

# Partial Sanger Sequence Analysis of SARS-CoV-2 Spike (S) Gene Detects the Delta SARS-CoV-2 Variant of Concern In Homabay and Kakamega (Lurambi) Prisons

*This is a preliminary report prepared by CDC Kenya's Diagnostic Laboratory Systems Program and the KEMRI Centre for Global Health Research on June 18, 2021.*

## Summary of Findings

- The Sanger partial sequencing method provides a quick, low-cost pre-screening approach to rapidly identify variants of concern (VOC) or interest (VOI).
- Twenty-three (23) SARS-CoV-2 RT-PCR positive samples from Kakamega (Lurambi) and Homabay prisons were sequenced including: Homabay Prison (17) and Kakamega Prison (6). These samples were collected between June 14 - 15, 2021 from patients aged 18-89 years; all were male. All cases were Kenyan nationals, and none of the 23 cases had the symptom field completed on their CIF, and none reported a recent travel history on their CIF (i.e., travel within the past 14 days).
- **All 23 samples (100%) aligned with the Delta SARS-CoV-2 VOC (B.1.617.2, first identified in India).** This is the first time we have detected Delta SARS-CoV-2 VOCs in these two prisons and reported results from the counties in which these prisons are located (i.e., Homabay and Kakamega).

## Background

There is increasing need for genomic surveillance of SARS-CoV-2 to determine new introductions and current circulation of variants of concern (VOC) and variants of interest (VOI) in the local population. Timely release of sequencing data is important for initiating mitigation measures and linking variants to clinical manifestation and vaccine effectiveness in the population.

## Methods

Here we describe findings from partial S gene sequencing at the CDC-funded KEMRI laboratory in Kisumu of 23 SARS-CoV-2 samples collected from Homabay and Kakamega prisons. These samples were collected between June 14 -15, 2021.

Portions of spike (S) gene at nucleotide positions 21358 to 23847 of SARS-CoV-2 reference sequence (NC\_045512) genome were amplified using Qiagen Onestep RT-PCR kit, and nested PCR was performed using New England BioLabs Taq DNA polymerase. The PCR products were purified using ExoSAP-IT (ThermoFisher) and cycle sequencing was performed using BigDye sequencing kit v3.1. Excess Bigdye removal was done using DyeEx 96 kit (Qiagen) and resultant purified products read-out in ABI 3730xl genetic sequence analyser. Multiple sequence alignment (MSA) was generated using BioEdit vr 7.2. Maximum likelihood (ML) tree was constructed in MEGA vr 7.

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## **Results - Sequence and Phylogenetic Analysis**

All 23 samples (100%) that clustered with the sub-lineage B.1.617.2 (Delta SARS CoV-2), contained amino acid changes at L452, T478K and D614G. Of these, 23 (100%) had amino acid changes at G142D and deletions at amino acid positions 156 and 157.

Information including age, location, and cluster are shown in the table below. No symptom data were recorded on the CIF.

## **Conclusions**

- This report provides preliminary sequencing results identifying the Delta VOC (B.1.617.2, first identified in India) in Homabay and Kakamega Prisons for the first time. These findings may inform public health action in these prison facilities.
- Using Sanger partial sequencing of the SARS-CoV-2 S gene, all 23 cases (100%) of specimens submitted for sequencing were identified as the Delta VOC (B.1.617.2) in Homabay and Kakamega prisons from samples collected between June 14 - 15, 2021. All cases were males ranging from 18-89 years old, and all were Kenyan nationals with no history of travel reported on their CIF.
- All results from this report require further confirmation with whole genome sequencing to confirm the lineages identified by partial sequencing.

## **Acknowledgement**

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**Table. Case information and sequencing results from two prisons of Homabay and Kakamega (Lurambi)**

Age (Years)	County	Facility	Symptoms	Date of sample collection	Pango lineage	WHO lineage
42	Homabay	GK Prison Dispensary, Homabay	NA	6/15/2021	B.1.617.2	Delta
36			NA	6/15/2021	B.1.617.2	Delta
45			NA	6/15/2021	B.1.617.2	Delta
30			NA	6/15/2021	B.1.617.2	Delta
26			NA	6/15/2021	B.1.617.2	Delta
18			NA	6/15/2021	B.1.617.2	Delta
44			NA	6/15/2021	B.1.617.2	Delta
30			NA	6/15/2021	B.1.617.2	Delta
25			NA	6/15/2021	B.1.617.2	Delta
52			NA	6/15/2021	B.1.617.2	Delta
44			NA	6/15/2021	B.1.617.2	Delta
36			NA	6/15/2021	B.1.617.2	Delta
45			NA	6/15/2021	B.1.617.2	Delta
30			NA	6/15/2021	B.1.617.2	Delta
29			NA	6/15/2021	B.1.617.2	Delta
21			NA	6/15/2021	B.1.617.2	Delta
89			NA	6/15/2021	B.1.617.2	Delta
27			Kakamega	GK Prison Kakamega	NA	6/14/2021
71	NA	6/14/2021			B.1.617.2	Delta
25	NA	6/14/2021			B.1.617.2	Delta
19	NA	6/14/2021			B.1.617.2	Delta
57	NA	6/14/2021			B.1.617.2	Delta
35	NA	6/14/2021			B.1.617.2	Delta

Note: No cases reported a travel history withing the last 14 days from the date of sample collection; NA = not completed on the CIF.