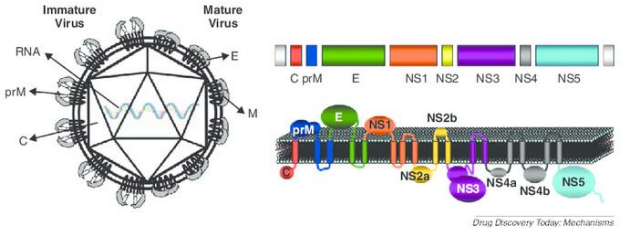
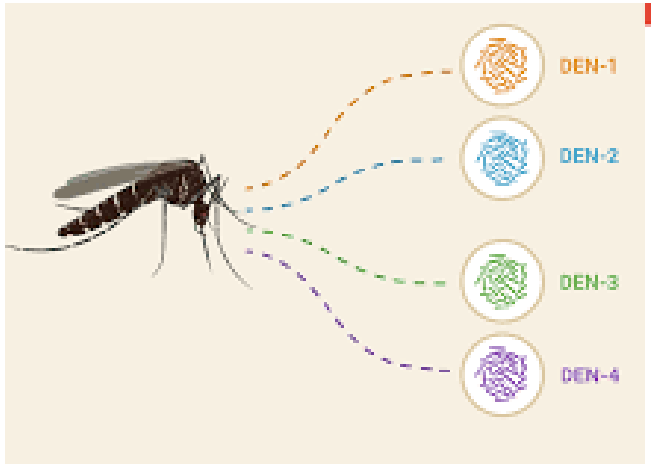
Epidemiological, Clinical and Genetic Disparities of 2023 Dengue Epidemic In Southern Bangladesh: A Multi-Centre Study





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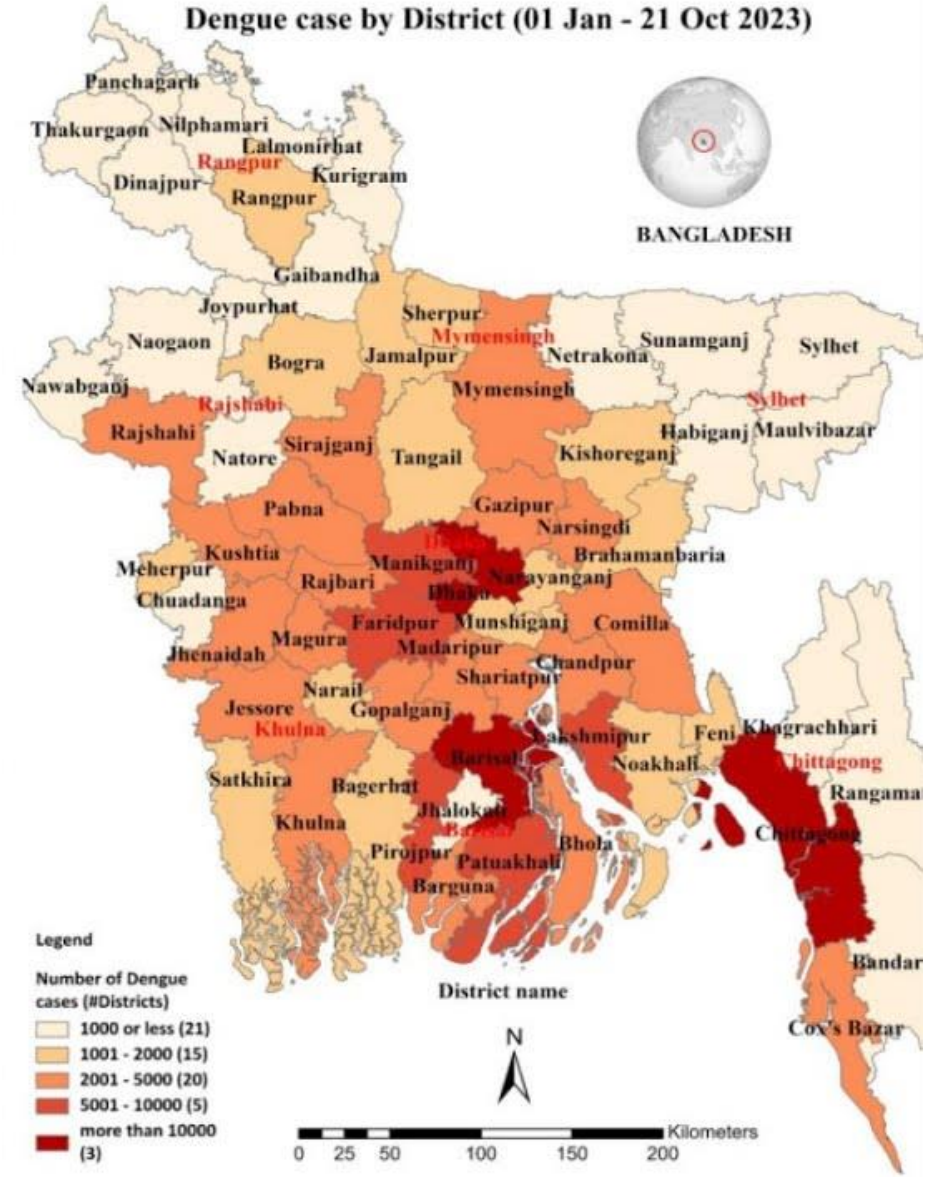
Dengue: A global public health threat that deserves attention



