COUNTRY PROFILE YELLOW FEVER

ARGENTINA

COUNTRY SITUATIONAL ANALYSIS

Argentina is in the southern portion of the South American continent. It has a vast surface area, extending across various latitudes, with a wide variety of climates. Conditions exist for enzootic yellow fever (YF) virus transmission in jungle areas of the northeast along the border with Brazil and Paraguay. Since major urban epidemics in the port city of Buenos Aires were brought under control in the 20th century, only foci of enzootic activity in the northeast and isolated sylvatic human cases persist in Argentina. Spikes in viral activity usually occur in a regional context of epizootics affecting southern Brazil and eastern Paraguay. Argentina has had no indigenous case since 2008, and outbreaks have been sporadic, with long intervals without evidence of viral activity.

ECOLOGICAL FACTORS AND CLIMATE [1]

With its long geographical extension (from the Neotropics to Antarctica) and range of latitudes, Argentina has a wide variety of ecoregions:

1) Pampa: in the center of the country, has a continental climate, and consists of prairies and plains with elevations up to 500 meters above sea level.

2) Cuyo: central-west mountainous region with sparse vegetation.

3) Northwest: desert plateau with mountain ranges (the Puna ecoregion) and areas of mountain jungle (the Yungas ecoregion).

4) Chaco and Mesopotamia: subtropical zone with dense woodlands and jungle vegetation.

5) Patagonia and Antarctica: plateaus and snow-capped mountains, with cold forests and steppes.

Vector distribution and incidence

The primary vectors of sylvatic yellow fever in Argentina are *Haemagogus* and *Sabethes*. The former are distributed primarily in the northeast and central Cuyo region, and the latter are distributed primarily in the extreme northeast of the country.[3]

YELLOW FEVER HIGHLIGHTS	
EYE strategy risk categorization	High
Routine immunization introduction (year)	2002
Latest official coverage estimates (2021)	74%
Gavi eligibility	No
International Coordinating Group on vaccine provision requests	No
Last disruptive yellow fever outbreak	2008
Yellow fever vaccination proof for entry/exit	No
Diagnostic capacity	Yes
Fragility, conflict, and violence status	No

DEMOGRAPHICS [2]	
Total population	45 380 000
Annual population growth rate	1%
Life expectancy	79.9 years (female); 73.2 years (male)
Percentage population living in urban dwellings	92%
Percentage urban population living in slums	14%

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

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

3 Cano ME, Marti GA, Balsalobre A, Muttis E, Bruno EA, Rossi G, et al. Database of *Sabethes* and *Haemagogus* (Diptera: Culicidae) in Argentina: Sylvatic Vectors of the Yellow Fever Virus. J Med Entomol. 2021;58(4):1762-1770. Disponible en: https://doi.org/10.1093/jme/tjab059

High levels of vector infestation with *Aedes aegypti* have been found in large urban centers in Argentina. *Aedes albopictus* is also very common in the northeast.[4,5,6,7,8]

EPIDEMIOLOGY

Since the last urban cases of yellow fever recorded in 1905, only cyclical epizootic activity has been detected in non-human primates.[9] After over 40 years without cases in humans, an outbreak in 2008 related to viral activity in southern Brazil and Paraguay was detected in the province of Misiones. Eighty-six percent of the cases were in men of economically active age, who worked or lived in the forest.

Cases occurred between February and March, and there were two fatalities. None of those affected had a history of vaccination and all cases corresponded to sylvatic acquisition.

Endemic areas

The areas at risk of reintroduction are in the northeast, in the provinces of Corrientes, Formosa, and Misiones, which border with Brazil, where jungle vectors and susceptible non-human primates live. Some departments of Chaco, Jujuy, and Salta are also considered at risk.

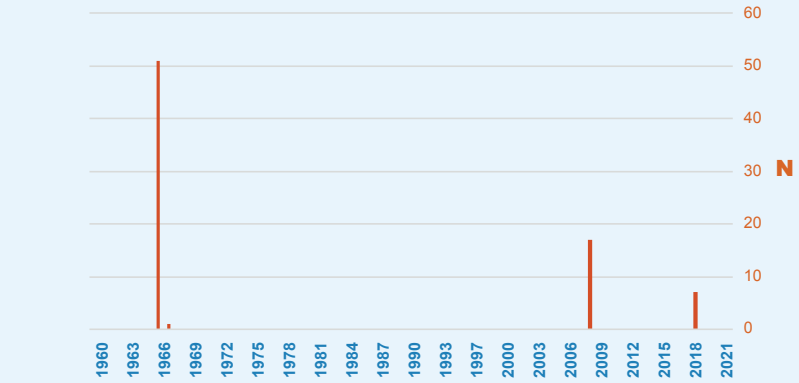
PAST OUTBREAKS[10]

