VII Jornadas Actualización en Inmunizaciones 2026

XX Aniversario Curso Latinoamericano Actualización en Inmunizaciones a Distancia

"Acercando el conocimiento, acortando distancias y uniendo a Latinoamérica a través de las inmunizaciones"

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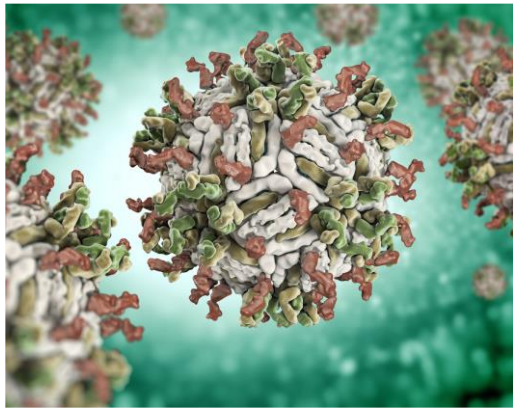
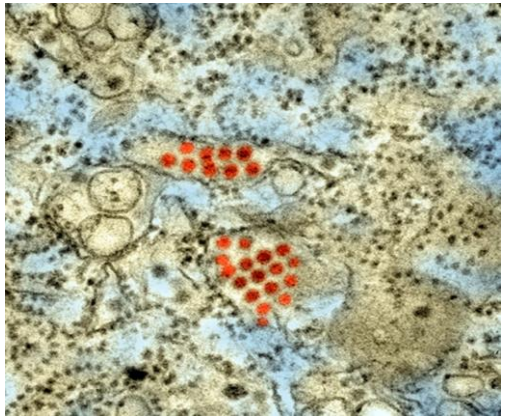
Dengue Vaccine Development: Challenges, Progress, and Lessons Learned. A vaccine for routine immunization programs?

Marco Aurélio P. Sáfadi. MD, PhD

Santa Casa de São Paulo

Dengue Vaccine Development: Challenges, Progress, and Lessons Learned. A vaccine for routine immunization programs?





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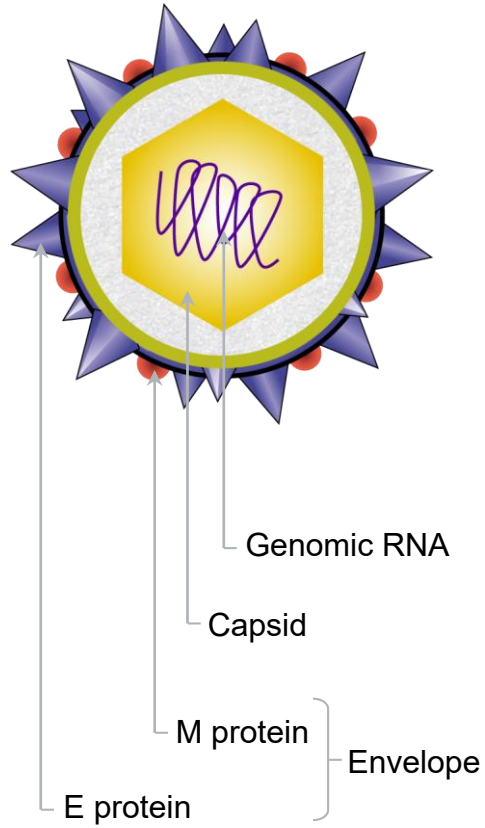
Disclosure

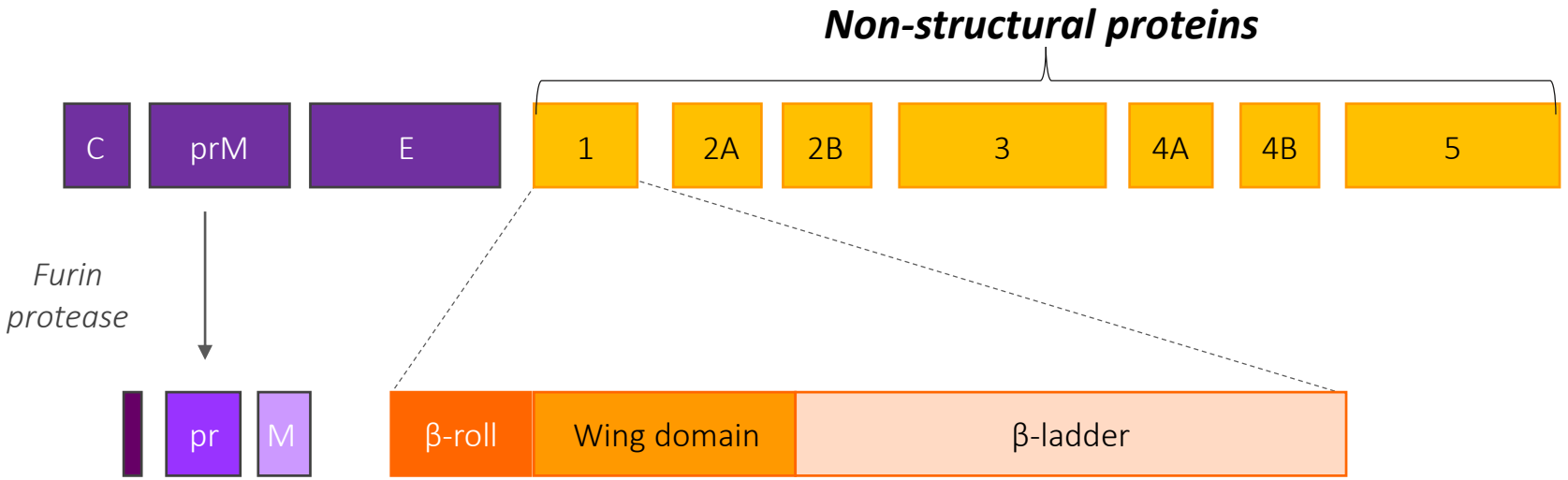
Marco Aurélio Sáfadi MD. PhD

- Consultant for SAGE from the WHO
- Consultant AdHoc for ANVISA
- Member of the CEPI Scientific Committee.
- Member of the Ministry of Health Brazilian Advisory Committee on Immunization
- Research grants, speaker's fee and participation in *advisory boards from* GSK, Pfizer, Takeda and Sanofi.
- Member of the Independent safety monitoring board for vaccines from Meta-DSMB

Dengue Virus

- Arbovirus, belongs to the Flaviviridae family.
- DENV is a small icosahedral enveloped single stranded RNA virus, which enclosed three types of structural proteins including capsid (C), envelope (E) and membrane (M) and seven non-structural (NS) proteins such as NS1, NS2A, NS2B, NS3, NS4A, NS4B and NS5 within its matured enveloped structure known as virions
- **Four antigenically distinct viruses DEN1, DEN2, DEN3 and DEN4.**





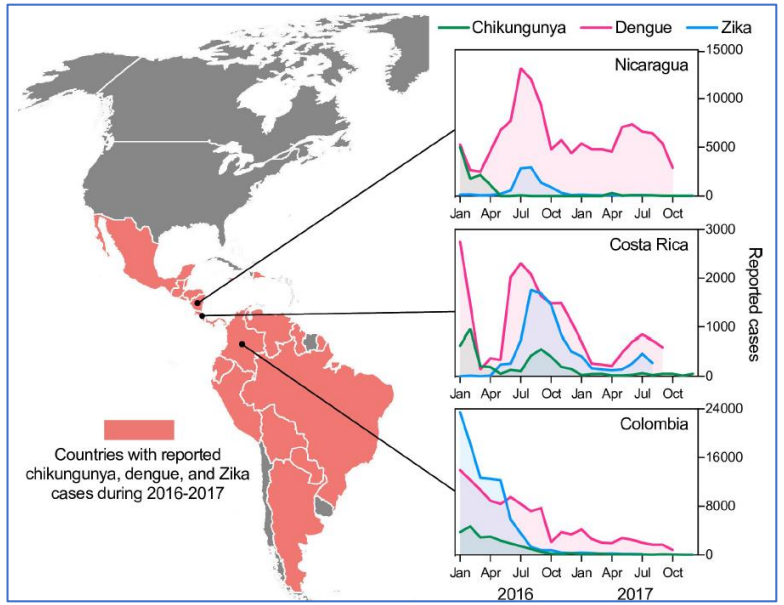
Kok et al. Virus Research 324 (2023) 199018

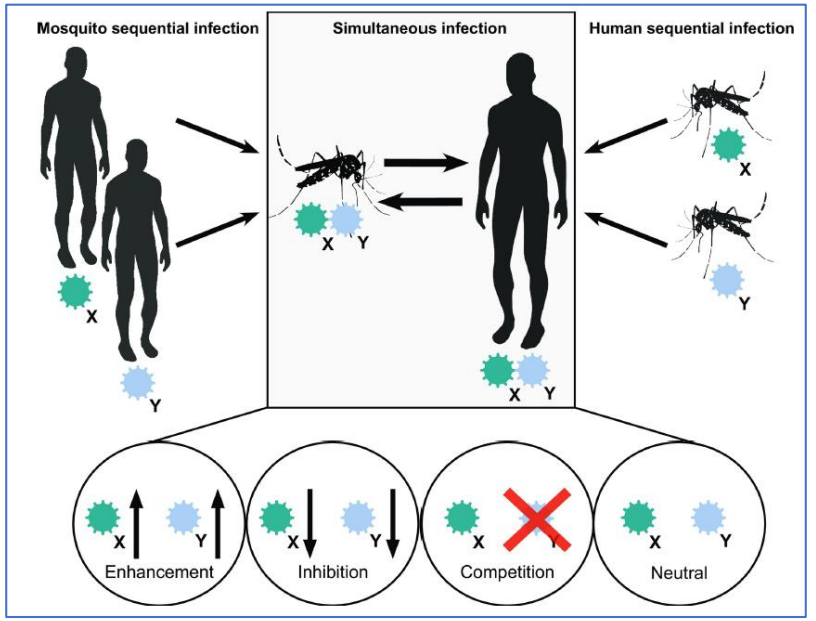
Do we have news on these controversial topics?

