



Genomics and Wastewater

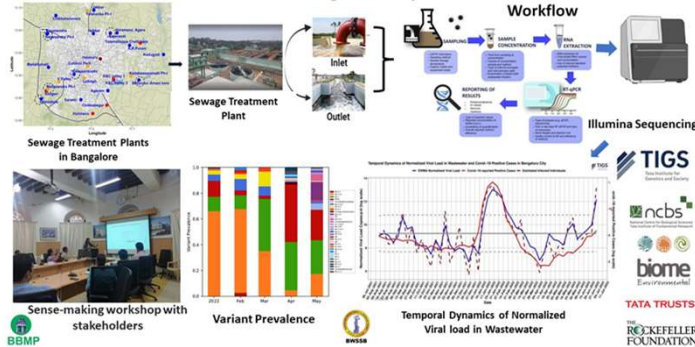
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Bengaluru, India

History of Wastewater Monitoring

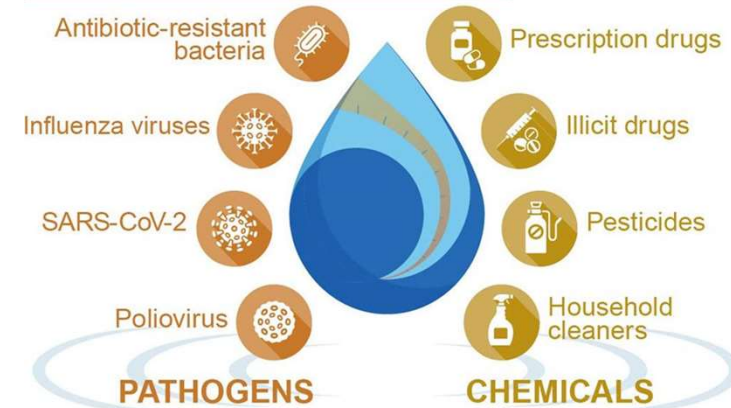


Sewage monitoring for enteric pathogens especially polio in endemic areas

Wastewater-based Epidemiology as an Early Warning System for SARS-CoV-2 in Bangalore City



Complementary tool for monitoring SARS-COV-2 spread and evolution, emergence of new variants



Sources: GAO analysis of World Bank information (data); Alexandra GL/Blankstock/stock.adobe.com (images). | GAO-22-105841

Scaling up monitoring to other pathogens—Smart Surveillance tool

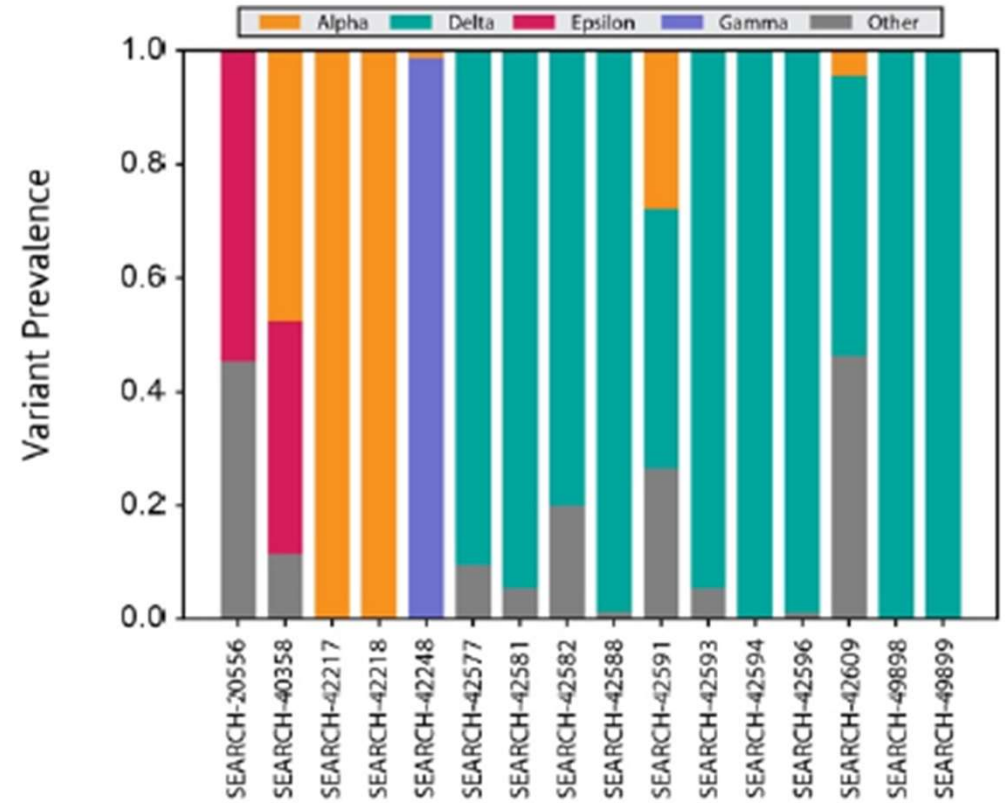
Genomic Surveillance



Freyja pipeline

Mutation	Variants	Mutation	Variants
L452R	Delta, Epsilon, Kappa	K417T	Gamma
P681R	Delta, Kappa	K417N	Beta
E484Q	Kappa	DelHV69/70	Alpha
DelY144	Alpha	N501Y	Alpha, Beta, Gamma

