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Journées d'automne Lille
11 & 12 octobre



La dengue : visions et actions d'une nation en pleine épidémie

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11 octobre 2024

VV-MEDMAT-111511

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Potential Conflicts of Interest

- Dengue epidemiology discussions - Sanofi, Takeda, GSK, Merck, Butantã
- Member of dengue boards – Sanofi, Takeda & GSK
- Studies supported by Sanofi
- Congress and meetings supported by Sanofi & Takeda
- I've had dengue before

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Dengue Key Facts

- Dengue is a viral infection transmitted to humans through the bite of infected mosquitoes
- Public health problem in over 100 countries
- 100–400 million estimated infections each year.
- Ten-fold surge in reported cases from 2000 to 2019 (500,000 to 5.2 million)
- Spreading to new areas including Europe
- High economic burden

Source: World Health Organization (<https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue>)



Dengue Key Facts

- Many dengue infections are asymptomatic or produce only mild illness, but more severe cases and even death **DO** occur
- Common symptoms
 - High fever (40°C/104°F) ✓
 - Severe headache ✓
 - Pain behind the eyes ✓
 - Muscle and joint pains ✓
 - Nausea ✓
 - Vomiting ✓
 - Rash ✓

Most will get better in 1–2 weeks
But... These are terrible two weeks
My personal experience:
Breakbone fever

Source: World Health Organization (<https://www.who.int/news-room/fact-sheets/detail/dengue-and-severe-dengue>)

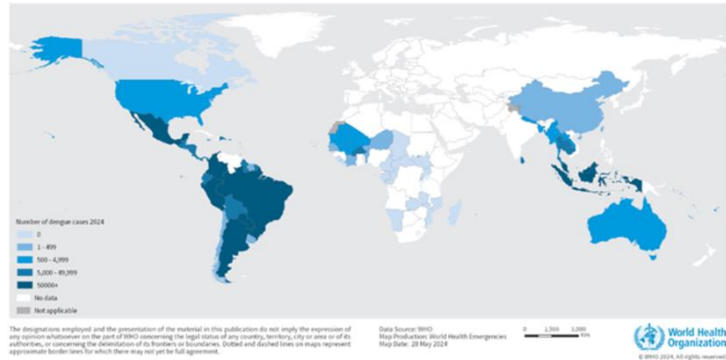




**Almost
4
billion
people**

**at risk of
Aedes-borne
infections**

Figure 2: Geographical distribution of dengue cases as reported to WHO from January to April 2024*



**May 2024: 90 countries have
active dengue transmission**

* Based on most recent available data (the data should be interpreted considering the differences in reporting rates and case definitions between the regions).

<https://www.who.int/emergencies/disease-outbreak-news/item/2024-DON518>



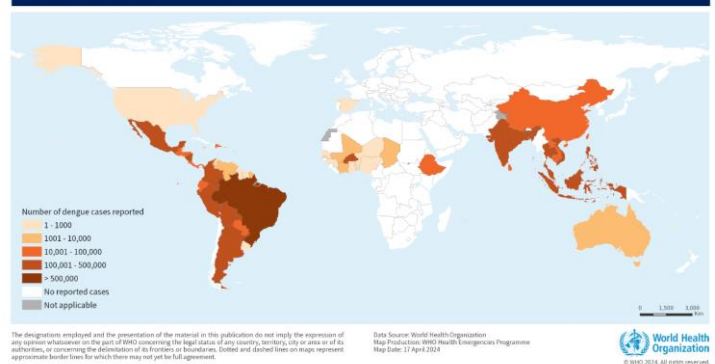
Upsurge of dengue cases and deaths in 2023

More than 6M cases and over 7,000 dengue-related deaths reported from 80 countries/territories

Over the last four decades, dengue cases have been increasing, with the highest numbers reported in 2023:

- PAHO (>4.5M cases, > 7600 severe cases, >2400 deaths)
- SEARO (5-fold surge in Bangladesh and 3-fold surge in Thailand in 2023 compared to 2022)
- EURO (**autochthonous transmission in France, Italy, Spain**)
- EMRO (increase in incidence in 10 countries)
- WPRO (8 countries reporting cases, mostly the Philippines and Viet Nam)
- AFRO (12 countries, mostly Mauritius, Burkina-Faso)

Dengue virus cases reported in 2023

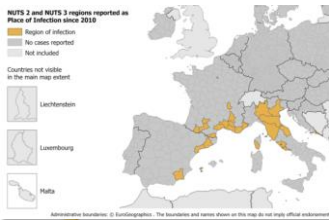


Kindly shared by Dr Diana Rojas / WHO Geneva



Local transmission of dengue virus in mainland EU/EEA, 2010-present

Year	Country	Department or regions affected	Number of autochthonous cases	Probable period of virus circulation	References
2010	Croatia	Korčula Island and the Pelješac peninsula	10	August–October	[1-3]
2010	France	Alpes-Maritimes department	2	August–September	[4-6]
2013	France	Bouches-du-Rhône department	1	September–October	[6,7]
2014	France	Var and Bouches-du-Rhône departments	4	July–September	[6,8]
2015	France	Gard department	8	July–September	[6,9,10]
2018	France	Alpes Maritimes, Hérault, and Gard departments	8	September–October	[6,11]
2018	Spain	Catalonia region, Murcia region or province of Cádiz	6	August–October	[11-13]
2019	Spain	Catalonia region	1	September	[14,15]
2019	France	Alpes-Maritimes and Rhône departments	9	July–September	[15-17]
2020	France	Hérault, Var, Alpes-Maritime, and Gard departments	13	July–October	[18-20]
2020	Italy	Veneto region	10	August	[21]



