

SARS-CoV-2 Genomic Surveillance (April 2020-August 2022) and reliability of PCR Single Point Mutation Assay(EscaPLEX) for the rapid Detection of Variant of Concern in Cameroon

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I am a young Cameroonian, holder of Master's degrees in Clinical Biology (2018) and in Medical Virology (2021). I am currently a PhD student in Medical Virology at the Faculty Of Medicine and Biomedical Sciences, University Of Yaoundé 1- Cameroon. I am currently working on the "resistance of HIV-1 to NNRTI and INSTI to second generation "at the Chantal BIYA International Reference (CIRCB). Besides, I am involved in Covid-19 and genomic surveillance at country level.

Background

To inform decision-making for COVID-19 response, surveillance of SARS-CoV-2 variants of concern (VOC) and lineages is crucial. Though genomic sequencing is the gold standard, point mutation PCR is recommended for rapid surveillance of VOCs.

We sought to study :

- ❖ dynamics of SARS-CoV-2 strains across different waves ;
- ❖ And to evaluate the reliability of SNP EscapePLEX kit for the rapid detection of VOC.

Methods

- ❖ **Type and Site of the study:** Cross-sectional ,at the **CIRCB**
- ❖ **Eligibility-Criteria:**SARSCoV-2 positive nasopharyngeal specimens (Ct-value<30)
- ❖ **Duration:** Between April 2020-August 2022.
- ❖ **Genotyping:** Sanger-sequencing and SNP-EscapePLEX were performed, using sequencing as gold standard to evaluate the performance of SNP-EscapePLEX.
- ❖ **Sequence analysis:** Stanford algorithm program;NCBI (National Center for biotechnology information).

Results

❖ Characteristics of the study population

Of the 130 specimens (from individuals with median [IQR] age 38 [29-49],53% female; 26% symptomatic).

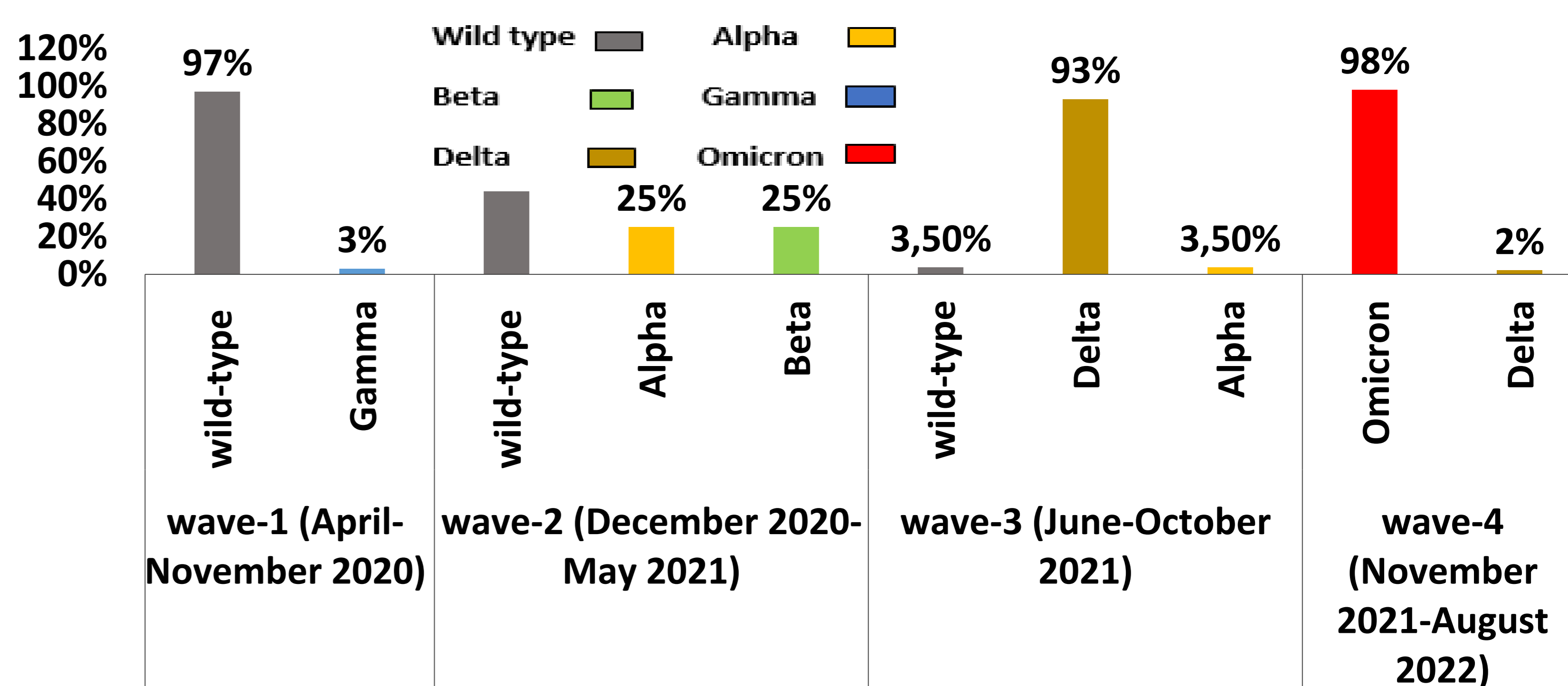
Table 1 : Dynamics of Omicron sub-variants

	BA.1	BA.2	BA.3	BA.4	BA.5
1st Trimester (January-March 2022)	100% (25/25)	/	/	/	/
2nd Trimester (April-June 2022)	/	75% (3/4)		25% (1/4)	/
3rd Trimester (July-September 2022)	/	17% (4/24)	/	8 % (2/24)	75% (18/24)

Table2: SARS-CoV-2 VOC detected using Senger sequencing and SNP-ExcaPLEX kits.

VOC	Senger sequencing	SNP- ExcaPLEX	P-Value
Wild-type	30.00 (39/130)	35.38 (46/130)	0.35
Alpha	3.85(5/130)	6.92 (9/130)	0.24
Beta	2.31(3/130)	2.31 (3/130)	1.00
Gamma	0.77(1/130)	0.00 (0/130)	0.32
Mu	0.77(1/130)	0.00 (0/130)	0.32
Delta	21.54(28/130)	16.15 (21/130)	0.26
Omicron	40.77(53/130)	39.23(51/130)	0.80

Figure1: Dynamics of SARS-CoV-2 strains across different waves



- ❖ **Clinical performance of EscapePLEX** (Table 2 and 3): Overall sensibility and specificity of SNP-Escapeplex : 84%[78-87] and 89%[76-95] respectively.

Table 3: Intrinsic features of EscapePLEX Kit

	Sensitivity	Specificity	Kappa
Alpha	84% [78-86];	Sp=89%[76-96]	0.67 [0.51-0.76]
Beta	67% [52-97];	98% [97-99];	0.56 [0.09-0.83]
Gamma	00%	100%	---
Delta	75% [63-76]	100 % [95-100]	0.82 [0.65-0.83]
Omicron	96% [93-98]	100 % [95-100]	0.97 [0.93-0.98]

Conclusions

- ❖ Genomic surveillance reveals a rapid dynamic in SARS-CoV-2 strains, moving from wild-type lineages to Omicron variants and sub-variants
- ❖ EscapePLEX kit represents a suitable alternative to genotyping. However, this point PCR assay needs to be upgraded for the surveillance of sub-lineages of concern under monitoring.

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