

Viral dynamics and Clinical Outcomes of Dengue Virus serotype 2 (DENV-2) the Dominican Republic, 2022

Robert Paulino-Ramirez¹; Jolis A. Ovalle Segura², Cinthia Campechano Pérez², Hector Lora¹; Maridania Jabier³, Sayira Mueses¹, Armando Peguero¹, Chantal Vogels⁴; Nathan D. Grubaugh⁴, & Jenny Cepeda¹

¹Instituto de Medicina Tropical & Salud Global, Universidad Iberoamericana, UNIBE Research Hub, Santo Domingo, 22333, Dominican Republic; ²School of Medicine, Universidad Iberoamericana (UNIBE), Francia 129, Gascue, Santo Domingo, 22333, Dominican Republic; ³Bionuclear, Technical Services, Diagnostics Division, Santo Domingo, Dominican Republic.

⁴ Department of Epidemiology of Microbial Diseases, Yale School of Public Health, New Haven, Connecticut, USA

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Background

Dengue Virus (DENV) is the most common arboviral infection in La Hispaniola. Four DENV serotypes has been recognized with temporality across the years. The aim of this study is to describe viral dynamics and clinical outcomes of DENV infection in children in the Dominican Republic (DR).

Methods

A cross-sectional study was performed among suspected DENV cases in a major paediatric hospital in Santo Domingo, DR. Blood samples were collected between January-April 2022 for DENV ARN PCR detection and sequencing. Demographic and epidemiological data was obtained.

Results

- A total of 61 samples were collected. Mean age was 8 years old (range 5 months-15yo). PCR positivity for DENV was 75% (n=46).
- All genotypes were DENV-2.
- Signs and symptoms reported were associated to DENV with haemorrhagic signs (abdominal pain 84% (n=39), vomiting 61% (n=28), and fever 100% (=46) (Table 1).
- Higher Cycle threshold (Ct) detected corresponded to April 2022.
- No deaths were reported (Figure 1). DENV PCR negative cases were positive for specific-DENV neutralizing antibodies, but no other arboviruses were amplified in further analysis.

Conclusions

- Our study observed that DENV-2 is associated to more haemorrhagic outcomes.
- Endemicity and pre-existing DENV genotype circulation is influencing in viral-host responses, noted in the PCR negative but antibodies (+) cases.
- Molecular dynamics associated to transmission was observed and suggests that control measures need to be reinforce based on molecular surveillance.
- It is of utmost importance to understand the role of DENV variability considering vaccine candidates that might be available soon.

Figure 1. A. Distribution of DENV PCR positive cases in the Dominican Republic; B. Phylogenetic tree of DENV-2 genotype III identified in all positive DENV cases (red square) compared with registered genotypes from other Caribbean islands (Obtained from GISAID); C. Cycle threshold (Ct) levels for amplified sequences through RT-PCR, cases showed higher viral loads in April 2022, suggesting a viral effervescence in the corresponding months.

