PAHO

Pan American Health Organization | World Health Organization, Regional Office for the Americas

Public Health Risk Assessment related to Oropouche Virus (OROV) in the Region of the Americas

9 February 2024

Risk assessment date: 7 February 2024

Overall Risk
Regional
Moderate

Confidence in available information
Regional
Moderate

General Risk Statement

Considering the alert issued by the Pan American Health Organization / World Health Organization (PAHO/WHO) on 2 February 2024, due to the surge in the detection of Oropouche virus infection (OROV) cases in some countries of the Region of the Americas in recent months (*1),* the Rapid Risk Assessment (RRA) for public health in the region is presented.

This RRA aims to assess the current regional risk related to OROV, taking into account the potential risk to human health (clinical-epidemiological behavior of the disease, severity indicators, risk factors and more detailed determinants at the country level), the risk of dissemination (vector activity, transboundary geographic expansion) and, the risk of insufficient capacity for prevention and control with available resources (including capacities to support the response, surveillance capacities, diagnostic technique, preparedness of health services and supplies).

Since the first identification of OROV in 1955 in Trinidad and Tobago, cases, and outbreaks of OROV have been identified in Brazil, Colombia, Ecuador, French Guiana, Panamá, Peru, Trinidad and Tobago, and Venezuela. The reported outbreaks have occurred mainly in the Amazon Basin Region. These are related to the presence of the midge vector, *Culicoides paraensis (C. paraensis) (1, 2)* maintained in a sylvatic cycle involving reservoir host as sloths and non-human primates. Given that its clinical presentation is similar to other arboviral infections, that there is no systematic surveillance of cases, and that laboratory diagnosis is not widely disseminated, it is possible that the true burden of the disease in the countries of the Region is underestimated. Outbreaks have generally been identified by retrospective population-based or laboratory epidemiological studies.

Several factors are associated with the increased risk of spread of the vector *C. paraensis*, among which are: climate change leading to increased rainfall and rising temperatures; deforestation due to the expansion of the agricultural frontier in the area of influence of the Amazon Basin Region; increased urbanization; among other human activities that favor the spread of the vector and create an environment conducive to vector-host interaction, and as a consequence, the possibility of increased OROV transmission. The same factors tremendously impact the reservoir hosts habitats, forcing them to move closer to urban and peri-urban regions where the vectors are proliferating.

Fragile health systems amid political and financial instabilities in countries facing complex humanitarian crises and high population movements are also determinants to consider in the face of an increased risk of disease spread.

Although the scientific evidence and data for the surveillance of the event are currently limited, the outbreaks that have occurred in the last decade have allowed a partial characterization of the clinical-epidemiological behavior of OROV disease, as well as the estimation of its magnitude and severity. In terms of documented severity, most cases have mild to moderate symptoms. They are self-limited (recover within 7 days) and in rare cases complications such as aseptic meningitis develop and there is no evidence of human-to-human transmission. No related deaths have been reported *(3).*

Based on the criteria defined for this assessment, the overall risk at the level of the Region of the Americas has been classified as **“Moderate"** with a **“Moderate"** level of confidence in the available information**.**

Criteria	Assessment		Risk	Rationale
	Likelihood	Consequences		
Potential risk to human health	Likely	Minor	Moderate	– The clinical presentation of OROV infection is similar to other arboviral diseases or malaria, so there may be low case detection, underestimating the true burden of the disease. – According to the available information, regarding the severity of the clinical presentation, it has been documented that most cases have mild to moderate symptoms and are self-limiting (usually recover within 7 days of the onset of symptoms). Complications such as aseptic meningitis have been described. The presentation of neurological manifestations clinically defined as meningitis have been recorded mostly during large outbreaks *(3).* – Direct human-to-human transmission of the virus has not been documented. – No fatal cases have been reported in the documented outbreaks. – There is no specific treatment or vaccine for OROV, medical care focuses on the management and control of symptoms and signs.
Risk of the event spreading	Likely	Moderate	High	– The OROV outbreaks identified in the last ten years have taken place mainly in the Amazon Basin Region, in rural and urban areas, where the presence of the vector *C. paraensis* has been identified *(4*). – Brazil is currently reporting an increase in cases of OROV disease, which affects several municipalities in two states of the country: Amazonas and Acre. In addition, cases of OROV disease reported in the state of Roraima are under investigation (*5).* These three states share borders with other countries in the Amazon Basin Region, such as Bolivia, Colombia, Peru, and Venezuela. – The risk of spread could be increased due to the high population movements (within and between countries) and the social, entomological, and environmental factors that favour the proliferation of *C. paraensis* in the countries located in the area of influence of the Amazon Basin Region. – Proximity to low-income urban and peri-urban centers in areas where the vector is present is also associated with increased risk, especially for those with good transport connections. – Environmental factors generated by the "El Niño Phenomenon" and climate change (increase in temperatures and changes in precipitation) could facilitate the geographic expansion of the vectors of OROV and other arboviruses. – No cases have been identified in areas where transmission of OROV has not been previously documented.
Risk of insufficient prevention and	Likely	Minor	Moderate	– Since the symptoms of OROV disease are non-specific and resemble other febrile infections, such as dengue, chikungunya,

