



COUNTRY SITUATIONAL ANALYSIS

The Bolivarian Republic of Venezuela is located on the north coast of South America. The country maintains pockets of endemic sylvatic yellow fever (YF) transmission across most of its territory, with the exception of the mountainous areas. Cases are linked to viral circulation along border countries, mainly Brazil and Colombia. The YF vaccine was introduced into routine childhood vaccination nationwide in 2000. National vaccination coverage rates have fluctuated over the years.

Since the reintroduction of *Aedes aegypti*, dengue has become a major public health problem, with steady increases in both incidence and geographical spread. Two other arboviruses, chikungunya and Zika, have also emerged over the past decade. Their dramatic spread and morbidity highlight the extraordinary capacity of these viruses to invade a mainly susceptible population.

ECOLOGICAL FACTORS AND CLIMATE¹

The country is located on the northern coast of South America. It has four major natural regions with a wide variety of climates determined primarily by altitude, including tropical, subtropical, and temperate zones:

- 1) The *Andes Region*** is located in the north and northeast. This is the area with the greatest climatic and geographical variety, ranging from savannas to rainforests, as well as arid areas extending away from the mountain range. Most cities in this region are in valleys. The main activity is livestock and farming, with crops such as bananas, sugar cane, and coffee.
- 2) The *Caribbean coast*** is a temperate zone where most Venezuelan cities are located, including the country's capital, Caracas.
- 3) The *Plains*** is a region lying less than 100 meters above sea level and, with its many rivers, is easily flooded. Agricultural-livestock is the main activity. It is essentially rural and sparsely populated.
- 4) The *Guyana*** region lies to the south and has a varied relief ranging from plains or savannas to mountains. The climate is tropical and humid, with cooler temperatures at higher altitudes.
- 5) The *Lake Maracaibo*** region lies to the west. This is the largest lake on the continent. It is surrounded by a variety of landscapes and is an area of major oil activity. The forest makes up 53% of the land cover, with 24% used for agricultural activities.

YELLOW FEVER HIGHLIGHTS

EYE strategy risk categorization	High
Routine immunization introduction (year)	2000
Latest official coverage estimates (2021)	76%
Gavi eligibility	No
International Coordinating Group on vaccine provision requests	No
Last disruptive yellow fever outbreak	2021
Yellow fever vaccination proof for entry/exit	No
Diagnostic capacity	Yes
Fragility, conflict, and violence status	Yes

DEMOGRAPHICS²

Total population	28 435 943
Annual population growth rate	– 0.28%
Life expectancy	76 years (female) 68 years (male)
Percentage population living in urban dwellings	88%
Percentage urban population living in slums	44%

¹ World Bank. Climate Change Knowledge Portal for Development Practitioners and Policy Makers: Venezuela. Washington (DC): World Bank; 2021. Available from: <https://climateknowledgeportal.worldbank.org/country/venezuela-rb>

² World Bank. Understanding poverty: Open data. Washington (DC): World Bank; 2020. Available at: <https://www.worldbank.org/en/understanding-poverty>

Vector distribution and incidence

Aedes-borne diseases have increased in urban areas over the past few decades. Studies have demonstrated a link between poor water supply and high *Aedes aegypti* numbers in major cities, high entomological indices, and increased insecticide resistance.^{3,4,5,6}

EPIDEMIOLOGY

Although urban epidemics have been controlled, endemic sylvatic transmission has persisted in the country. Cases occur throughout the year, with a peak incidence between June and October. Most cases are males (83%), with 61% between 15 and 40 years, up to 45% them engaged in activities in forest areas (agriculture, livestock, hunting, fishing, etc.), with no record of vaccination in any of the cases. In 2019, after 14 years with no cases of YF in humans, the country reported a case of sylvatic acquisition in the state of Bolívar⁷. At the end of the case investigation, there was no evidence of any additional events in at-risk communities or in non-human primates. In 2021, an outbreak in humans was reported in the state of Monagas, with 11 laboratory-confirmed YF cases between epidemiological weeks 39 and 49, with no fatal cases; additionally, 13 confirmed epizootics were reported in non-human primates, 10 in the state of Monagas and 3 in the state of Anzoátegui.⁸

Endemic areas

Of the states of the Bolivian Republic of Venezuela, 70% support sylvatic transmission. The country has three natural corridors with favorable conditions for transmission, where epizootics alternate with periods of silence:

- **Western focus:** south of the Lake Maracaibo corridor as well as neighboring municipalities.
- **Southwestern focus:** along the San Camilo corridor including the states of Apure, Barinas, Portuguesa, and Táchira.
- **Southern focus:** along the Guyana corridor including the states of Amazonas and Bolívar.

