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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 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 the Geneva University Hospitals represents around 20% of the total number of tests performed in the canton of Geneva during week 46 (3150/16007). Roughly **30% of the positive specimens collected in the Geneva area were processed at HUG (322/1091) during week 46**. Tests performed at our outpatient testing center are either PCR-based or antigen-based. Most symptomatic patients are screened by RT-PCR and all positive antigen-based tests are confirmed by PCR, allowing screening for variants.

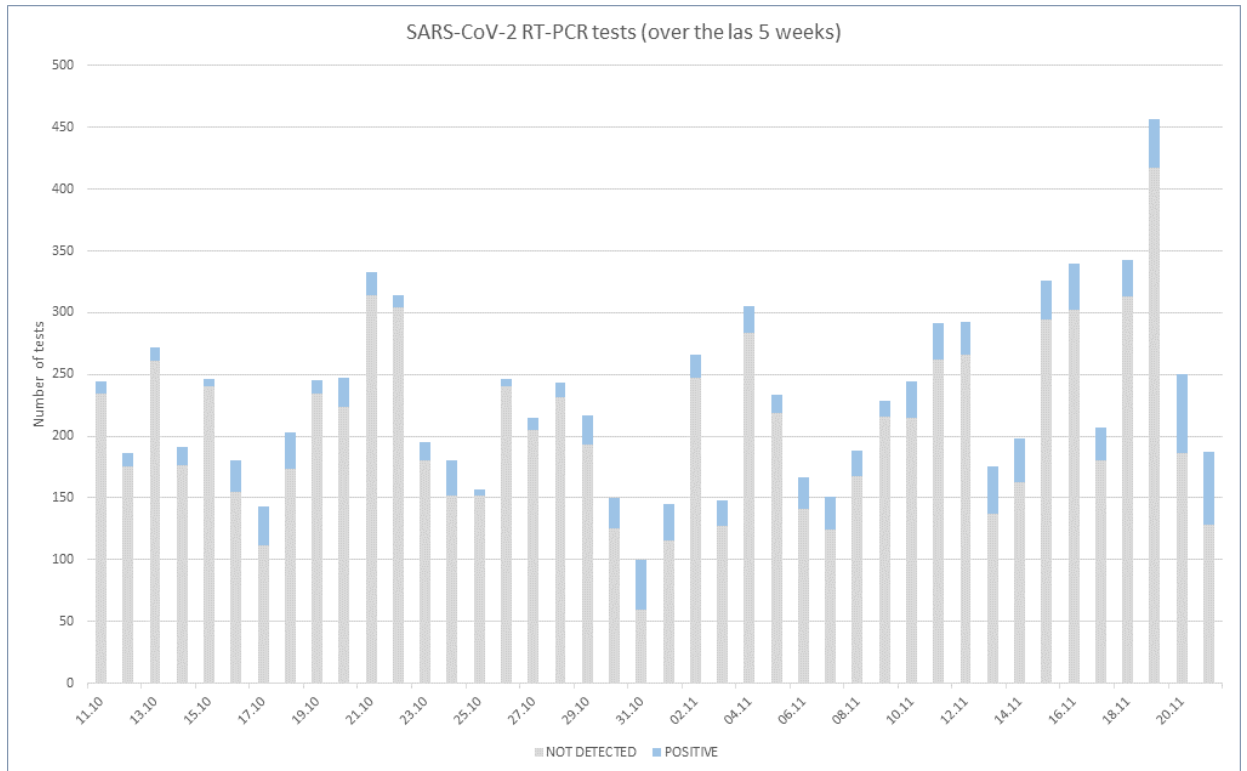
The number of positive tests in the canton and the total number of tests done during the surveilled week come from the website of the Direction Générale de la Santé in Geneva (available at <https://infocovid.smc.unige.ch/>), accessed November 22, at 2 pm.

Methods and collaborations

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 collected at HUG with a Ct value ≤ 32 are sequenced. In some instances, sequencing can be done on specimens sent by other laboratories in Switzerland within the surveillance program. Phylogenetic analysis data are produced by Nextstrain, in collaboration with Richard Neher's group at the University of Basel.

