IN THESE MONTHS

The main events of epidemiological interest in the last months in Italy and in the European Union

Outbreaks of Chikungunya virus in Italy: history of the disease and infection in the country

Introduction

The Chikungunya virus (CHIKV) is an RNA virus that belongs to the Togaviridae family, the Alphavirus genus. CHIKV is transmitted by the mosquitoes bite that become infected if they sting a person during the viremic phase. The duration of viremia in humans is not well defined; it is thought to last from 3 to 10 days, starting immediately before the onset and ending 5-7 days after the onset of symptoms (1). Infected mosquitoes can then transmit the virus to other people by bite. The infection can be transmitted from person to person only through blood or transplantation of infected organs and tissues or from mother to child (2). The most typical symptoms of Chikungunya are fever and joint pains with an acute onset. Joint swelling, rash, and other non-specific symptoms such as weakness, chills, headache, nausea, vomiting may also be present. The clinical presentation may affect both young adults and children more prevalently (3). The disease is usually self-limited, cases with a severe course are reported, but usually in individuals with underlying conditions with clinical pictures involving the central nervous system (meningo-encephalitis) hit defunct individuals; deaths are attributable to complications from concomitant diseases (4). The infection may be asymptomatic and sero-prevalence studies have shown that up to 10-15% of people with specific circulating antibodies did not remember having the disease (5).

The presence of the vector combined with other factors, such as climate changes and increase in the travel to / from endemic countries, in 2007 determined an epidemic of autochthonous cases of CHIKV in Emilia-Romagna, in the Municipalities of Cervia, Cesena , Ravenna, Rimini and Bologna, about 334 total cases have been identified, of which 281 confirmed with laboratory investigations. The indigenous transmission was also confirmed by the isolation of the Chikungunya virus (CHIKV) in tiger mosquitoes collected in the affected area (6-8). Since 2011, the CHIKV is reported by the Regions and Autonomous Provinces through a special surveillance system set up by the Ministry of Health and the National Institute of Health, for CHIKV cases during the period of vector activity (June-November) and of the cases imported all year round (9).

In 2016, the Regional Office of the Americas for the World Health Organization notified nearly 350,000 suspected cases of chikungunya, of which 146,000 were confirmed in the laboratory. Brazil (265 thousand suspected cases), Bolivia and Colombia (in both 19 thousand suspected cases) the most affected countries. In 2016, in the African Region, Kenya has notified a Chikungunya outbreak with over 1,700 suspected cases and in Pakistan an outbreak is still ongoing (10).

In early August 2017, France in the department of Var (Southern France) reported the presence of an outbreak of CHIKV with 6 autochthonous confirmed cases and a probable case, all residing in the same district of Cannet-des-Maures (11).

In the beginning of September 2017, an outbreak of autochthonous cases has been identified in Italy in Anzio (province of Rome, Lazio region) which gave rise to several outbreaks occurring in Rome, Latina (both in Lazio region) and in in the municipality

of Guardavalle marina (Calabria region) (12). In this paper, we report preliminary results on the epidemiological investigation conduct during the CHIKV epidemic that occurred from August to October 2017 in Italy

The surveillance system of authoctonous and imported cases in Italy

The surveillance of human cases of Chikungunya is throughout the year, however, during the period of vector activity (June-October) the surveillance system is enhanced in mosquito-infested areas to allow the identification of cases, for the purposes of immediate adoption of the necessary control measures (in relation to entomological surveillance), to reduce the risk of transmission. In the vector activity period, the surveillance system provides for the timely identification of suspected cases (symptomatic persons returning from an endemic country) and the potential identification of people with clinical symptoms, according to the case definition reported in Table 1, with no history of travel to endemic countries, in order to recognize autochthonous cases and outbreaks (two or more cases occurring within a 30-day time frame in a restricted territorial area). From 2008 to 2016, 85 confirmed CHIKV cases have been reported to the surveillance System