Year	Country	Department or regions affected	Number of autochthonous cases	Probable period of virus circulation	References
2021	France	Var and Hérault departments	2	July and September	[22,23]
2022	France	Pyrénées-Orientales, Hautes-Pyrénées, Haute-Garonne, Tarn et Garonne, Var, Alpes-Maritimes and Corse-du-Sud departments	65	June–September	[24,25]
2022	Spain	Ibiza	6	August–October	[26]
2023	France	Val-de-Marne (3 cases), Bouches-du-Rhône (14 cases in 2 clusters), Pyrénées-Orientales (11 cases), Hérault (3 cases), Gard (9 cases), Alpes-Maritimes (3 cases) and Drôme (2 cases) departments	45	July–October	[27-29]
2023	Italy	Lodi (41 cases), Rome (38 cases in the Rome metropolitan city and 1 case in Anzio) and Latina (2 cases) provinces	82	End of July–November	[30-32]
2023	Spain	Catalonia region (3 cases)	3	August–October	[33,34]
2024	France	Alpes-Maritimes (15 cases in 3 clusters), Drôme (2 cases), Hérault (2 cases in 2 clusters), Pyrénées-Orientales or Lozère (2 cases), Vaucluse (18 cases), Var (37 cases in 2 clusters) departments	76	Mid-June–September	[35-37]
2024	Italy	Emilia-Romagna (19 cases), Lombardy (6 cases), the Marches (102 cases), Tuscany (1 case) and Veneto (1 case) regions*	129	August–September	[43]
2024	Spain	Catalonia region (Tarragona province)	8	August–September	[43,44]



Distribution of travel-associated dengue cases reported to ECDC, by place of infection, 2022



EU overseas countries/territories and outermost region reporting cases and not visible in the main map extent

- Guadeloupe
- La Réunion
- Martinique
- Mayotte

Number of cases reported

- No cases reported
- 1-10
- 11-25
- 26-50
- 51-100
- >100

Administrative boundaries: © EuroGeographics © UN-FAD. The boundaries and names shown on this map do not imply official endorsement or acceptance by the European Union. Map produced by ECDC on 05 June 2024.

<https://www.ecdc.europa.eu/en/dengue/surveillance/dengue-virus-infections-travellers>



**REUTERS**

WorldBusinessMarketsSustainabilityMore

February 26, 2024 8:44 PM GMT-3

Americas

Peru declares health emergency as dengue outbreak 'imminent'

Reuters

February 26, 2024 8:44 PM GMT-3 · Updated a day ago

 **Outbreak News Today** 

LATIN AMERICA AND THE CARIBBEAN

Costa Rica reports 1,260% increase in dengue in first six weeks of 2024

 **ROBERT HERRIMAN**
24 DE FEV. DE 2024



08 MAR 2024 | 04:00 PM UTC

Indonesia: Elevated dengue fever activity reported in multiple areas in March

09 FEB 2024 | 07:19 AM UTC

Thailand: Elevated dengue fever activity reported in multiple areas in early February

<https://www.reuters.com/world/americas/peru-declare-emergency-parts-country-amid-rise-dengue-fever-cases-2024-02-26/>
<https://www.laprensalatina.com/brazil-faces-more-than-700000-dengue-cases-in-two-months/>
[https://outbreaknewstoday.substack.com/p/costa-rica-reports-1260-increase;](https://outbreaknewstoday.substack.com/p/costa-rica-reports-1260-increase)
<https://www.unmc.edu/healthsecurity/transmission/2023/06/14/thailand-reports-a-nearly-500-increase-in-dengue-in-2023/>



Dengue Cases* in the Americas, 1981 - 2024 (EW 29)

Year	Cases reported (million)	Fold Increase
1981	1.6	-
1991	3.1	1.9 fold increase
2001	7.8	2.5 fold increase
2011	18.2	2 fold increase
2023	20.6	-

- **Increase** in the last 4 decades. Two fold increase by decade.
- 2024 has **3 times more cases** than 2023.
- 2024: **11.9 million cases**.



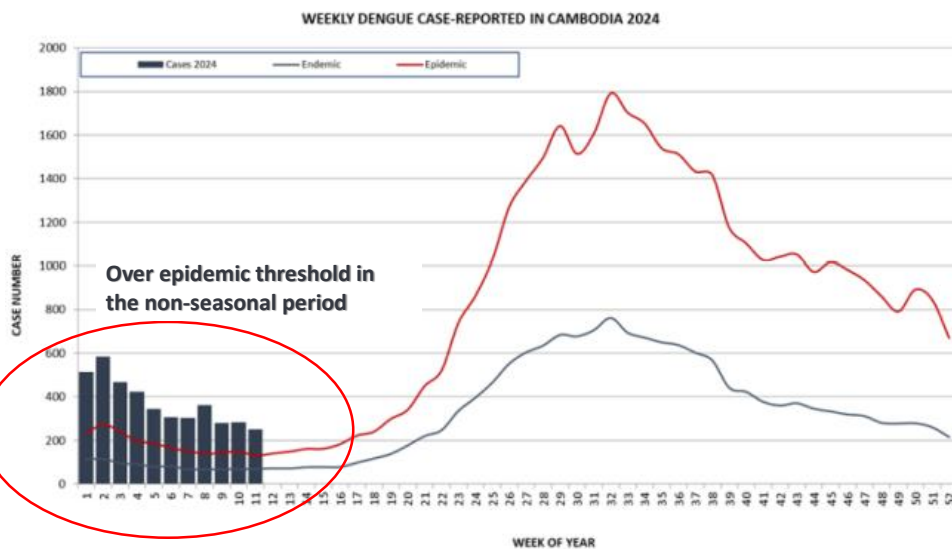
Source: Plataforma de Información en Salud (PLISA) OPS/OMS
*Suspected Cases

