

## Risk evaluation on chikungunya – Implications for the Region of the Americas

9 March 2023

Date of risk assessment: 7 March 2023

Overall risk
Regional
High

Confidence in available information
Regional
Moderate

Criteria		Evaluation		Risk	Rationale
		Probability	Consequences		
Potential risk for human health	Regional	Likely	Moderate	High	<ul style="list-style-type: none"> <li>Significant increase in chikungunya transmission in some countries of the Region of the Americas.</li> <li>Dengue, chikungunya, and Zika have similar signs and symptoms, this may represent a challenge in clinically differentiating these infections in the first few days of illness. This similarity makes it challenging for healthcare workers to establish an appropriate clinical diagnosis and clinical management, which can lead to inadequate treatment and deaths.</li> <li>Expansion of chikungunya outside historical transmission areas poses additional risks, as the population is immunologically susceptible to infection and may not be aware of clinical manifestations of the disease, including severe clinical manifestations.</li> <li>Most cases of chikungunya are self-limiting. Severe clinical presentations are infrequent but may contribute to the cause of death in neonates infected during the perinatal period, the elderly, and people with underlying medical conditions. Uncommon complications include uveitis, retinitis, myocarditis, hepatitis, nephritis, bullous skin lesions, hemorrhage, meningoencephalitis, myelitis, Guillain-Barré syndrome, and cranial nerve palsies.</li> <li>One country of the Region (Paraguay) is reporting an unprecedented increase in chikungunya cases, including a high incidence of meningoencephalitis possibly associated to chikungunya, which is generally considered a severe and uncommon clinical presentation.</li> </ul>
Risk of the event spreading	Regional	Highly likely	Moderate	High	<ul style="list-style-type: none"> <li>Cases of chikungunya reported outside of the historical transmission areas (in the South of Brazil and Argentina).</li> <li>East-Central-South-African (ECSA) chikungunya lineage was preliminarily detected in Paraguay. This lineage was not circulating widely in the Region previously.</li> <li>Arboviral transmission is heightened during the summer in the Southern Hemisphere, which coincides with the rainy season in the countries and territories of the Region of the Americas that are in the tropics.</li> <li>In the South Cone subregion, currently, Paraguay has a high transmission of chikungunya. Bordering countries might be affected as a result, thus potentially spreading this illness to new areas.</li> <li>The Region of the Americas is characterized by wide social inequalities with large urban populations living in conditions that lack of sanitary infrastructure which promotes increases in the mosquito vector presence/reproduction. This situation has been exacerbated by the impact of the COVID-19 pandemic on the community and healthcare systems.</li> <li>Between EW 1 and EW 8 of 2023, the number of cases of chikungunya is over the average reported during the same period of the last 5 years.</li> <li>The <i>Aedes aegypti</i> and <i>Aedes albopictus</i> mosquitos are widely distributed in the Region of the Americas.</li> </ul>
Risk of insufficient control capacities with available resources	Regional	Likely	Moderate	High	<ul style="list-style-type: none"> <li>Health care facilities in some countries are overburdened, specifically in the endemic areas with high transmission due to concurrent emergencies.</li> <li>The COVID-19 pandemic has impacted vector control equipment and management of supplies, causing several countries to have shortages in insecticides and other vector control consumables.</li> <li>Dengue, chikungunya, and Zika (among other diseases that present rash and fever) can produce similar clinical manifestations, particularly in the first days of the disease. This similarity makes it challenging for health care personnel to identify the illness; therefore, these diseases may be misdiagnosed, which can lead to inadequate case management and cause patient death.</li> </ul>

					<ul style="list-style-type: none"> <li>Personnel who were trained in arbovirus surveillance and response/vector control before the COVID-19 pandemic require re-training, as most of these personnel had to stop these activities during the pandemic due to the social distancing measures.</li> </ul>
--	--	--	--	--	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

