

# MONTHLY SCIENTIFIC REVIEW ON OROPOUCHE VIRUS

EDITION 18 December 2024  
No. 3

*The content of this document is subject to change as the health situation evolves. All informations comes from a valid and credible source.*

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<https://anrs.fr/fr/Cellules-Emergence/cellule-emergence-maladie-a-virus-oropouche/>

## Situation at a glance

**This section details the history and latest developments of the outbreak, with significant events and updates on its current status.**

- By December 13, 2024, the Americas reported 13,014 confirmed cases of Oropouche, including 2 deaths, from 11 countries.
  - » Barbados (n= 2 cases), Bolivia (Plurinational State of) (n= 356 cases), Brazil1 (n=10.940 cases, including 2 deaths), Canada (n= 2 imported cases), Colombia (n= 74 cases), Cuba (n= 603 cases), Ecuador (n= 3 cases), the United States of America (n= 94 imported cases), Guyana (n= 2 cases), the Cayman Islands (n= 1 imported case), Panama (n= 1 case), and Peru (n= 936 cases)
  - » Cuba reported its first Oropouche outbreak in June 2024 with 603 confirmed cases and over 10,000 suspected cases
- Additionally, imported Oropouche cases have been reported in countries in the European Region (30 cases).
- Vertical transmission of Oropouche virus from mother to fetus had been reported in Brazil and confirmed.

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## Scientific articles

This section presents relevant articles published on peer-reviewed scientific journals or pre-print platforms.

***This week, delve into the latest insights on Oropouche virus, from alarming vertical transmission cases and prolonged detectability in body fluids, to the ecological and epidemiological factors driving its re-emergence across the Americas.***

### Cinical

**Oropouche virus infection: Differential clinical outcomes and emerging global concerns of vertical transmission and fatal cases.** Ceccarelli G, Branda F, Scarpa F, Ciccozzi M, Alcantara LCJ, Giovanetti M.

Published in *Int J Infect Dis* on 1 January 2024.

In this letter, the authors report Oropouche virus (OROV) vertical transmission with fatal outcomes in 5 foetus or neonates. These cases, along with the detection of IgM antibodies in neonates and positive RT-PCR results for OROV RNA in fetal tissues, provide compelling evidence that OROV is capable of vertical transmission.

**Oropouche Virus Genome in Semen and Other Body Fluids from Traveler.** Iglói Z, Soochit W, Munnink BBO, Anas AA, von Eije KJ, van der Linden A, Mandigers M, Wijnans K, Voermans J, Chandler FD, van der Eijk AA, GeurtsvanKessel C, Molenkamp R, Sikkema RS, Verstrepen B, Koopmans M.

Published in *Emerg Infect Dis* on 11 December 2024.

This letter is a response to the article by Castilletti et al. that showed prolonged shedding of Oropouche virus (OROV) in various body fluids and described in addition, isolation of OROV from semen of 1 patient. The authors report detection of ORV in urine and semen samples obtained 17 and 32 days after symptom onset in a male patient returning to the Netherlands from Cuba in August 2024. The authors conclude that although sexual transmission of OROV has yet to be fully studied, their findings, along with those of Castilletti et al., indicate potential.

**Prolonged detection of Oropouche virus RNA in whole blood samples.** Colavita F, Carletti F, D'Abramo A, Nicastrì E, Maggi F; INMI Arbovirosi Group.

Published in *Lancet Infect Dis* on 6 December 2024.

In this correspondence letter in response to the article by Castilletti et al., the authors report on four cases of Oropouche virus infection among individuals travelling from Cuba to Italy between August and September, 2024, each of which showed long detectability of viraemia. In conclusion, the authors emphasise the need for continuous monitoring and follow up of individuals with Oropouche virus infection and the importance of improving understanding the dynamics of Oropouche virus infection, which is essential for improving public health responses.

**Oropouche virus: A re-emerging arbovirus of clinical significance.** Desai AN, Otter A, Koopmans M, Granata G, Grobusch MP, Tunali V, Astorri R, Jokelainen P, Greub G, Ergönül Ö, Valdoleiros SR, Rovers CP, Di Caro A, Pisapia R, Fusco FM, Pereira do Vale A, Krogfelt KA, Petersen E, Atkinson B.

Published in *Int J Infect Dis* on 1 December 2024.

In this Editorial, the authors representing a panel of international experts, report in practice main characteristics of Oropouche virus, viral transmission and geographic distribution, main clinical manifestations, diagnosis tests and treatments of Oropouche virus disease.

## Ecology

### Probing Oropouche fever ecology beyond the Amazon. Postigo-Hidalgo I, Drexler JF.

Published in *Lancet Infect Dis* on 15 November 2024.