Kindly shared by Thais dos Santos/ OPS Washington



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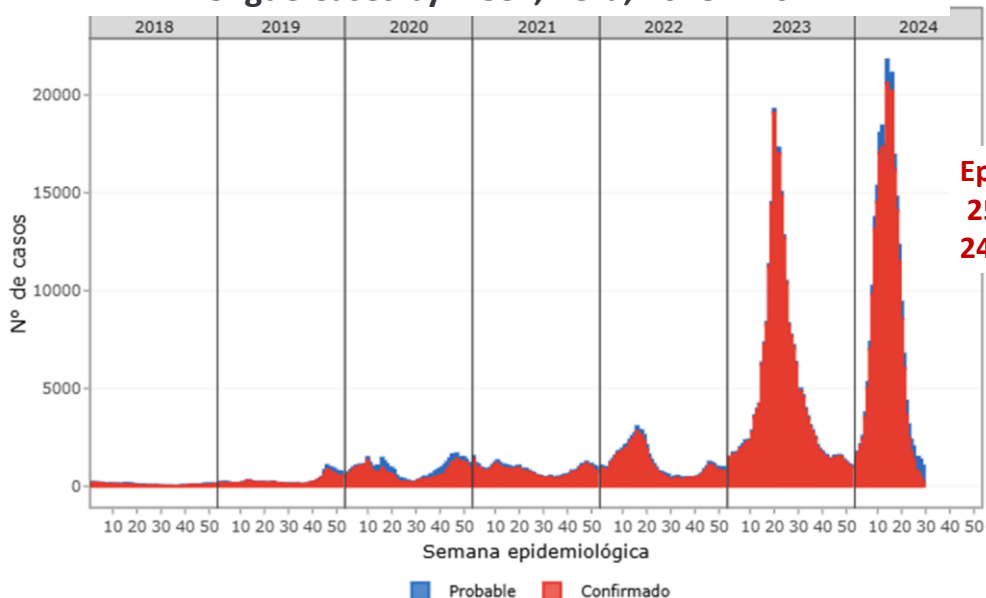
Dengue cases reported weekly in 2024 vs endemic and epidemic alert lines in Cambodia



https://cdn.who.int/media/docs/default-source/wpro---documents/emergency/surveillance/dengue/dengue-20240328.pdf?sfvrsn=fc80101d_139

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Dengue Cases by week, Peru, 2018 – 2024*

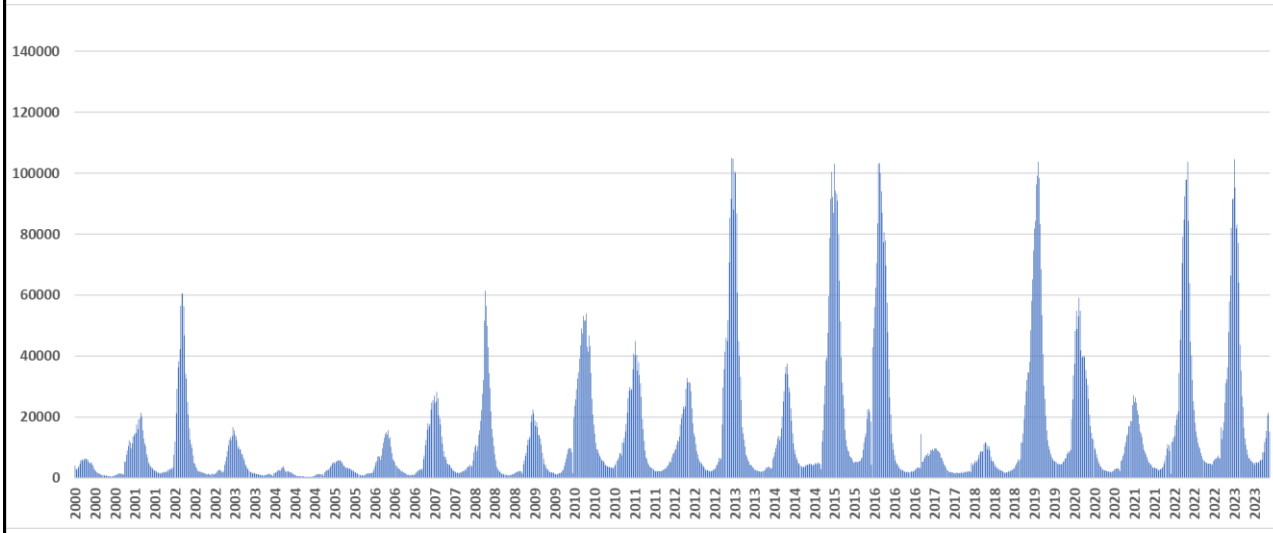


Epi Week 29/2024:
259.129 cases
241 deaths

Fuente: Centro Nacional de Epidemiología, Prevención y Control de Enfermedades - MINSA. (*) Hasta la SE 29
Sala situacional de Dengue (dge.gob.pe)