## Supporting information

### Hazard assessment

<b>Chikungunya</b>
<p>Chikungunya is a viral disease transmitted by the bites of infected female mosquitoes. The vectors most often involved are <i>Aedes aegypti</i> and <i>Aedes albopictus</i>. These two species of mosquitoes are also responsible for transmitting other viruses, including dengue fever, urban yellow fever (<i>Aedes aegypti</i>), and Zika. Some animals, including non-human primates, rodents, birds, and small mammals can act as reservoirs. When conditions are favourable, the attack rates observed during major epidemics can exceed 30% of the exposed population.</p> <p>The disease is caused by the Chikungunya virus (CHIKV), an RNA virus of the family <i>Togaviridae</i> that is clinically characterized by the sudden onset of fever frequently accompanied by severe and debilitating arthralgia or arthritis that varies in duration. Other common signs and symptoms include myalgia, headache, nausea, fatigue, and rash. Severe clinical presentations are uncommon but may contribute to the cause of death in neonates infected during the perinatal period, the elderly, and people with underlying medical conditions. Symptoms in infected people are often mild and the infection may go unrecognized or be misdiagnosed in areas affected by other arboviruses. Uncommon complications include uveitis, retinitis, myocarditis, hepatitis, nephritis, bullous skin lesions, haemorrhage, meningoencephalitis, myelitis, Guillain-Barré syndrome, and cranial nerve palsies.</p> <p>There is no specific antiviral treatment or approved vaccine for chikungunya. Treatment is primarily aimed at relieving symptoms, including joint pain, with antipyretics and fluids; infection can provide lifelong immunity. Prevention efforts are highly focused on the control of the disease vectors' populations.</p> <p>In 2013, chikungunya virus was introduced in the Region of the Americas. It has since spread to most areas where the competent vectors are present. The virus can be also transported from one place to another (areas without prior transmission) by infected travellers. Given the high epidemic potential of chikungunya, it is also possible to trigger local transmission in areas with a naive population.</p>

### Exposure assessment

In the Region of the Americas, between EW 1 and EW 8 of 2023, a total of 444,895 cases of three arboviral diseases were reported. Out of the total cases, 333,112 (75%) were dengue cases, 111,288 (25%) were chikungunya cases, and 495 (0.1%) were Zika cases (1).

In 2022, in the Region of the Americas, the number of cases of chikungunya were over the average number of cases for the previous 4 years (2018-2021), with a total of 263,685 cases including 87 deaths, representing a 2-fold increase in cases and 7-fold increase in deaths compared with the cases reported in 2021 (137,025 cases, including 12 deaths). During the same period, out of the 14 countries that reported cases, the highest incidence rate of chikungunya cases was reported in **Belize** with 568.9 cases per 100,000 population, followed by **Brazil** with 123.9 cases per 100,000 population, and **Paraguay** with 32.8 cases per 100,000 population. Of the total deaths reported in 2022, all were reported in **Brazil** (1).

Between EW 1 and EW 8 of 2023, a total of 115,539 cases of chikungunya were reported in the Region of the Americas, including 33 deaths, representing a 5-fold increase in cases and a 4-fold increase in deaths compared with the same period in 2022 (21,887 cases, including 8 deaths). During the same period, out of the 14 countries that reported cases, the highest incidence rate of chikungunya cases was reported in **Paraguay** with 1,127.5 cases per 100,000 population, followed by **Brazil** with 14.2 cases per 100,000 population, and **Belize** with 10.4 cases per 100,000 population. Of the total deaths reported in 2023, all were reported in **Paraguay** (1).

The following section summarizes the epidemiological situation of chikungunya in countries in the Region of the Americas that currently report ongoing very high transmission.

## **Argentina**

Between EW 1 and EW 9 of 2023, a total of 230 cases of chikungunya were reported in Argentina, of which 198 were laboratory confirmed, with no deaths. During the same period in 2022, no cases of chikungunya were reported. Of the total of cases, 12 have no travel history; these cases were reported in Buenos Aires Province (3 cases) and Buenos Aires City (1 case). Previously, the Buenos Aires Province did not report chikungunya virus circulation. Additionally, 45 confirmed and probable cases are currently under investigation in Buenos Aires Province (23 cases), Buenos Aires City (10 cases), Cordoba (2 cases), Santa Fe (1 case), Chaco (2 cases), Corrientes (1 case), Formosa (2 cases), and Misiones (4 cases); in addition to 173 cases with travel history (classified as imported) which are also under investigation (2, 3).

