have suggested that conventional control measures could be sufficient to reduce the risk of infection in humans, but must be actively implemented if *P. knowlesi* is to be controlled.

Human-to-human transmission of *P. knowlesi* is still not yet an obvious risk, and occupies a low profile in the public psyche, having been largely overshadowed by more immediate problems such as the recent spike in dengue fever.

Convincing the public to keep up conventional control methods, and justifying public funds in this manner, could prove difficult.





1 Mosquito populations from different areas exhibit a variation in resistance to different chemicals – useful information for localised control strategies. Photo: AFP

2 It is likely that humans acquired *P. knowlesi* infections after venturing into forests where infected macaques were living. Photo: Wikimedia Commons