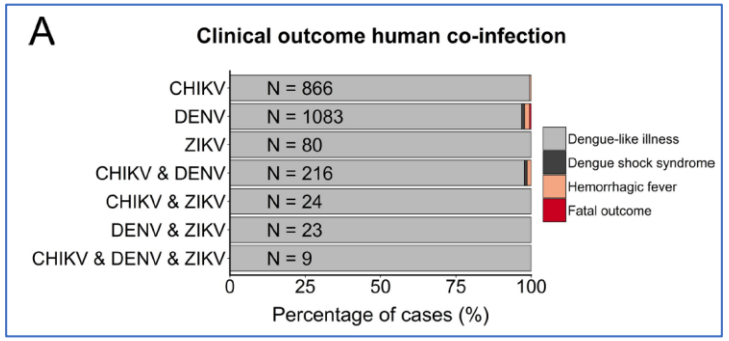
- What is the effect of previous flavivirus infection (eg ZIKV) or vaccination against a heterologous flavivirus (eg, yellow fever vaccination) on the severity of DENV infections or *vice-versa*?

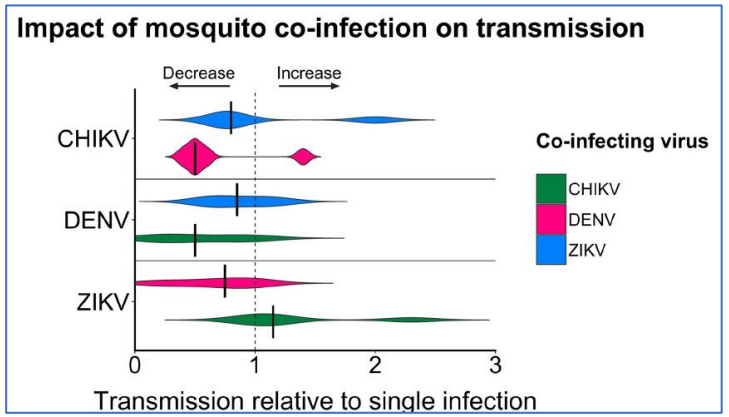
- Is there antibody-dependent enhancement between ZIKV, DENV, or other flaviviruses?

Arbovirus coinfection and co-transmission: A neglected public health concern?







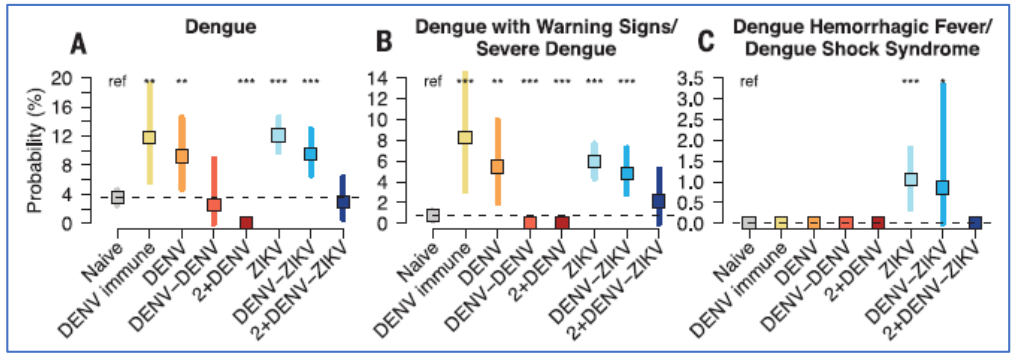


Despite the potential impact on public health, we know only little about the occurrence and consequences of coinfection of humans with multiple viruses such as chikungunya, dengue, and Zika.

PLOS Biology | https://doi.org/10.1371/journal.pbio.3000130

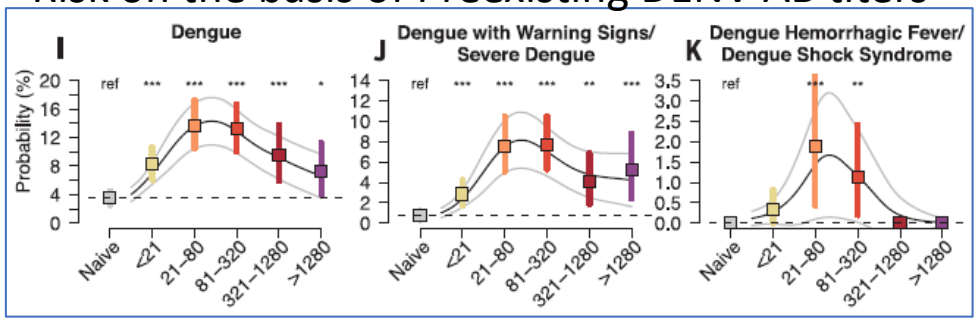
Risk of severe dengue disease according to previous ZIKV or DENV infection and previous immunity.

Prospective pediatric cohorts in Nicaragua, that experienced sequential DENV1 to -3 (2004 to 2015), Zika (2016 to 2017), and DENV2 (2018 to 2020) epidemics.

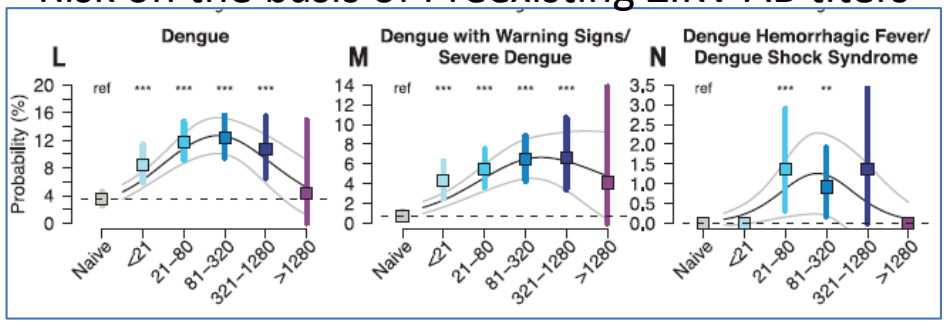


- ✓ Risk of symptomatic DENV2 infection and severe disease was elevated by one prior ZIKV infection, one prior DENV infection, or one prior DENV infection followed by one ZIKV infection, compared with being flavivirus-naïve.
- ✓ By contrast, multiple prior DENV infections reduced dengue risk.

Risk on the basis of Preexisting DENV AB titers



Risk on the basis of Preexisting ZIKV AB titers

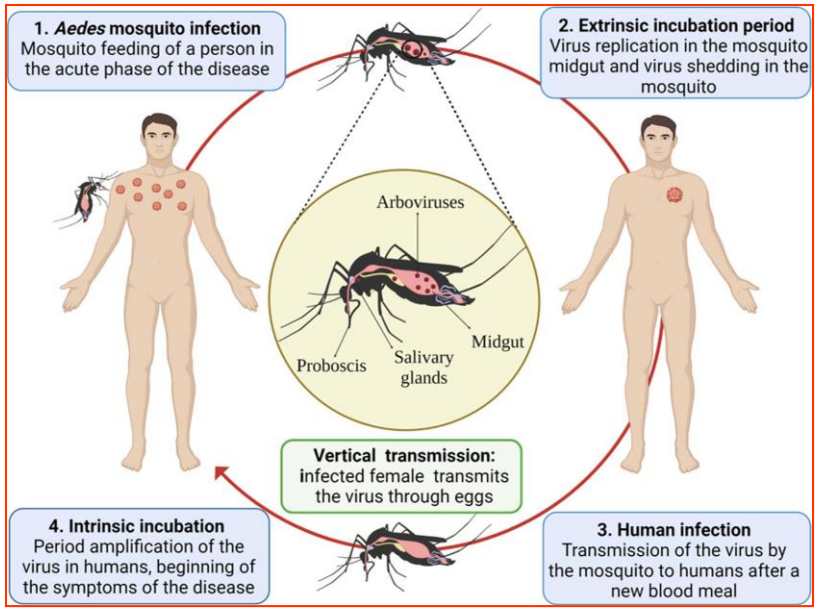


- ✓ Although high preexisting DENV antibody titers protected against DENV1, DENV3, and ZIKV disease, intermediate titers induced by previous ZIKV or DENV infection enhanced future risk of DENV2 and DENV3 severity.
- ✓ The observation that prior ZIKV infection can modulate dengue severity like a DENV serotype poses challenges to development of DENV and ZIKV vaccines.

