

Federal Office of Public Health FOPH
Public Health Directorate Communicable
Diseases Division
Schwarzenburgstrasse 157
3003 Berne
Switzerland

N/réf : LK/MS/PV

Geneva, July 20, 2021

Geneva Centre for
Emerging Viral Diseases

Division of Infectious
Diseases

Department of Medicine

Laboratory of virology

Division of Laboratory
Medicine

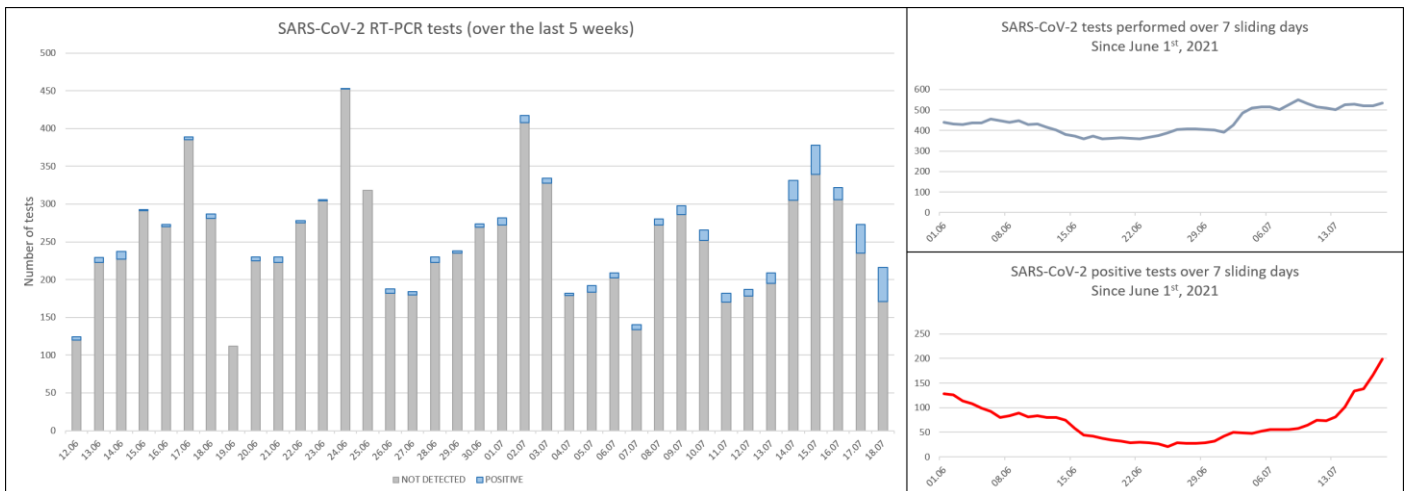
Diagnostic Department

SARS-CoV-2 genomic and variants surveillance in Geneva: weekly update

The laboratory of virology of the Geneva University Hospitals as a sentinel site for the Geneva area

