SHORT REPORT
Increased number of cases of Chikungunya virus (CHIKV) infection imported from the Caribbean and Central America to northern Italy, 2014

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SUMMARY
This report describes an increased number of cases of Chikungunya virus (CHIKV) infection imported in northern Italy (Emilia-Romagna region) during the period May–September 2014, indicating that the recent spread of CHIKV and its establishment in the Caribbean and in central America, resulted in a high number of imported cases in Europe, thus representing a threat to public health. From May to September 2014, 14 imported cases of CHIKV infection were diagnosed; the patients were returning to Italy from Dominican Republic (n = 6), Haiti (n = 3), Guadeloupe (n = 2), Martinique (n = 1), Puerto Rico (n = 1) and Venezuela (n = 1). Phylogenetic analysis performed on the envelope protein (E1) gene sequences, obtained from plasma samples from two patients, indicated that the virus strain belongs to the Caribbean clade of the Asian genotype currently circulating in the Caribbean and Americas. The rise in the number of imported cases of CHIKV infection should increase healthcare professionals’ awareness of the epidemiological situation and clinical presentation of CHIKV infection in order to enhance surveillance and early diagnosis in the forthcoming season of vector activity in Europe and North America.

Key words: Arbovirus, Chikungunya virus, epidemiology, Italy, phylogeny.

Chikungunya virus (CHIKV) is a single-stranded, positive-sense RNA virus belonging to the Alphavirus genus of the Togaviridae family. CHIKV is transmitted by the bite of Aedes mosquitoes, primarily Aedes aegypti and Aedes albopictus. Clinical signs of CHIKV infection are high fever, myalgia, skin rash and arthralgia, which may persist for weeks.

CHIKV is endemic in parts of Africa, South-East Asia and in the Indian subcontinent. First evidence of CHIKV infections in the Western Hemisphere was reported in December 2013 in the Caribbean island of St Martin [1], spreading thereafter to other Caribbean islands and to Central, South and North America (http://www.cdc.gov/chikungunya/geo/index.html) [2]. The vector involved in the CHIKV outbreak in the Caribbean is A. aegypti [3] and the virus strain circulating belongs to the Asian genotype [1, 4]. The high density of the vector together with increasing number of potential vireamic patients returning from endemic countries highlights the potential risk of local CHIKV outbreaks in Europe [5].

Since its introduction to the Caribbean in 2013 [1] the number of imported cases of CHIKV infection in Europe has increased, as recently reported in Spain.
Table 1. Clinical, epidemiological and diagnostic features of cases of CHIKV infection in patients returning from the Caribbean and Americas to the Emilia-Romagna region, Italy, May–September 2014.

<table>
<thead>
<tr>
<th>Case no.</th>
<th>Sex</th>
<th>Age, yr</th>
<th>Country visited</th>
<th>Period of stay</th>
<th>Clinical symptoms</th>
<th>Laboratory findings</th>
<th>Time to diagnosis (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>F</td>
<td>42</td>
<td>Guadeloupe</td>
<td>25 Apr.–4 May</td>
<td>Fever, arthralgia, myalgia, rash, headache</td>
<td>CHIKV RNA+; IgM+; IgG-</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>M</td>
<td>50</td>
<td>Guadeloupe</td>
<td>25 Apr.–4 May</td>
<td>Fever, arthralgia, myalgia, asthenia, headache</td>
<td>CHIKV RNA-; IgM+; IgG+</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>F</td>
<td>53</td>
<td>Haiti</td>
<td>Apr.–14 May</td>
<td>Fever, arthralgia, rash, asthenia</td>
<td>CHIKV RNA-; IgM+; IgG+</td>
<td>13</td>
</tr>
<tr>
<td>4</td>
<td>F</td>
<td>35</td>
<td>Haiti</td>
<td>7 May–24 May</td>
<td>Fever, arthralgia, rash, asthenia, myalgia, headache, retro-orbital pain</td>
<td>CHIKV RNA-; IgM+; IgG+</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>F</td>
<td>54</td>
<td>Dominican Rep.</td>
<td>28 Apr.–30 May</td>
<td>Fever, arthralgia, rash, myalgia, asthenia, retro-orbital pain</td>
<td>CHIKV RNA-; IgM+; IgG+</td>
<td>n.a.</td>
</tr>
<tr>
<td>6</td>
<td>M</td>
<td>68</td>
<td>Haiti</td>
<td>26 May–5 June</td>
<td>Fever, arthralgia, rash, asthenia, myalgia, retro-orbital pain</td>
<td>CHIKV RNA+; IgM+; IgG+</td>
<td>9</td>
</tr>
<tr>
<td>7</td>
<td>M</td>
<td>62</td>
<td>Dominican Rep.</td>
<td>25 May–8 June</td>
<td>Fever, arthralgia, asthenia</td>
<td>CHIKV RNA+; IgM+; IgG+</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>M</td>
<td>67</td>
<td>Dominican Rep.</td>
<td>28 May–10 June</td>
<td>Fever, arthralgia, myalgia</td>
<td>CHIKV RNA+; IgM+; IgG+</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>F</td>
<td>8</td>
<td>Dominican Rep.</td>
<td>7 June–6 July</td>
<td>Fever, rash, headache</td>
<td>CHIKV RNA+; IgM+; IgG+</td>
<td>1</td>
</tr>
<tr>
<td>10</td>
<td>M</td>
<td>32</td>
<td>Dominican Rep.</td>
<td>17 June–27 June</td>
<td>Fever, arthralgia, myalgia, headache, asthenia</td>
<td>CHIKV RNA-; IgM+; IgG+</td>
<td>n.a.</td>
</tr>
<tr>
<td>11</td>
<td>F</td>
<td>40</td>
<td>Dominican Rep.</td>
<td>3 July–31 July</td>
<td>Fever, rash, retro-orbital pain, headache, arthralgia</td>
<td>CHIKV RNA-; IgM+; IgG+</td>
<td>26</td>
</tr>
<tr>
<td>12</td>
<td>M</td>
<td>34</td>
<td>Martinique</td>
<td>4 Aug.–17 Aug.</td>
<td>Fever, rash, asthenia, headache, retro-orbital pain</td>
<td>CHIKV RNA-; IgM+; IgG+</td>
<td>6</td>
</tr>
<tr>
<td>13</td>
<td>M</td>
<td>60</td>
<td>Puerto Rico</td>
<td>n.a.–18 Sept.</td>
<td>Fever, arthralgia, rash, myalgia</td>
<td>CHIKV RNA+; IgM+; IgG-</td>
<td>n.a.</td>
</tr>
<tr>
<td>14</td>
<td>M</td>
<td>21</td>
<td>Venezuela</td>
<td>11 Apr.–18 Sept.</td>
<td>Fever, arthralgia, rash, asthenia, myalgia, headache</td>
<td>CHIKV RNA+; IgM+; IgG+</td>
<td>4</td>
</tr>
</tbody>
</table>

