COUNTRY PROFILE YELLOW FEVER

COLOMBIA

COUNTRY SITUATIONAL ANALYSIS

Colombia is situated in the north-western part of South America. Foci of sylvatic yellow fever transmission persist across most of the territory, with the exception of cities located in the mountains. After the inclusion of the yellow fever vaccine in the childhood vaccination schedule in 2002 and the implementation of mass vaccination campaigns, the incidence of cases started to decrease. However, isolated cases and small outbreaks still occur mainly in unvaccinated population groups living or working in forest areas. Childhood vaccination coverage exceeds 80%.

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

ECOLOGICAL FACTORS AND CLIMATE[1]

Colombia has six phytogeographic regions: 1) the Andes, which crosses the country from north to south and in which about 75% of the population live; 2) the Amazon, which represents 30% of the territory, with its longest international border, between Venezuela and Colombia; 3) the Caribbean region, on the Caribbean coast; 4) the Orinoquía, known as “the eastern plains,” extends eastward to the border with Venezuela; 5) the Pacific coast, one of the wettest regions in the world; and finally 6), the large number of islands.

Apart from the temperate climate in the highlands, the climate of most of the country’s territory is tropical rainforest. The forest covers 47% of the land cover and about 35% is exploited for agricultural purposes.

Vector distribution and incidence

High entomological indices and high dengue and chikungunya infestation rates were found in *Aedes aegypti* and *Aedes albopictus* in Colombia.[3,4,5]

YELLOW FEVER HIGHLIGHTS	
EYE strategy risk categorization	High
Routine immunization introduction (year)	2002
Latest official coverage estimates (2021)	86%
Gavi eligibility	No
International Coordinating Group on vaccine provision requests	No
Last disruptive yellow fever outbreak	2002-2005
Yellow fever vaccination proof for entry/exit	No
Diagnostic capacity	Yes
Fragility, conflict, and violence status	No

DEMOGRAPHICS[2]	
Total population	50 339 440
Annual population growth rate	1.4%
Life expectancy	80 years (female) and 72 years (male)
Percentage population living in urban dwellings	81%
Percentage urban population living in slums	28%

1 World Bank. Climate Change Knowledge Portal for Development Practitioners and Policy Makers: Colombia. Washington (DC): World Bank; 2021. Available from: https://climateknowledgeportal.worldbank.org/country/colombia

3 Martínez D, et al. Identification of Aedes (Diptera: Culicidae) species and arboviruses circulating in Arauca, Eastern Colombia. Front Ecol Evol. 2020:412.

4 Rodríguez G, De la Hoz R. Dengue and dengue and vector behaviour in Cáqueza, Colombia, 2004. Rev. public health. 2005:7(1):1-15

5 Arboleda S, Jaramillo-O N, Townsend Peterson A. Spatial and temporal dynamics of Aedes aegypti larval sites in Bello, Colombia. J Vector Ecol. 2012 Jun;37(1):37-48.

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

EPIDEMIOLOGY

After eradicating urban yellow fever epidemics (the last urban case was in 1929), Colombia continued to experience outbreaks of sylvatic acquisition, mainly along the border with Venezuela. These events appeared along the course of the rivers through mountain valleys, as well as in the Amazon and Orinoquía regions. The frequency and magnitude of the outbreaks decreased when navigation activities were replaced by rail in 1961. Mortality rates varied greatly, ranging from 38 to 100%, with an average of 51%. Cases occur annually in small outbreaks of sylvatic acquisition, with 6 to 7 years between outbreaks of greater magnitude. There are two peaks of high incidence: from May to September and from December to the end of February.

About 78% of patients are male and 59% are between 15 and 40 years of age, which corresponds to the economically active population. Among those with known data, 74% are involved in agriculture, livestock, hunting, fishing, or forestry-type activities in endemic areas. Of those with known data, 92% had not been vaccinated.

Endemic areas

Yellow fever is endemic across most of the national territory, with the exception of high areas in the mountain ranges.

