

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

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Geneva Centre for  
Emerging Viral Diseases

Division of Infectious  
Diseases

Department of Medicine

Laboratory of virology

Division of Laboratory  
Medicine

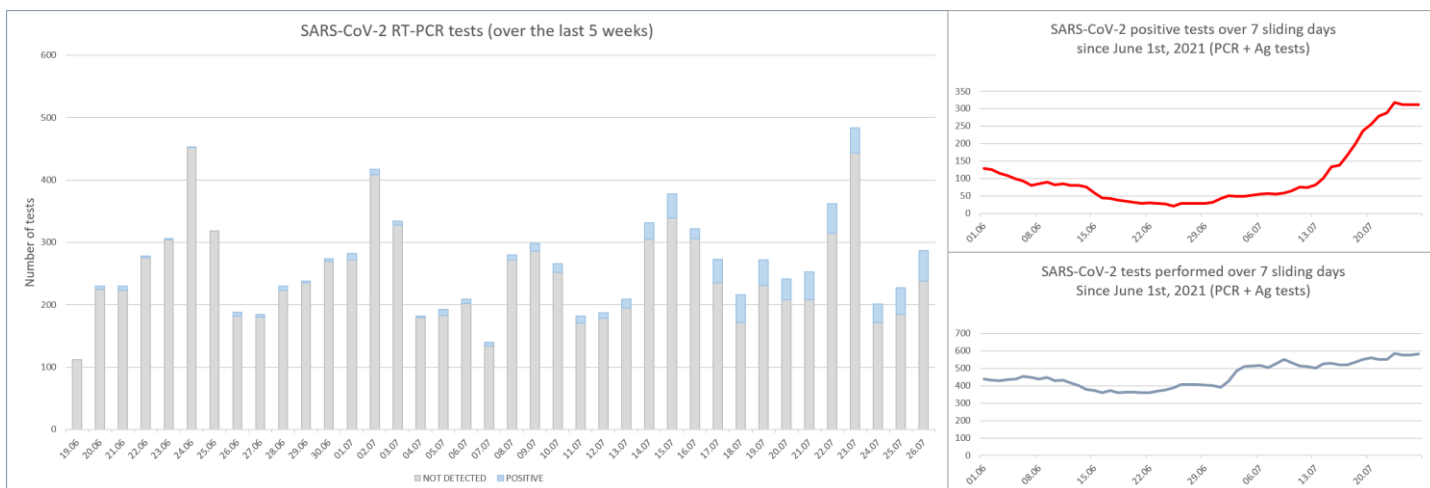
Diagnostic Department

## 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

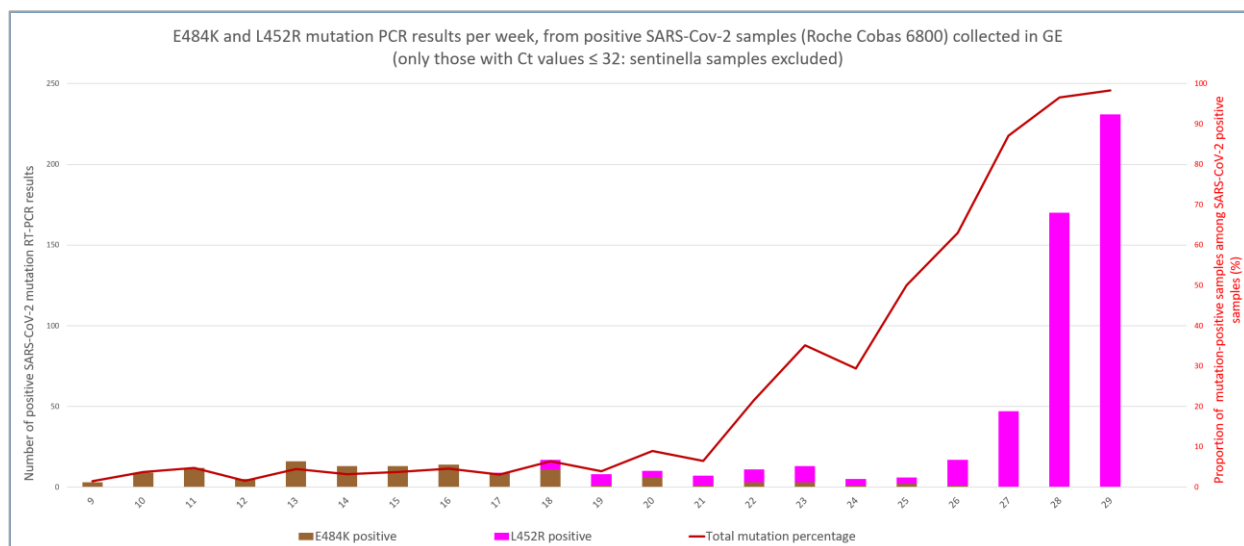
The number of tests (PCR and antigen tests) performed at the laboratory of virology of Geneva University Hospitals represents around 1/4 of the total number of tests performed in the canton of Geneva during week 29 (4026/14580). Roughly 40% of the positive specimens collected in the Geneva area were processed at HUG (N=311/739). 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  $\leq 32$  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 positive tests in the canton and the total number of tests done during the surveilled week come from the website of the Direction Générale de la Santé in Geneva (available at <https://infocovid.smc.unige.ch/>), accessed July, 27 at 2:00 pm.