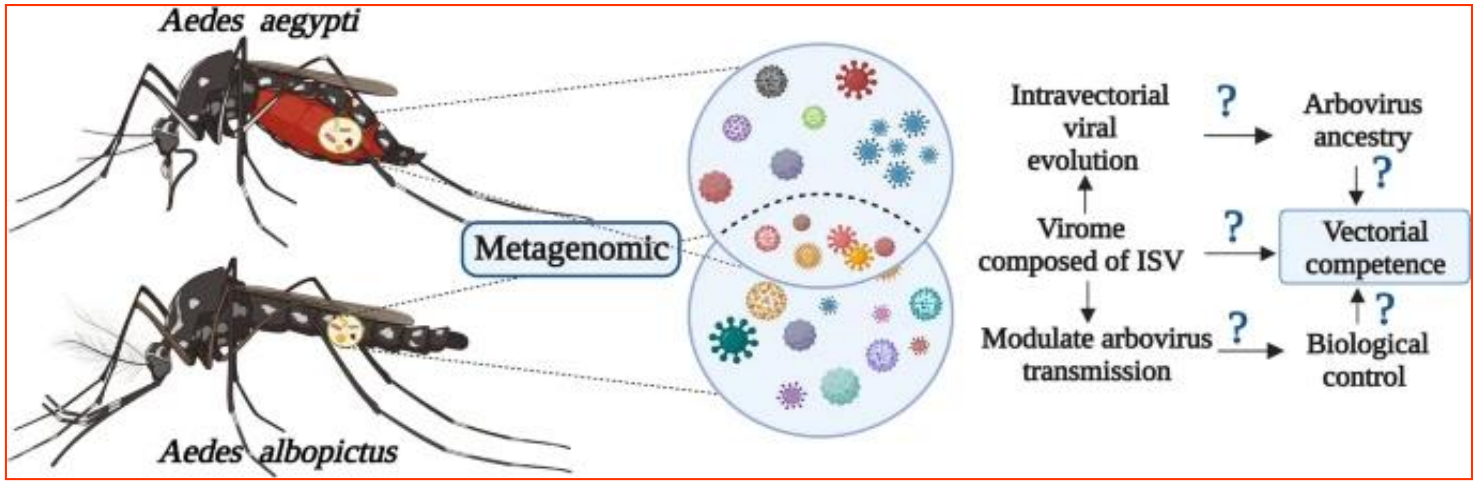
Katzelnick et al., Science, (2020)

Aedes aegypti and Aedes albopictus: the main vectors of DENV

The urban cycle of arboviruses in humans and mosquitoes



These two mosquito vectors have been described as highly competent in the transmission of arboviral pathogens such as DENV, ZIKV, and CHIKV



- Metagenomics studies have established that mosquito vectors harbor a highly conserved virome composed of insect-specific viruses, that can play a role in modulating arboviral transmission.
- Despite vector control efforts, in recent years an increase in the geographical distribution of *Aedes spp*. has been detected due to factors associated with climate change, globalization, urbanization, and resistance to different insecticides

Gómez et al. Parasites & Vectors (2022) 15:287

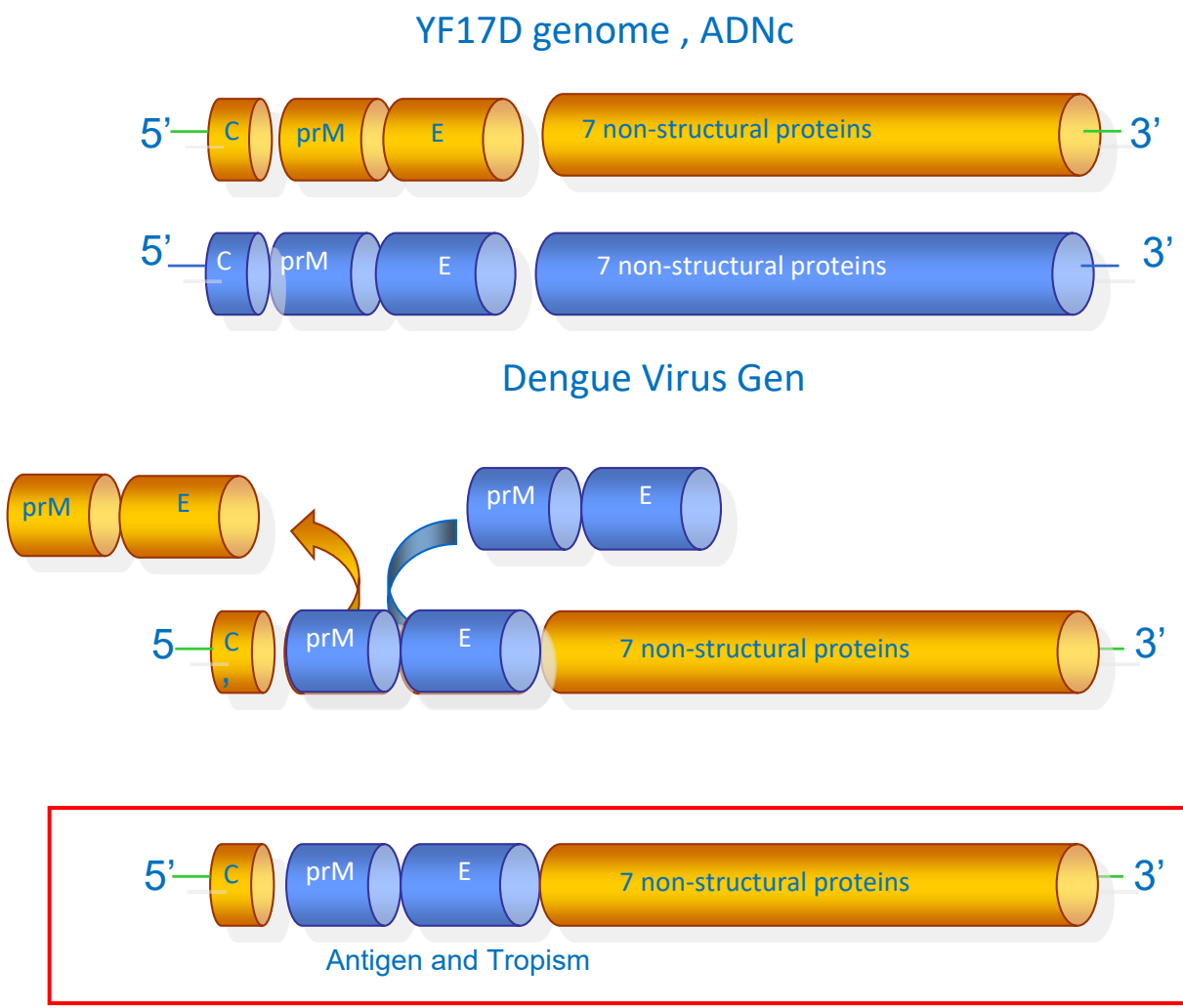
Dengue: a hidden threat in blood transfusions amidst Brazil's largest outbreak?

- All patients were children who were transfused multiple times following cardiac surgeries for complex congenital heart diseases, during the peak of Brazil's current outbreak.

Asymptomatic blood donors with DENV viraemia represent a potential source of TT-DENV transmission. Asymptomatic infections account for a substantial proportion of cases during large outbreaks, making them difficult to detect through routine screening.

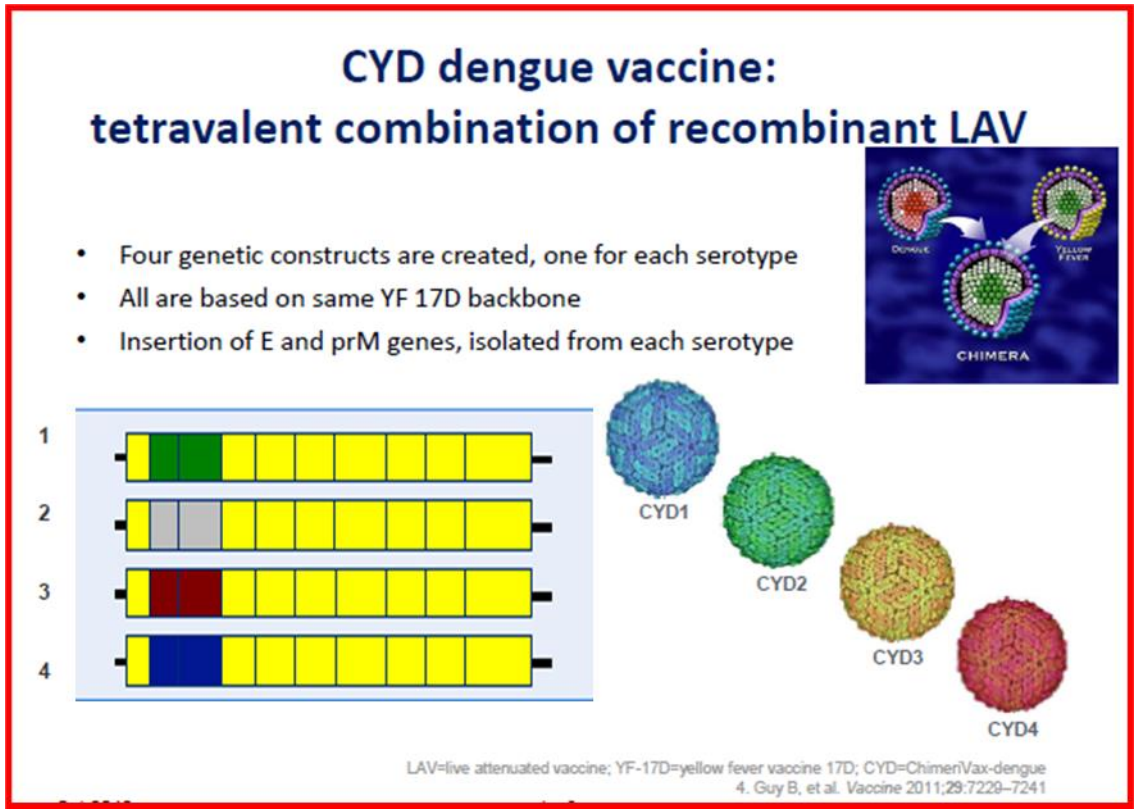
- We reported six cases of TT-dengue from two paediatric CICUs in São Paulo.
- There were four deaths