Table 1. Chikungunya case definition, Ministry of Health 2017

Clinical criteria	Fever and severe polyartralgia (limiting daily activities), in absence of other causes
Laboratory criteria[1]	Probable case: - Detection of chikungunya specific IgM antibodies in a single serum sample. Confirmed case (At least one of the following four): - Isolation of chikungunya virus from a clinical specimen; - Detection of chikungunya viral nucleic acid from a clinical specimen; - Detection of chikungunya specific IgM antibodies in a single serum sample AND confirmation by neutralisation; - Seroconversion or four-fold antibody titre increase of chikungunya specific antibodies in paired serum samples.
Epidemiological criteria	History of travel to, or residence in an area with documented on-going transmission of chikungunya, within the two-week period prior to the onset of symptoms
Classification	
Probable case	Any person meeting the clinical criteria and the laboratory criteria for a probable case
Confirmed case	Any person meeting the laboratory criteria for a confirmed case.

[1]Serological results should be interpreted according to previous exposure to other alphaviral infections

Autochthonous cases in Italy, 2017

On 6 and 7 September 2017, the National reference Laboratory for arboviral infections based at the National Institute of Health, Italy, received serum and urine samples from three patients with a history of high fever (>38°C), severe joint pain and an itching skin rash. Symptoms had started while they were on holiday near the coastal town of Anzio, in the province of Rome, Lazio region (ca 58 km from Rome). Later we talk about epidemiology on the territory of Anzio, confirmed cases of CHIKV have been reported in the municipality of Rome and Latina (13).

After the autochthonous cases of Chikungunya reported by the Lazio region, a secondary outbreak has been identified in Calabria in the municipality of Guardavalle marina (CZ). It all started from four confirmed cases reported between 19 and 25 September 2017 to the national surveillance system from two regions (one in Lazio and three from Emilia-Romagna), in persons resident in both regions that showed suggestive symptoms of CHIKV infection in August while they were staying in Guardavalle Marina for summer holidays.

In total, 359 probable and confirmed autochthonous cases of Chikungunya were reported in the Lazio region in the municipalities of Anzio, Rome and Latina (184 confirmed and 175 probable) and 61 probable and confirmed autochthonous cases in the Calabria region in the municipality of Guardavalle marina (50 confirmed and 11 probable). Several probable and confirmed cases have also been reported by other Italian regions (for example Emilia-Romagna, Marche) and in other Member States (France and Germany). All were epidemiologically connected to Anzio, Rome or to Guardavalle Marina. In total, 428 probable and confirmed CHIKV cases were reported in Italy (Figure 1).