DENGUE HOSPITALISATION AND DEATHS

(2000-2023)

Hospitalisation

Deaths

	2000-2015	2016	2017	2018	2019	2020	2021	2022	2023
Hospitalisation	31,201	6,060	2,769	10,148	101,354	1,405	28,429	62,382	321,179
Deaths	248	14	8	26	179	7	105	281	1,705

First case of dengue detected in country in **2000**

93 people died that year

DENGUE IN 2023

Total deaths **1,705**

Male: **735**
Female: **970**

Death rate
0.9% in Dhaka city

0.3% elsewhere

58% of total deaths in Dhaka city

Child deaths **10%**

Source: DGHS

Research Question

- Why dengue is severe in 2023 in Chattogram?
- Which areas are hotspots of dengue?
- Is there any new serotype or variant circulating in Chattogram?
- Is there any genetic variation?

Aims and Objectives

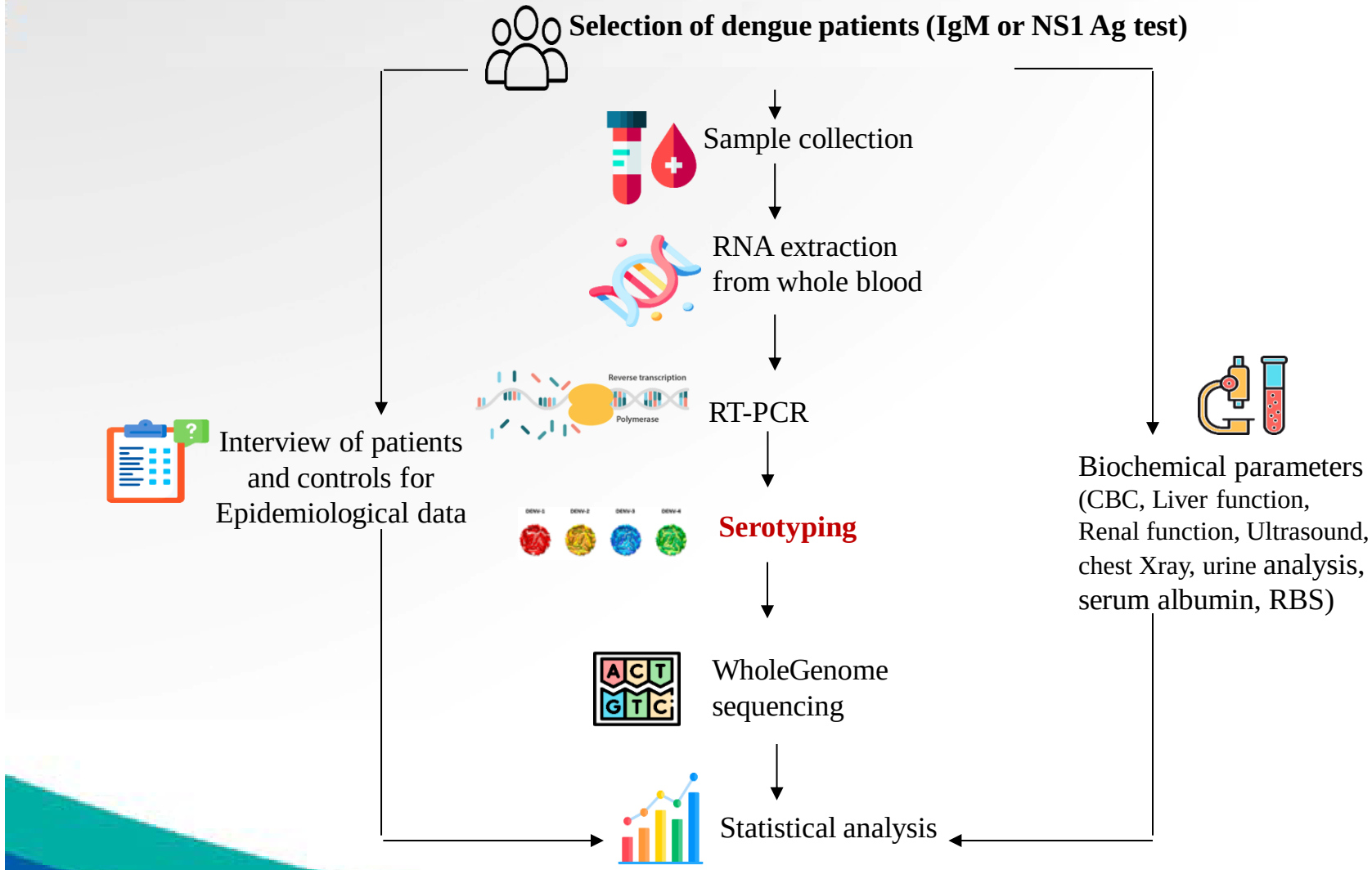
- To check the common clinical features among dengue infected patients
- To investigate the prevalence of various serotypes of dengue virus in southern Bangladesh
- To investigate the epidemiological factors associated to various serotypes
- To understand the genetic pattern and variety of viral genome isolated from Chattogram.

