

# Zika in Singapore: insights from One Health and social medicine

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The detection of the Zika virus in Singapore in the last week of August 2016 has generated concern in the community, particularly among pregnant women, and prompted the authorities to take swift action to contain the spread of the virus. In addition to public health efforts currently under way, including the lively ethical discourse on dealing with this mild disease and its significant risk of congenital malformations, we believe that important insights can also be found in the One Health (OH) approach. OH is an ethical, ecological approach that takes into consideration justice and respect for human and animal populations as well as the environment.<sup>(1-3)</sup> This approach considers the wider social and environmental factors that shape disease transmission, and helps us to identify three populations that are particularly vulnerable but may be overlooked in this scenario: transient foreign workers, their sexual partners and local monkey populations.

A disproportionate number of transient foreign workers in Singapore have been infected with the Zika virus; of the initial 56 confirmed cases of Zika, 38 were foreign workers working at a construction site at Sims Drive. The OH approach is valuable, as it takes into consideration the social and environmental factors that have exposed foreign workers to a greater risk of contracting the Zika virus. These transient workers are vulnerable due to their limited choices of living arrangements and working conditions – factors that they have almost no control over. Providing these workers with safe and clean working environments is essential to the immediate response and long-term management of Zika. There is a lack of evidence to support the effectiveness of vector control methods such as fogging,<sup>(4)</sup> as the *Aedes* mosquito may be found in inaccessible places many storeys above the ground<sup>(5)</sup> and can develop resistance to insecticides.<sup>(6)</sup> The OH approach encourages sound interventions that carry little risk to humans, animals and the environment, focusing instead on the ecological conditions that promote the *Aedes* breeding cycle. A wider review of environmental management practices in the construction industry may be warranted to prevent further outbreaks.

The Zika virus is also transmitted through sexual contact, which leads us to the second vulnerable group – female sexual partners of transient workers. This group is likely to include low-wage foreign workers who are particularly vulnerable due to their lack of education, limited English fluency and often insecure employment situation. These workers are currently not eligible for the government subsidy for Zika screening, and thus, the need to

pay the full cost of the test may act as a deterrent to getting tested.<sup>(7)</sup> If they are casual workers, the issues may be compounded by the limited access to screening provided for licensed workers, who may travel without the disease being detected.<sup>(8)</sup> To minimise the spread of the disease within Singapore and around the region,<sup>(9)</sup> it is critical that appropriate information reaches these women and that they have access to subsidised testing and resources for safe sex.

The third potentially vulnerable population is the local cynomolgus monkeys. Zika is a zoonotic disease that is now being efficiently transmitted between humans; however, it was first isolated from rhesus monkeys in Uganda in 1947.<sup>(10)</sup> Although there is no evidence that non-human primates are involved in the spread of the Zika virus,<sup>(11)</sup> it may be speculated that due to the close relation between the cynomolgus and rhesus monkeys, the virus could also possibly infect cynomolgus monkeys via mosquitoes.<sup>(12)</sup> However, to date, there are no studies that support this claim. Public health authorities often resort to culling as a measure to control disease outbreak, although such interventions are frequently ineffective, morally objectionable and lack public support. The OH approach encourages the allocation of resources to investigate the prevalence of the Zika virus in non-human primates, and to develop and implement interventions that benefit humans, animals and the environment. For example, it would be more appropriate and ethically sound to accelerate the development of vaccines for those who may be susceptible to the virus – both human and non-human animals.

In conclusion, the OH approach can provide important lessons for dealing with the current outbreak and other emerging infectious diseases. As an ethical, ecological approach, OH emphasises that working in silos to control an outbreak is not only unjust, but also likely to be ineffective. An effective OH response requires a collaborative, cross-disciplinary approach that considers the ecology of Singapore to be a space jointly shared by humans (both foreign and local) and non-human animals, as well as the environment we all live in. This response requires the cooperation of experts in public health, clinical medicine, environmental management, veterinary science, ecology, virology, sociology and other related disciplines. Furthermore, as Zika is also present in neighbouring countries, the response should extend beyond the borders of Singapore to help control the spread of the disease in the region. This is the only way to ensure optimal health for humans, animals, and the environment in Singapore and beyond.

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