control capacity with available resources				Zika, and malaria, among others, it is difficult to diagnose cases clinically. – Laboratory diagnosis of OROV depends on the availability of tests in the country and is subject to established laboratory algorithms for arbovirus surveillance. Most of the affected countries do not have the diagnostic capacity. The restriction of laboratory diagnosis contributes to a less sensitive surveillance. – There is a great deal of heterogeneity in the surveillance and response capacity within the Region in the face of OROV disease outbreaks. – There is no systematic surveillance of cases in most countries in the region. Outbreaks and cases have generally been documented by retrospective population-based, or laboratory epidemiological studies. – The documented outbreaks have not generated saturation or collapse of health services, however, considering the simultaneous and large circulation of other arboviruses such as dengue, the increasing outbreaks of OROVs may represent an additional burden on health systems in the countries of the region. – In countries where cases of OROV disease have been documented, irregular migration phenomena have been occurring, resulting in limited access to health care services for particularly vulnerable populations. – Lack of participation and mobilization of local communities in vector control activities. – OROV is an emerging virus with low identification, which means that it is underfunded and there is not a high level of institutional commitment for its surveillance, prevention, and control.

Background information

Hazard assessment

Oropouche
Oropouche fever (ICD-10 A93.0) is a vector-borne viral disease caused by Oropouche virus (OROV), a segmented single-stranded RNA virus that is part of the genus *Orthobunyavirus* of the *Peribunyaviridae* family. It is transmitted to humans mainly by the bite of *Culicoides paraensis (C. paraensis).* The disease manifests with symptoms resembling dengue (with no warning signs), chikungunya, and other arboviral diseases. It has an incubation period of 4 to 8 days (range between 3 and 12 days). The onset is sudden, usually with fever, headache, arthralgia, myalgia, chills, and sometimes persistent nausea and vomiting for up to 5 to 7 days. Occasionally, aseptic meningitis may occur. Most cases recover within 7 days, however, in some patients, convalescence can take weeks *(1).* The circulation of the Oropouche virus is suspected to include both epidemic urban transmission cycles, and sylvatic cycles. In the sylvatic cycle, vertebrate hosts include non-human primates, sloths, and wild birds, although no definitive arthropod vector has been identified. In the urban epidemic cycle, humans are the amplifying host. The virus is transmitted mainly through the bite of the *C. paraensis* that is present in the region, as well as the mosquito species *Culex quinquefasciatus* which have been reported to be likely vector in the sylvatic cycle *(2).*

Other species of hematophagous mosquitoes such as *Coquillettidia venezuelensis*, and *Aedes (Ochlerotatus) serratus* have the potential to reproduce and could be naturally infected by the virus. These two species are classified as secondary vectors of the virus and are commonly found in dense populations within sylvatic habitats *(3)*. OROV is an emerging virus and was first isolated in 1955 from an infected individual in Vega de Oropouche, Trinidad and Tobago. In most of these outbreaks, people of both sexes and of all ages were affected. In populations with previous contact with the virus, children and young people were the most affected. It is usually undiagnosed because of its mild, self-limiting manifestations or is misdiagnosed because its clinical features are similar to those of dengue, chikungunya, Zika, yellow fever, and malaria. Currently, there is no specific antiviral treatment, and in the absence of a vaccine for the effective prophylaxis of human populations in endemic areas, prevention of the disease is based solely on vector control strategies and personal protection measures *(3).* The midges of the genus Culicoides including *C. paraensis* and the mosquito species *Cq. venezuelensis*, *Ae. serratus*, *Cx. quinquefasciatus* have been identified in various tropical and subtropical regions of South America, being especially prominent in the Amazon Basin region *(3)*. It is important to mention that the larvae of *C. paraensis* develop in various habitats capable of remaining moist, enhancing larvae feeding in dry periods, like rainforests, riverbanks, damp soil, and tree holes. Banana stems were found to favor the proliferation of large amounts of *C. paraensis*, while cocoa shells were found to be the second most productive habitat. Decaying banana stems and cocoa shells are common waste materials resulting from cocoa and plantain cultivation in urban and semi-urban areas and on cocoa plantations in the Amazon Basin region *(4).*

Exposure Assessment

Table 1. Summary of ongoing and/or reported Oropouche outbreaks as of January 2024