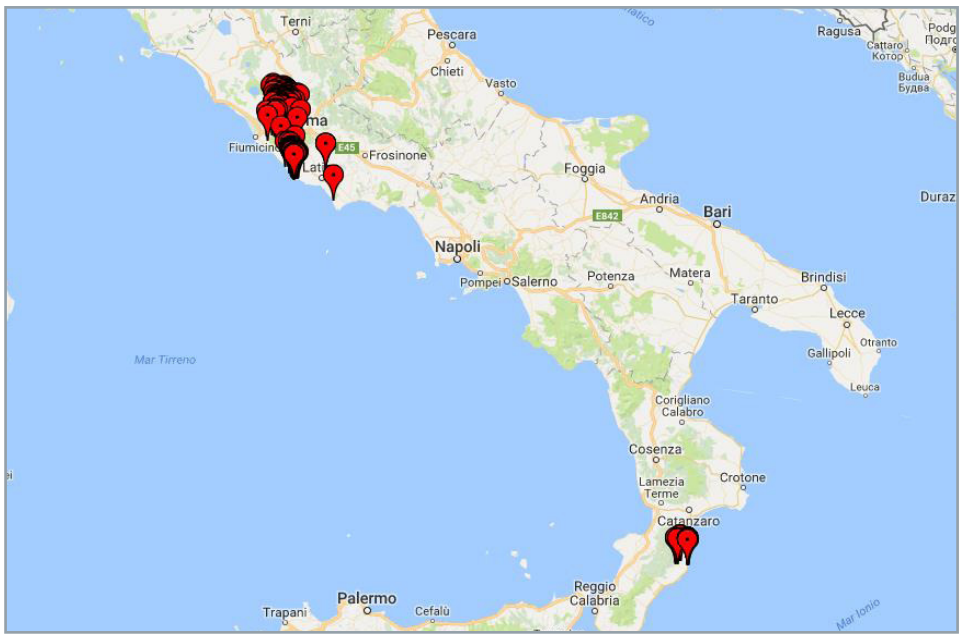


Figure 1.
Maps of the autochthonous cases by site of exposure, Italy, August-September 2017

Sequences of the PCR amplicons of the virus envelope (E)1 gene from patients (GenBank numbers: LT908477 and LT908478) and from the mosquitoes were identical (GenBank number: LT908476), and also showed a 100% similarity with the sequence of a chikungunya East Central South African (ECSA) strain involved in an ongoing epidemic in Pakistan (12), which does not carry the A226V mutation, responsible of the 2007 Emilia – Romagna outbreak in Italy (7).

Most of the cases had onset between August and September and the last date of onset is registered on the 17th of October 2017 (Figure 2 and 3).

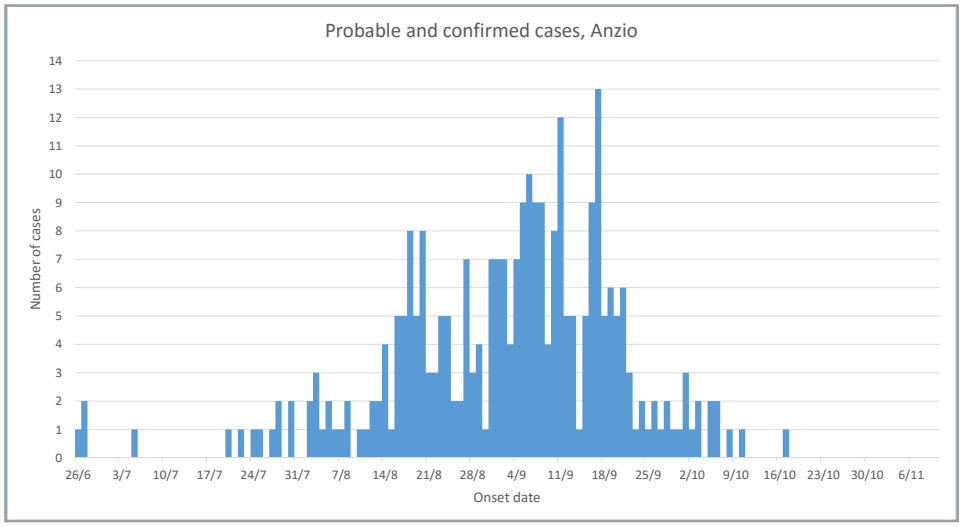


Figure 2.
Epidemic curve of cases reported or linked to the Lazio region outbreak. August – October, 2017

Panel A: Anzio; Panel B: Roma

Epidemic curve of cases reported or linked to the Lazio region outbreak. August – October, 2017

