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Geneva Centre for
Emerging Viral Diseases

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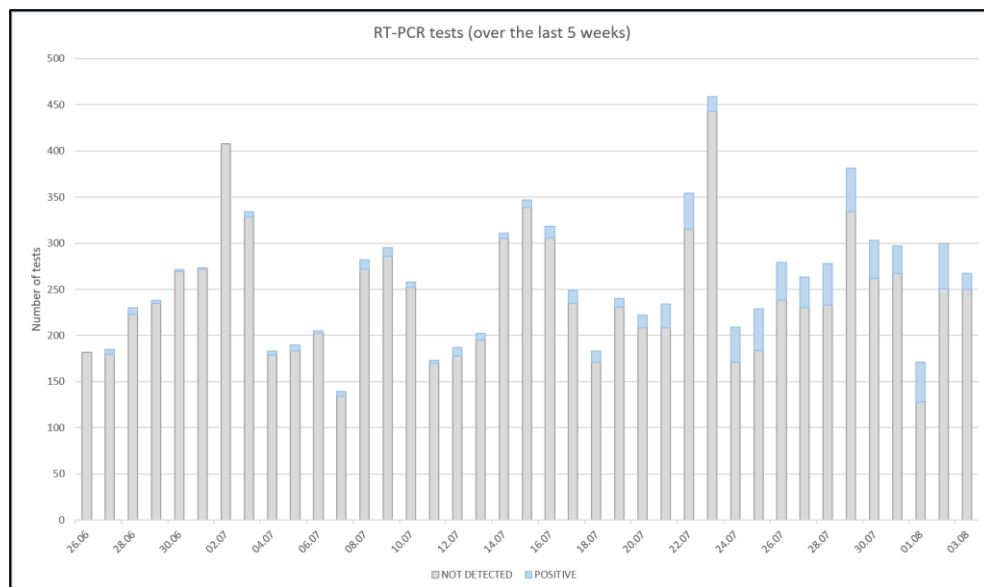
Diagnostic Department

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

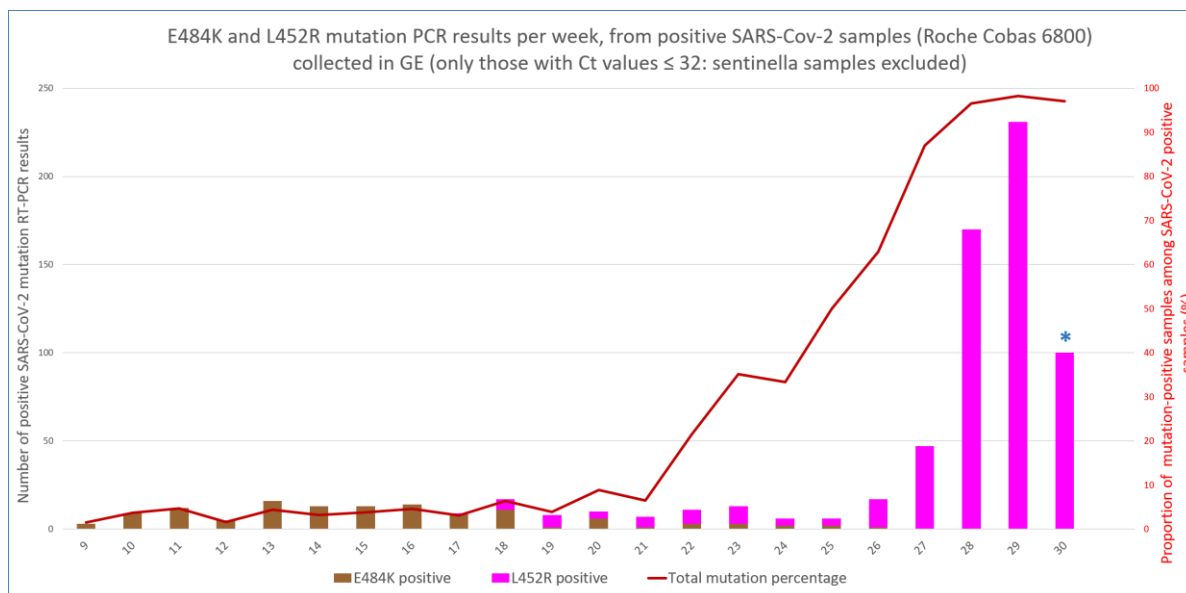
The number of tests (PCR and antigen tests) performed at the laboratory of virology of Geneva University Hospitals represents around 1/4 of the total number of tests performed in the canton of Geneva during week 30 (4118/15278). Roughly 45% of the positive specimens collected in the Geneva area were processed at HUG (N=310/690). 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 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 August 4, at 2:00 pm.