## **Bolivia**

In 2023, between EW 1 and EW 6, a total of 300 cases of chikungunya were reported, with no deaths, representing an 8-fold increase in cases compared with the same period in 2022 (38 cases). During the same period, the national cumulative incidence rate was 2.5 cases per 100,000 population. (4).

## **Brazil**

In 2023, between EW 1 and EW 9, a total of 35,566 probable and confirmed cases of chikungunya were reported in Brazil, including one confirmed death (reported in Espiritu Santo State) and 13 deaths under investigation. During the same period, the national cumulative incidence rate was 16.7 cases per 100,000 population, representing a 109.6% relative increase compared to the same period in 2022. Out of 27 Federal Units, 25 reported cases in 2023: Alagoas, Amazonas, Bahía, Ceará, Distrito Federal, Espiritu Santo, Goiás, Maranhão, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Tocantins, Paraíba, Pará, Paraná, Pernambuco, Piauí, Río de Janeiro, Río Grande do Norte, Río Grande do Sul, Rondônia, Roraima, São Paulo, Sergipe, and Santa Catarina (5, 6).

In the Southern region of the country, between EW 1 and EW 9 of 2023, a total of 224 cases were reported with an incidence rate of 0.7 cases per 100,000 population. This represents an increase of 180% when compared to the same period in 2022. An increased trend has been observed since EW 4; of the total cases reported between EW 1 and EW 9 of 2023, 10.5% were reported in Paraná, 4.7% in Santa Catarina, and 3.2% in Rio Grande do Sul (5, 6).

## **Paraguay**

The first autochthonous case of chikungunya in Paraguay was reported in 2015. In 2016, cases were reported mainly in Asuncion and Central departments and in 2018 were reported mainly in Amambay department. Since EW 40 of 2022, an increasing trend of cases has been observed over the historical threshold. Between EW 52 of 2022 and EW 8 of 2023, a total of 24,659 cases were classified as probable and confirmed, including 2,910 hospitalizations and 34 deaths. There have been no reported deaths due to chikungunya during this period in previous years. Of the total cases reported during this period, a high proportion of cases (93%) and deaths (97%) were reported during EW 1 and EW 8 of 2023 (7).

Confirmed and probable cases have been reported in 18 regions of the country. The highest number of cases was reported in two departments: Central (21,069 cases, including 23 deaths) and Asunción (8,754 cases, including 8 deaths). The highest proportion of suspected cases reported was registered in the following departments: Central with 62%, Asunción with 22%, Paraguari with 3.5%, and Cordillera with 2.5% (7).

Between EW 1 and EW 8 of 2023, of the total cases reported, 132 were neonates<sup>1</sup>, including four deaths. One infant, whose age was under 31 days old, was also reported among the deaths. During the same period, a total of 219 suspected cases of acute meningoencephalitis were reported, 87 attributed to chikungunya meningoencephalitis<sup>2</sup>, 38 of which were neonates (7).

In 2015 and 2016, during the first outbreaks of chikungunya in Paraguay, the Central Asia lineage was detected. The East/Central/South African (ECSA) lineage was first detected in the country in 2018 during an outbreak in Amambay department. Currently, preliminary genomic sequencing has detected ECSA in seven samples taken in October 2022 in the Metropolitan area of Asunción (7).

## Context assessment

During the last 3 years, there were three concurrent Public Health Emergencies of International Concern (PHEIC) (COVID-19, Mpox, and Polio) that had a direct impact on the health systems globally, which further weakened the health systems response capacity in countries and territories of the Region of the Americas.

Migration within the Region of the Americas has increased, due to the social, political, and economic situation in several countries and territories. CHIKV can be transported from one place to another (areas without documented transmission) by infected travelers; when competent vectors are present in these new areas, it is possible to trigger local transmission, with a high epidemic potential.