Region of the Americas	
In the Americas, according to the available information, numerous outbreaks of OROV disease have been reported in rural and urban communities in Brazil, Colombia, Ecuador, French Guiana, Panama, Peru, and Trinidad and Tobago *(6).* Outbreaks of Oropouche virus in the last ten years have occurred mainly in the Amazon Basin Region.	
Country / Territories	**Context**
Brazil	On 6 January 2024, the Health Surveillance Foundation (FVS as for its acronym in Portuguese) of the state of Amazonas published an epidemiological alert regarding the detection of cases of OROV disease in this state. The alert reported that between December 2023 and 4 January 2024, the Central Public Health Laboratory of Amazonas (LACEN-AM as per its acronym in Portuguese), analysed 675 clinically compatible samples, confirming in 199 (29.5%) the infection by OROV. Of this total, 94.9% (189) correspond to the municipality of Manaus, 2.5% (n=4), the municipality of Presidente Figueiredo, 1% (n=2) Maués, 1% (n=2) Tefé and 0.5% (n=1) to Manacapuru *(7)*. Between 2023 and 2024, a total of 1,066 human cases with detectable results in RT-qPCR for the Oropouche virus were documented in the state of Amazonas. Of these, 699 samples were from Manaus, 88 from Maués, 69 from Iranduba, 36 from Manacapuru, 32 from Presidente Figueredo, 29 from Parintins, 22 from Carauari, 21 from Itacoatiara, 17 from Rio Preto da Eva, 9 from Careiro, 8 from Borba and Coari, 6 from Novo Airão and Tefé. There is a record of transmission in the municipalities of Alvares, Autazes, Barreirinha, Benjamin Constant, Beruri, Boa Vista do Ramos, Caapiranga, Canutama, Cordeiro da Várzea, Itamarati, Lábrea, Nova Olinda do Norte, Novo Aripuanã, São Paulo de Olivença, Tabatinga and Tapauá. In addition, cases of Oropouche reported in the states of Acre and Roraima are under investigation *(5, 8, 9).*
Colombia	Through a study published on 8 December 2022, conducted by the National University of Colombia, 87 cases of Oropouche virus disease occurred between 2019 and 2021 in four

	cities in the country: Cúcuta (3 cases), Cali (3 cases), Leticia (43 cases) and Villavicencio (38 cases), which were identified through retrospective laboratory analysis of samples from acute febrile illness cases. The cases were confirmed using different serological, molecular and metagenomic sequencing techniques at the One Health Genomic Laboratory of the National University of Colombia, Medellín Campus, and their results were corroborated by the National Reference Laboratory of the National Health Institute in 2023. Regarding the characterization of the cases, 35.6% (31 cases) correspond to the 18-29 age group, 52% (45 cases) are men, and 91.2% (80 cases) correspond to samples collected in 2021 (*10, 11).*
French Guiana[1]	On 30 September 2020, the Regional Health Agency of French Guiana (ARS) reported the first detection of OROV in French Guiana. On 22 September 2020, the Institute Pasteur de Cayenne (a member of the French National Reference Laboratory for Arboviruses) reported the detection of seven laboratory-confirmed cases of Oropouche virus infection in the village of Saül. These cases were identified following clinical investigations of an unusual high number of dengue-like illnesses in this locality. Between 11 August and 25 September, 37 cases clinically compatible with Oropouche virus disease were identified in Saül. Serology results for dengue, chikungunya, and Zika viruses were negative, and seven of the nine cases were positive for OROV on the reverse transcription polymerase chain reaction (RT-PCR) test *(12).*
Peru	From 2016 to 2022, 94 cases of Oropouche were reported in Peru in six departments of the country: Ayacucho, Cajamarca, Cusco, Loreto, Madre de Dios, and San Martín. Of the total accumulated cases, 45% occurred in 2016, the year with the highest cumulative incidence rate (0.14 cases per 100,000 inhabitants) reported with the report of outbreaks in Ayacucho, Cusco, and Madre de Dios. In 2022, eight cases were reported (*13)*.

Context Assessment

Because it is an emerging and poorly identified arbovirus in the Americas, OROV does not have systematic active surveillance in most countries of the Region. Outbreaks are usually identified by retrospective population-based, or laboratory epidemiological studies. In addition to this, OROV disease is often undiagnosed or confused with other endemic diseases in these territories, such as dengue, Zika, chikungunya, or malaria, due to the similarity of their symptoms.

The outbreaks of OROV recorded in the last ten years have taken place mainly in the Amazon Basin region, where the presence of the vector has been identified. The abundant presence of *C. paraensis* in areas where decaying banana stems and cocoa husks are found suggests a direct correlation between vector proliferation and the availability of these waste materials. This raises the probability of greater exposure of these products in urban and rural populations with an agricultural vocation *(4).*

Given the current situation related to climatic phenomena such as "El Niño", unusual increases in temperature and/or precipitation can lead to increased vector density and viral transmission, which would facilitate potential epidemics of vector-borne diseases *(14).*

There is no specific treatment for OROV and without a vaccine, prevention focuses on vector control and taking personal protective measures.