Methodology

Study design

- **Sample size**: 1550 patients
- **Type of study:** Cross sectional
- **Place of Study**
- Chittagong Medical College
- 250 Bedded General Hospital
- BITID
- Epic Healthcare
- Parkview Hospital
- Max Hospital
- Fatikchari health Complex

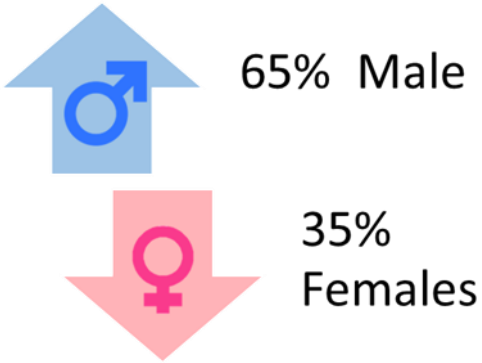
Experimental Flowchart



Results


alkalische Phosphatase
Amylase
ASL
Bilirubin direkt
Bilirubin gesamt
Calcium
Cholesterin
Cholinesterase
CK
CK-MB
CRP
Eisen
IgA
IgG
IgM
Kalium
Kreatinin

Socio demographic features



65% Male

35% Females

Education Level	Frequency
Never been to school	8.02%
Primary	37.44%
SSC	20.72%
HSC	18.18%
Bachelor/Hons	10.95%
Masters/PhD	4.69%

Common Features

Symptoms	Total
Fever	1,017 (99.41%)
Anorexia	723 (70.67%)
Severe Headache	702 (68.62%)
Nausea	595 (58.17%)
Vomiting	544 (53.18%)
Retro-orbital pain	361 (35.29%)
Red Eye	238 (23.27%)
Diarrhea	293 (28.64%)
Itching	124 (12.12%)
Rash	112 (10.95%)
Sore throat	124 (12.12%)
Mouth Sore	93 (9.09%)