Currently the arboviral disease programs in affected countries do not have enough resources to respond to outbreaks due to the COVID-19 pandemic. This lack of resources has affected all the prevention activities and is now affecting all the control activities. Additionally, personnel who were trained in arbovirus surveillance and response/vector control before the COVID-19 pandemic now require re-training, as most of these personnel had to stop these activities during the pandemic due to the social distancing measures.

Furthermore, according to the chikungunya seasonal pattern, most cases in the southern hemisphere occur in the first semester of the year, corresponding with the warmer, rainy summer months. These conditions are favorable for proliferation/reproduction of competent vectors such as *Aedes aegypti* and *Aedes albopictus* which are widely distributed in the Region of the Americas. Therefore, increased transmission activity is expected in the coming months.

The expansion of CHIKV outside of historical areas of transmission represents a risk to immunologically naive populations, including risk groups for severe disease, who may not be aware of clinical manifestations of the disease, including those of severe. The identification of extra-articular and/or severe manifestations helps to clinically categorize the illness and decide on proper patient care.

<sup>1</sup> Newborn infant or neonate: 0 to 28 days of age: <https://bit.ly/3IDPU3h>

<sup>2</sup> Classification of the cases was done by RT-PCR in cerebrospinal fluid (CSF), those that did not have a RT-PCR result in CSF positive for Chikungunya were classified as having positive PCR results in blood for Chikungunya added to clinical signs compatible with encephalitis. Currently, there is no classification of probable chikungunya encephalitis.

**Table 1: Capacities and vulnerabilities related to chikungunya for countries/territories within the Region of the Americas, March 2023**

Capacities	Vulnerabilities
<ul style="list-style-type: none"> <li>• Member States are coordinating at all levels, strengthening epidemiological surveillance, clinical management, laboratory network, risk communication, entomological surveillance and vector-control activities, as preparedness and/or response to these events.</li> <li>• In the framework of the implementation of the Integrated Management Strategy for Arbovirus Prevention and Control in the Region of the Americas (IMS-Arbovirus), PAHO/WHO is actively working with Member States in order to strengthen arbovirus prevention and control with an integrated and multidisciplinary approach.</li> <li>• PAHO/WHO is supporting the implementation of effective integrated vector surveillance and control by Member States through publishing guidelines and surveillance and control materials, including technical assistance to national authorities.</li> <li>• PAHO/WHO has been supporting the Member States to increase the laboratory-capacity.</li> <li>• PAHO/WHO has been publishing case management guidelines and developing training sessions for health care workers.</li> <li>• PAHO/WHO experts are being deployed to countries which are experiencing high magnitude outbreaks.</li> <li>• PAHO/WHO has been supporting Member States with clinical management and organization of health services, vector control, epidemiological surveillance, virological surveillance, and risk communication.</li> <li>• Some countries have National networks of clinical experts in arboviral diseases, under the direction of the Ministries of Health, which are responsible for conducting training at the local level.</li> <li>• In 2020, PAHO/WHO began a collaboration with the Andean Health Organization-Hipólito Unanue Agreement (ORASCONHU) to strengthen national technical capacities for the prevention and control of arboviral diseases in Bolivia, Colombia, Chile, Ecuador, Peru, and Venezuela. This collaboration falls under the framework of the PAHO/WHO Integrated Management Strategy for the Prevention and Control of Arboviral Diseases, approved by Member States.</li> <li>• Agreements established between ORAS-CONHU and PAHO/WHO allowed for the incorporation of arboviruses in the political agenda and facilitated the development of a proposed five-year plan of health ministers of the Andean subregion countries in 2022.</li> <li>• Virtual cooperation spaces have been created as an effort of collaborative integrated epidemiological, entomological and laboratory surveillance between PAHO and Member States that allow for the automated generation of different epidemiological analyses, situation rooms, and epidemiological bulletins, strengthening the epidemiological surveillance and control of dengue, chikungunya and Zika.</li> </ul>	<ul style="list-style-type: none"> <li>• Several countries are reporting stockouts of several essential supplies for prevention and control.</li> <li>• Several countries are reporting lack of reagents and consumables.</li> <li>• Some countries are overburdened with concurrent major ongoing outbreaks.</li> <li>• In some areas, there is a lack of health care facilities, added to diverse access barriers.</li> <li>• Expansion out of historical areas of transmission, where the population is completely immunologically naive.</li> <li>• Summer in the southern hemisphere is favorable for competent vectors, notably the <i>Aedes aegypti</i>, which is widely distributed in the Region of the Americas.</li> <li>• Field teams in many countries require re-training in vector control, community mobilization, and clinical care/case recognition.</li> <li>• There are early increases of arbovirus transmission in Central America and the Caribbean. These countries/territories need support in laboratory capacity, strengthening epidemiological and entomological surveillance, and vector control.</li> <li>• East-Central-South-African (ECSA) lineage was preliminarily detected in Paraguay. This lineage was primarily circulating in southern Brazil previously, expanding its range since 2014. Therefore, it might affect naive populations.</li> <li>• One country of the Region (Paraguay) is experiencing an unprecedented increase in chikungunya cases, including high incidence of meningoencephalitis as a severe complication due to chikungunya.</li> <li>• Lack of family and community participation in activities to eliminate vector breeding sites within the home and around the home.</li> </ul>