The prevention and control of OROV continue to pose significant challenges due to the underestimation of the burden of this disease in the countries of the region. Responding to outbreaks requires an integrated, multidisciplinary, multisectoral approach to achieve its goal of reducing the impact of this event on public health.

[1] French Guiana is an overseas region and department of France, which is part of the European Union as an outermost region. It is located on the northern coast of South America.

Increased migration, the effect of climate change (such as drought, rising temperatures and floods), political instability and insufficient development mean that an increasing number of people are at risk of contracting this and other arboviruses in countries where the vector has been identified. These factors, along with others such as financial crises and migration, have left large populations without access to adequate health care, and thereby putting them at risk of contracting OROV disease.

Strengths	Vulnerabilities
Coordination • PAHO/WHO is in close contact with key partners and Member States to ensure a coordinated response for optimal support to countries in a resource-limited environment.	**Coordination** • Insufficient coordination among departmental sectors contributing to the response to arboviruses. • Low level of coordination between the health sector and other public and private actors in vector control. • Insufficiently developed and coordinated One Health approach among human, animal, and environmental sectors.
Surveillance • Generation of regional epidemiological alerts and updates, along with recommendations for Member States. • Provision of epidemiological surveillance materials and technical assistance to national authorities. • The capacity in information systems and data management that was developed as part of the response to the COVID-19 pandemic is being leveraged for the surveillance of arboviral diseases. • Virtual Cooperation Spaces (VCS) have been created in the Region as a collaborative surveillance initiative between PAHO/WHO and Member States that allow the automated generation of different epidemiological analyses, situation rooms, and epidemiological bulletins, strengthening epidemiological surveillance of arboviruses.	**Surveillance** • National public health surveillance and emergency response teams are exhausted and overwhelmed by numerous large-scale, high-risk parallel outbreaks and other public health emergencies. • Limited use of mapping of case hotspots for the implementation of targeted response activities • Limited use of vector and climate data prediction and integration tools • Outbreaks of other diseases and the ongoing response to other public health emergencies reduce the ability to provide support. • Inadequate infrastructure for data presentation in many areas and insufficient connectivity in others.
Laboratory • Development and application of algorithms for laboratory testing. • Improved genomic surveillance capacity.	**Laboratory** • Resources are limited in many countries due to the simultaneous response to outbreaks of dengue and other viruses.

• RT-PCR and genomic sequencing platforms installed in many countries of the Region. • Distribution of key (or critical) reagents for molecular diagnostics to countries with a history of circulation.	• Insufficient supplies of laboratory reagents and consumables. • Restricted number of reference laboratories able to carry out specific serological methods such as neutralization tests and advanced molecular methods such as metagenomics and nucleotide sequencing. • In general, laboratory algorithms for arbovirus diagnosis do not include testing for OROV.
Case Management	**Case Management**
• Some countries have national networks of clinical experts in arboviral diseases under the direction of each country's Ministries of Health, which are responsible for providing clinical training at the local level. • The Region has an international technical group of experts on arboviral diseases that supports technical cooperation activities in the countries.	• Inadequate treatment inputs (liquids, etc.) • Some clinicians do not have the experience to detect cases of OROV. • In general, clinicians do not have much experience or training in detecting and managing OROV cases.
Entomological surveillance and vector control	**Entomological surveillance and vector control**
• Strengthening the capacity of Member States to monitor insecticide resistance. • Strengthening vector control activities in affected countries. • Support in the implementation of effective interactive vector monitoring and control by Member States through the issuance of guidelines. • The capacities surveillance and vector control that were developed as part of the response to the dengue, Zika and chikungunya outbreaks are being leveraged for the surveillance of OROV diseases by some countries in the Region.	• Suboptimal residue control practices leading to more vector breeding sites. • Suboptimal vector control activities. • Countries have few formally trained entomologists working in ministries of health. • Vector control programs have been underfunded for decades, and their limited resources were frequently redirected to other response activities during the COVID-19 pandemic.
Risk Communication & Community Engagement	**Risk Communication & Community Engagement**
• Coordination of partners has been strengthened. • Coordination of partners has been strengthened. • Risk communication and community engagement have been improved to strengthen community engagement in	• Limited resources. • Lack of targeted and effective risk communication, community engagement, and community wastewater management, with effective community feedback mechanisms.

vector control and knowledge of the signs/symptoms OROV disease and recommended actions. **Logistics** • PAHO/WHO experts are providing support in countries that are experiencing outbreaks.	• Limited understanding of risk perception and health-seeking behaviours of affected populations. **Logistics** • Insufficient financial resources to respond in a timely and effective manner at the national level. • In some countries, there are insufficient staff and resources with expertise in OROV vector control.

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