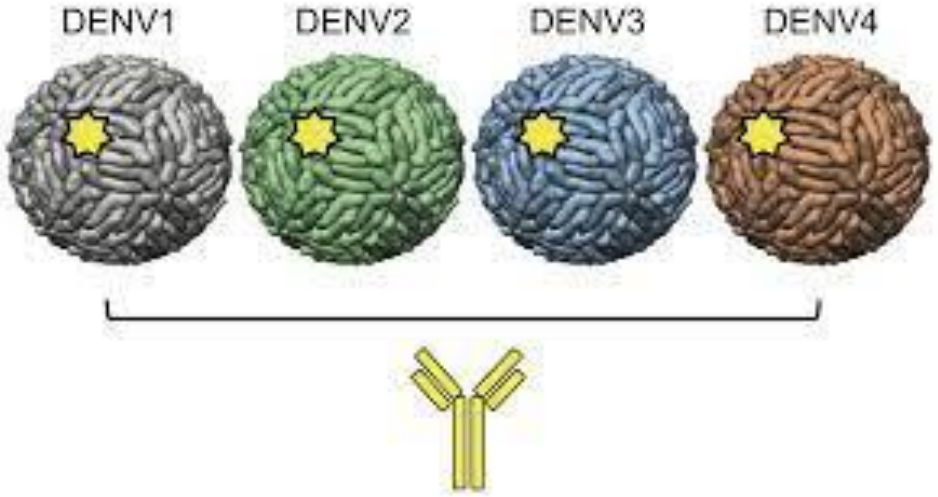
15% of the total patients are children

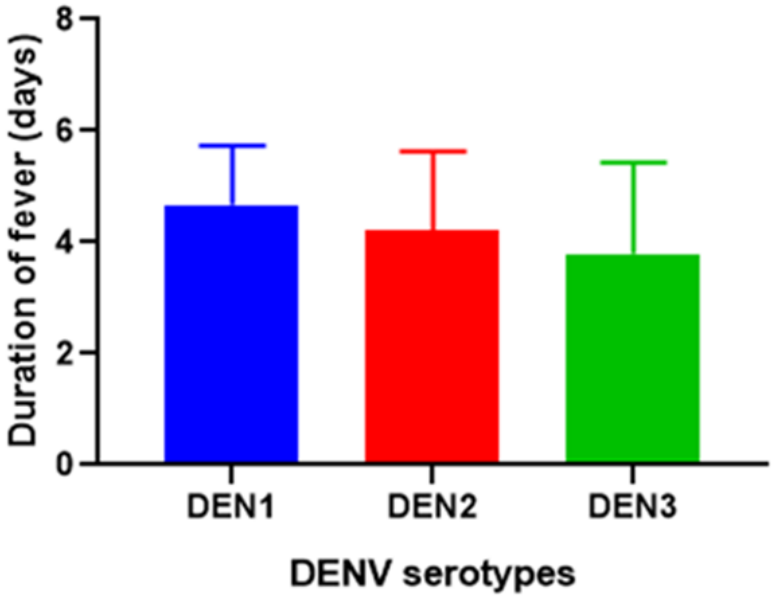
99.5% had fever

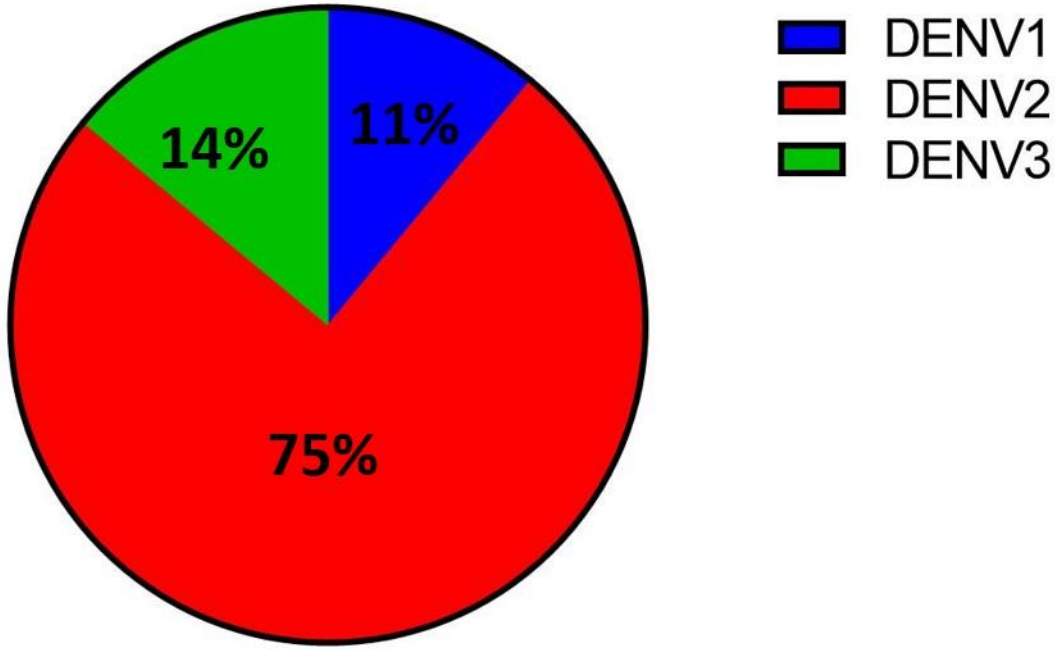