Year	Number	Region	Comments
1966	62	Misiones and Corrientes provinces (northeast) along border with Brazil	Case fatality rate: 29%
2008	9	Misiones	Case fatality rate: 22%

Trend of past outbreaks[10]

Over the last 60 years, Argentina reported two outbreaks of YF to the Pan American Health Organization (PAHO), with a total of 71 cases. Both events occurred within the context of expanding epidemic waves originating in southeastern Brazil during which Paraguay was also affected. These events highlight the extent to which the epidemiological scenario in Argentina depends on the epidemiological situation in southern Brazil.

Number of yellow fever cases in Argentina, 1960-2021



ARBOVIRAL ACTIVITY

Dengue Dengue was first detected in Argentina in the late 1990s. Its incidence and geographical extension have both increased over the years, with cocirculation of various serotypes. Argentina reported 3 199 161 cases to PAHO between 1989 and 2021.[11]

Chikungunya Chikungunya was first detected in Argentina in 2016. The country reported over 3716 cases to PAHO.[12]

4 Estallo EL, Sippy R, Stewart-Ibarra AM, Grech MG, Benítez EM, Ludueña-Almeida FF, et al. A decade of arbovirus emergence in the temperate southern cone of South America: dengue, *Aedes aegypti* and climate dynamics in Córdoba, Argentina. Heliyon. 2020;6(9):E04858. Available from: https://doi.org/10.1016/j.heliyon.2020.e04858

5 Rubio A, Cardo MV, Vezzani D, Carbajo AE. *Aedes aegypti* spreading in South America: new coldest and southernmost records. Mem Inst Oswaldo Cruz. 2020;115:E190496. Available from: https://doi.org/10.1590/0074-02760190496

6 Fischer S, Alem IS, De Majo MS, Campos RE, Schweigmann N. Cold season mortality and hatching behavior of *Aedes aegypti* L. (Diptera: Culicidae) eggs in Buenos Aires City, Argentina. J Vector Ecol. 2011;36(1):94–99. Available from: https://doi.org/10.1111/j.1948-7134.2011.00145.x

7 Lizuain AA, Leporace M, Santini MS, Utgés ME, Schweigmann N. Update on the distribution of *Aedes albopictus* (Diptera: Culicidae) in Misiones, Argentina. Rev Inst Med Trop Sao Paulo. 2019;61:E46. Available from: https://doi.org/10.1590/S1678-9946201961046

8 Vezzani D, Carbajo AE. *Aedes aegypti*, *Aedes albopictus*, and dengue in Argentina: current knowledge and future directions. Mem Inst Oswaldo Cruz. 2008;103(1):66-74. Available from: https://doi.org/10.1590/s0074-02762008005000003

9 Goenaga S, Fabbri C, Dueñas JC, Gardenal CN, Rossi GC, Calderon G, et al. Isolation of yellow fever virus from mosquitoes in Misiones province, Argentina. Vector Borne Zoonotic Dis. 2012;12(11):986–993. https://doi.org/10.1089/vbz.2011.0730

10 Pan American Health Organization. Epidemiological alerts and updates: Yellow Fever. Washington, D.C.: PAHO; n.d. Available from: https://www.paho.org/en/epidemiological-alerts-and-updates

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/es/temas/indicadores-dengue/dengue-nacional/237-dengue-casos-muertes-pais-ano.html

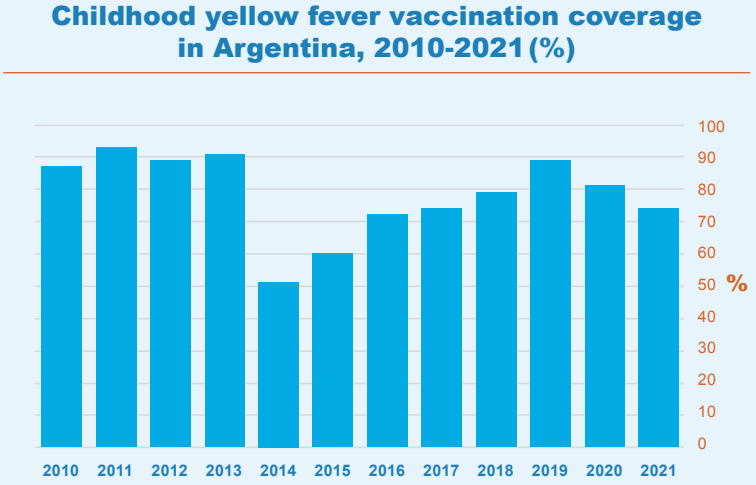
12 Pan American Health Organization. Topics: Chikungunya. Number of cases reported. Washington, D.C: PAHO; 2018. https://www.paho.org/en/topics/chikungunya