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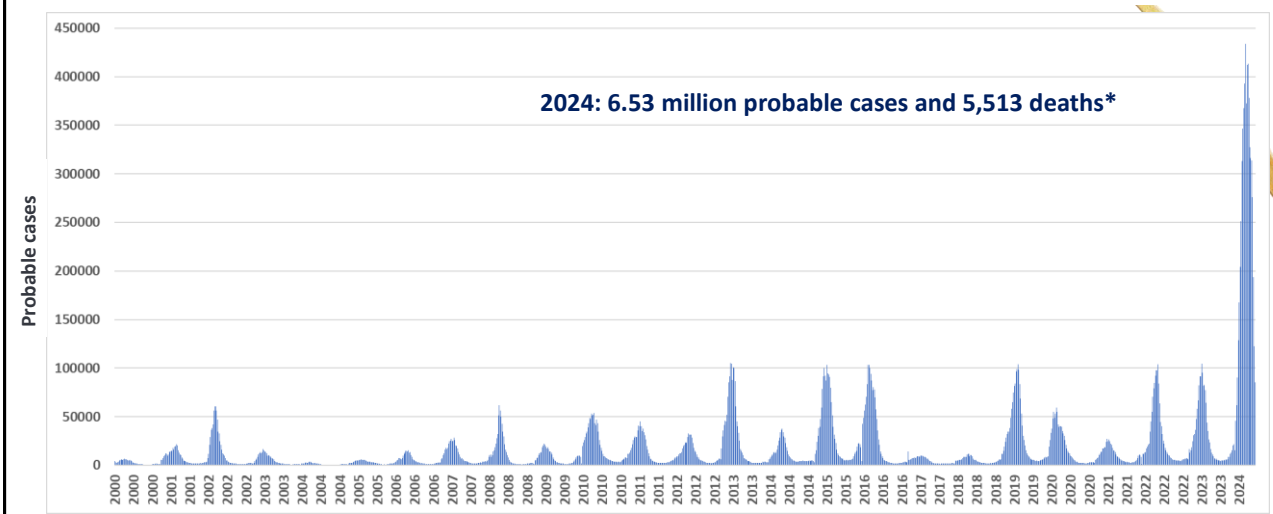
Number of Dengue Cases by week, Brazil, 2000- 2023



Source: Sinan/SVSA/MS <http://tabnet.datasus.gov.br/cgi/defthtm.exe?sinanet/cnv/denguebbr.def>
<https://www.gov.br/saude/pt-br/assuntos/saude-de-a-a-z/a/aedes-aegypti/monitoramento-das-arboviroses>



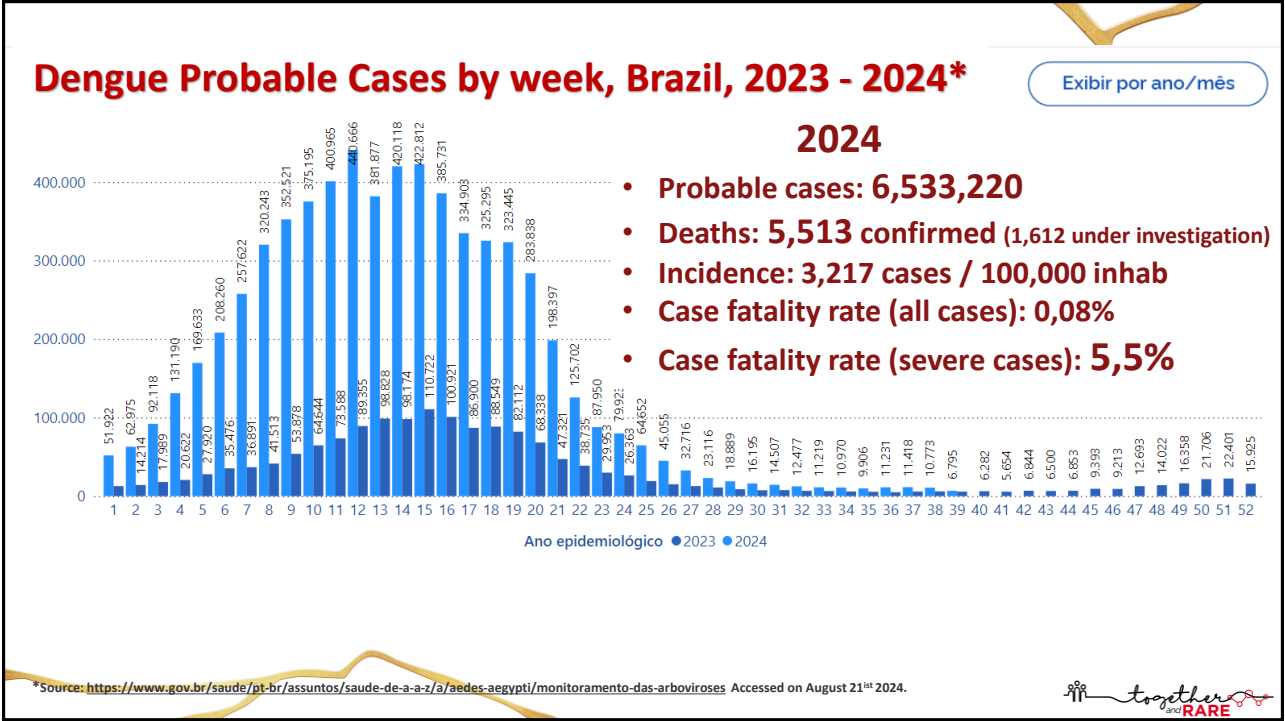
Number of Dengue Cases by week, Brazil, 2000- 2024*