70% DEN1 cases are children

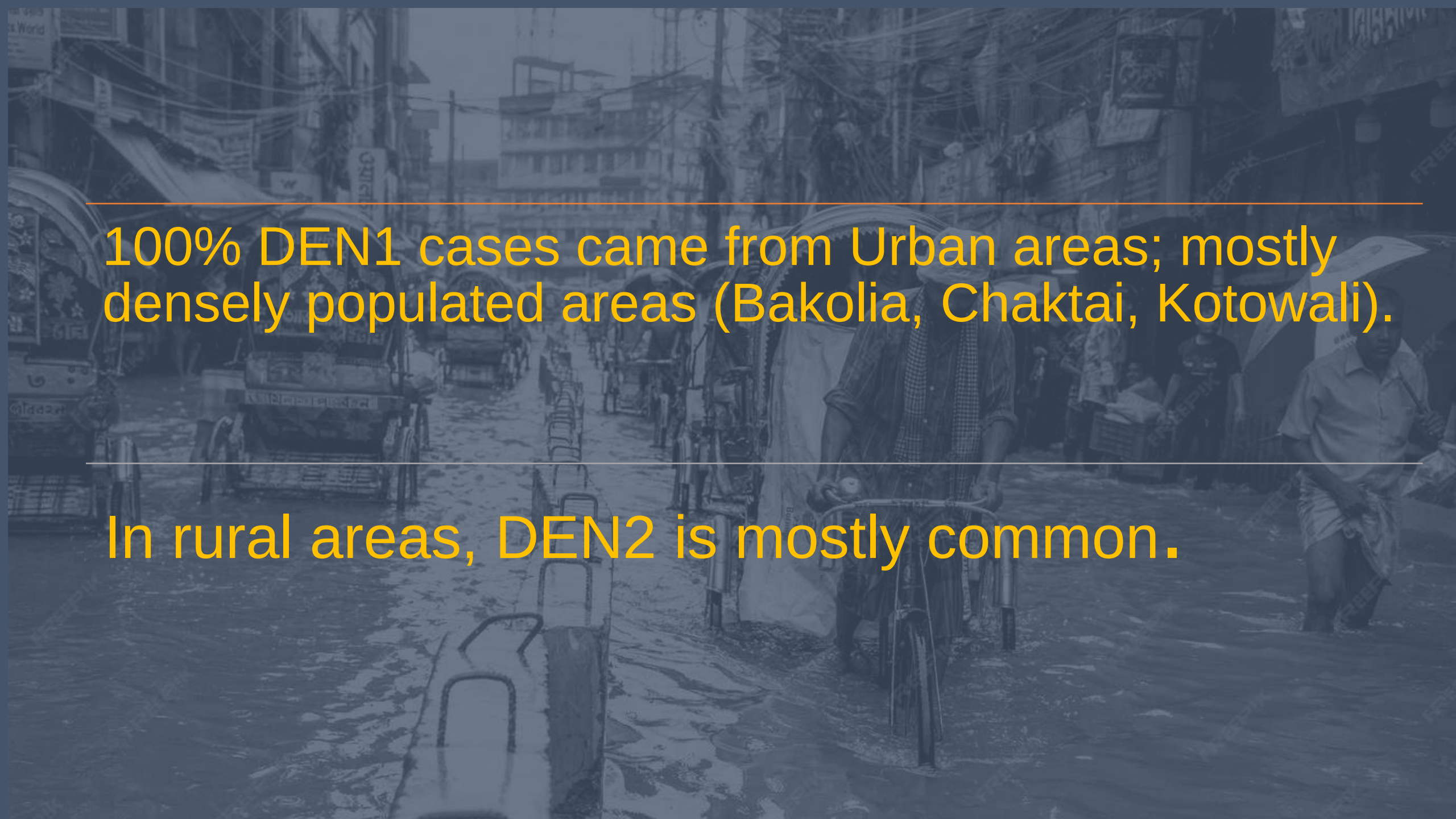
Mostly children (70%) from urban areas are affected

Which serotype was highest in Chattogram?





