

Re-emergence of dengue in Réunion, France, January to April 2012

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Since January 2012, 20 autochthonous cases of dengue virus (DENV) infection have been identified in Réunion. The first cases were detected on the western coast, but the two co-circulating viruses (DENV-1 and DENV-3) seemed to have spread later to different cities of the island. There is a non-negligible risk of increase in viral transmission over the following weeks, so health professionals and public health authorities in Réunion are preparing to face a potential epidemic.

Since January 2012, 20 autochthonous cases of dengue fever have been identified in Réunion. Of these, 13* were probable and seven* laboratory-confirmed. Nine of them occurred in April and this suggests an increase in viral circulation while the geographical distribution of the cases suggests the spread of the virus.

Background

South-western islands of the Indian Ocean are permanently threatened by dengue fever outbreaks because of their tropical climate, their geographical proximity to many endemic countries in Africa and Asia and their numerous tourists and commercial exchanges [1].

In Réunion, a French overseas territory located 700 km east of Madagascar with 840,000 inhabitants (2011 estimate [2]), two dengue outbreaks were documented during 1977 to 1978 and in 2004 [3,4]. In 1977 to 1978, a massive epidemic occurred in the whole island, with an estimated 30% of the population infected [3]. In 2004, 228 cases were reported in the western part of the island [4], i.e. an attack rate of 3 per 10,000 population.

Since 2004, only sporadic cases have been confirmed: two cases in 2007, three in 2008 and two in 2010 [5]. Epidemiological surveillance is undertaken by the Indian Ocean Regional Office of the French Institute for Public Health Surveillance (Cire OI - InVS) in collaboration with the vector control team (Lutte anti-vectorielle,

LAV) of the French Health Agency Indian Ocean (ARS OI) [5]. It is based on an active participation of hospitals and general practitioners, as well as public and private biological laboratories, that report every dengue virus (DENV) infection. As soon as a case is notified, control measures are implemented by the LAV and an active case finding among patient's contacts is performed by the LAV together with the Cire OI. The following case definition is used: a confirmed case is defined as a patient with a positive PCR or seroconversion; a probable case is defined as a patient with positive IgM on a single sample plus epidemiological link to a confirmed case and/or dengue-like syndrome with high IgM titres; a possible case is defined as a patient with positive IgM on a single sample.

Re-emergence of dengue virus circulation

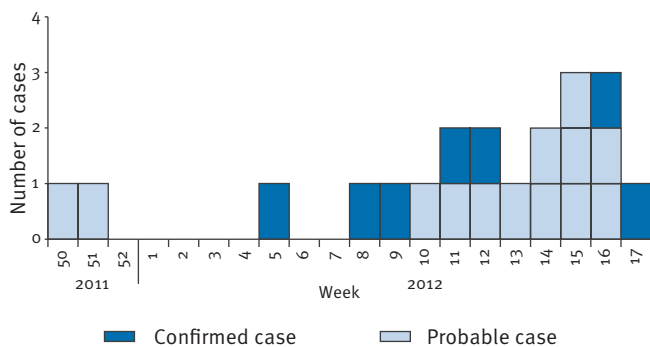
In January 2012, two possible cases without travel history were identified in two separate areas of Saint Paul, a city located on the western coast of the island, affected by the re-emergence of chikungunya virus in 2010 [6]. Despite an active search of symptomatic cases among their close contacts and in the neighbourhood, no other cases were identified. Unfortunately, second sets of blood samples for follow-up investigations could not be obtained.

On 10 February 2012, a case confirmed by RT-PCR was detected in the area of Bellemène (city of Saint Paul), the same area where the two possible cases had been identified earlier. Autochthonous transmission of the virus was therefore strongly suspected, and the two first possible cases were thus classified as probable. However, as the patient had returned from Asia three weeks before the onset of symptoms, a secondary transmission following importation of the virus by an asymptomatic co-traveller could also be possible.

Autochthonous viral circulation was confirmed in March when three confirmed and two probable cases

FIGURE 1

Autochthonous cases of dengue virus infection by week of symptom onset, Réunion, January–April^a 2012 (n=20)



^a Data for weeks 16 and 17 are incomplete because of the time lag between symptom onset and laboratory confirmation.