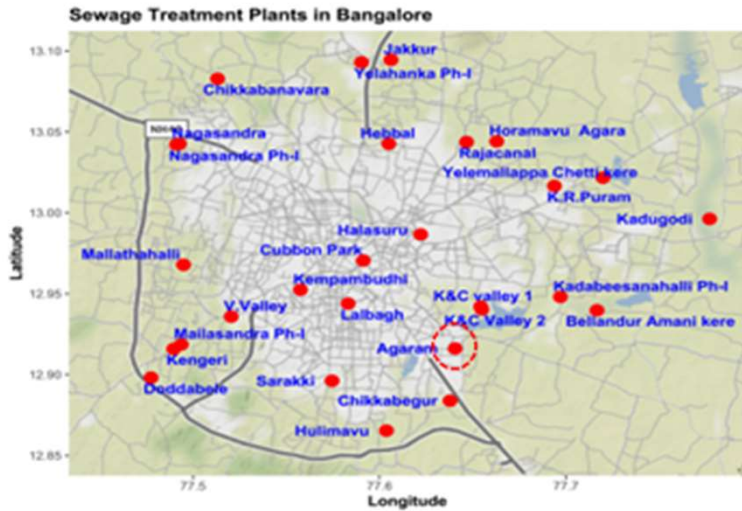
Karthikeyan et al. 2022 Nature



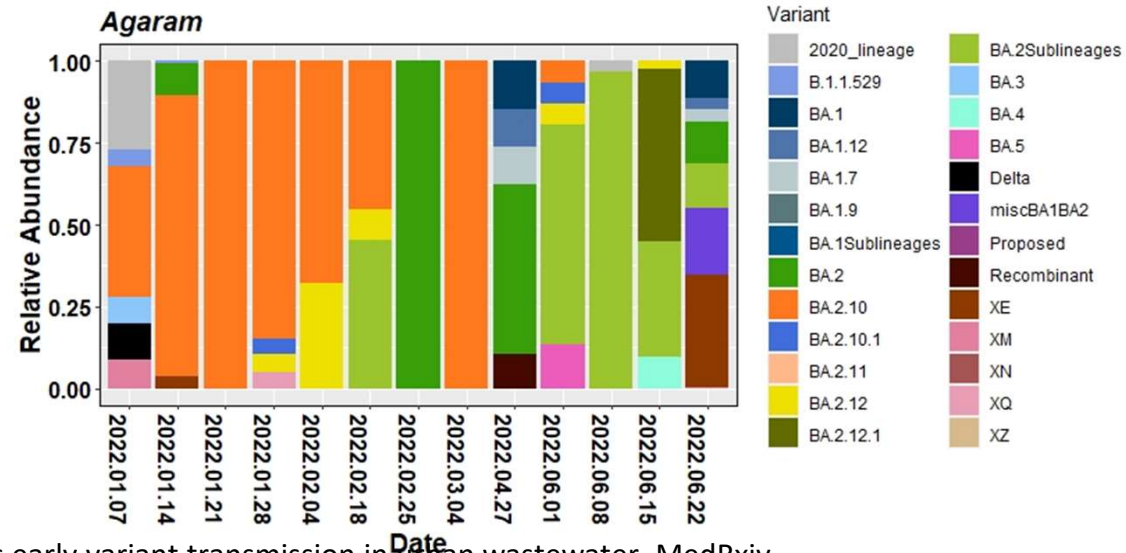
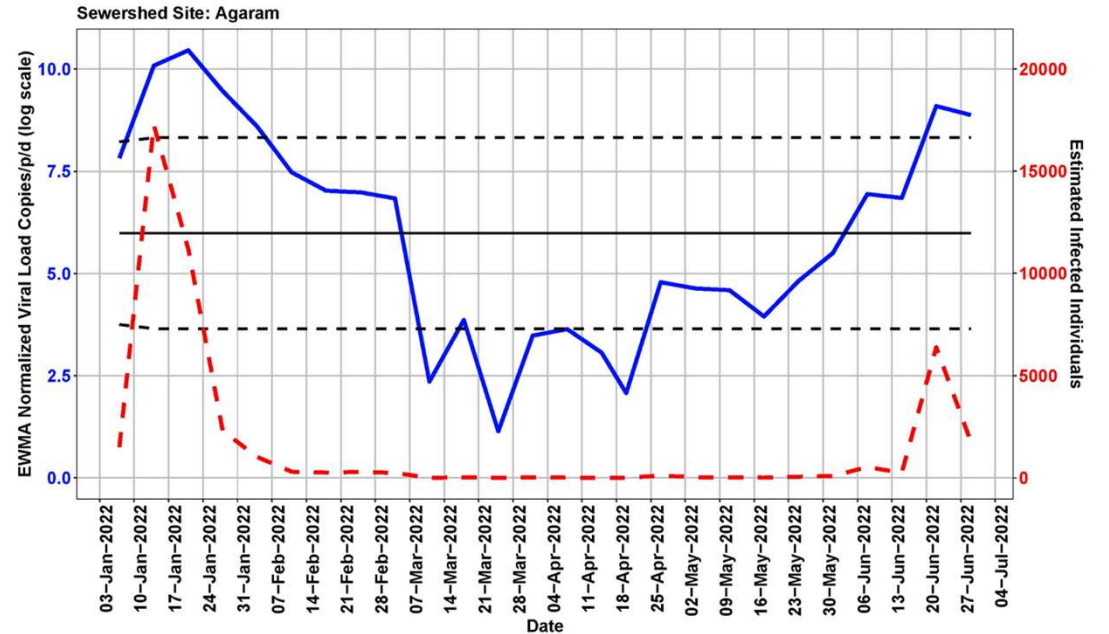
qPCR VOC Detection