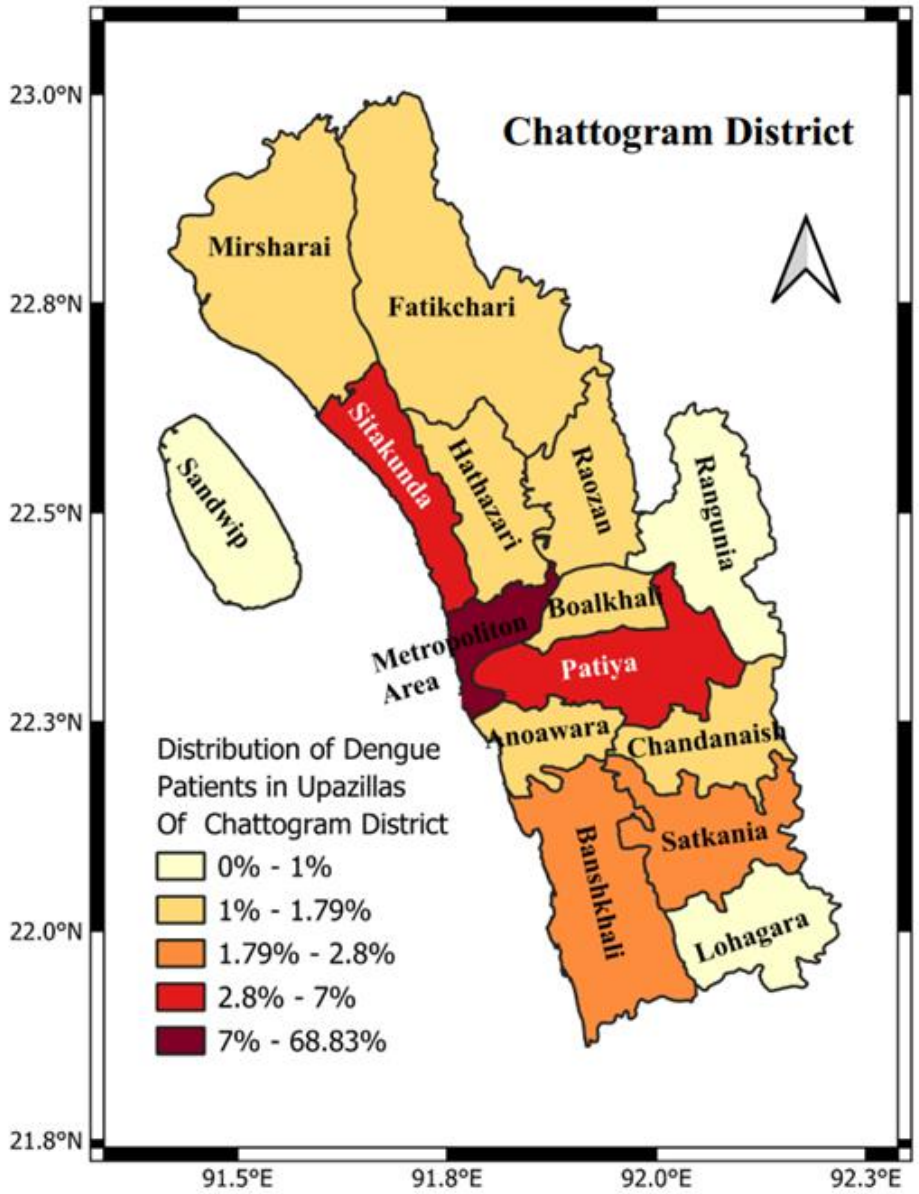




100% DEN1 cases came from Urban areas; mostly densely populated areas (Bakolia, Chaktai, Kotowali).

In rural areas, DEN2 is mostly common.