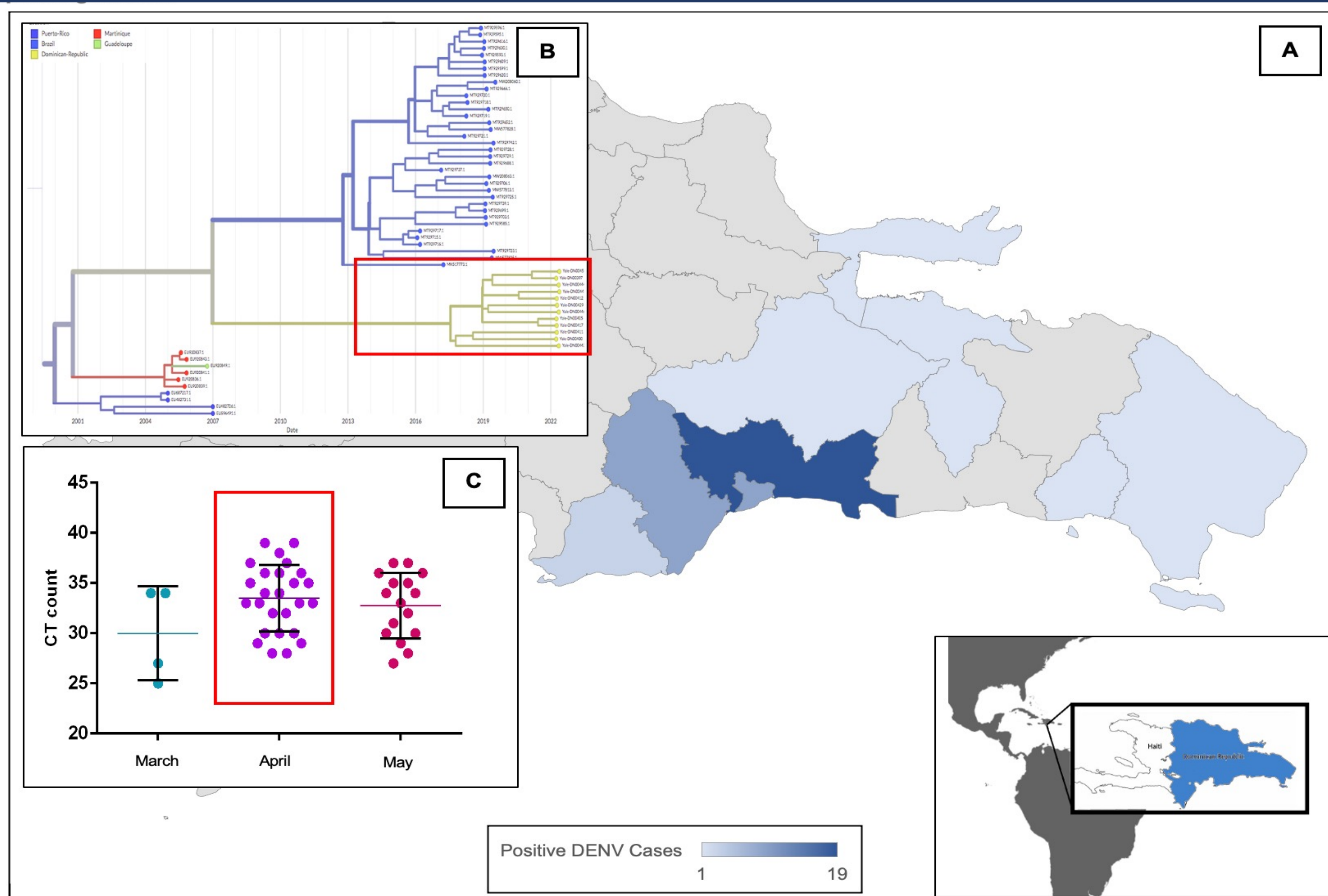


Table 1. Clinical outcomes in positive and negative suspected DENV cases in the Dominican Republic, 2022

	DENV PCR (+) N=46	DENV PCR (-) N=15	OR (95% CI)	P- value
Signs				
Seizures	0	1	-2.264 (-5.518-0.991)	0.077
Hypotension	1	0	0.22 (-3.230-3.274)	0.565
Oliguria	4	0	1.189 (-1.790-4.168)	0.237
Dyspnoea	2	0	0.555 (-2.536-3.646)	0.412
Petequiae	8	0	1.923 (-0.989-4.836)	0.083
Taquicardia	3	1	-0.024 (-2.366-2.319)	0.984
Vomiting	28	10	-0.251 (-1.477-0.975)	0.687
Rash	9	1	1.225 (-0.930-3.381)	0.241
Diarrhoea	13	6	-0.526 (-1.742-0.690)	0.394
Epistaxis	4	0	1.189 (-1.790-4.168)	0.237
Symptoms				
Headache	26	5	0.956 (-0.266-2.177)	0.119
Retroocular pain	6	1	0.742 (-1.461-2.945)	0.501
Myalgias	16	3	0.758 (-0.645-2.161)	0.283
Abdominal pain	39	10	1.025 (-0.317-2.366)	0.125
Arthralgias	8	1	1.081 (-1.086-3.248)	0.309
Onset of symptoms (days)	Mean 7 (Range 2-13)			

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