(dengue-like syndrome with positive IgM and epidemiological link with a confirmed case) were reported in people living in the western part of the island. In early April, two probable cases were also identified in Saint Denis, the administrative capital of the island located in the north; since then, ten more cases have been detected in different areas of the island.

Outbreak description

A total of 20 autochthonous cases of dengue fever have been identified during the past four months; of these, 13* were probable and seven* confirmed. The mean age for the 20 patients was 39 years (minimum: 2 years; maximum 86 years), and 12 of the cases were women. None had travelled in the three weeks prior to disease onset to a dengue-endemic country. Three patients required hospitalisation because alert signs were present (persistent vomiting, mucosal bleed, and clinical fluid accumulation), but did not experience a severe form of the disease.

As shown in Figure 1, nine of the cases occurred in April, suggesting an increase in viral circulation.

The geographical distribution of the 20 cases also suggests a spread of the virus, as shown in Figure 2.

Eight cases were detected in the western part of the island, in the city of Saint Paul. Epidemiological or geographical links were identified between all of them, suggesting they were all related to a single chain of transmission. However, cases were subsequently identified in other parts of the island, showing the spread of the virus. Furthermore, two different serotypes were identified (two DENV-1 and three DENV-3), confirming the presence of at least two different transmission chains. This co-circulation has its origin in the simultaneous introduction of different viruses: since the beginning of the year, seven cases were imported to Réunion from Asia (Thailand, India and Indonesia), where these two serotypes are regularly circulating [7-9]. Five of

these cases had returned before onset of symptoms and have therefore been viraemic in Réunion, but the serotypes could not be identified since only serology was performed.

Control measures

Since January 2012, more than 3,500 premises have been investigated by LAV in the proximity of the cases. Measures taken included: removal of natural and artificial breeding sites for *Aedes albopictus*, spatial insecticide treatments, and active search for symptomatic cases. In addition, all health professionals and general practitioners in the areas concerned have been contacted by phone and provided with information updated on a weekly basis. The general population has been regularly informed on the situation by health authorities through the media in order to strengthen preventive measures to protect against mosquitoes.

Conclusion

Dengue is currently re-emerging in Réunion after a seven-year inter-epidemic period, with 20 cases reported in four months compared with a total of seven cases reported between 2005 and 2011. The epidemiological situation seems stable at the moment, probably due to timely control measures implemented for every case and improved epidemiological surveillance. However, *Ae. albopictus* has shown to be a good vector for dengue in Réunion [10]: its density is high enough to allow transmission during the whole year and the current meteorological conditions (high temperatures and precipitation levels) are particularly favourable to its reproduction. Moreover, because of the potentially high proportion of asymptomatic forms (50% to 94% according to the studies [11]), the virus could continue to spread unnoticed. It has been recently suggested that the number of asymptomatic infections could increase with the incidence of infection in the preceding year [12]. This would be in favour of a moderate proportion in Réunion which has been free from active dengue circulation during the past seven years. However, asymptomatic cases are inevitably present on the island, and might reach levels of viraemia sufficient to infect competent mosquitoes [13].

The risk of an increased viral transmission in the following weeks is therefore non-negligible, and health professionals as well as public health authorities are currently preparing themselves to face a potential epidemic. The identification of two serotypes among autochthonous cases, combined with a high vector density and probably a low immunity of the population, suggest the presence of a higher risk, which will most probably decrease with the arrival of the austral winter. Indeed, past outbreaks of arboviruses in Réunion showed that viral circulation ended or significantly decreased in July [4-6, 14]. However, during the chikungunya outbreak in 2005-2006, low viral circulation persisted during the austral winter and led to the greatest epidemic ever described with 266,000 persons infected (i.e. an attack rate of 34%) [14]. Drawing

on experiences from this outbreak, epidemiological surveillance has now been reinforced in order to early detect any new case and to obtain systematic laboratory confirmations, with an active involvement of hospital and general practitioners as well as public and private laboratories.