Panel B: Roma

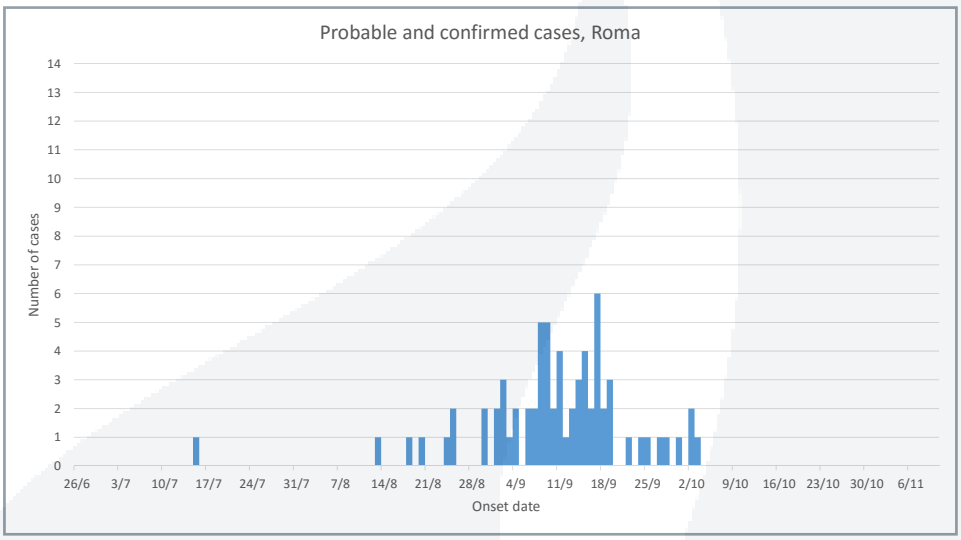
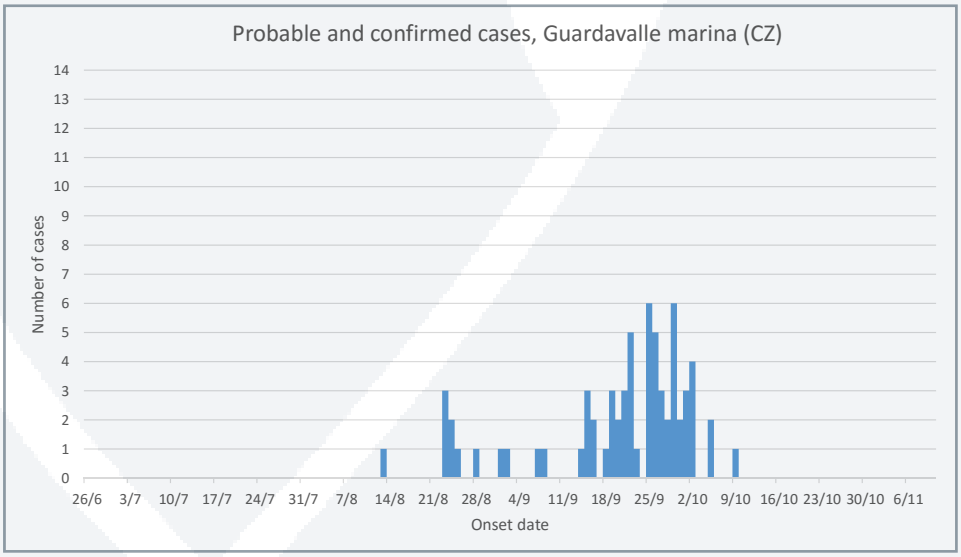


Figure 3.
Epidemic curve of cases reported or linked to the Calabria region outbreak, August – October, 2017



Prevention and control measures adopted

FIn the areas with the highest concentration of cases both in the Lazio region and in Guardavalle marina (CZ), an epidemiological investigation was immediately set up with an enhanced epidemiological surveillance of cases, a retrospective investigation to identify the real burden, and an entomological surveillance to describe the vector present in the area and its density.

Furthermore, all the measures for the prevention of the disease have been activated in relation to the donations of blood, tissues and organs for the reduction of the risk of transmission from blood products, according to the indications of the National Blood Center and the National Transplant Center (14). The control measures adopted were also related to the disinfestation of the areas involved, to reduce the density of the vector and the relative transmission risk. A communication campaign was also activated to alert people to protect themselves from mosquito bites.