What variants are driving viral trend?



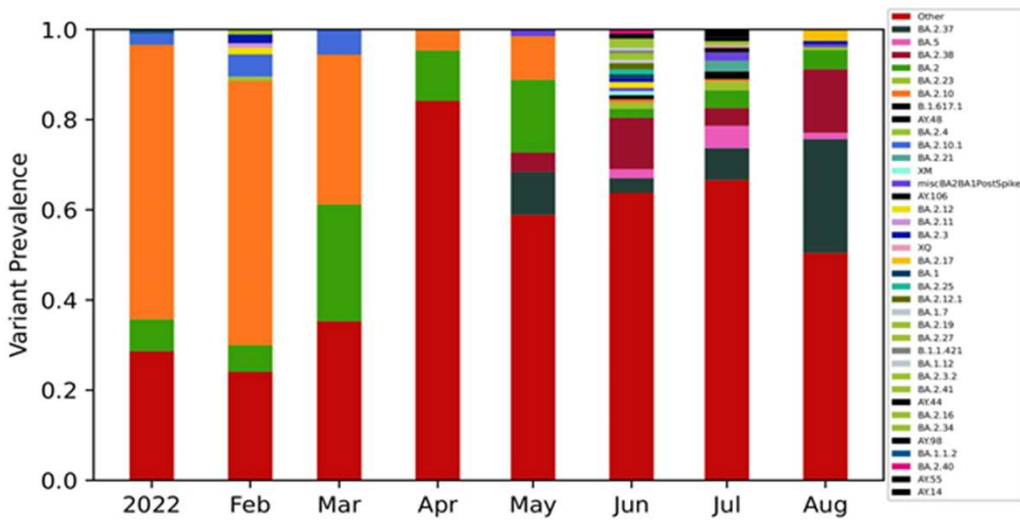
Ward No.	Ward Name
85	Dodda Nekkundi
150	Bellanduru
151	Koramangala
152	Suddagunte Palya
172	Madivala
173	Jakka Sandra
174	HSR Layout



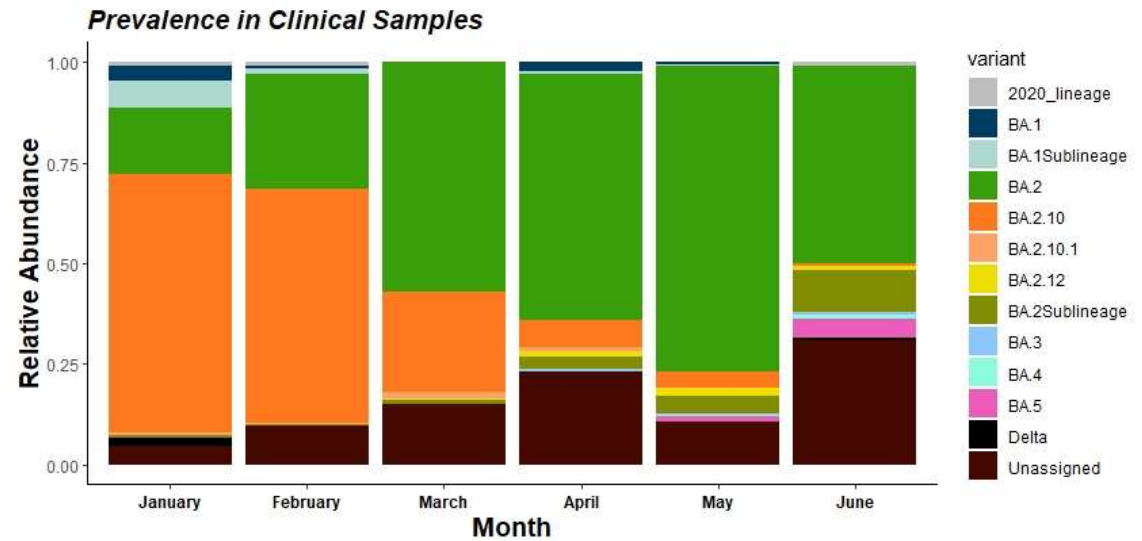
Lamba et al. SARS-CoV-2 infection dynamics and genomic surveillance reveals early variant transmission in urban wastewater. MedRxiv