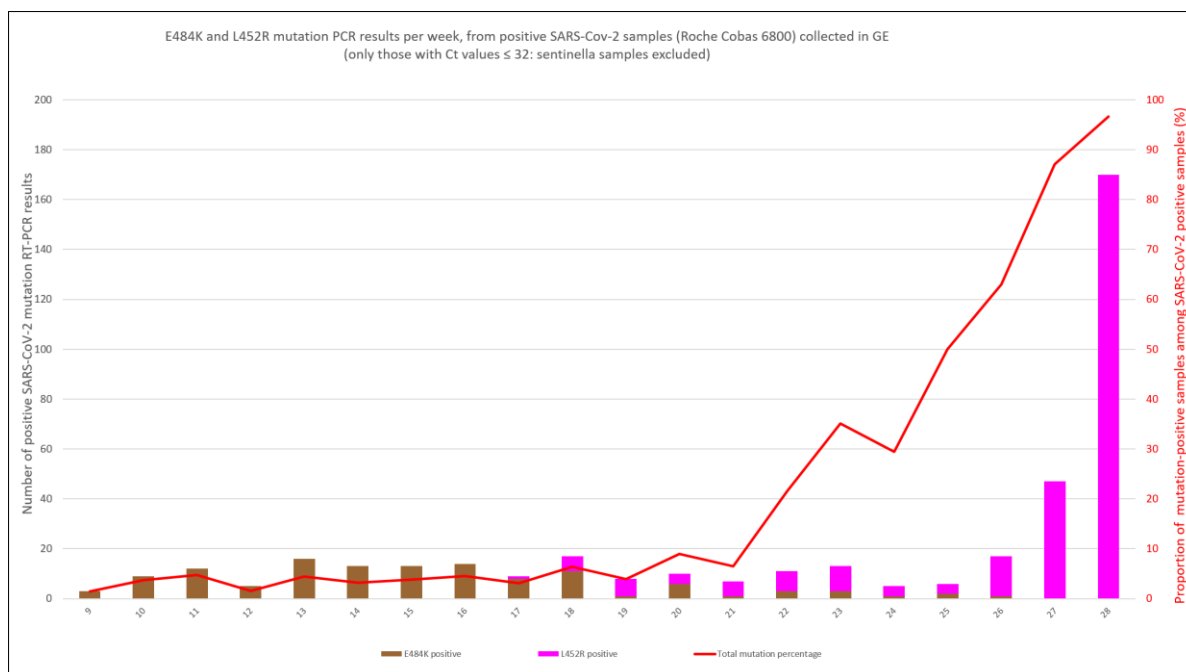
The number of tests (PCR and antigen tests) performed at the laboratory of virology of Geneva University Hospitals represents around 1/4 of the total number of tests performed in the canton of Geneva during week 28 (3743/15724). Roughly 40% of the positive specimens collected in the Geneva area were processed at HUG (N=199/501). Tests performed at our outpatient testing center (located in the Hospital but open to anyone from the community) are either PCR-based or antigen-based; all positive antigen-based tests are confirmed by PCR, allowing screening for variants.

WGS is carried out in close collaboration with the Health 2030 Genome Center in Geneva and Philippe Le Mercier from the Swiss Institute of Bioinformatics. Since March 1, 2021, the sequencing has been done within the Swiss national SARS-CoV-2 genomic and variants surveillance program. All specimens with a Ct value ≤ 32 are sequenced. In some instances, sequencing can be done on specimens sent by other laboratories in Switzerland. Phylogenetic analysis data are produced by Nextstrain, in collaboration with Richard Neher's group at the University of Basel.



The number of weekly positive cases diagnosed at HUG and the positivity rate have sharply increased over the last week, increasing from 75 to 199 positive cases. The mean daily number of positive tests at HUG rose from 11 to 28 positive cases per day over the last 7 days, with a progressive increase of the positivity rate from 3 to 9%.

Screening for specific mutations by RT-PCR among SARS-CoV-2 positive samples collected in GE and sent to our laboratory for primary diagnosis, according to calendar weeks



Date of E484K/Q mutation screening: January, 27, 2021 until July 15, 2021 (week 28). Date of 417N/T mutation screening: March, 3, 2021 until July 15, 2021 (week 28). This 417N/T screening was only done on E484K-positive samples until July 5, and presumably allows distinguishing between B.1.351 (Beta) and P.1 (Gamma, not depicted on this graph). Between July 5 (week 27) and July 15 (week 28) and the dominance of the Delta variant, the 417N/T screening was done on all positive specimens in order to help differentiate between Delta (452R positive, 417N negative) and its sub-lineage AY.1 (452R positive and 417N positive). Starting date of L452R mutation screening: May, 4, 2021 (week 17). This graph only displays positive results of specific mutations looked for in samples sent for primary diagnosis with Ct values $<$ 32, and does not include mutation results obtained in SARS-CoV-2-positive samples sent from other laboratories.

Note:

The 484K mutation is mainly found, but not exclusively, in the B.1.351 (Beta), the P.1 (Gamma) variants, and various variants of interest.