The suspension of donations concerned only the municipality of Anzio, the Local Health Autority n 2 of the municipality of Rome, the municipality of Latina and the municipality of Guardavalle marina. In all other areas of the regions of Lazio and Calabria, based on the assumption of a lower level of risk of infection, the 'quarantine' of 5 days was applied to the blood collected if the donor stayed in the endemic areas on the Italian territory. At national level, donors who stayed in the affected municipalities were suspended for 28 days (14).

During entomological surveillance samples of eggs, larvae and adult mosquitoes of species Aedes albopictus were collected. Agreements were also made with the municipal authorities to activate entomological monitoring with ovitraps, and to map the larval presence in the area. Furthermore, vector control interventions have been carried out, both with adulticides and larvicides, following the procedures indicated in Annex IV of the Ministry of Health's National Plan for Surveillance and Control of aroviral infections published on 10th July 2017 (9). Disinfection / disinfestation services in the affected regions have carried out at least 3 larvicidal and adulticidal interventions to control the outbreaks in areas affected by autochthonous transmission.

Conclusions

Vector borne diseases are a priority for public health in the coming years. The Italian model, which includes integrated and multidisciplinary surveillance and response plans, is considered one of the most advanced in Europe and internationally. However, despite the preparednessactivities, the question concerning the identification of these cases by physicians, still remains open.

The 2017 epidemic in Italy also shows how difficult it is to think of CHIKV infection, if the first case imported from an affected area is not identified, as was the case in 2007 in Emilia-Romagna. On the other hand, the identification of imported cases is not always easy, because the symptoms are neither specific nor serious. From now until next spring it will be important to improve the knowledge on this infection both among health workers and the population.

In order to rapidly respond in the case of a new autochthonous transmission, close coordination between different figures is essential, so that: a) pediatricians and family doctors also consider CHIKV among the causes of acute febrile illness, if coupled with joint and muscular pains, and if the onset in the months of vector activity; and b) adequate laboratory capacity is available to confirm the diagnosis. At the moment, a national reference laboratory has been identified at the Istituto Superiore di Sanità; c) the suspected and confirmed cases are rapidly reported to the local health authorities; d) the notified case activate a prompt epidemiological investigation and appropriate actions for vector control.

The presence of this mosquito in other European countries is a serious cause for concern also in the rest of Europe, and ECDC stands for this by closely monitoring the situation given the outbreaks already reported in France and Italy in 2017.

Furthermore, research in this sector plays a fundamental role and should be strengthened. Other areas to be further developed are the harmonization of procedures among the different Italian regions, training and information and evaluation of control meaures.

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Edited by:
Caterina Rizzo[1], Giulietta Venturi[1], Martina Del Manso[1], Claudia Fortuna[1], Anna Domenica Mignuoli[2], Liliana Rizzo[2], Maria Grazia Caporali[1], Flavia Riccardo[1], Patrizio Pezzotti[1], Maria Elena Remoli[1], Francesco Severini[1], Luciano Toma[1], Daniela Boccolini[1], Roberto Romi[1], Marco Di Luca[1], Giuseppe De Vito[3], Vincenzo De Giorgio[3], Patrizia Parodi[4], Francesco Maraglino[4], Maria Rosaria Capobianchi[5], Concetta Castilletti[5], Francesco Vairo[6], Alessia Mammone[6], Paola Scognamiglio[6], Francesca Fratto[2], Giuseppe Ippolito[5], Giovanni Rezza[1]

[1] *Dipartimento malattie infettive, Istituto Superiore di Sanità*
[2] *Dipartimento Tutela della Salute, Politiche Sanitarie, Regione Calabria*
[3] *Dipartimento di Prevenzione, ASP di Catanzaro*
[4] *Ministero della Salute*
[5] *Istituto Nazionale per le Malattie Infettive "Lazzaro Spallanzani" IRCCS*
[6] *Servizio regionale di epidemiologia, sorveglianza e controllo per le malattie infettive, Regione Lazio - Istituto Nazionale per le Malattie Infettive "Lazzaro Spallanzani" IRCCS*