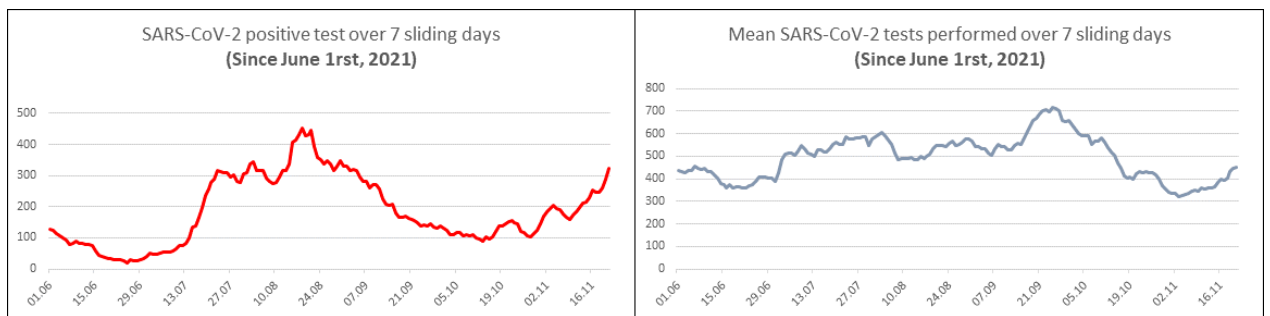
Geographic distribution, transmission advantage estimates and detailed number of available sequences over time in the canton of Geneva is available via CoVspectrum, maintained by the group of Tanja Stadler at ETH Zurich.

These reports are produced in collaboration with the Geneva Cantonal Physician team, which provides information on epidemiological links and post-vaccination infections (see below).

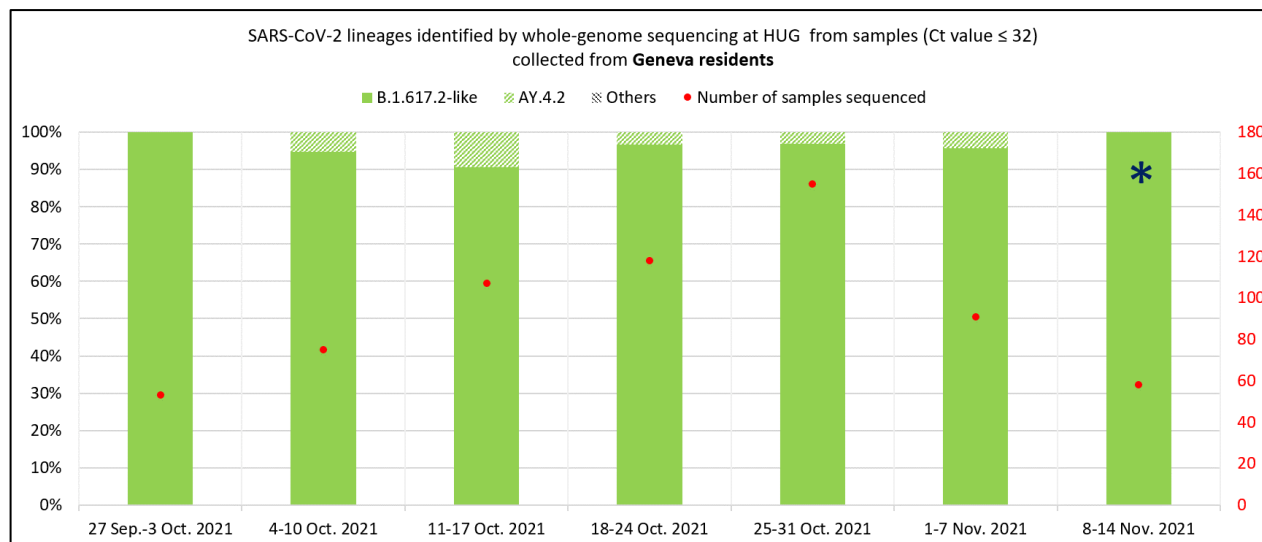


During week 46, the **absolute number of positive SARS-CoV-2 tests sharply increased (+50% over one week)**, as long as the mean positivity rate over 7 sliding days, which reached more than 10%.