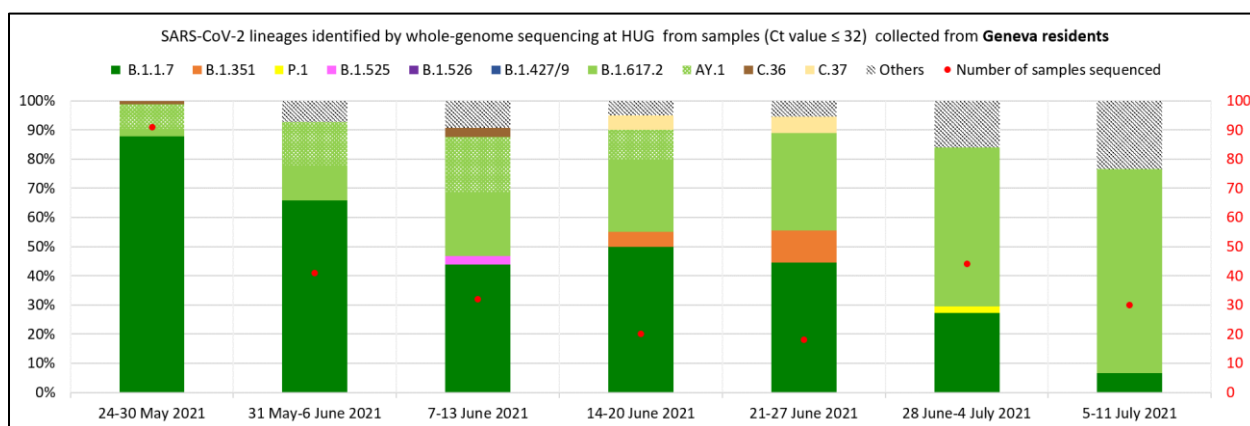
The 452R mutation is mostly, but not exclusively, carried by the B.1.617.2 (Delta) (and AY.1, which is B.1.617.2 with an additional 417N mutation) and the C.36.3 variants (not a VOC but a VOI). A large cluster of C.36.3 variant was identified in June in Geneva, and only few cases have been identified since. Almost all specimens carrying the 452R mutation have been confirmed to be Delta by sequencing since mid-June 2021.

Over the last week, the total number of new cases in the whole canton among persons living in the Geneva area was 501. Among 176 SARS-CoV-2 PCR-positive specimens with Ct values below 32 collected at HUG during week 28, **96% (N=170) carried the 452R mutation.**

Most of the cases are now arising from the community (only a small proportion has been identified in returning travelers), according to the cantonal physician team.

These data illustrate that **B.1.617.2 (Delta) variant has replaced the B.1.1.7 (Alpha) variant in the Geneva area over a period of 3 months** (first detection mid-April 2021 in the Geneva area).

SARS-CoV-2 lineages identified by whole-genome sequencing at HUG from samples (Ct value ≤32) collected from Geneva residents



Note: AY.1 (dashed light green) is the sublineage of B.1.617.2 (Delta) with the additional 417N mutation.

The WGS data confirmed the trend shown by the specific mutation screening at the beginning of July 2021. The B.1.617.2 (Delta) variant is still increasing in proportion, representing around 2/3 of available sequences collected between July 5 and July 11, 2021.

No new AY.1 sequences have been retrieved since mid-June, after the control of a large cluster in the Geneva area.

Among other notable sequences detected in the Geneva area but not tested by the HUG for primary diagnosis (and therefore not depicted in this graph) are one sequence corresponding to the C.37 (Lambda) variant and one B.1.621 sequence (not a VOC, but a VOI carrying numerous mutations, including the 484K).

Post vaccination infections

During the last 7 days, in parallel to the increase in the number of new cases, and the progressive replacement of the Alpha by the Delta variant, the number of infections after full SARS-CoV-2 vaccination have increased. Indeed, 20 cases have been sent for sequencing after identification by the cantonal physician team as breakthrough infection after full vaccination (compared to 8 during week 27 and less than 5 per week the prior weeks since the beginning of June).

This represents only a very few percent (4%) of the positive cases. Sequencing is ongoing, and no other data is available on those vaccinees. Of note, this number relies on patients' declaration of their vaccination status, and may be subject to underreporting.

Conclusions


- A steep increase in the number of SARS-CoV-2 infections in the Geneva area has been noted over week 28. The number of positive tests have more than tripled during the last week, reaching 500 cases per week in the whole canton.
- The 452R mutation (currently reflecting the Delta variant), was detected in 96% of the specimens screened last week.
- **The B.1.617.2 (Delta) variant has replaced the B.1.1.7 (Alpha) variant in the Geneva area.**
- The sublineage AY.1 (Delta + 417N) has not been detected in Geneva since mid-June.
- Only a few SARS-CoV-2 cases have been identified as breakthrough infections after vaccination during week 28.
- The number of patients hospitalized with acute SARS-CoV-2 slightly increased during week 28, but the new number of hospitalization is still low (9 as of July 19, 2021).



Laurent Kaiser



Samuel Cordey



Manuel Schibler



Pauline Vetter