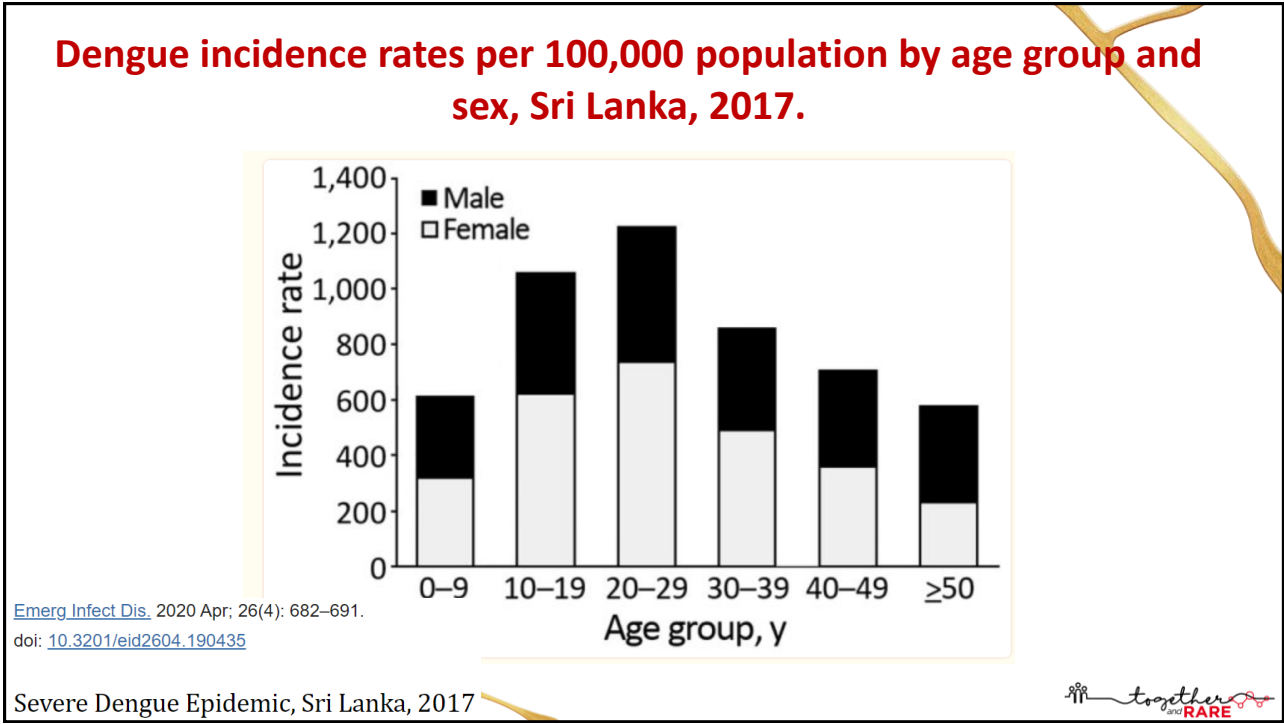
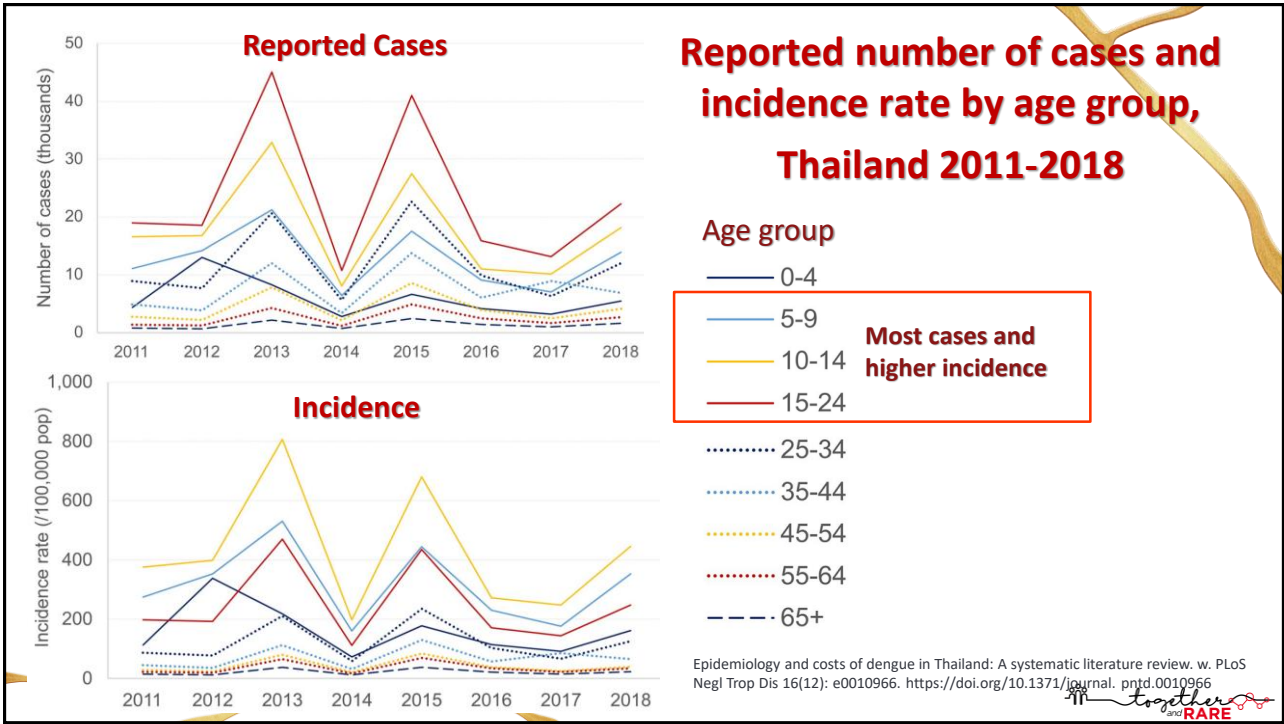
2024: 6.53 million probable cases and 5,513 deaths*