PAST OUTBREAKS⁹

Year	Number	Region	Comments
1960-1980	69	Not available	
1981-2000	18	Not available	
2003	34	State of Zulia (municipalities of Jesús María Semprún, Machiques, and Rosario de Perija), state of Tachira (municipalities of Fernando Feo, Libertador, and Uribante, on the border between the Bolivarian Republic of Venezuela and Colombia), and the state of La Portuguesa (municipality of Guaranito) (San Camilo corridors and south of Lake Maracaibo).	The case fatality rate was 41%. The outbreak began along the border with Colombia and spread to the states of Táchira and Zulia. Most of the cases were unvaccinated migrants.
2004	5	States of Mérida and Monagas (municipalities of Bolívar and Maturín) (Guyana Corridor).	This is a predominantly forested area with some cocoa plantations. The Venezuelan authorities intensified vaccination efforts in the area, although the population was already being immunized due to epizootic activities detected weeks earlier.
2009	Epizootic activity	States of Aragua (Zamora municipality) and Guarico (municipalities of Roscio and Ortiz) (Guyana Corridor).	

3 World Bank. Understanding poverty: Open data. Washington (DC): World Bank; 2020. Available at: <https://www.worldbank.org/en/understanding-poverty>.

4 Ibid.

5 Rubio-Palis Y, Guzmán H, Sánchez V and Pérez Ybarra LM. Population fluctuations of *Aedes aegypti* (Diptera: Culicidae) and dengue cases in 6 municipalities of Aragua state, Venezuela. Bol Mal Salud Amb. 2017; 57(1): 1-16.

6 Abe M, McCall PJ, Lenhart A, Villegas Elci and Kroeger A. The Buen Pastor cemetery in Trujillo, Venezuela: measuring dengue vector output from a public area. Trop Med Int Health. 2005;10(6):597-603. Available from: <https://doi.org/10.1111/j.1365-3156.2005.01428.x>

7 Pan American Health Organization. Epidemic outbreaks: yellow fever in the Bolivarian Republic of Venezuela. Washington, DC: PAHO; 2019.

8 Pan American Health Organization. Topics: Chikungunya. Number of cases reported. Washington, DC: PAHO. 2018. Available from: <https://www.paho.org/en/topics/chikungunya>

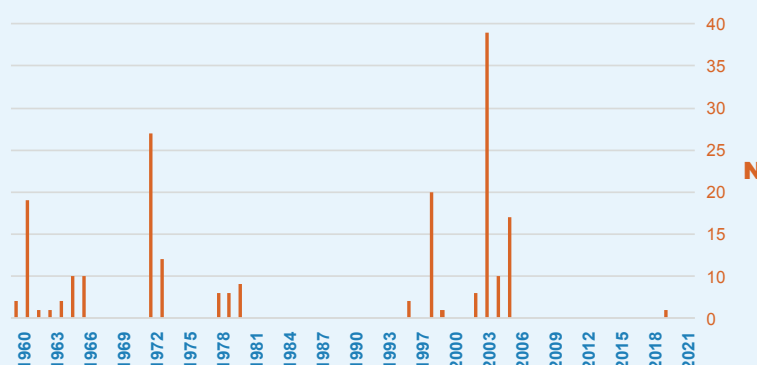
9 Ibid.

2019	1	State of Bolívar (municipality of Gran Sabana) (Guyana Corridor).	One human case was recorded after 14 years without any cases. With PAHO support, a preventive mass vaccination campaign was initiated, targeting 100% of the population from the age of 2 to 59 years. The initial phase focused on 10 high-risk states during 2020-2021, achieving coverage of 81.1%.
2021	11	Municipality of Maturín, State of Monagas (Guyana Corridor).	Nine men and two women aged 16 to 82 years, of whom three were asymptomatic. No fatalities were reported. Seven were confirmed by RT-PCR and four by serological tests and clinical-epidemiological criteria. This was preceded by epizootic activity in the states of Monagas and Anzoátegui. An epizootic outbreak was recorded 12 km from the city of Maturín, an urban area of over 410 000 inhabitants.

Trends of previous outbreaks¹⁰

Between 1960 and 2021, the country reported 153 cases and 33 deaths to PAHO. Of these, 79, 18 and 62 were recorded between 1960-1980, 1981-2000, and 2001-2021, respectively. In 2019, a human case was reported after 14 years of epidemiological silence. This occurred in the context of shortages and low vaccination coverage in municipalities at greatest risk and border areas, further compounded by increased viral circulation in the Region. In 2021, an outbreak of sylvatic acquisition began in the Guyana corridor which was preceded by epizootic activity.