*** Authors' correction:**

The numbers of probable and confirmed cases were corrected on 22 May 2012, at the request of the authors: 13 cases were probable and seven were laboratory-confirmed.

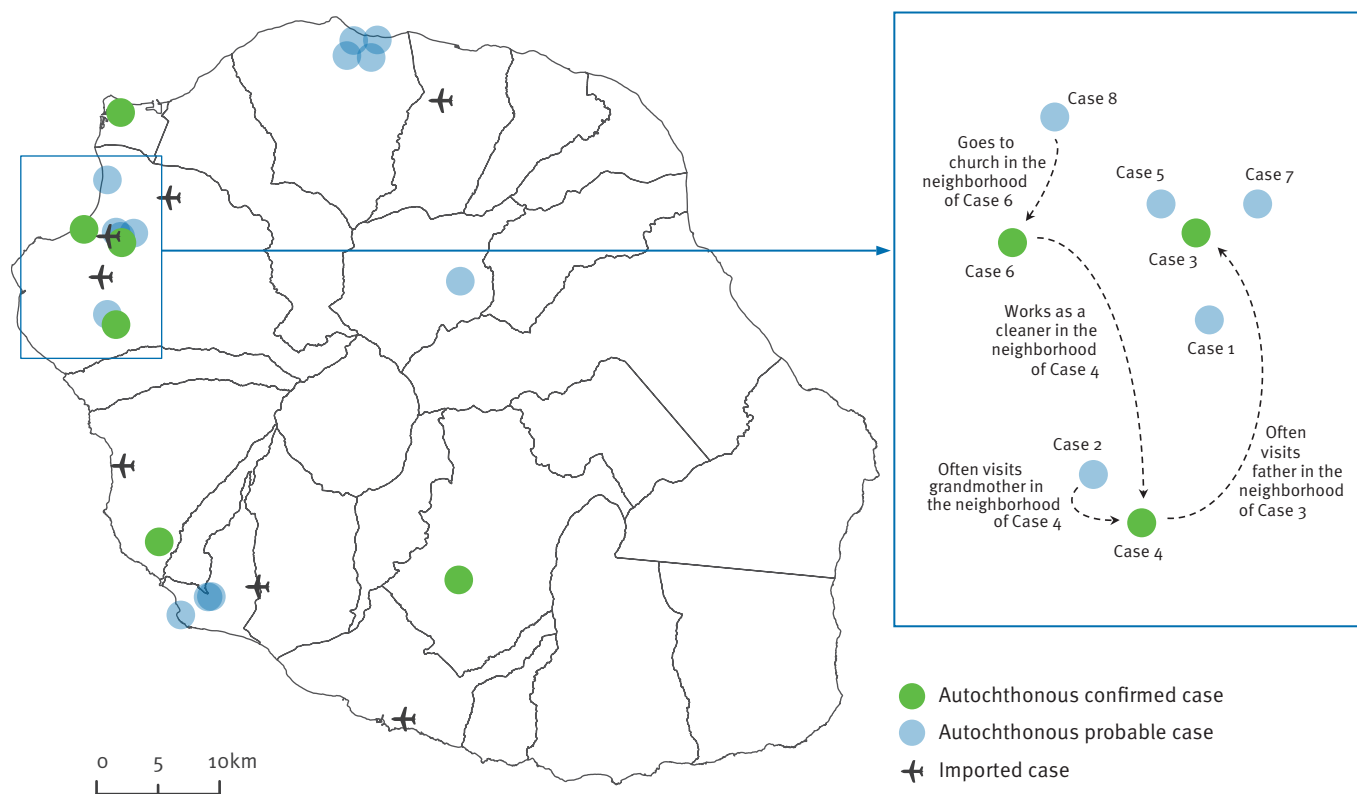
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FIGURE 2

Geographical distribution and epidemiological links^a between autochthonous cases of dengue virus infection, Réunion, January–April 2012 (n=20^b)



^a Epidemiological links are detailed for eight cases.

^b In addition to the 20 autochthonous cases, seven imported cases were identified on the island in the same period.