n.a., Not available.
After the outbreak of autochthonous CHIKV infection that occurred in the Emilia-Romagna region in 2007 (with 217 confirmed cases) [8], only sporadic imported cases have been reported in Italy (two cases in 2011, five cases in 2012, three cases in 2013). While the number of cases of CHIKV imported into Emilia-Romagna region, Northern Italy, was very low between 2011 and 2013 (one case in 2011, 0 cases in 2012, one case in 2013), the number has increased significantly over the course of 2014.

In Italy, a surveillance system for arboviral diseases, defined annually by the National Ministry of Health, is implemented and allows detection of imported cases of CHIKV throughout the year, with more attention during the period of vector activity. Following the activities of the integrated surveillance plan for arboviruses, 14 patients were diagnosed with CHIKV infection in Emilia-Romagna region from May to September 2014. All the 14 patients had history of recent travel to the Dominican Republic (n = 6), Haiti (n = 3), Guadeloupe (n = 2), Martinique (n = 1), Puerto Rico (n = 1) and Venezuela (n = 1). All patients had symptoms compatible with CHIKV infection, including fever (>38.5 °C), arthralgia, headache, and myalgia. The median age of CHIKV cases was 46 (range 8–68) years; CHIKV infection was diagnosed in a median time of 7 days from disease onset (range 1–26 days) and was supported by virological and serological means.

All patients were tested for both dengue (DENV) and CHIKV infection. Serum samples were tested for the presence of IgM and IgG antibodies specific for DENV and CHIKV, respectively, by indirect immunofluorescence assay (Euroimmun AG, Germany); for the presence of DENV non-structural protein (NS1) (Platelia Dengue NS1 AG kit, Bio-Rad Laboratories, USA) and for the presence of CHIKV and DENV RNA in plasma and/or serum samples by using real-time RT–PCR [9, 10]. All the patients tested negative for DENV infection.

CHIKV RNA was identified in the plasma and/or serum samples of seven patients; in six patients the diagnosis was based on the presence of CHIKV-specific IgM and IgG in serum samples and one patient was only IgM positive and thus considered a probable case. A summary of epidemiological, clinical and laboratory findings from imported cases is reported in Table 1.

Nucleotide sequences (1518 nt) of the envelope protein (E1) gene of CHIKV were obtained from plasma samples from two patients (case nos. 7 and 9) returning to Italy from the Dominican Republic. Overlapping amplicons were amplified and bi-directionally sequenced. Primers used for sequencing were [11]: 19 F: 5'-AGTTGTGTCAGTGGCCTCGTTC-3' and...
CHIKV infection in patients returning from the Caribbean region and the Americas in order to enhance surveillance for early identification of imported cases.

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DECLARATION OF INTEREST

None.

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