Yellow fever cases in Venezuela (Bolivarian Republic of), 1960-2021



ARBOVIRAL ACTIVITY

Dengue. Dengue fever was first observed in the country in 1980. Since then, there have been annual epidemics of varying magnitudes, with co-circulation of serotypes. The country reported 1 086 041 dengue cases to PAHO between 1980-2021.¹¹

Chikungunya. The first cases of chikungunya disease were reported in 2014. As of 2017, Venezuela had notified PAHO of 22 730 cases.¹²

Zika. The Zika outbreak began in the country in 2016. By 2017, the country had reported 60 146 suspected cases, 2413 confirmed cases, and no congenital syndrome associated with the Zika infection to PAHO.¹³

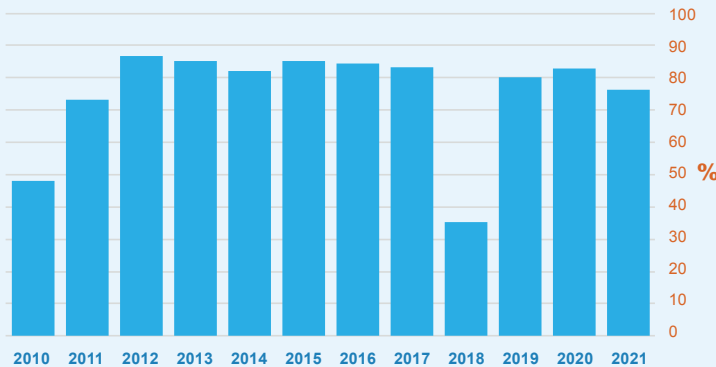
¹⁰ Ibid.

¹¹ Pan American Health Organization. Health Information Platform for the Americas (PLISA). Dengue and severe dengue: Cases and deaths for the countries and territories of the Americas. Washington, DC: PAHO; n.d. Available from: <https://www3.paho.org/data/index.php/en/mnu-topics/indicadores-dengue-en/dengue-nacional-en/257-dengue-casos-muertes-pais-ano-en.html>

¹² Pan American Health Organization. Topics: Chikungunya. Number of cases reported. Washington, D.C: PAHO; 2018. Available from: <https://www.paho.org/en/topics/chikungunya>

¹³ Pan American Health Organization. Zika: PAHO Regional Epidemiological Update (Americas) 25 August 2017. Epidemiological report of Peru. Washington, D.C: PAHO; 2017. Available from: https://www3.paho.org/hq/index.php?option=com_content&view=article&id=11599:regional-zika-epidemiological-update-americas&Itemid=41691&lang=en#gs.tab=0

YELLOW FEVER VACCINATION

Routine childhood immunization ¹⁴		Vaccine coverage ¹⁵																										
Yellow fever vaccine introduced	Yes	<div><h3>Childhood vaccination coverage of yellow fever in Venezuela (Bolivarian Republic of), 2010-2021 (%)</h3><table><caption>Childhood vaccination coverage of yellow fever in Venezuela (Bolivarian Republic of), 2010-2021 (%)</caption><thead><tr><th>Year</th><th>Coverage (%)</th></tr></thead><tbody><tr><td>2010</td><td>45</td></tr><tr><td>2011</td><td>75</td></tr><tr><td>2012</td><td>95</td></tr><tr><td>2013</td><td>92</td></tr><tr><td>2014</td><td>85</td></tr><tr><td>2015</td><td>92</td></tr><tr><td>2016</td><td>90</td></tr><tr><td>2017</td><td>88</td></tr><tr><td>2018</td><td>35</td></tr><tr><td>2019</td><td>82</td></tr><tr><td>2020</td><td>82</td></tr><tr><td>2021</td><td>78</td></tr></tbody></table><p>YF vaccine coverage has fluctuated over the years, with significant decreases between 2016 and 2018. The latest country estimates (2020) reported a vaccination coverage of 82% as a result of intensified efforts to contain a sylvatic outbreak. The gap with MMR-1 also narrowed to below 5% as a result of this activity. Previous estimates for 2016 to 2019 showed gaps of over 10% and vaccination coverage below 80%. The challenges identified for the implementation of the vaccination program include access to healthcare for indigenous populations, remote locations that are difficult to access (river and air), gasoline supply, and the negative impact of the COVID-19 pandemic.¹⁶</p></div>	Year	Coverage (%)	2010	45	2011	75	2012	95	2013	92	2014	85	2015	92	2016	90	2017	88	2018	35	2019	82	2020	82	2021	78
Year	Coverage (%)																											
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Year of introduction	1998																											
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Gap MMR-1/ yellow fever vaccine to monitor program	Yes																											
Vaccination campaigns ¹⁷																												
Catch-up campaigns implemented during the last 20 years		Yes																										
Preventive mass campaigns implemented during the last 20 years		Yes																										
2020	In the context of high viral activity, the country received over 4.7 million YF vaccine doses in mid-2020 to roll out a preventive mass vaccination campaign targeting the entire population from 2-59 years in 10 states classified as high risk, as the first phase of the campaign (2020-2021). By the end of 2021, vaccination coverage rates in prioritized states reached 92.7% (4 242 639/4 577 157). Six of these achieved 100% coverage (Amazonas, Anzoátegui, Apure, Delta Amacuro, Sucre, and Táchira), while targets were not met in the other five (Guárico, 98.7%; Monagas, 92.9%; Bolívar, 91.7%, and Zulia, 68.6%). ¹⁸																											
2002-2004	Venezuela vaccinated approximately 1.9 million people in areas considered enzootic, i.e., the states of Bolívar and Monagas and areas bordering with Colombia.																											
Reactive vaccination campaigns implemented in the last 20 years		Yes																										
2021	The outbreak response included the deployment and rollout of the YF Vaccination Plan: 129 336 doses were administered in the municipalities of Aguasay, Cedeño, Ezequiel Zamora, Maturín, and Santa Bárbara, in the state of Monagas.																											
1995, 1998, 1999, 2002, 2003, 2004, 2005, 2019	Vaccination campaigns carried out in the context of the outbreak response																											
Is vaccination provided for international travelers? ¹⁹		Yes																										
The country offers vaccination to travelers departing for at-risk countries.																												