Similarly, at our **outpatient symptomatic testing center, the mean positivity rate continued to increase and reached 25% on average.**



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



Results of WGS of 657 sequences submitted to GISAID between September 27 and November 14, 2021.

Note: due to a technical problem encountered during the WGS process, a total of 76 SARS-CoV-2 positive samples collected between September 23 and 28 could not be sequenced. This partly explains the drop in the number of sequences available during this period.

* Partial data for week 45 (November 8 to November 14), as sequencing is still ongoing. Numbers will be updated in the next report.

Delta or one of its sub-lineage has been identified in all the available SARS-CoV-2 sequences collected over the last 2 months. Worldwide, this variant and its sub-lineages are retrieved in more than 98% of available sequences.

AY.4.2 is circulating in the community since the beginning of October. It hasn't been increasing in frequency in the canton of Geneva over the last 6 weeks.

We still observe a large variety of different Delta sub-lineages circulating in the community, without any trend towards any out-competition by a specific variant. As Delta sub-lineage diverge, more sub-lineages are being delineated (not depicted here).

Summary of the situation regarding the circulation of the E484Q Delta sub-lineage first identified in Geneva (E484Q + V687I + T859N):

Three additional specimen have been identified in the last sequencing batch; the last positive specimen was collected on November 9, and was the one identified by the systematic screening of the E484Q mutation already described in the previous report.

A total of 34 sequences of this specific variant have been identified in Switzerland since the beginning of October: 31 from Geneva residents, 1 additional collected in Geneva from a patient leaving abroad (France), 1 in the Canton of Valais and 1 in the Canton of Zurich, among specimen collected between October 12 and November 9, 2021.

Among patients for whom vaccination status is available (see below), **16/25 (64%) were vaccinated.**

Systematic screening of the E484Q mutation has been implemented from November 10 to November 18, on specimen collected from November 9 to November 18 and tested from primary diagnostic at HUG. Only one positive sample collected on November 9 was detected among 258 samples tested.

The systematic screening of the E484Q mutation has then stopped following this **reassuring signal that the E484Q Delta sub-lineage first identified in Geneva (E484Q + V687I + T859N) did not largely spread in the Canton, and apparently stopped circulating.**

The next report will be published in two weeks if no particular variant or mutation emerges.

Post-vaccination infections in the canton of Geneva

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.

Among the 1270 new COVID-19 cases reported by the Direction Générale de la Santé in Geneva over week 46, 401 (32%) have been identified as post-vaccination infections.

As expected with the increased number of vaccinated people and the non-sterilizing immunity conferred by the vaccine, the proportion of post-vaccination infections is progressively increasing over time.

Although absolute numbers are still low, there is an increasing trend in the proportion of fully vaccinated hospitalized patients over time, mostly in elderlies > 75 years-old.

Please refer to the report of the Geneva Center for Emerging Viral Diseases regarding progression of COVID-19 hospitalizations at Geneva University Hospitals distributed on November 22, 2021, which includes data from mid-July to November 21, 2021.

Conclusions

- The **absolute number of positive tests sharply increased** over week 46, and the **mean positivity rate reached 25% in our symptomatic outpatient testing center**.
- Delta or its sub-lineage is exclusively causing all new identified infections in the canton of Geneva since mid-September. Worldwide, this variant is retrieved in more than 98% of available sequences of the last 2 months.
- The Delta sub-lineage **AY.4.2 is circulating in the community at a low level** and represents 4.5% of the available sequences of the Canton since the beginning of October.
- **The E484Q Delta sub-lineage first identified in Geneva** (with Spike mutations E484Q, V687I and T859N) **shows signs of extinction**. The systematic screening for the specific E484Q mutation on samples tested for primary diagnostic at the laboratory of virology of HUG was thus stopped.



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Pauline Brindel for the Geneva Cantonal Physician team.