Dengue vaccine (Dengvaxia*) structure



Chimeric, recombinant, tetravalent live attenuated virus vaccine:

Yellow fever vaccine backbone



Huang et al. , Expert Review of Anti-infective Therapy, 2021

Dengvaxia Vaccine

- **Efficacy is variable**
  - In participants 9-16 years, overall efficacy against symptomatic virologically confirmed dengue of any severity was 65%
  - Lower protection against DEN-1 (58%) and DENV-2 (47%) comparing to DEN-3 (73%) and DEN-4 (83%)
  - Lower efficacy in children < 9 years as well as in dengue-naive individuals
- **Safety of CYD-TDV**
  - Increased hospitalization risk and severe disease in seronegative individuals
- **Current Use of CYD-TDV**
  - Licensed for use from age 9 up to age 45 or 60 depending on country
  - WHO recommendations – **only use in individuals with prior lab- confirmed dengue** infection and living in a dengue endemic area;
  - Sanofi decided not to further manufacture this vaccine, and it will be discontinued

a. Hou J, et al. Front Immunol. 2022; 13:840104; b. Hadinegoro SR et al. N Engl J Med 2015;373:1195-206; c Halsted SB, et al. J Infect Dis. 2016:214; d. https://www.ema.europa.eu/en/documents/product-information/dengvaxia-epar-product-information_en.pdf

A case-control study to determine the effectiveness of Dengvaxia vaccine in the state of Paraná, Brazil

- case-control study in the five most populous municipalities targeted by the vaccination, with a vaccine uptake of 25%.
- Symptomatic dengue cases were identified. The age groups targeted were 15−18y and 19−27y in four municipalities and 9−14y and 28−44y in one municipality.

- Study included 618 RT-qPCR-confirmed dengue cases and 1,236 matched controls. Vaccine effectiveness against dengue due to any serotype was 11.1% (95% CI: −19.0%; 33.6%).
- **Effectiveness against DENV-1 was 33.3% (95% CI: −5.0%; 57.6%), against DENV-2 was −56.7% (95% CI: −142.2%; −5.0%). DENV-3 did not circulate.**
- **The vaccine was significantly effective only for the prevention of DENV-4 cases (VE = 93.3%; 95% CI: 47.7%; 99.2%).**

	Odds Ratio (95% CI)	Vaccine Effectiveness (95% CI)
Vaccination	0·889 (0·664; 1·190)	+ 11·1% (− 19·0%; + 33·6%)
Age 15 to 18	1·150 (0·745; 1·777)	− 15·0% (− 77·7%; − 25·5%)
Age 19 to 27	0·679 (0·450; 1·024)	+ 32·1% (− 2·4%; + 55·0%)
Sex Female	0·682 (0·418; 1·112)	+ 31·8 (− 11·2%; + 58·2%)
Sex Male	1·158 (0·647; 2·072)	− 15·8 (− 107·2%; + 35·3%)
DENV-1	0·667 (0·424; 1·050)	+ 33·3% (− 5·0%; + 57·6%)
DENV-2	1·567 (1·015; 2·422)	− 56·7% (− 142·2%; − 1·5%)
DENV-4	0·068 (0·009; 0·523)	+ 93·2% (+ 47·7%; + 99·1%)
DENV-1		
Age 15 to 18	0·796 (0·395; 1·603)	+ 20·4% (− 60·3%; + 60·5%)
DENV-1		
Age 19 to 27	0·611 (0·335; 1·114)	+ 38·9% (− 11·4%; + 66·5%)
DENV2		
Age 15 to 18	2·014 (1·053; 3·851)	− 101·4% (− 285·1%; − 5·3%)
DENV2		
Age 19 to 27	1·105 (0·593; 2·058)	− 10·5% (− 105·8%; + 40·7%)
DENV4		
Age 15 to 18	0·200 (0·023; 1·700)	+ 80·0% (− 70·0%; + 97·7%)
DENV4	–	–
Age 19 to 27		
Reported as a dengue case in the past	–	–
Not reported as a dengue case in the past	0·907 (1·225−0·672)	+ 9·3% (− 22·5%; + 32·8%)

Table 3: **Effectiveness of a complete schedule (3 doses) CYD-TDV, state of Paraná, Brazil, 2016−2019.**

De Moraes JC et al. The Lancet Regional Health – Americas 2022; 7: 100141

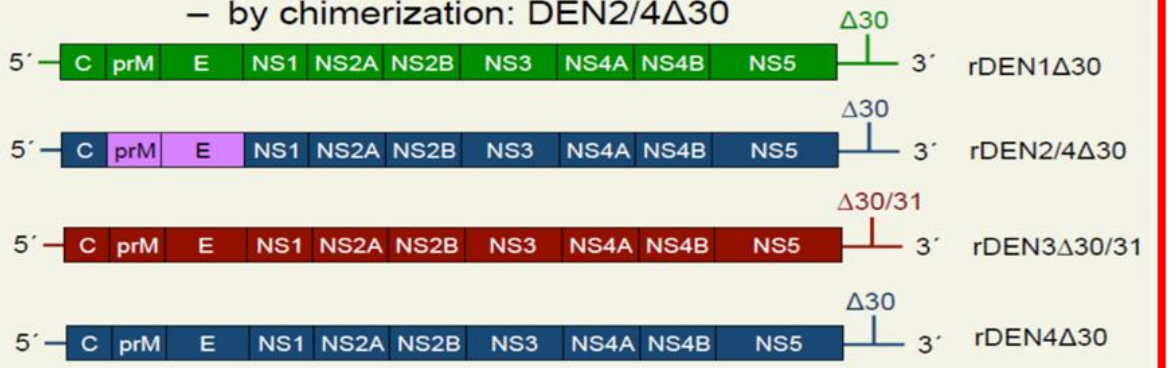
Butantan-DV/NIH TV-003 and TV-005

- Two candidates (TV003 and TV005) formulated with different amounts of the rDEN2/4D30 component[a]
- Butantan Institute has manufactured a lyophilised tetravalent live-attenuated dengue vaccine (Butantan-DV), analogous to the US NIH TV003 admixture[b]
- Licensed to several manufacturers (Instituto Butantan, Serum Institute of India, Panacea, Merck).

Admixture	Dose of each component (log_{10}PFU)	Monovalent vaccine component for indicated serotype			
		DENV-1	DENV-2	DENV-3	DENV-4
TV003	3, 3, 3, 3	rDEN1Δ30	rDEN2/4Δ30	rDEN3Δ30/31	rDEN4Δ30
TV005	3, 4, 3, 3	rDEN1Δ30	rDEN2/4Δ30	rDEN3Δ30/31	rDEN4Δ30

- All monovalent vaccine components have a DENV genetic background and share a core attenuating, 30-nucleotide deletion in the 3′ untranslated region of the viral genome, yielding replication-deficient attenuated viruses.
- **Only one component (rDEN2/4Δ30) is chimeric**, with the structural proteins of DENV-2 replacing those of DENV-4

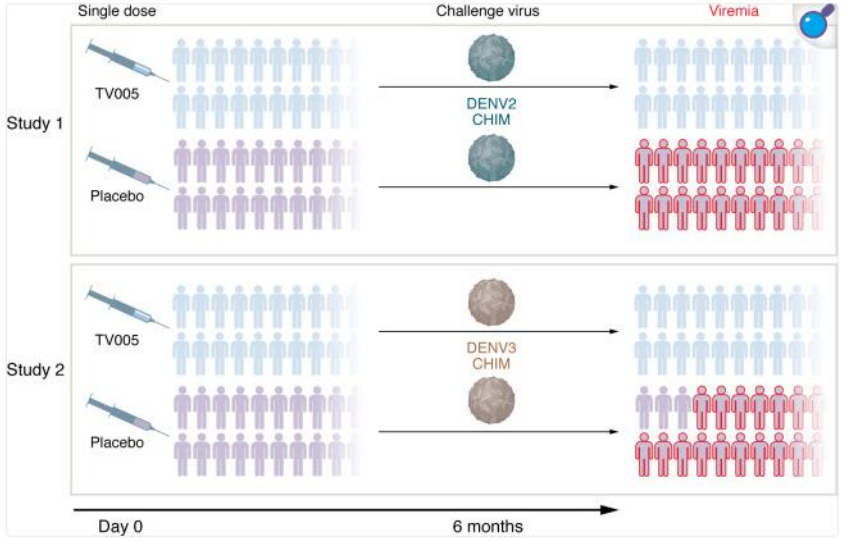
- Live attenuated tetravalent dengue vaccine
- Attenuated by 30-nucleotide deletion in 3′ UTR
  - DEN1Δ30, DEN3Δ30/31, DEN4Δ30 or
  - by chimerization: DEN2/4Δ30



a. Kirkpatrick et al. J Infect Dis. 2015;212:702–10. b. Kallas et al. Lancet Infect Dis. 2020;20(7):839–50

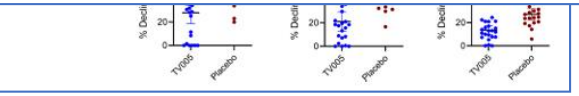
TV005 dengue vaccine protects against dengue serotypes 2 and 3 in two controlled human infection studies

Randomized controlled trials. TV005 or placebo (n = 21 each) and, 6 months later, challenge with dengue virus 2 (rDEN2Δ30) or dengue virus 3 (rDEN3Δ30)



	No. with viremia (%)	No. with rash (%)	No. with neutropenia (%)[A]
After DENV2 challenge			
TV005 vaccinees + DENV2 challenge (*n* = 21)	0	0	0
Placebo + DENV2 challenge (*n* = 21)	21 (100%)	21 (100%)	1 (4.8%)
P value[B]	<0.0001	<0.0001	0.50
After DENV3 challenge			
TV005 vaccinees + DENV3 challenge (*n* = 23)	0	0	2 (8.7%)
Placebo + DENV3 challenge (*n* = 20)	17 (85%)	20 (100%)	5 (25%)
P value[B]	<0.0001	<0.0001	0.15

The TV005 vaccine was well tolerated and protected all vaccinated volunteers from viremia with DENV2 or DENV3 (none infected in either group).
Placebo recipients had post-challenge viremia (100% in Study 1, 85% in Study 2) and all had post-challenge rash with either serotype.