The 2023–24 Oropouche virus (OROV) outbreak has reached nearly 10,000 cases across the Americas, with severe outcomes like fetal deaths and malformations reported. This unprecedented outbreak has expanded beyond the Amazon into Bolivia, Brazil, Peru, Colombia, and Cuba, fueled by ecological changes favoring its vector, *Culicoides* biting midges, particularly in agricultural areas growing bananas and cassava. Approximately 10 months after the onset of the Oropouche fever outbreak, substantial uncertainties remain regarding the specific factors underlying it. A pivotal study by Tiago Gräf and colleagues links agricultural practices, deforestation, and landscape modifications to OROV's spread. Challenges remain in modeling ecological predictors due to complex interrelationships, inconsistent regional data, and underreporting. Future studies should integrate diverse factors, including climatic changes, biodiversity loss, and socioeconomic variables, alongside serological and vector surveillance.

## Epidemiology

### Re-emergence of Oropouche virus between 2023 and 2024 in Brazil: an observational epidemiological study. Scachetti GC, Forato J, Claro IM, Hua X, Salgado BB, Vieira A, Simeoni CL, Barbosa ARC, Rosa IL, de Souza GF, Fernandes LCN, de Sena ACH, Oliveira SC, Singh CML, de Lima STS, de Jesus R, Costa MA, Kato RB, Rocha JF, Santos LC, Rodrigues JT, Cunha MP, Sabino EC, Faria NR, Weaver SC, Romano CM, Lalwani P, Proenca-Modena JL, de Souza WM.

Published in *Lancet Infect Dis* on 15 October 2024.

This study provides a comprehensive assessment of Oropouche fever in Brazil from 2015 to 2024, focusing on the 2024 re-emergence, which had a 58.8-fold higher incidence than the annual median between 2015 and 2023. The substantial increase in Oropouche fever cases can be partly attributed to the increase of Oropouche virus surveillance in public health laboratories across Brazil, which was implemented nationwide in Brazil in January, 2024, after being limited to North Brazil region. Amazonas was the most affected Brazilian state by the 2023–24 Oropouche fever re-emergence, caused by a new Oropouche virus reassortant that subsequently spread to many Brazilian states. The 2023–24 Oropouche virus reassortant has significantly higher replicative competence in mammalian cells than the historical Oropouche virus. The study highlights challenges in epidemiological surveillance and disease control, especially in the absence of vaccines or specific treatments. It emphasizes the need for robust molecular monitoring and public health preparedness to mitigate future epidemics in the Americas and beyond.

*This section provides a digested list of a more extensive content accessible in Excel format [here](#).*

## Relevant news

This section presents official reports from health agencies, manufacturers and press releases with reliable sources.

### Oropouche Virus Genome in Semen and Other Body Fluids from Traveler

Published by CDC on January 2024.

The increasing evidence that OROV infection during pregnancy can affect fetal development is concerning. Although sexual transmission of OROV has yet to be fully studied, our findings, along with those of Castilletti et al., indicate potential. However, the outbreak, although slowing, is still ongoing in Central and South America.

### Barbados reports Oropouche virus cases as CDC ups travel advisory for Brazil hot spot

Published by CIDRAP on 13 December 2024.

The Barbados Ministry of Health and Wellness recently reported two cases of Oropouche virus, both involving adults.

## Epidemiological Alert - Oropouche in the Americas Region - 13 December 2024

Published by PAHO on 13 December 2024.

Considering the beginning of the season of increased circulation of arbovirolos in the Southern Hemisphere and the increase in cases of Oropouche in some countries of the Americas Region, including areas where no cases had been historically recorded, the Pan American Health Organization/World Health Organization (PAHO/WHO) recommends that Member States maintain surveillance, early diagnosis, and timely treatment of cases of Oropouche and other arbovirolos, in order to prevent complications and deaths associated with these diseases.

## Oropouche: Geographical expansion of the virus

Published by PAHO on 10 December 2024.

PAHO has also observed an increase in cases of Oropouche virus, which is transmitted by infected midges and some mosquito species.

## PAHO/WHO and MINSAP Strengthen Technical Cooperation to Address Oropouche Virus Outbreak in Cuba

Published by PAHO on 26 November 2024.

The mission led to several key recommendations, particularly emphasizing the need for continued research to enhance Cuba's understanding of Oropouche virus (OROV) and contribute to a broader understanding of the disease in the Americas. This is especially important given the recent increase in reported OROV fever cases in certain regions.

## Fact sheets

This section provides a short overview of the epidemiology, virology, clinical features and risk assessment related with the disease.