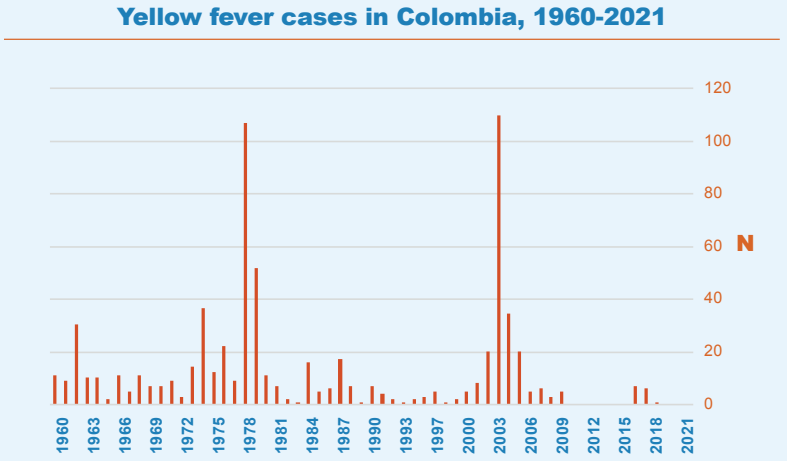
PAST OUTBREAKS[6]

Year	Number	Region	Comments
1960-1980	385		No data available.
1981-2000	94		No data available.
2003	101	Departments of Guaviare, Casanare, Meta, Caqueta, Cesar, and Norte de Santander (Venezuela-Colombia border)	Cases began to appear during the first 7 weeks of the year along the Venezuela-Colombia border. The case fatality rate was 44%. With a coordinated mass vaccination campaign carried out by both countries, the outbreak was controlled. Re-emergence in Norte de Santander confirmed additional cases (communes of Convención, Tibú, El Carmen, Teorema, and Tarra). All but one occurred in adult men aged 13 to 43 years.
2004	22		Case fatality rate: 36%. These cases are a continuation of the extensive outbreak that began in 2003 along the border with Venezuela.
2009	5	Department of Meta (municipality of La Macarena and Puerto Concordia)	Cases were reported in a known endemic area. The patients had no history of yellow fever vaccination.
2016-2017	12	Departments of Antioquia, Amazonas, Guainía, Meta, Vaupésm, and Vichada	Of the cases, 67% were men between 20 and 29 years of age. The case fatality rate was 83%. The distribution of cases was mainly in border departments which implied a risk of spreading to neighboring countries (Venezuela, Brazil, and Panama).
2018		Vaupés Department (municipality of Mitú)	The case was a 21-year-old from the Desano indigenous community.

6 Pan American Health Organization. Epidemiological alerts and updates: Yellow fever. Washington, DC: PAHO; n.d. Available from: https://www.paho.org/en/epidemiological-alerts-and-updates

Trends of previous outbreaks[6]

Colombia, along with Peru, Bolivia, and Brazil, reported the highest number of cases over the past few decades. From 1960-2021, Colombia reported 702 confirmed cases and 166 deaths. Of these, 385, 94, and 223 occurred in the 1960-1980, 1981-2000, and 2001-2021 intervals, respectively. Outbreaks occur in the same traditional areas over the years and are attributed to low vaccination coverage.[7] The yellow fever vaccine was introduced in the early 1940s in areas considered as high risk. There was a general decrease in cases between 1960 and 1980 when Colombia reported 17% of cases in the region, while between 1980 and 2000, this figure was 3%. With the turning of the century, reports from Colombia reflected an increased viral activity, consistent with the regional trend.



ARBOVIRAL ACTIVITY

Dengue. Dengue outbreaks in Colombia began in the early 1980s and since then the incidence and geographical distribution have increased over the years, with cocirculation of serotypes.

Between 1980 and 2021, Colombia notified the Pan American Health Organization (PAHO) of 1 797 819 cases.[8]

Chikungunya. Chikungunya emerged in Colombia in early 2015. During the period 2015-2017, the country reported more than 294 831 cases to PAHO.[9]

Zika. Zika cases emerged in Colombia in early 2015. Colombia reported a total of 93 803 suspected cases and 9927 confirmed cases between 2015 and 2017, and 248 confirmed congenital syndromes associated with the Zika virus.[10]

7 Shearer FM, Longbottom J, Browne AJ, Pigott DM, Brady OJ, Kraemer MUG, et al. Existing potential infection risk zones of yellow fever worldwide: a modelling analysis. Pathog Glob Health. 2018;6:e270-8.

