

Last horizon scan	Signals currently under monitoring and investigation	Variants under investigation	Variants of concern
Cluster detection 07-06-2021	Epsilon B.1.427/B.1.429 (California)	Zeta VUI-21JAN-01 P.2 (Brazil)	Alpha VOC-20DEC-01 B.1.1.7 (UK)
Mutation Scan 04-06-2021	Iota B.1.526 (New York)	VUI-21FEB-01 A.23.1 with E484K (UK) focus Liverpool	Beta VOC-20DEC-02 B.1.351 (South Africa)
International Scan 08-06-2021	B.1.1.7 with S494P (UK)	Eta VUI-21FEB-03 B.1.525	Gamma VOC-21JAN-02 P.1 (Japan ex Brazil)
Signals investigated at last scan: <b>1</b>	A.27 (France)	VUI-21FEB-04 B.1.1.318 (England)	VOC-21FEB-02 B.1.1.7 with E484K (UK) focus Bristol/SW.
New genomes in last 24 hr period: <b>1013</b>	B.1.1.7 with Q677H (UK)	Theta VUI-21MAR-02 P.3 (Philippines)	Delta VOC-21APR-02 B.1.617.2 (India)
Note: Signals of individual mutations and new clusters excluded until defined variant identified	B.1.620 (travellers to the UK)	Kappa VUI-21APR-01 B.1.617.1 (India)	
	B1.214.2 (Belgium)	VUI-21APR-03 B.1.617.3 (India)	
	B.1.1.1 with L452Q and F490S (seen in imported UK cases)	VUI-21MAY-01 AV.1 (UK)	
	R.1 Associated with multiple locations	VUI-21MAY-02 C.36.3 (Egypt)	

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B.1.621 (Spain)		

Variants provisionally extinct (not detected for 12 weeks in the UK)	International signals under monitoring	International variants under investigation	International variants of concern
VUI-21MAR-01 B.1.324.1 with E484K (UK)	Brazil Lineage B.1.1.28 with N501T and E484Q from Belo Horizonte		
	Variant Associated with Tanzania Travellers; R346K, T478R and E484K		
	Variant Associated with North America: USA 214insQAS Samples		
	Variant Associated with Russia: AT.1		

## MUTATION PROFILES: VARIANTS OF CONCERN AND VARIANTS UNDER INVESTIGATION

VARIANT	MUTATION PROFILE (SUBSTITUTIONS AND INSERTION/DELETIONS)
Alpha VOC-20DEC-01	S: del69-70, del144, N501Y, A570D, P681H, T716I, S982A, D1118H; ORF1ab: T1001I, A1708D, I2230T, del3675-3677; ORF8: Q27*, R52I, Y73C; N: D3L
Beta VOC-20DEC-02	S: D80A, D215G, del242-244, K417N, E484K, N501Y, A701V; ORF1ab: T265I, K1655N, K3353R, del3675-3677; ORF3a: Q57H, S171L; E: P71L, T205I; N:T205I
VOC-21FEB-02	VOC-20DEC-01 + S: E484K; N: A173V A398T
Gamma VOC-21JAN-02	S: T20N P26S K417T E484K N501Y T1027I; ORF1ab: S1188L K1795Q del3675-3677; ORF8: E92K; N: P80R
VUI-21FEB-01	S: R102I F157L V367F E484K Q613H P681R; ORF1ab: L1559F M3655I L3667F M3752I; ORF8: L84S E92K; N: S202N
Eta VUI-21FEB-03	S: Q52R del69-70 del144 E484K Q677H F888L; ORF1ab: del3675-3677 P4715F; E: L21F; M: I82T; ORF6: del2; N: del2, D3Y
VUI-21FEB-04	S: T95I del144 E484K P681H D796H; ORF1ab: E1196V K2511N T2936I A3209V T3284I del3675-3677 V6672M; M: I82T; ORF8: del1-3 E106*; N: del208, R209G
Zeta VUI-21JAN-01	S: E484K; ORF1ab: L3468V; N: A119S M234I
VUI-21MAR-01	B.1.324.1 + S: E484K; ORF1ab: G894S G5530C; ORF8: del27922nt-27956nt
Theta VUI-21MAR-02	S: del141-143 E484K N501Y P681H E1092K H1101Y V1176F; ORF1ab: D736G L438P D112E L71F A368V; ORF8: K2Q
Kappa VUI-21APR-01	S: E154K, L452R, E484Q, P681R; ORF1ab: T1567I T3646A M5753I K6711R; ORF7a: V82A; N: R203M
Delta VOC-21APR-02	S: T19R, 156-157del, R158G, L452R, T478K, P681R, D950N; ORF3a: S26L, M:I82T, ORF7a: V82A, T120I, N: D63G, R203M, D377Y

Where INDEL are defined in 'nt' the INDEL is non-codon aligned.

Note: These are not lineage defining mutations, these are mutations found in the VOC/VUIs. Lineage defining mutations can be found [here](#)

## MUTATION PROFILES: VARIANTS OF CONCERN AND VARIANTS UNDER INVESTIGATION

VARIANT	MUTATION PROFILE (SUBSTITUTIONS AND INSERTION/DELETIONS)
VUI-21APR-03	S: T19R, 156-157del, R158G, L452R, E484Q, P681R, D950N, ORF1ab: A1526V, T1830I, A194S, A117V, ORF7a: V82A, ORF8: T26I, N: P67S, R203M, D377Y
VUI-21MAY-01	S: D80G, T95I, G142D, 144del, N439K, E484K, D614G, P681H, I1130V, D1139H , Orf1ab: A119V, G339S, H342Y, G519S, A591V, H1160Y, P1640L, N2405S, A3209V, 3675-3677del, P4715L, S4826A, A6044V, M: A63T, H125Y , Orf3a: 26158-26161del , N: I157V, R203K, G204R
VUI-21MAY-02	S: S12F, 69-70del, W152R, R346S, L452R, Q677H, A899S ; orf1ab: D105Y, S118L, D217N, E102K, A859V, S3687L, L3691S, T1246I, D1639N, P2287S, D3222N, G3278S, T4090I, P4715L; N: R203K, G204R, G212V; M: I82T

Where INDEL are defined in 'nt' the INDEL is non-codon aligned.

## MUTATION PROFILES: SIGNALS IN MONITORING

VARIANT	MUTATION PROFILE (SUBSTITUTIONS AND INSERTION/DELETIONS)
Epsilon B.1.427/B.1.429 (California)	S: S13I W152C L452R; N: T205I
Iota B.1.526 (New York)	S: L5F T95I D253G S477N/E484K A701V
B.1.1.7 with S494P (UK)	S: S494P
A.27 (France)	S: L18F L452R N501Y A653V H655Y D796Y G1219V
B.1.1.7 with Q677H (UK)	S: Q677H
B.1.620 (travellers to the UK)	S: P26S V126A S477N E484K P681H T1027I D1118H
R1 (Multiple Locations)	S: W152L E484K D614G G769V
B.1.1.1 with L452Q and F490S (seen in imported UK cases)	S: G75V T76I L452Q F490S D614G T859N
B1.214.2 (Belgium)	S: Q414K N450K D614G T716I Ins: 22204 – ACAGATCGA
AT.1 (Russia)	S: D215G, E484K, E780K, H245P, P9L, del136-144, N679K/insGIAL
B.1.621 (Spain)	T95I, Y144T/144insS/Y145N*, R346K, E484K, N501Y, D614G, P681H, D950N