Clin Invest. 2024;134(3):e173328.

Efficacy and safety of Butantan-DV in participants aged 2–59 years through an extended follow-up trial in Brazil

Phase 3 study included ~ 16,000 volunteers that received single-dose Butantan-DV (10,259) or placebo (5,976).

Vaccine efficacy against symptomatic virologically confirmed dengue, overall and according to baseline serostatus, serotype, and age subgroup, through an average of 3·7 years of follow-up

Participants aged 2–59 years

	Incidence rate estimate (95% CI)		Vaccine efficacy (95% CI)
	Butantan DV- (n=10 215)	Placebo (n=5947)	
Any DENV serotype			
Regardless of serostatus	0·34 (0·28–0·40)	1·04 (0·91–1·18)	67·3% (59·4 to 73·9)
With previous exposure	0·22 (0·16–0·30)	0·95 (0·78–1·14)	76·7% (66·9 to 83·9)
Without previous exposure	0·49 (0·38–0·61)	1·22 (1·00–1·47)	60·2% (46·8 to 70·3)
DENV-1			
Regardless of serostatus	0·12 (0·09–0·16)	0·50 (0·41–0·60)	75·8% (65·8 to 83·1)
With previous exposure	0·07 (0·04–0·12)	0·37 (0·27–0·49)	80·8% (64·8 to 90·1)
Without previous exposure	0·19 (0·13–0·27)	0·71 (0·55–0·90)	73·2% (59·0 to 83·1)
DENV-2			
Regardless of serostatus	0·22 (0·17–0·27)	0·54 (0·44–0·64)	59·7% (46·5 to 69·8)

Participants aged 18–59 years

Any DENV serotype			
Regardless of serostatus	0·19 (0·13–0·27)	0·69 (0·54–0·87)	72·8% (57·5 to 82·8)
With previous exposure	0·18 (0·11–0·28)	0·65 (0·47–0·86)	72·6% (52·4 to 84·5)
Without previous exposure	0·22 (0·09–0·43)	0·93 (0·60–1·37)	76·4% (46·1 to 90·2)
DENV-1			
Regardless of serostatus	0·03 (0·01–0·08)	0·15 (0·09–0·24)	77·7% (40·4 to 92·2)
DENV-2			
Regardless of serostatus	0·16 (0·10–0·23)	0·54 (0·41–0·70)	71·4% (53·0 to 82·6)

Participants aged 7–17 years

Any DENV serotype			
Regardless of serostatus	0·38 (0·28–0·50)	1·28 (1·02–1·58)	70·6% (57·8 to 79·8)
With previous exposure	0·27 (0·17–0·41)	1·25 (0·93–1·65)	78·7% (64·0 to 87·6)
Without previous exposure	0·56 (0·36–0·83)	1·36 (0·93–1·92)	58·6% (29·4 to 75·9)
DENV-1			
Regardless of serostatus	0·15 (0·09–0·23)	0·70 (0·51–0·94)	78·9% (63·9 to 88·2)
DENV-2			
Regardless of serostatus	0·23 (0·15–0·33)	0·56 (0·40–0·78)	59·8% (34·4 to 75·5)
DENV-2			
Regardless of serostatus	0·29 (0·20–0·42)	0·49 (0·32–0·73)	40·4% (−3·4 to 65·8)

−25 0 25 50 75 100

The efficacy against symptomatic VCD vaccine in participants aged 2-59 years, regardless of baseline dengue status, was 67.3% (95% CI 59.4-73.9) against any serotype. The vaccine's efficacy was 75.8% (65.8–83.1) against DENV-1 and 59.7% (46.5–9.8) against DENV-2.

Nogueira M et al Lancet ID 2024

Efficacy and safety of Butantan-DV in participants aged 2–59 years through an extended follow-up trial in Brazil

Phase 3 study included ~ 16,000 volunteers that received single-dose Butantan-DV (10,259) or placebo (5,976).

	Butantan-DV (n=10 259)	Placebo (n=5976)	Total (n=16 235)
Participants with one or more adverse events	7288 (71·0%)	3725 (62·3%)	11 013 (67·8%)
Participants with one or more unsolicited adverse events	3751 (36·6%)	2170 (36·3%)	5921 (36·5%)
Participants with serious adverse events*	637 (6·2%)	395 (6·6%)	1032 (6·4%)
Participants who died	37 (0·4%)	30 (0·5%)	67 (0·4%)

*Three serious adverse events were associated with infants of the participants, not the participants themselves; all occurred at least 22 days after vaccination and none were considered to be related to study vaccine by the investigator.

Table 2: **Adverse event summary from day 0 after vaccination to the cutoff date (July 13, 2021)**

During follow-up, the proportion of participants who had SAEs was similar between the treatment groups (637 [6·2%] of 10 259 in the vaccine group and 395 [6·6%] of 5976 in the placebo group).

- **There were 19 cases (three in the vaccine group and 16 in the placebo group) of severe dengue or dengue with warning signs, regardless of hospital admission, during follow-up, resulting in a vaccine efficacy of 89·0% (95%CI: 62·5–97·3)**

Kallas E et al. NEJM 2024

5-year efficacy and safety data for the Butantan-DV vaccine[1]

A double-blind phase 3 trial conducted in Brazil

N=16,235
46.3% were dengue naïve

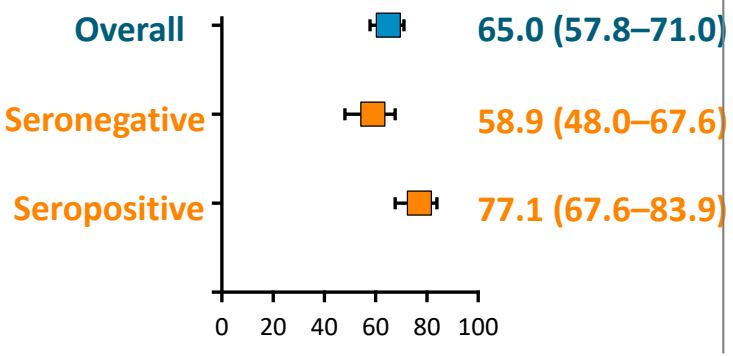
Butantan-DV
N=10,259

Randomized 2:1

Placebo
N=5,976

5-year follow-up

Vaccine efficacy against VCD through 5 years of follow-up (95% CI)

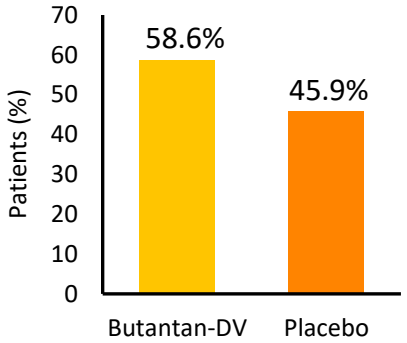


Serotype-specific vaccine efficacy (95% CI)

- **DENV-1: 73.0 (64.3–79.7)**
- **DENV-2: 55.7 (42.3–66.1)**
- **DENV-3 and DENV-4 were not identified during the study**

Safety

Non-serious solicited vaccine-related adverse events[a]