## Reference documents

1. Pan-American Health Organization/ World Health Organization (PAHO/WHO). Health Information Platform for the Americas (PLISA as per its acronym in Spanish). Washington, DC: PAHO; 2023. accessed on 7 March 2023. Available from: <https://bit.ly/314Snw4>
2. **Argentina** International Health Regulations (IHR) National Focal Point (NFP) report received by PAHO/WHO via email communication.
3. **Argentina** Ministry of Health. National epidemiological bulletin N 641 EW 7, 2023 and N 589 EW 7, 2022. Available from: <https://bit.ly/3ILFjTX> and <https://bit.ly/3mpK0va>
4. **Bolivia** data was retrieved from the Health Information Platform for the Americas (PLISA as per its acronym in Spanish). Washington, DC: PAHO; 2023. Available from: <https://bit.ly/314Snw4>
5. **Brazil** International Health Regulations (IHR) National Focal Point (NFP) report received by PAHO/WHO via email communication.
6. **Brazil** Ministry of Health. Epidemiological Bulletins. Available from: <https://bit.ly/3Jbd0Q5>
7. **Paraguay** International Health Regulations (IHR) National Focal Point (NFP) report received by PAHO/WHO via email communication.
8. PAHO/WHO. Guidelines for the Clinical Diagnosis and Treatment of Dengue, Chikungunya, and Zika. Washington, DC: PAHO; 2022. Available from: <https://bit.ly/3SB0nkn>
9. PAHO/WHO. Methodology for Evaluating National Arboviral Disease Prevention and Control Strategies in the Americas. Washington, DC: PAHO; 2021. Available from: <https://bit.ly/3JoQt2t>
10. PAHO/WHO. Integrated Management Strategy for Arboviral Disease Prevention and Control in the Americas. Washington, DC: PAHO; 2020. Available from: <https://bit.ly/3ylDEj6>
11. United States – Centers for Disease Prevention and Control (US-CDC). Chikungunya virus, Clinical Evaluation & Disease. Last Reviewed: 26 January 2023. Available from: <https://bit.ly/3YqIbez>
12. United Nations Office for South-South Cooperation. Good Practices in South-South and Triangular Cooperation for Sustainable Development – Vol. 4 (2022). New York, NY: PAHO; 2022. Available from: <https://bit.ly/3T2btW>
13. PAHO/WHO. Topics – Chikungunya. Washington, DC: PAHO; 2022. Available from: <https://bit.ly/3Z88IEI>
14. WHO. Chikungunya factsheet. Geneva: PAHO; 2023. Available from: <https://bit.ly/3Y9Ova8>
15. PAHO/WHO. Epidemiological Alert: Chikungunya increase in the Region of the Americas. 13 February 2023, Washington, D.C. PAHO / WHO. 2023. Available from: <https://bit.ly/3YxCuvv>
16. PAHO/WHO. Epidemiological Update: Dengue, chikungunya and Zika. 25 January 2023, Washington, D.C. PAHO / WHO. 2023. Available from: <https://bit.ly/3ZDFIEe>