*Preliminary data 02/08/2024. Additional 1,612 deaths currently under investigation
Source: Sinan/SVSA/MS <http://tabnet.datasus.gov.br/cgi/defthtm.exe?sinanet/cnv/denguebbr.def>
<https://www.gov.br/saude/pt-br/assuntos/saude-de-a-a-z/a/aedes-aegypti/monitoramento-das-arboviroses>

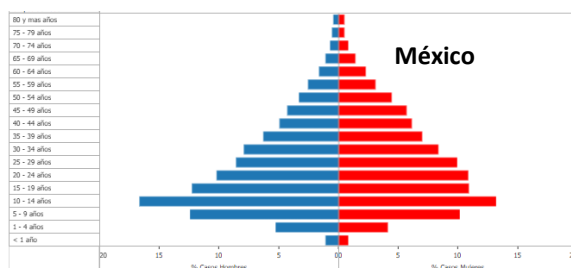
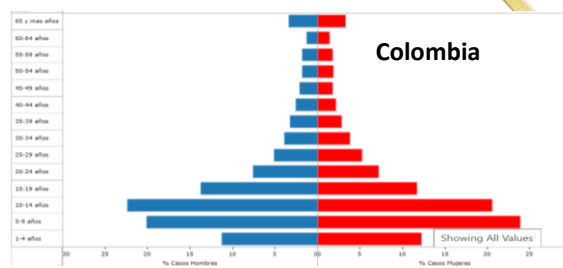
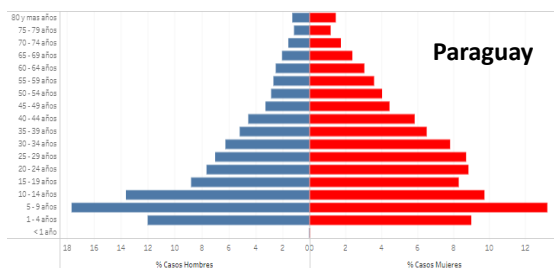




Who is getting sick?



Dengue cases by age group in selected countries, 2024*



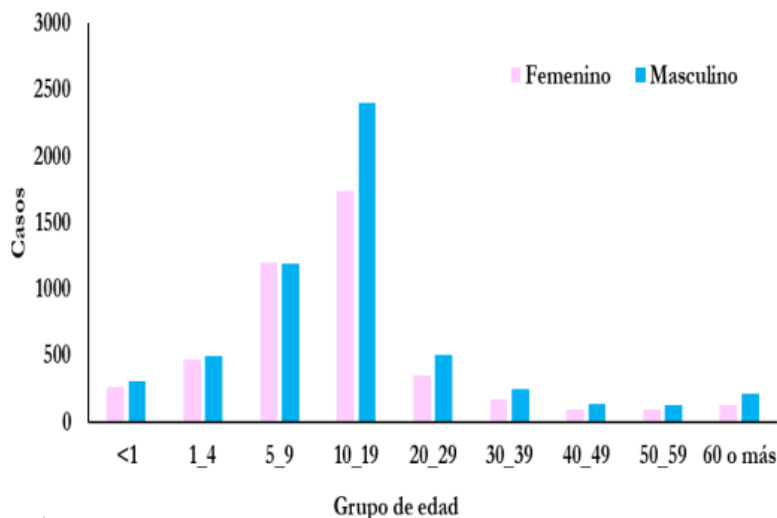
*Epidemiological week 15

Source: Plataforma de Información en Salud (PLISA) OPS/OMS



Dengue cases by age group, Dominican Republic, 2022

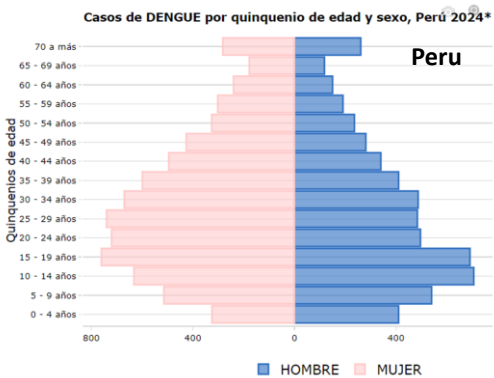
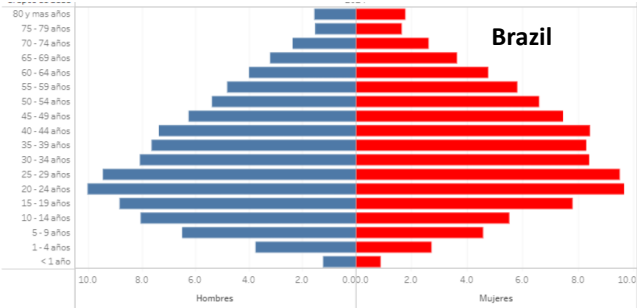
Fig.-2. Distribución de casos probables de dengue según grupo de edad y sexo desde la SE 01 hasta la SE 48 de 2022. República Dominicana.