Summary of findings

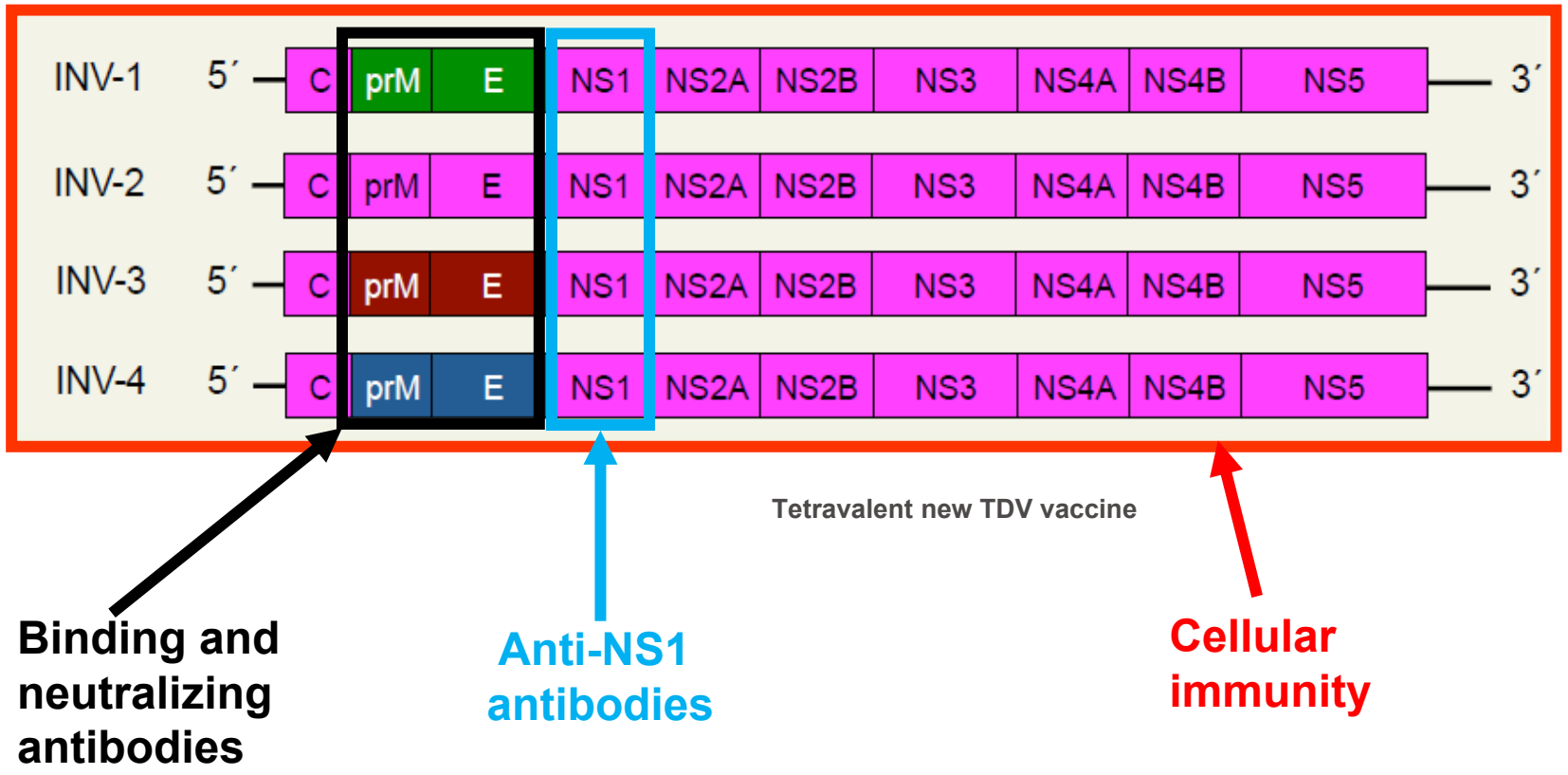
- The vaccine was efficacious against VCD due to DENV-1 or DENV-2
- No safety concerns were seen

[a]Within 21 days post-vaccination. CI, confidence interval; VCD, virologically confirmed dengue

References: 1. Nogueira ML, et al. ASTMH 2025 (abstract 6645). ASTMH 2025 abstracts are available at https://plan.core-apps.com/astmh25/abstracts (accessed April 2026).

TAK-003 vaccine (Takeda)

Immune response targets



TAK-003 is based on a live, attenuated DENV-2 virus backbone expressing E and prM proteins of all four DENV serotypes.

- TAK-003 was made using DENV2 as a basal platform, attenuated in primary dog kidney (PDK-53) cells.
- The prM and E genes of DENV1, DENV3, and DENV4 were used to substitute the corresponding genes of attenuated DENV2

1. Osorio JE, et al. Expert Rev Vaccines 2016;15:497–508; 2. Osorio JE, et al. Vaccine 2015;33:7112–7120; 3. Patel SS, et al. Clin Infect Dis 2022. doi:10.1093/cid/ciac418.

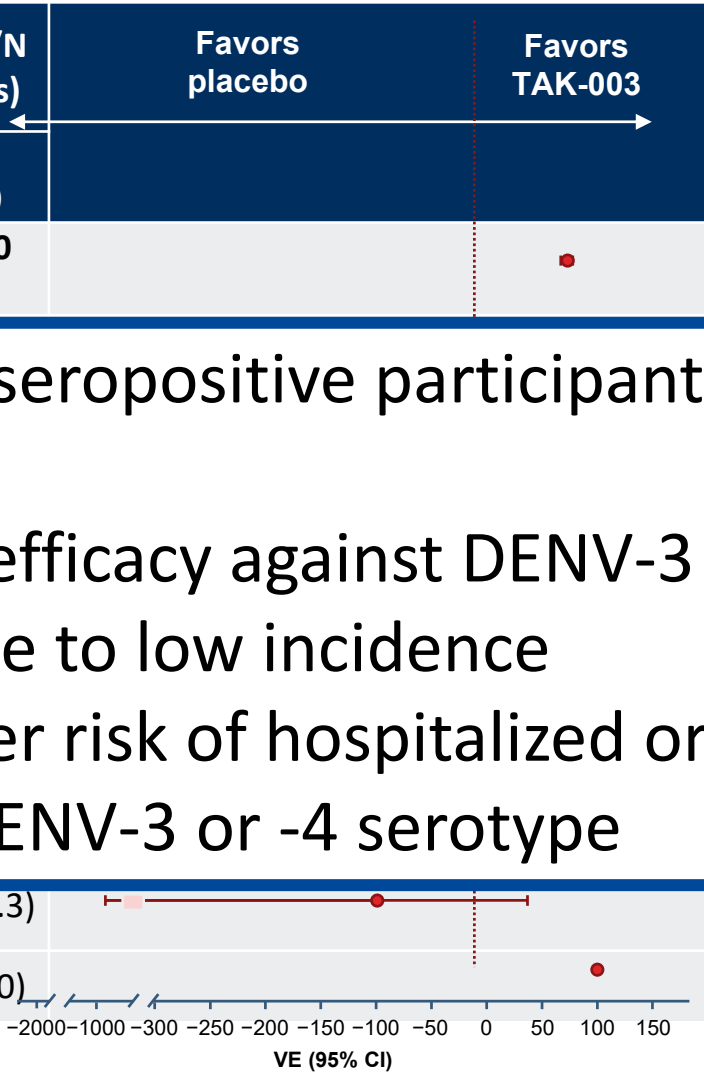
VE against hospitalized VCD showed varying efficacy by serotype and serostatus up to 54 months post 2nd dose

TAK-003 was efficacious against hospitalized VCD caused by all four serotypes in baseline seropositives and DENV-1 and DENV-2 in

– Efficacious against all four serotypes in baseline seropositive participants
– Among baseline seronegative participants:
➢Efficacious against DENV-1 and DENV-2 and No efficacy against DENV-3
➢The trial did not allow assessment of DENV-4 due to low incidence
➢Current Long-term follow-up did not find a higher risk of hospitalized or severe forms of dengue associated with TAK-003 and DENV-3 or -4 serotype

seronegatives was not possible due to low incidence

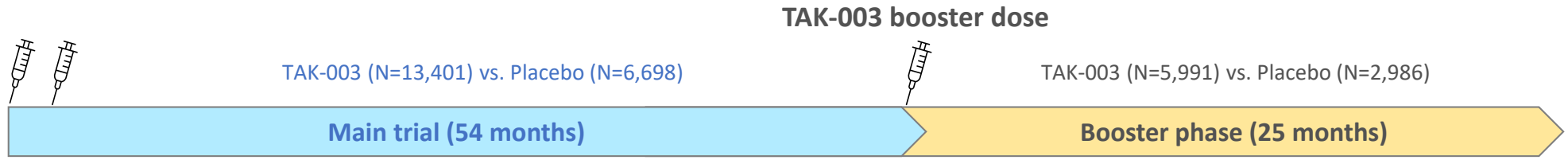
		VCD or hospitalized VCD, n/N (cases per 100 person-years)		VE (95% CI)
		Placebo (n=6687)	TAK-003 (n=13,380)	
Hospitalized VCD	**Overall**	**142/6687 (2.1)**	**46/13,380 (0.3)**	**84.1 (77.8, 88.6)**
	DENV-3	3/1832 (0.2)	11/3714 (0.3)	**47.6)**
	DENV-4	1/1832 (<0.1)	0/3714 (0.0)	**100.00 (NE)**



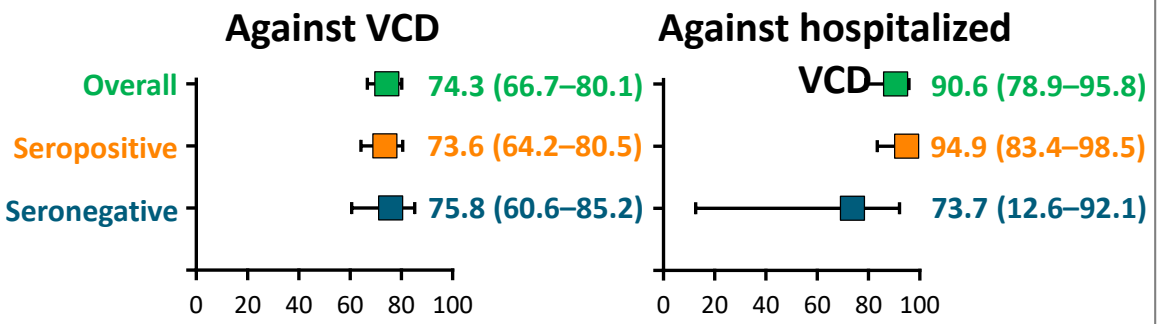
Tricou V, et al. *Lancet Glob Health* 2024; 12: e257–70 .