Aggregated Relative Abundance of SARS-CoV-2 lineages

Wastewater data



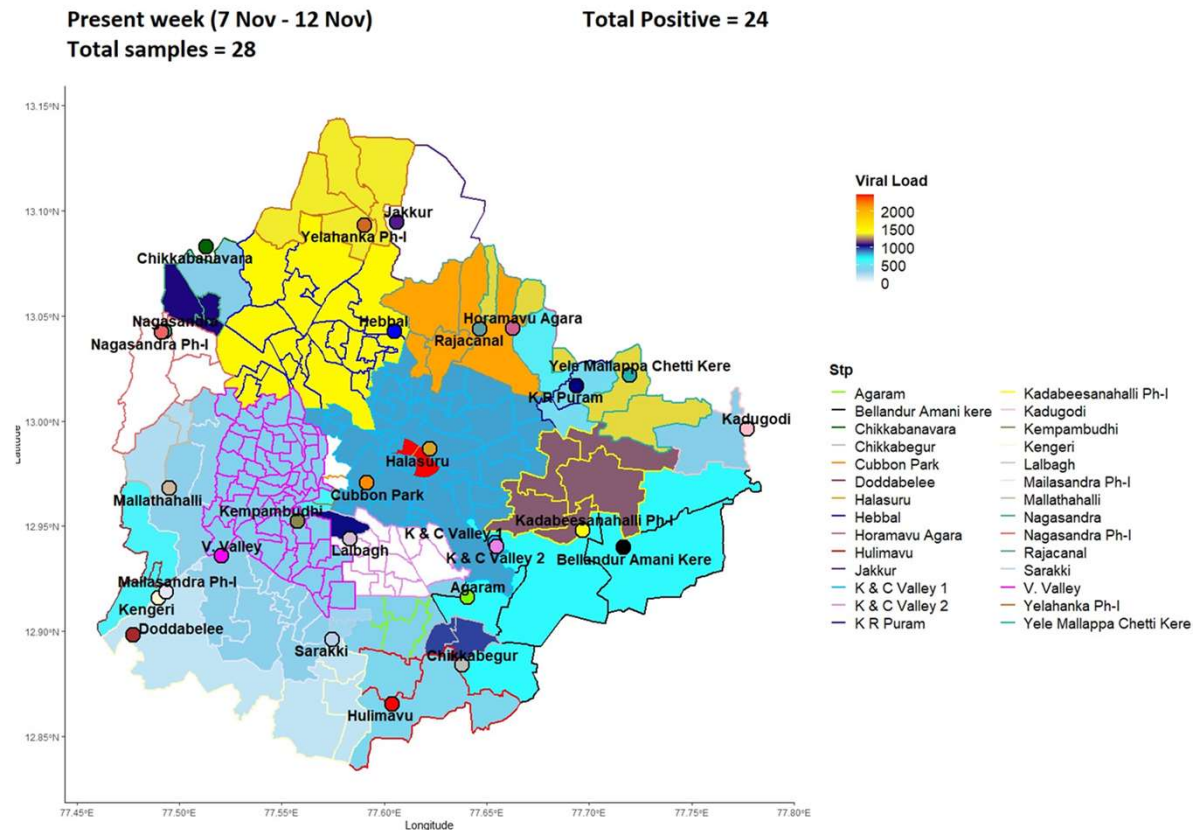
Clinical data



Courtesy: GISAID

Wastewater-based Epidemiology: A powerful tool to track public health

1. Identify hotspots/sites catchment areas
2. Integrate with healthcare system for long-term monitoring of panpathogens: dengue, influenza, AMR, bacterial, fungal etc.



Metagenomic analysis for Bacterial Diversity in sewage