<https://digepti.gob.do/media/r1ilfdb1/boletin-semanal-48-2023.pdf>



Dengue cases by age group in selected countries, 2024*



Source: Plataforma de Información en Salud (PLISA) OPS/OMS

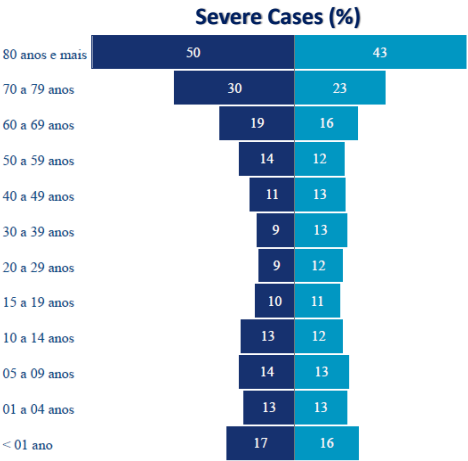
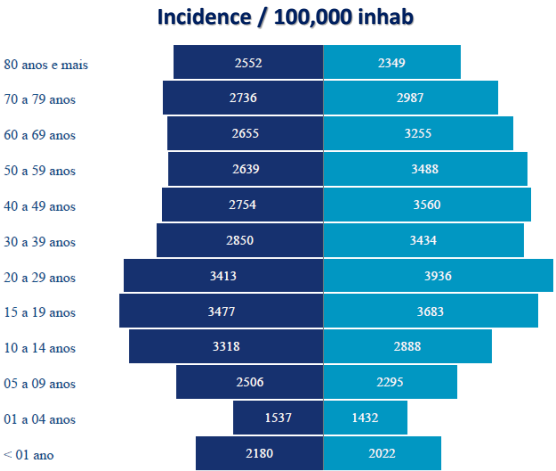
Fuente: Centro Nacional de Epidemiología, Prevención y Control de Enfermedades - MINSA. (*) Hasta la SE 5

<https://www.dge.gob.pe/sala-situacional-dengue/#grafico01>

*Epidemiological week 15



Dengue incidence by age group and sex and proportion , EW 1-26, Brazil, 2024



Legenda: ■ Masculino ■ Feminino

Fonte: SINAN.



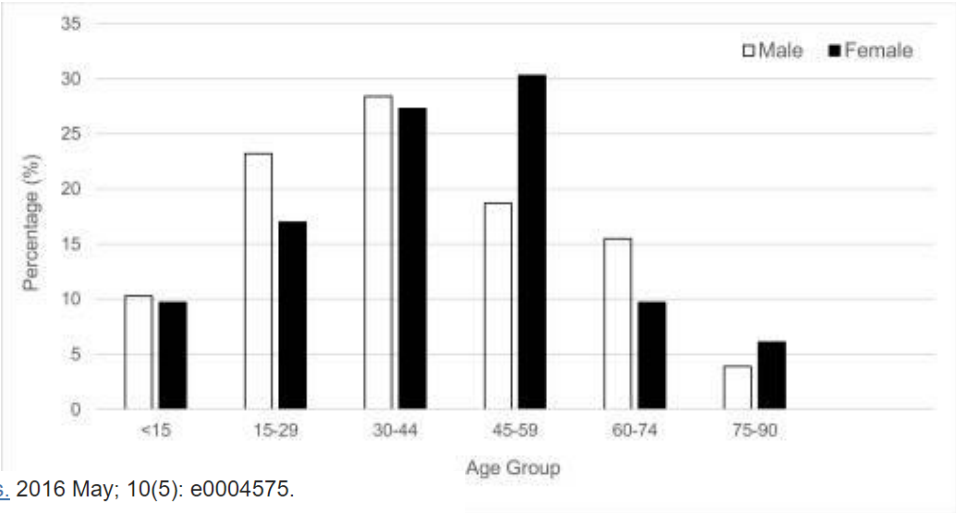
<https://www.gov.br/saude/pt-br/assuntos/saude-de-a-a-z/a/arboviroses/informe-semanal/informe-semanal-no-21.pdf/view>

What about the deaths?



A Two-Year Review on Epidemiology and Clinical Characteristics of Dengue Deaths in Malaysia, 2013-2014

Mortality distribution across different age groups (of 15-year intervals) by gender.



PLoS Negl Trop Dis. 2016 May; 10(5): e0004575.
Published online 2016 May 20. doi: [10.1371/journal.pntd.0004575](https://doi.org/10.1371/journal.pntd.0004575)



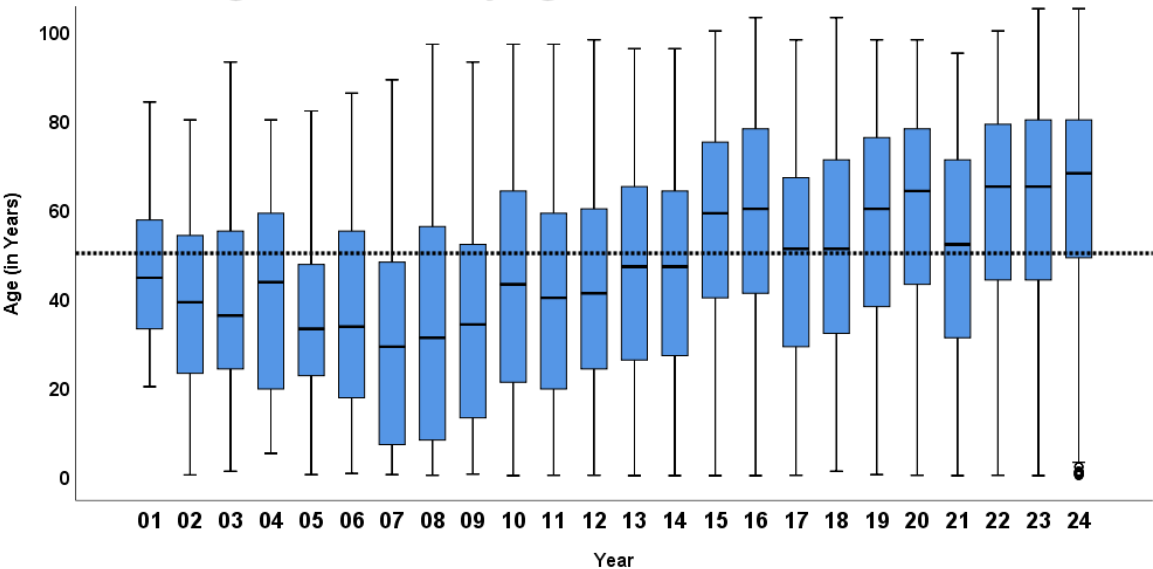
Dengue cases in Peru by age group, 2024

	N° Casos	%	TIA x 100000 Hab.	Fallecidos	Letalidad (%)
Según curso de vida					
Niños (0 - 11 años)	36927	14.2	556.36	15	0.04
Adolescentes (12 - 17 años)	33840	13	956.75	3	0.01
Joven (18 - 29 años)	56706	21.9	845.22	16	0.03
Adulto (30 - 59 años)	103875	40	797.72	73	0.07
Adulto mayor (60 + años)	28154	10.8	669.32	135	0.48