The numbers of weekly positive cases diagnosed at HUG, as well as the mean positivity rate have been stable over the last 2 weeks (mean positivity rate of 8.5% during week 30). Of note, when considering only symptomatic patients tested at the dedicated outpatient department (secteur E'), the mean positivity rate was on average 39% 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 ≤ 32, and does not include mutation results obtained in SARS-CoV-2-positive samples sent from other laboratories.

Note:

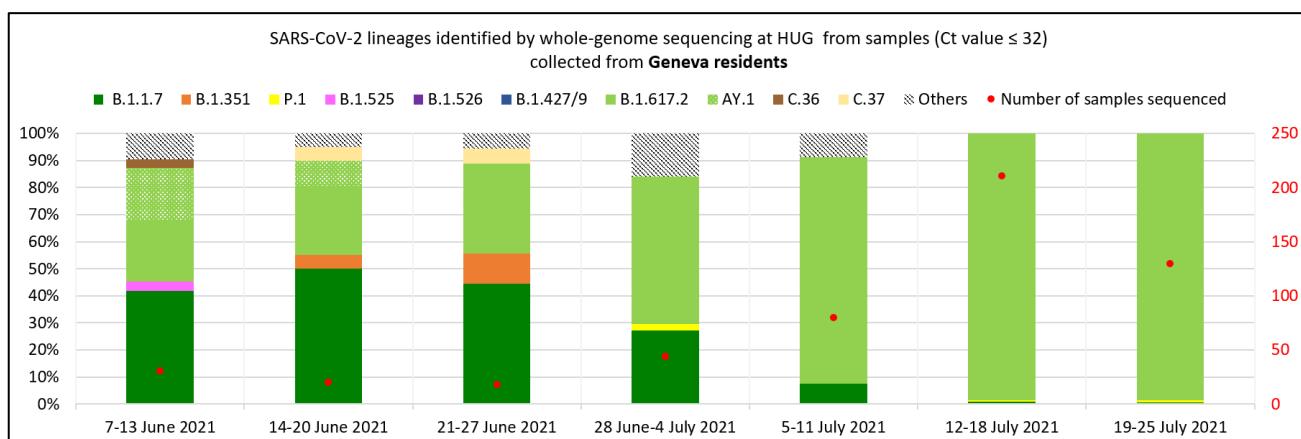
Almost all specimens carrying the 452R mutation have been confirmed to be Delta by sequencing since mid-June 2021.

* During week 30, the L452R specific mutation screening was performed only from July 26 to July 29, and not all the 7 days of the week.

Among 103 SARS-CoV-2 PCR-positive specimens with Ct values below 32 collected at HUG from July 26 to July 29, **97% (N=100/103) carried the 452R mutation.**

More than 96% of the specimens tested carried the 452R mutation over the last 3 weeks. With respect to this result, our laboratory has stopped the systematic screening of positive cases for the 452R mutation on July 29, 2021. The surveillance is still ongoing by whole genome sequencing, and specific mutation screening will resume according to local epidemiology when necessary.

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



Results of WGS of 534 sequences submitted to GISAID over the last 7 weeks.

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

130 samples collected from Geneva residents between July 19 and July 25 have been sequenced. Of those, 128 were collected at Geneva University Hospitals. The other specimens were collected in other Geneva-based laboratories and then 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 has replaced previously circulating viruses in the Geneva area since mid-July. Of note, more than 98% of the sequences are confirmed to be Delta from July 12 to July 25, 2021.

Post-vaccination infections

Post-vaccination infection 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 post-vaccination infections is still low, as expected given existing data showing high vaccine efficacy. This number represents 7.7% of the 709 cases reported by the Direction Générale de la Santé in Geneva over week 30.

The median age of the persons in whom post-vaccination infections have been identified is 51 years (IQR 33-66). No other background information is available regarding underlying health status of those persons.

Most (>92%) positive tests therefore occur in non-vaccinated persons.

Conclusions

- The number of SARS-CoV-2 infections detected in the Geneva area has stabilized around 700 per week over the last 2 weeks.
- The positivity rate among symptomatic outpatients tested at HUG remains high, at 39% on average over the last 7 days.
- The 452R mutation (currently reflecting the Delta variant), was detected in over 96% of the specimens screened over the last 3 weeks. With respect to this result, our laboratory has stopped the systematic screening of positive cases for the 452R mutation on July 29, 2021. The surveillance is still ongoing by WGS, and specific mutation screening will resume according to local epidemiology when necessary.
- WGS confirmed that it has almost exclusively been the B.1.617.2 (Delta) variant circulating in the Geneva area since mid-July.
- Only a few SARS-CoV-2 cases have been identified as breakthrough infections after vaccination during week 30, within the expected range.
- The number of patients hospitalized with acute SARS-CoV-2 continued to increase during week 30, for a total of 25 patients hospitalized on August 3, 2021. The vast majority are not vaccinated.



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