Evaluating a TAK-003 booster dose in healthy children and adolescents in endemic regions: results from DEN-301[1]

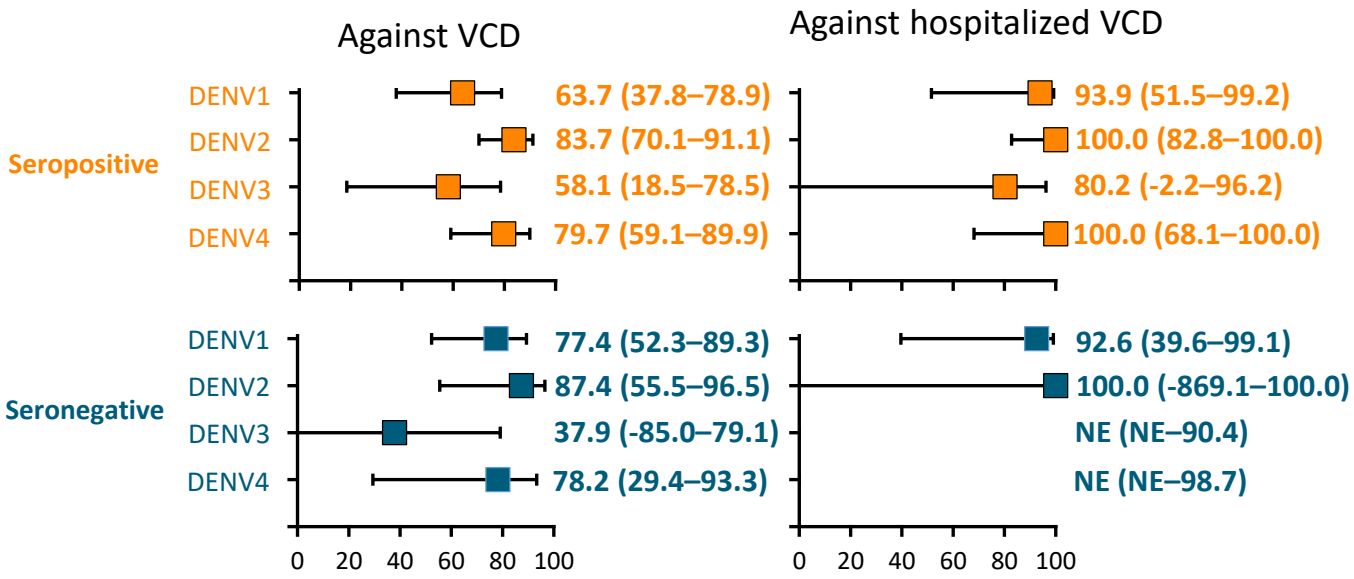
Assessing the effect of a booster dose given 4–4.5 years after the primary vaccination[a]



Vaccine efficacy 25 months post booster (95% CI)



Vaccine efficacy post booster (95% CI) by serotype



References: 1. Escudero I, et al. WSPID 2025 (OP010/#437). WSPID 2025 abstracts are available at https://wspid2025.com/abstract-e-book/ (accessed April 2026).

Real-world experience in Brazil with Dengue vaccine TAK-003 (Qdenga)

VV-MEDMAT-52686

Immunization Campaign in Brazil, 2024

- TAK-003 is licensed since march, 2023 for children from four years of age, adolescents and adults up to 60 years of age. Administration in a two-dose schedule, with a three-month interval between doses.
- Vaccination campaign with TAK-003 started in February, 2024, targeting adolescentes 10-14 years of age from determined cities, defined with previous high transmission of disease.
- The decision was driven by the limited supply of doses available (~6 million doses) for 2024 and the recommendation from WHO to prioritize the vaccination for the age group of 6-16 Years from regions with high dengue transmission intensity

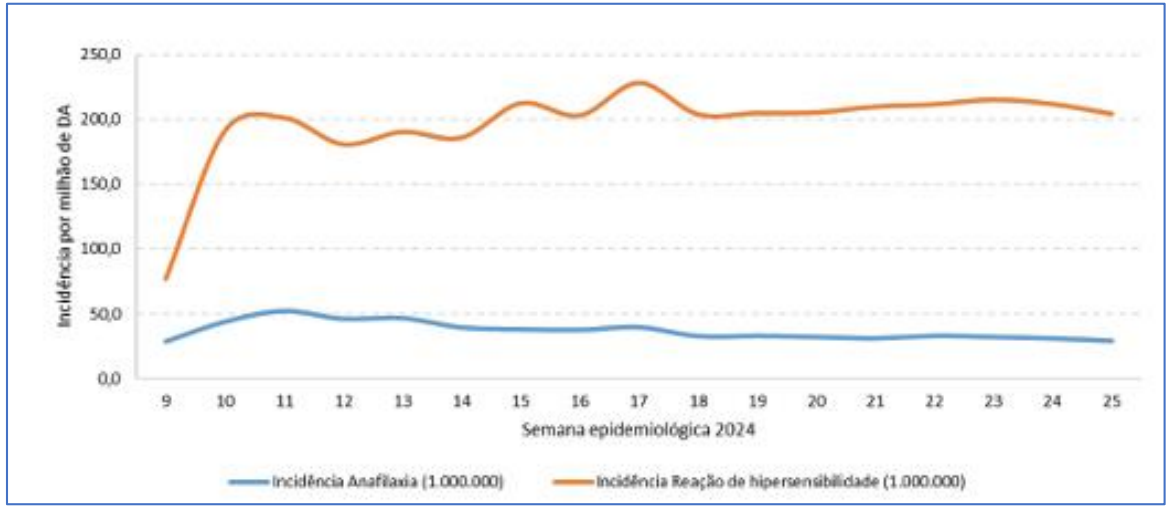
https://www.gov.br/saude/pt-br/centrais-de-conteudo/publicacoes/notas-tecnicas/2024/nota-tecnica-no-7-2024-cgfam-dpni-svsa-ms/

VV-MEDMAT-52686

Immunization Campaign in Brazil, 2024

- **After administration of the first 3.404.877 doses** , among the adverse events reports, regardless of severity classification, **124 cases of anaphylaxis (3.64/100,000 doses)**.
- **The median time between vaccination and symptom onset was 23 minutes** [3-240], with 25 (39.7%) cases onsetting symptoms within 15 minutes of administration of the vaccine.
- **None of the cases progressed to death.**

Rate of anaphylaxis and hypersensitivity reactions per epidemiological weeks, 2024, Brazil



Most cases of anaphylaxis presented clinical manifestations involving, in addition to the skin and mucous membranes, the respiratory system, followed by the circulatory and gastrointestinal systems.

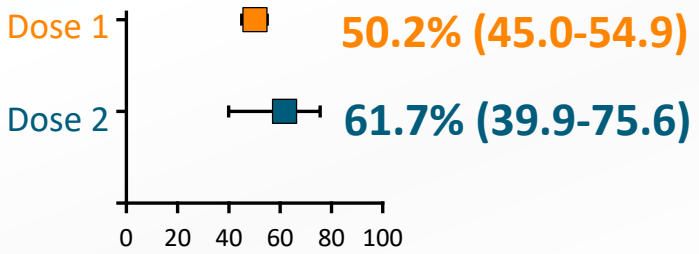
https://www.gov.br/saude/pt-br/centrais-de-conteudo/publicacoes/notas-tecnicas/2025/nota-tecnica-no-14-2025-cgfam-dpni-svsa-ms/view

Effectiveness of TAK-003 in adolescents in São Paulo, Brazil, during the 2024 outbreak[1,2]

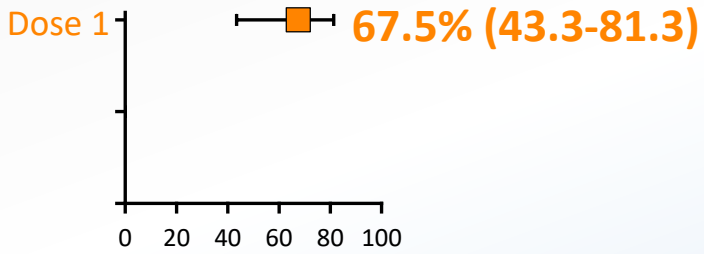
A test-negative, case-control study. Participants were adolescents aged 10–14 years.

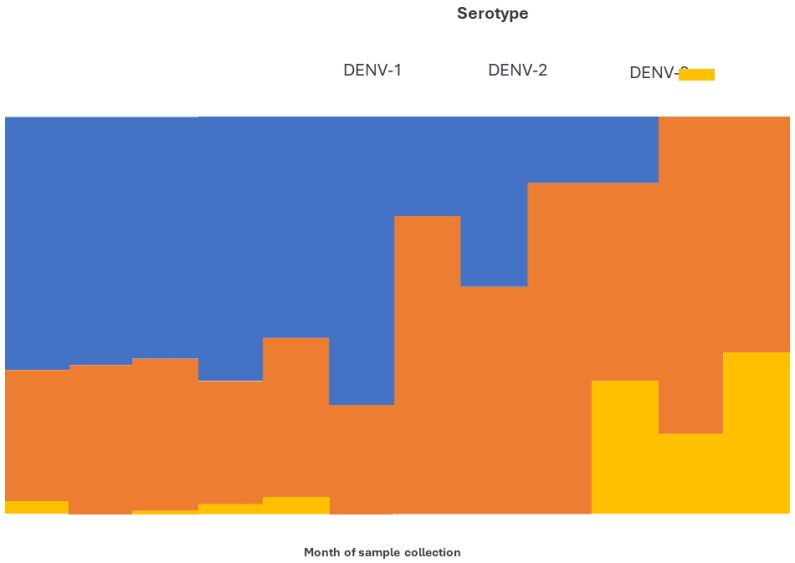
Vaccine effectiveness[a] (95% CI)

Against symptomatic VCD (N=92,621)



Against hospitalization with dengue (N=49,871)