Hotspots


Chattogram District
Mirsharai
Fatikchari
Sitakunda
Hathazari
Raozan
Rangunia
Sandwip
Boalkhali
Patiya
Metropoliton Area
Anoawara
Chandanaish
Satkania
Banshkhali
Lohagara
Distribution of Dengue Patients in Upazillas Of Chattogram District
0% - 1%
1% - 1.79%
1.79% - 2.8%
2.8% - 7%
7% - 68.83%
23.0°N
22.8°N
22.5°N
22.3°N
22.0°N
21.8°N
91.5°E
91.8°E
92.0°E
92.3°E

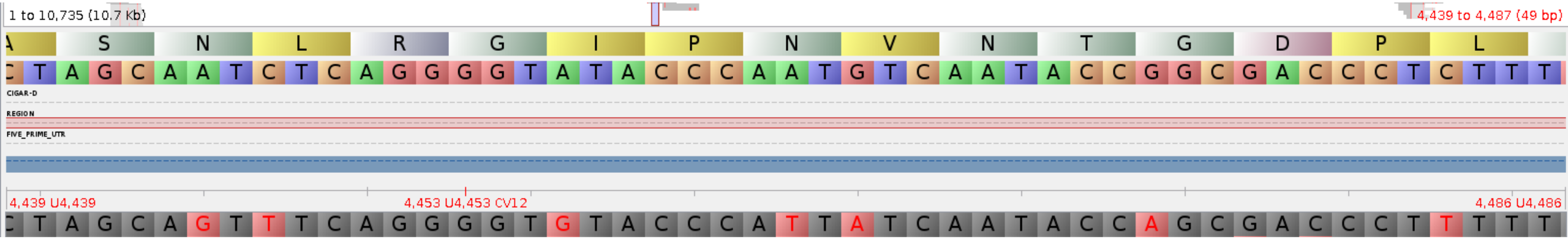

91°48' E
91°54'
22°24'
22°18' N
Hathazari
Sitakunda
Raozan
Bayejid Bostami
Chandgaon
Boalkhali
Pachlaish
Pahartali
Khulshi
Chawkbazar
Kotwali
Bakalia
Halishahar
Chittagong
Double Mooring
Bandar
Karnafuli
Patiya
Patenga
Bay of Bengal
CHITTAGONG METROPOLITAN AREA
Anowara
2 0 2
Kilometer
N

Knowledge and practice among Dengue Infection patients

Characteristics		Frequency (Percentage)
Previously heard of Dengue		80.05%
Knew that dengue is a mosquito/vector-borne disease		71.25%
Usage of net to prevent mosquito bite		85.33%
Usage of mosquito repellent to prevent mosquito bite		55.0%
Potential source of infection	from nearby water reservoir	85.0%
	from rooftop water clog	20.11%
	from ongoing construction on-site	17.22%
	others	5.75%