### Overview

Oropouche disease is an arboviral disease caused by the Oropouche virus (OROV), a single-stranded RNA virus belonging to the *Orthobunyavirus* genus of the *Peribunyaviridae* family. This virus is endemic in several regions of Central and South America, as well as the Caribbean, where it actively circulates. Human transmission primarily occurs through the bite of small midges of the *Culicoides* genus (*Culicoides paraensis*), which inhabit forested and humid areas.

### Symptoms

After OROV infection, **the incubation period ranges from 3 to 10 days**. Symptoms are often non-specific and can easily be confused with other arboviruses like Dengue, Chikungunya, or Zika. Patients may experience fever, headaches, nausea, joint and muscle pain, conjunctivitis, and abdominal pain. However, about **80% of infected individuals remain asymptomatic**. Recovery typically takes about a week, though it may extend for several weeks in some cases. Around **4% of symptomatic cases may develop severe, neuroinvasive forms**, including meningitis and encephalitis. **Vertical transmission** of the virus, from mother to child during pregnancy, is still being studied.

### Diagnosis

Diagnosis of Oropouche disease relies on several methods. Virus detection via RT-PCR is possible between days 1 and 7 after symptom onset. Serological tests like ELISA can detect IgM and IgG antibodies, which appear from day 1 to two weeks after illness onset. Biological samples used for these tests include serum, saliva, and urine. In patients with signs of neuroinvasive disease, cerebrospinal fluid analysis can also be performed.

### Treatment

Treatment is primarily symptomatic, focusing on hydration, pain relief, and antipyretics. **No specific antiviral treatment** is currently available. As with Dengue, the use of aspirin and nonsteroidal anti-inflammatory drugs is discouraged to reduce the risk of bleeding. Although several antiviral candidates have been tested against OROV, none have proven effective. Ribavirin, tested in vitro on mice, showed no antiviral activity against OROV, though it was effective against other *Orthobunyaviruses* like Tacaiuma and Guama viruses. Favipiravir has not yet been tested against OROV but has shown efficacy against other viruses in the *Peribunyaviridae* family.

### Vaccine

There is **currently no vaccine for Oropouche**. A preclinical study evaluated a vaccine candidate based on vesicular stomatitis virus (VSV) expressing OROV glycoproteins. This study demonstrated protection in mice, with reduced viral loads after exposure to the virus.

## Diagnosis and care

This section offers a short overview of currently available countermeasures and recommendations for diagnosis, prevention and care.

Currently, Oropouche is an underdiagnosed disease because its clinical symptoms overlap with those of other arboviruses like Dengue, Chikungunya, and Zika, requiring laboratory confirmation, which delays diagnosis. Developing rapid diagnostic tests for OROV would enable early virus detection.

Moreover, no specific antiviral treatment is currently available, and very few clinical trials have been conducted in humans. Ribavirin, mycophenolic acid, and IFN- $\alpha$  have been tested for OROV. In vitro studies showed that ribavirin and mycophenolic acid lacked antiviral activity against OROV, unlike for two other *orthobunyaviruses*, Tacaiuma virus and Guama virus. IFN- $\alpha$  showed limited in vitro activity, dependent on dose and timing of treatment. Favipiravir has not yet been tested for OROV but shows promising activity against several related *Peribunyaviridae* viruses.

Developing an effective vaccine is also a priority, though studies are still scarce. Immunoassays have identified several epitopes for potential vaccine candidates, particularly T and B cell epitopes from the OROV polyprotein. Recently, a candidate vaccine based on vesicular stomatitis virus expressing OROV glycoproteins protected mice from viral challenge by reducing viral load. Cross-protection with existing vaccines against other viruses should also be explored.

## Guidelines and practical information

This section lists official manuals of recommendations for clinical practice or public health policy published by leading health organizations.

16 December 2024	Tips for southbound travelers
4 Novembre 2024	Preventing Oropouche (CDC)
25 Octobre 2024	Interim Guidance for Evaluating and Managing Infants Born to Pregnant People with Confirmed or Probable Oropouche Virus Disease (CDC)
25 Octobre 2024	Clinical Overview of Oropouche Virus Disease (CDC)
20 September 2024	Updated Interim Guidance for Health Departments on Testing and Reporting for Oropouche Virus Disease (CDC)
10 September 2024	Interim Guidance for Evaluating and Managing Infants Born to Pregnant People with Confirmed or Probable Oropouche Virus Disease (CDC)
9 August 2024	Threat Assessment Brief - Oropouche virus disease cases imported into the European Union (ECDC)
3 August 2024	Public Health Risk Assessment related to Oropouche Virus (OROV) in the Region of the Americas. (PAHO)
17 July 2024	Recommendations for the Detection and Surveillance of Oropouche in possible cases of vertical infection, congenital malformation, or fetal death. (PAHO)