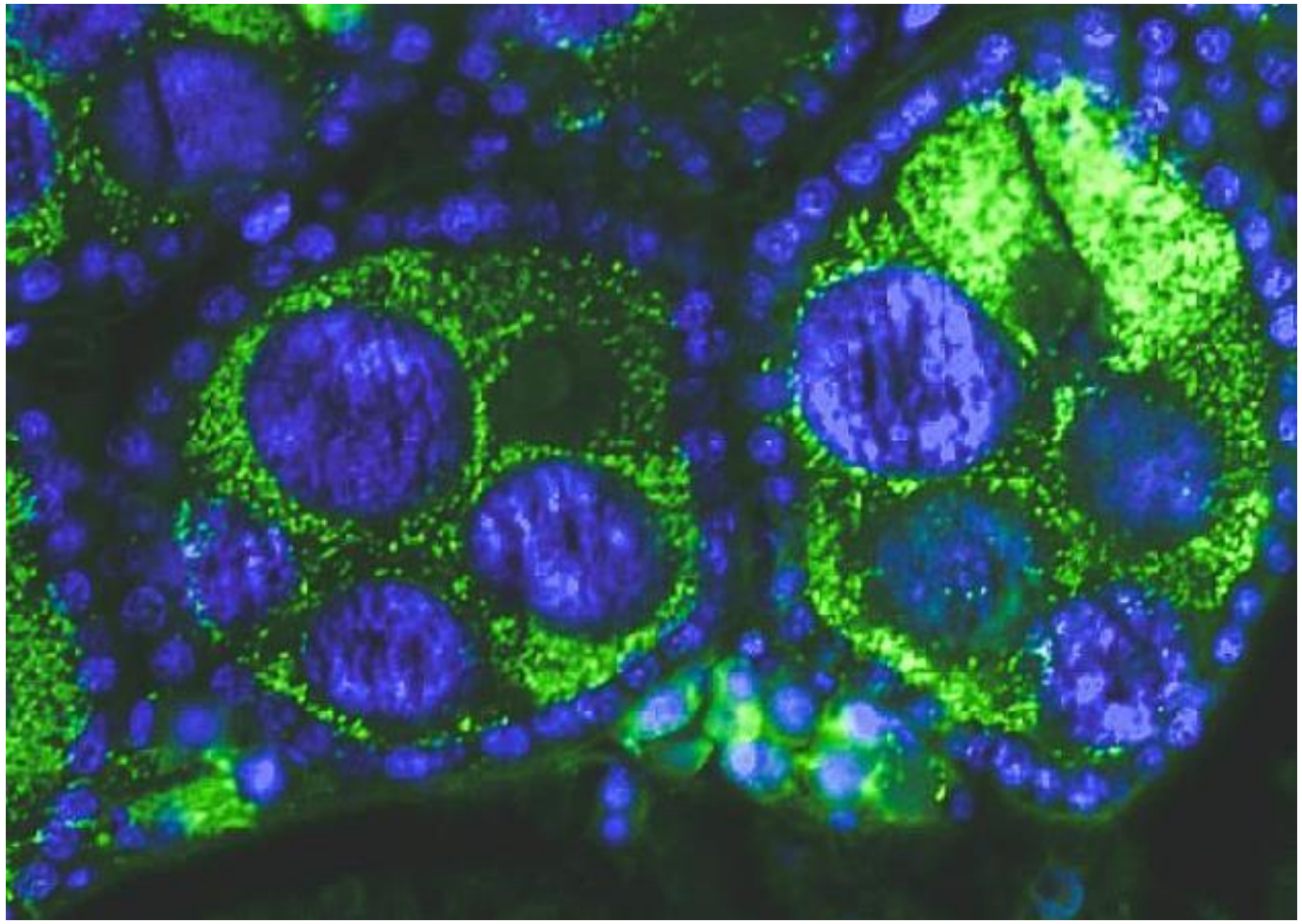
Following the first dose, vaccine effectiveness against symptomatic dengue was:

- 67.4% (95% CI, 57.2–75.1) at 14–27 days
- 49.7% (95% CI, 30.4–63.6) after 90 days

[a]Vaccine effectiveness estimates are adjusted for covariates (age, sex, self-reported race or skin colour, presence/absence of chronic comorbidities, and calendar time).
CI, confidence interval; VCD, virologically confirmed dengue.

References: 1. Ranzani OT, et al. *Lancet Infect Dis*. Preprint posted online August 19, 2025. doi:10.1016/S1473-3099(25)00382-2; 2 Sáfadi MAP. WSPID 2025 symposium (0470/ID 1130).

The Wolbachia method



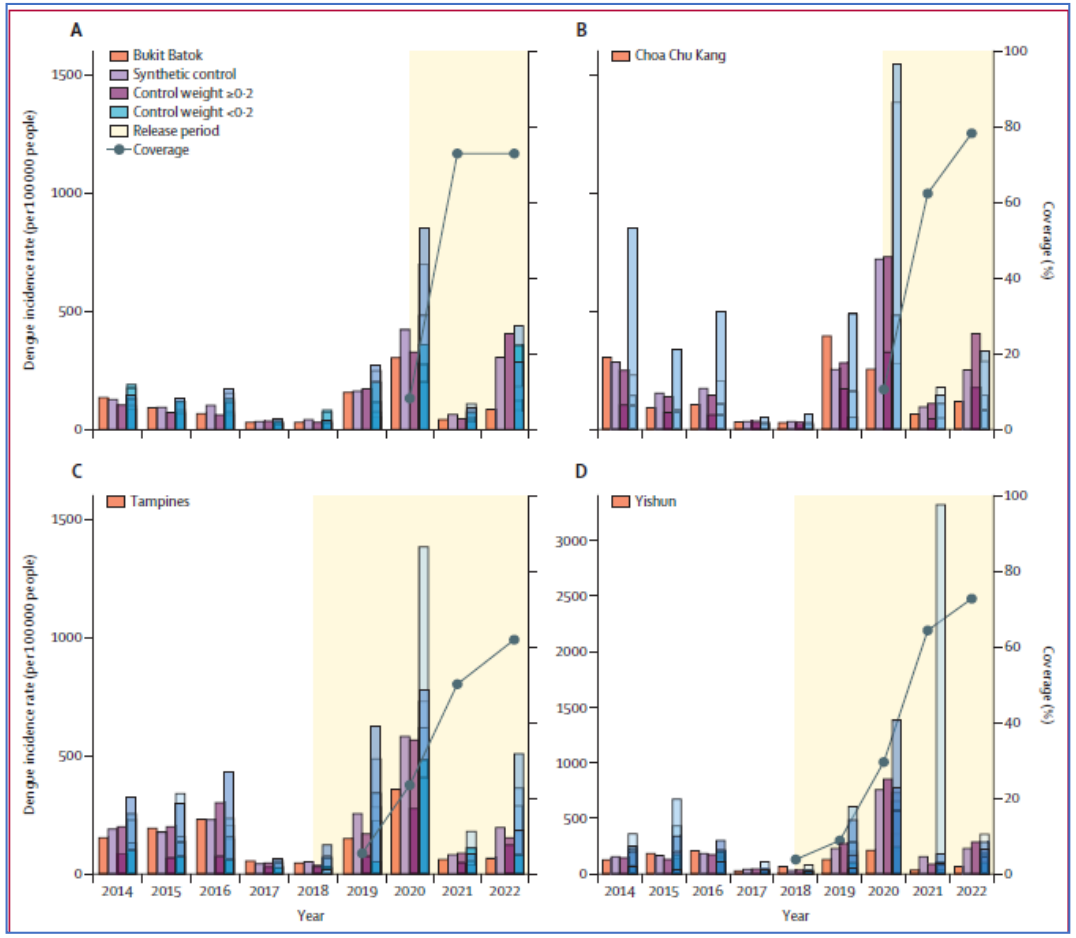
- Wolbachia is a self-sustaining method that spreads naturally through *Aedes aegypti*, blocks arbovirus replication, and creates a stable, long-term mosquito population with reduced ability to transmit dengue, Zika, chikungunya, and yellow fever.

Lin J et al. Lancet Microbe 2024

Efficacy of *Wolbachia*-mediated sterility to reduce the incidence of dengue: a synthetic control study in Singapore

In this synthetic control study in Singapore involving release of wAlbB-infected *A aegypti* male mosquitoes for dengue control via vector population suppression, from epidemiological week (EW) 27, 2018, to EW 26, 2022

- The study comprised an at-risk population of 607872 individuals in intervention sites and 3894544 individuals in control sites.
- Interventions demonstrated up to 77·28% (121/156, 95% CI 75·81–78·58) efficacy despite incomplete coverage.
- Releases led to 2242 (95% CI 2092–2391) fewer cases per 100 000 people in intervention sites during the study period.



Lin J et al. Lancet Microbe 2024

Key missing data for dengue vaccines

✓ Role of previous exposure to other flavivirus [ZIKV, YFV (vaccination), etc] on the safety & efficacy/effectiveness after Qdenga or Butantan-TV003 vaccination.

✓ Data on the immunogenicity & safety in the group of older adults (over 60 y) as well as some special populations.

✓ Duration of protection (both AB persistence and effectiveness).

✓ Data on long term safety and effectiveness in naïve vaccinated subjects against serotype 3 and 4.

✓ Interchangeability data of Qdenga with the Butantan-TV003 vaccine (1 + 1 ?).

✓ Final analysis of the anaphylaxis data (is it heightened awareness ?? age-related??, poloxamer??).

✓ Booster data (also looking at different priming in seropositive subjects (1 vs two doses in the priming and then a booster).

✓ Correlates of protection against severe disease

Conclusions

✓ Dengue is the most frequent arboviral disease, with continuous geographical expansion, also affecting more and more travelers.

✓Live attenuated tetravalent recombinant virus vaccines are in use or in an advanced stage of development

✓Overall, dengue vaccines have demonstrated protection against severe dengue in children. There are differences depending on the type of vaccine, age and dengue serological status of those vaccinated.

✓While the results are promising, safety and efficacy profiles are still evolving, emphasizing the need for further studies and rigorous monitoring.


Obrigado !
Gracias!