

## *Aedes aegypti* control in Brazil

On Nov 12, 2015, faced with the increased incidence of cases of microcephaly and the possible association with Zika virus, the Ministry of Health in Brazil declared a public health emergency. On Dec 5, the Brazilian Government decided that measures should be aggressively implemented to reduce the risk of exposure to Zika virus by eliminating the vector mosquito *Aedes aegypti*.

The strategy to eliminate the mosquito is based on pesticides (insecticides and larvicides) that have been applied since the dengue outbreak in 1986.<sup>1</sup> Nevertheless, the results have been very disappointing. The incidence of registered dengue cases has increased, and in 2015 there were 1.6 million cases with 863 deaths (figure).<sup>1</sup> Different insecticides (organophosphates and pyrethroids) and larvicides (organophosphates and growth regulators) have been successively used as a result of growing vector resistance.<sup>2</sup> Insecticide resistance is an example of evolutionary change, where the insecticide acts as a powerful selection factor that concentrates resistant mutants that were present in low frequencies in the original population.<sup>3</sup>

Despite these negative results, the Ministry of Health in Brazil has intensified the same strategy to face the epidemics of Zika and chikungunya, by mobilisation of the armed forces to survey households, addition of larvicide to water supplies, and by the use of thermonebulisation as an attempt to control the adult vector; despite serious concerns regarding the larvicide pyriproxyfen (Malathion).<sup>4</sup>

The Revolving Fund for Strategic Public Health Supplies in the Pan American Health Organization has prioritised the purchase of pesticides. The prescribed model of implementation is centralised, vertical, and does not consider the steep social gradient where clusters of microcephaly are found in poor outskirts of cities, where sanitary conditions are bad. Although official data point out that 92% of urban households in Brazil were connected to public water in 2010, there are 3 983 329 unserved households,<sup>5</sup> and intermittent water supply, forcing the population to store water for everyday consumption, and favouring mosquito breeding. And only 28% of rural households are connected to public water.<sup>5</sup>

The approach applied so far by the Government uses large resources on inefficient or unsafe vector control methods, instead of improving urban infrastructure and environmental

sanitation, with a stable supply of potable water. Relying on a chemical war against the vector tends to pacify the population with false security, while a broad programme for better sanitary urban conditions could generate social mobilisation and co-responsibility of the population. Improvement of sanitary conditions is a long-term investment in population health, while pesticide use will have to be repeated. The Brazilian Association of Collective Health calls to stop the use of chemical products against *A. aegypti*, especially in household water reservoirs, and prioritise sanitary measures.

We declare no competing interests.

\**Lia Giraldo da Silva Augusto, Aline M Gurgel, André M Costa, Finn Diderichsen, Francisco A Lacaz, Gabriel Parra-Henao, Raguél M Rigotto, Rubens Nodari, Solange L Santos*  
lgiraldo@uol.com.br

Universidade de Pernambuco, Recife, Pernambuco, Brazil (LGdSA); Oswaldo Cruz Foundation, Fortaleza, Ceará, Brazil (AMG); Oswaldo Cruz Foundation, Recife, Pernambuco, Brazil (AMC); University of Copenhagen, Copenhagen, Denmark (FD); Federal University of São Paulo, São Paulo, Brazil (FAL); Cooperative University of Colombia, Santa Marta, Colombia (GP-H); Federal University of Ceará, Fortaleza, Ceará, Brazil (RMR); Federal University of Santa Catarina, Santa Catarina, Brazil (RN); and Federal University of Pernambuco, Recife, Brazil (SLS)

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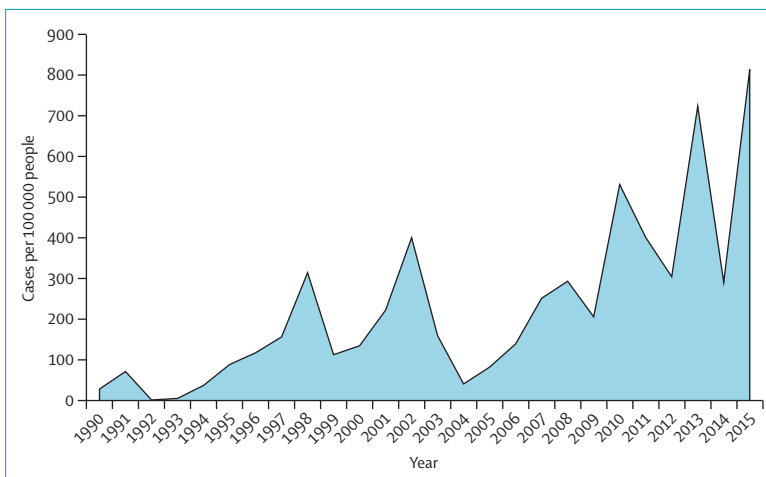


Figure: Incidence of dengue cases in Brazil from 1990 to 2015  
Data from Ministry of Health, Brazil.<sup>1</sup>



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