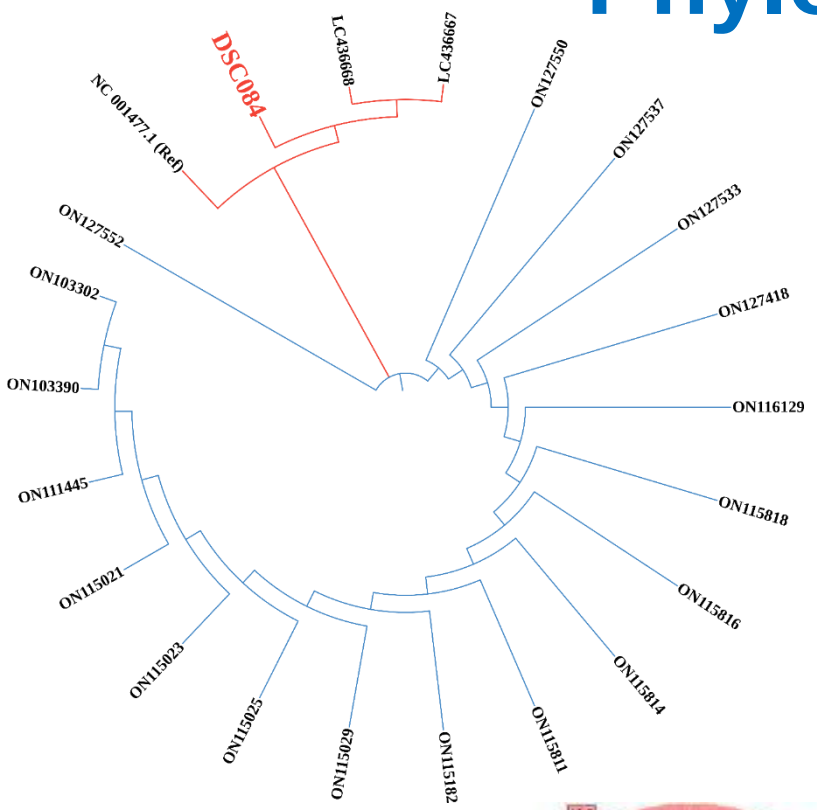
Whole genome sequencing: future concern

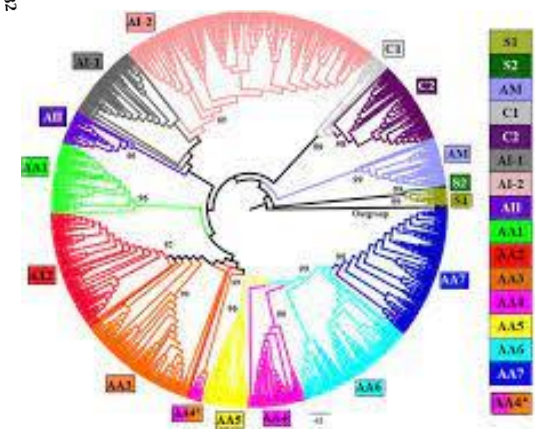
Variations in the DENV viral genome from Chattogram



Samples	Features
Total mutations	1574
Unique mutations	72
InDel	184
Deletion	38
Synonymous variant	197
Frame shift	2
Missense	312
Intergenic	12

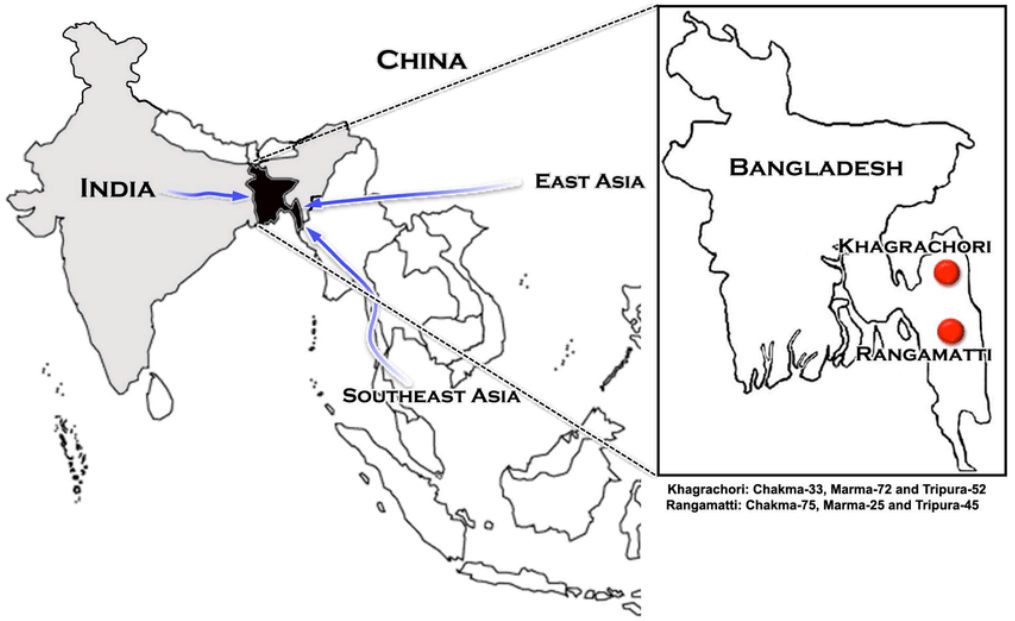
Phylogenetic tree analysis of DENV





* 30% dengue samples are **completely new genotype**. C. These **Cosmopolitan lineages** are completely new in Bangladesh.
* This might be another cause of high severity of dengue-infected patients in 2023.

- Genomic analysis exposed a new subclade of DENV-2, classified under Cosmopolitan genotype within C clade, distinct from previous years Bangladeshi variants until 2022.
- This subclade, possibly migrating from India, might be emerged during COVID-19 pandemic years and exhibited higher morbidity rates, thus challenging our existing mitigation strategies.



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THANK YOU