¹⁴ Pan American Health Organization. Comprehensive Family Immunization Unit. Survey for mapping of national policies on yellow fever vaccination and their implementation. Washington, DC: PAHO; Unpublished document.

¹⁵ World Health Organization. Data compiled from WHO vaccine-preventable diseases: monitoring system reported through the Joint Reporting Form. Geneva: WHO; 2022. Available from: <https://immunizationdata.who.int/pages/coverage/yfv.html>.

¹⁶ See Note 14.

¹⁷ Ibid.

¹⁸ Bolivarian Republic of Venezuela, Ministry of People's Power for Health, General Directorate of Epidemiology. Epidemiological update of yellow fever circulation in enzootic areas of Venezuela, EW 52 of 2021. Unpublished document.

¹⁹ See Note 14.

Is vaccination provided for internal travelers (when traveling to high-risk areas in the country) ²⁰		No
Registration system to record vaccination data ²¹	Nominal paper immunization registry system	
Vaccine program funding ²²		
Sources of funding	United Nations Children’s Fund and Pan American Health Organization	
Gaps in funding during the past 5 years	Yes	
Does the country require financial support?	Yes	

INTERNATIONAL HEALTH REGULATIONS²³

Does the country request proof of YF vaccination at points of entry?		No	
LABORATORY DIAGNOSTIC CAPACITY ²⁴		SURVEILLANCE ²⁵	
Member of the Arbovirus Diagnosis Laboratory Network of the Americas	Yes	National guidelines for surveillance	Yes
National Reference Laboratories	National Institute of Hygiene "Rafael Rangel"	Type of surveillance for human cases	Syndromic-case based
Report to PAHO	Yes	Type of YF surveillance for non-human primates	Passive
TESTING CAPACITY FOR YELLOW FEVER		Entomological surveillance	Yes
IgM antibody capture enzyme-linked immunosorbent assay (MAC-ELISA)	Yes	Entomovirological surveillance	No
Plaque reduction neutralization test (PRNT)	No	Case investigation (reactive)	Yes
Reverse transcription polymerase chain reaction (RT-PCR) blood specimens	Yes	YELLOW FEVER CONTROL STRATEGIES	
RT-PCR tissue specimens	Yes	Multi-annual immunization plan	Yes
RT-PCR wild type versus vaccine	No	Risk assessment methodology ²⁶	Yes
Immunohistochemistry	No	Vector control activities	Yes
Virus isolation	Yes	Diagnosis	Yes
External quality assessment compliance	Yes	Surveillance	Yes
Shortages of diagnostic supplies in the last 5 years	Yes	Request for proof of YF vaccination at points of entry	No

POPULATION MOVEMENTS²⁷

In the context of a serious economic and political crisis, in addition to the migration of Venezuelans to other countries in the Region, there is significant rural-urban internal migratory movement of persons in search of better opportunities and quality of life.

²⁰ Ibid.

²¹ Ibid.

²² Ibid.

²³ Ibid.

²⁴ Ibid.

²⁵ Ibid.

²⁶ Ibid.

²⁷ Office of the United Nations High Commissioner for Refugees (UNHCR). UNHCR Data. Geneva: UNHCR; n.d. Available from: <https://www.unhcr.org/en-us/data.html>