The numbers of weekly positive cases diagnosed at HUG (as well as the positivity rate) have continued to increase over the last week, from 199 to 311 positive cases. The mean daily number of positive tests at HUG rose from 28 to 44 positive cases per day over the last 7 days, with a mean positivity rate of 8.5% over the last 7 days. Of note, when considering only symptomatic patients tested at the dedicated outpatient department (secteur E'), the mean positivity rate was on average 35% over the last week.

### 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), due to 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  $\leq$  32, and does not include mutation results obtained in SARS-CoV-2-positive samples sent from other laboratories.

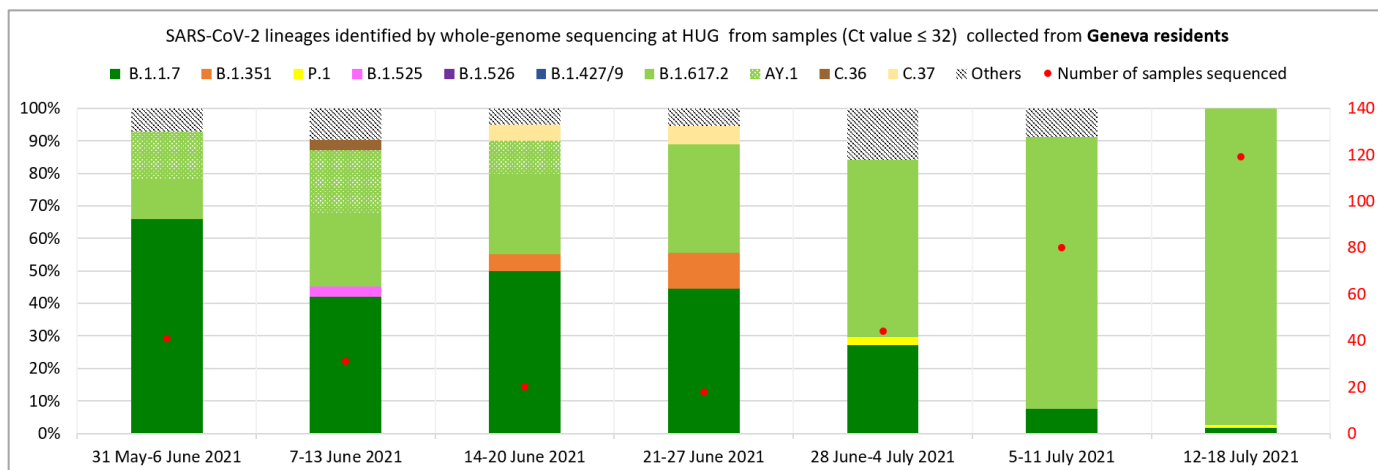
**Note:**

Almost all specimens carrying the 452R mutation have been confirmed to be Delta by sequencing since mid-June 2021.

Over the last week, among 235 SARS-CoV-2 PCR-positive specimens with Ct values below 32 collected at HUG during week 29, **98% (N=231) carried the 452R mutation.**

These data confirm that **B.1.617.2 (Delta) variant has replaced the B.1.1.7 (Alpha) variant** in the Geneva area. Indeed, almost all (>95%) specimens tested are positive for the L452R mutation for the second week in a row.

### 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

119 samples collected from Geneva residents between July 12 and July 18 have been sequenced. Of those, 69 were collected at Geneva University Hospitals. The other specimens have been collected in other Geneva-based laboratories and were sent to HUG for sequencing, at the request of the Cantonal Physician team.

The WGS data confirmed that the B.1.617.2 (Delta) variant replaced previously circulating viruses in the Geneva area since mid-July.

### Post-vaccination infections

Complete vaccination is defined here as a positive SARS-CoV-2 test occurring more than 14 days after the second vaccine dose. This surveillance is done in collaboration with the Direction Générale de la Santé (DGS) of Geneva. Data are collected by the DGS of Geneva during contact tracing calls after having obtained informed consent from SARS-CoV-2 positive patients. The list of patients with post-vaccination infections is sent weekly to HUG virology laboratory, which makes an effort to retrieve initial diagnostic samples in order to ensure sequencing, as recommended by FOPH.

The absolute number of positive cases identified as breakthrough vaccine infections increased during the last week, but the proportion of breakthrough vaccine infections amongst positive cases remained globally stable. Indeed, 40 cases have been transmitted by the cantonal physician team as post-vaccination infections for sequencing. This number represents 5% of the 754 cases reported by the Direction Générale de la Santé in Geneva over week 29.

The median age of the persons in whom post-infection vaccinations have been identified is 50 years (IQR 35-63). No other background information is available regarding underlying health status of those persons.

## Conclusions

- The number of SARS-CoV-2 infections in the Geneva area has continued to increase over week 29 (+50% compared to the previous week).
- The positivity rate among symptomatic outpatients tested at HUG is high, at 35% on average over the last 7 days.
- The 452R mutation (currently reflecting the Delta variant), was detected in over 95% of the specimens screened over the last 2 weeks.
- WGS confirmed that the B.1.617.2 (Delta) variant has replaced the B.1.1.7 (Alpha) variant in the Geneva area.
- Only a few SARS-CoV-2 cases have been identified as breakthrough infections after vaccination during week 29.
- The number of patients hospitalized with acute SARS-CoV-2 continued to increase during week 29. However, the new number of hospitalizations is still low (<20 as of July 27, 2021).



**Laurent Kaiser**



**Samuel Cordey**



**Manuel Schibler**



**Pauline Vetter**