8 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

9 Pan American Health Organization. Chikungunya. Data and statistics. Cumulative number of confirmed cases of Chikungunya in South America from 2013 to 2017. Washington, DC: PAHO; n.d. Available from: https://www.paho.org/en/topics/chikungunya

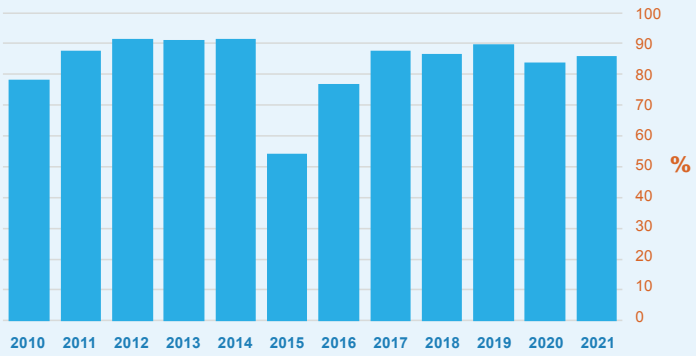
10 Pan American Health Organization. Zika cases and congenital syndrome associated with Zika virus reported by countries and territories in the Americas, 2015-2018. Cumulative cases. Washington, DC.: PAHO; 2018. Available from: https://www.paho.org/en/node/60231

YELLOW FEVER VACCINATION

Routine childhood immunization	
Yellow fever vaccine introduced	Yes
Level	National
Year of introduction	2002
Age vaccine is administered (months)	18
Vaccine schedule	Single dose
Integration with first does of measles, mumps, rubella vaccine (MMR-1)	No
Gap MMR-1/ yellow fever vaccine to monitor program	Yes

Vaccine coverage [11]

Yellow fever childhood vaccination coverage in Colombia, 2010-2021 (%)



Childhood yellow fever vaccination coverage rates oscillate around 80-90%. There was a significant drop in 2015 when the vaccination schedule switched from administration at 12 months to administration at 18 months of age following the nationwide introduction of the chickenpox vaccine for children aged 1 year. This change in the recommendation also explains the difference of more than 5% between MMR-1 and yellow fever coverage since 2015. Subsequently, a further decrease in coverage was related to the COVID-19 pandemic falling from 89.9% in 2019, to 84.2% in 2020, and 86.2% in 2021.

Vaccination campaigns	
Catch-up campaigns implemented during the last 20 years?	YES
special Vaccination Day has been organized since 2020 aimed at reaching the susceptible population of the cohorts from 2009 to 2018 with a national target of 612 951. As of December 2021, the country had reached 62%, with a further 381 913 susceptible people vaccinated. At the national level, National Vaccination Days are held to update all the vaccines of the national scheme in the months of January, April, July, and August in general. Results are consolidated with national coverage through the monthly report form. Nominal records are not kept.	
Preventive mass campaigns implemented during the last 20 years?	Yes
In 2003, when the vaccine was included in the national expanded immunization program, a nationwide immunization campaign reached 17 million susceptible people (2003-2006).	
Reactive vaccination campaigns implemented during the last 20 years	Yes
Vaccination for international travelers	Yes
Vaccination for internal travelers (traveling to high-risk areas in the country)	Yes
Registration system to record vaccination data	Nominal electronic immunization registry system

Vaccine program funding	
Sources of funding	Government
Gaps in funding during the past 5 years	No
Does the country require financial support?	No

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

INTERNATIONAL HEALTH REGULATIONS

Does the country request proof of YF vaccination at points of entry?	No

Not being vaccinated is not a barrier to entering the country. In any case, Colombia recommends and offers the vaccine to travelers entering through international airports and land terminals.

LABORATORY DIAGNOSTIC CAPACITY		SURVEILLANCE	
Member of the Arbovirus Diagnosis Laboratory Network of the Americas	Yes	National guidelines for surveillance	Yes
National Reference Laboratories	Virology Laboratory: National Institute of Health (INS)	Type of surveillance for human cases	Case-based
Report to PAHO	Yes	Type of YF surveillance for non-human primates	Yes
TESTING CAPACITY FOR YELLOW FEVER		Entomological surveillance	Yes
IgM antibody capture enzyme-linked immunosorbent assay (MAC-ELISA)	Yes	Entomovirological surveillance	Yes
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 virus versus vaccine	Yes	Risk assessment methodology[11]	No
Immunohistochemistry	Yes	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	No	Request for proof of YF vaccination at points of entry	No

POPULATION MOVEMENTS[12]

Over the past few years, there has been a large influx of migrants crossing the border from Venezuela. There are an estimated 1 742 927 Venezuelans in Colombia and of these, 56% are in an irregular situation, 741 420 are refugees, and 133 000 have sought temporary permits at border checkpoints.

12 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

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