Zika Zika emerged in Argentina in 2016. The country reported 869 suspected cases and 138 confirmed cases to PAHO, as well as 10 confirmed congenital syndromes associated with the Zika virus.[13,14]

YELLOW FEVER VACCINATION[15]

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

Vaccine coverage[16]



The YF vaccine is included in the childhood immunization schedule in high-risk areas. Vaccination coverage fluctuated around 90%, with drops following global vaccine shortages.

There was a reduction in coverage rates after switching from a co-administration with MMR-1 strategy to sequential administration, adjusting the age recommendation from 12 to 18 months. However, the gap between the MMR-1 and YF vaccines is less than 5%. Argentina provides a booster dose for children aged 11 years. Vaccination coverage has, however, declined again in recent years due to the COVID-19 pandemic.

Vaccination campaigns	
Catch-up campaigns implemented during the last 20 years	No
Preventive mass campaigns implemented during the last 20 years	No
Reactive vaccination campaigns implemented during the last 20 years	Yes
2008	1 014 241 doses
Vaccination in international travelers	Yes
Argentina offers YF vaccination to travelers departing to at-risk countries	
Vaccination in internal travelers (when traveling to high-risk areas in the country)	No
Registration system to record vaccination data	Nominal paper immunization registry system

Vaccine program funding[17]	
Sources of funding	Government
Gaps in funding during the past 5 years	No
Does the country require financial support?	Yes

13 Pan American Health Organization. Zika: PAHO Regional Epidemiological Update (Americas) 25 August 2017. Epidemiological report of Argentina. 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#gsc.tab=0

14 Tellechea AL, Bidondo MP, Luppo V, Baricalla A, Liascovich R, Fabbri C, et al. Embriopatía por virus Zika en Argentina: características clínicas y diagnóstico en recién nacidos. Revista de la Facultad de Ciencias Médicas de Córdoba, 77(2), 100-105. Available from: https://doi.org/10.31053/1853.0605.v77.n2.26754

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

16 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

17 Ibid.

INTERNATIONAL HEALTH REGULATIONS[18]

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

LABORATORY DIAGNOSTIC CAPACITY[19]

Member of the Arbovirus Diagnosis Laboratory Network of the Americas	Yes
National Reference Laboratories	National Institute of Human Viral Diseases "Dr. Julio I. Maiztegui"
Report to PAHO	Yes

TESTING CAPACITY FOR YELLOW FEVER

IgM antibody capture enzyme-linked immunosorbent assay (MAC-ELISA)	Yes
Plaque reduction neutralization test (PRNT)	Yes
Reverse transcription polymerase chain reaction (RT-PCR) blood specimens	Yes
RT-PCR tissue specimens	Yes
RT-PCR wild type virus versus vaccine	Yes
Immunohistochemistry	Yes
Virus isolation	Yes
External quality assessment compliance	Yes
Shortage of diagnostic supplies in the last 5 years	No

SURVEILLANCE[20]

National guidelines for surveillance	Yes
Type of surveillance for human cases	Syndromic-case based
Type of surveillance for non-human primates	Passive and active
Entomological surveillance	Yes
Entomovirological surveillance	Yes
Case investigation (reactive)	Yes

YELLOW FEVER CONTROL STRATEGIES[21]

Multi-annual immunization plan	Yes
Risk assessment methodology[22]	Yes
Vector control activities	Yes
Diagnosis	Yes
Surveillance	Yes
Request for proof of YF vaccination at points of entry	No

POPULATION MOVEMENTS[23]

As of December 2020, there were 185 342 refugees, asylum seekers and other persons of concern, as well as 171 659 Venezuelans displaced abroad in Argentina.

18 Ibid.
19 Ibid.
20 Ibid.
21 Ibid.
22 Ibid.
23 Oficina del Alto Comisionado de las Naciones Unidas para los Refugiados (ACNUR). UNHCR Data. Ginebra: ACNUR; s. f. Disponible en: https://www.unhcr.org/en-us/data.html

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