<https://www.dge.gob.pe/sala-situacional-dengue/#grafico01>



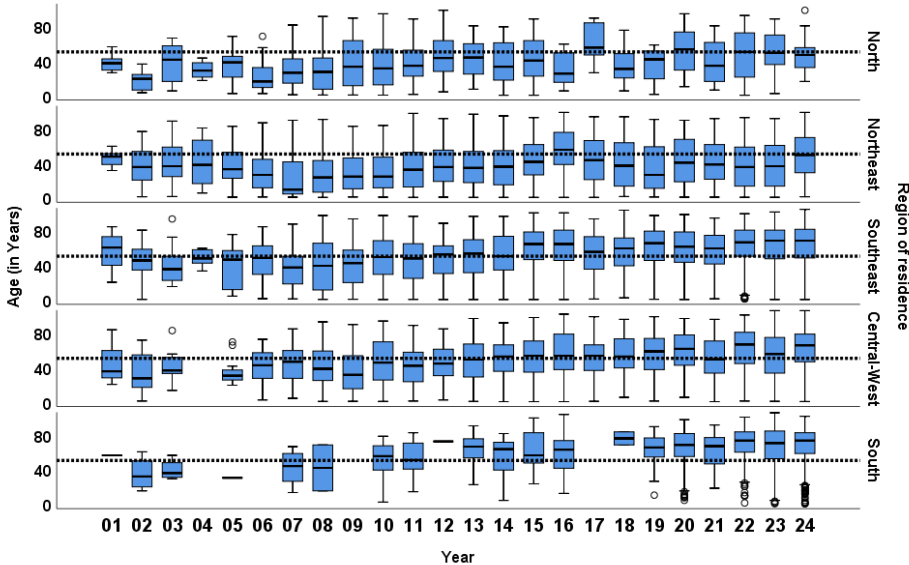
Dengue deaths by age, Brazil, 2001 – 2024*



Source: Notifiable Diseases Information System (Sinan/SVS).
*Data updated on 11/06/2024



Dengue deaths by age and region of residence, Brazil, 2001 – 2024*



Source: Notifiable Diseases Information System (Sinan/SVS). *Data updated on 11/06/2024

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International Journal of Infectious Diseases

journal homepage: www.elsevier.com/locate/ijid



International Journal of Infectious Diseases 122 (2022) 521–528

Epidemiology and costs of dengue in Brazil: a systematic literature review

- From a societal perspective, the estimated costs of dengue, including ambulatory, hospital, and fatal cases, varied from **\$516.79 million (2009) to \$1688.3 million (2013)** USD after adjusting for under-reporting (Martelli et al., 2015).
- Shepard et al reported an **overall annual aggregated cost of \$1014.3 million USD**, with more than half of the cost related to ambulatory cases (\$678.56 million USD) and **indirect costs** (\$859.77 million USD) (Shepard et al., 2016).

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Ministry of Health Response for Diagnosis



Sorologia
dengue, Chikungunya e Zika

Reações distribuídas¹
1.532.066

¹ Dados atualizados em 24/09/2024. Fonte: CGLAB



Biologia Molecular
ZDC

Reações distribuídas¹
905.180

¹ Dados atualizados em 24/09/2024. Fonte: CGLAB

Larvicide and insecticide distributed



Inseticidas
dengue, chikungunya e Zika

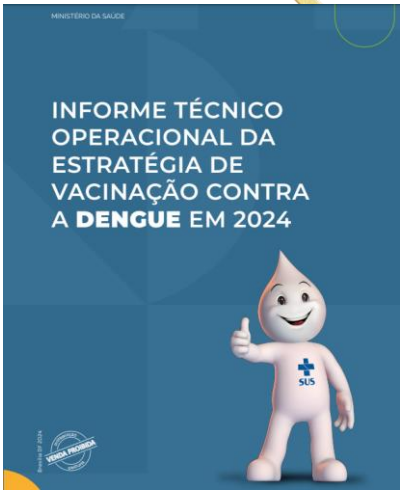
Insumos distribuídos³
Larvicida: 172.079 Kg
Adulticida para PE: 11.710 Kg
Adulticida para UBV: 312.360 L

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Dengue vaccine in the National Immunization Program

- Licensed in Brazil: 4-60 years of age
- December 21st 2023 – Incorporated in the NIP
- Target population: 10 -14 years of age
- Over 2.3 million doses in the public health system
- Over 1.1 million doses in private clinics
- Vaccine coverage needs to improve



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Final remarks

- Increasing trend of dengue cases and deaths in the Americas
- High burden in older children and adolescents
- Deaths mostly in the elderly (Brazil and Peru)
- Complex scenario - 3 urban arbovirus (DENV, ZIKAV, CHIKV) and new Oropouche dispersion
- Challenge for the vaccines – program objectives, communication, rumors, travelers



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Thank you

