Investigating the first stage of the COVID-19 pandemic in Ukraine using epidemiological and genomic data

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Abstract

This is the supplementary information that was not included in the main manuscript body.

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Appendix

The Ukrainian Transmission Clusters

The visualizations of seven largest intra-Ukrainian transmission clusters are presented in Figures A1-A7. The numbering of clusters corresponds to the one presented in Figures 3 and 4.
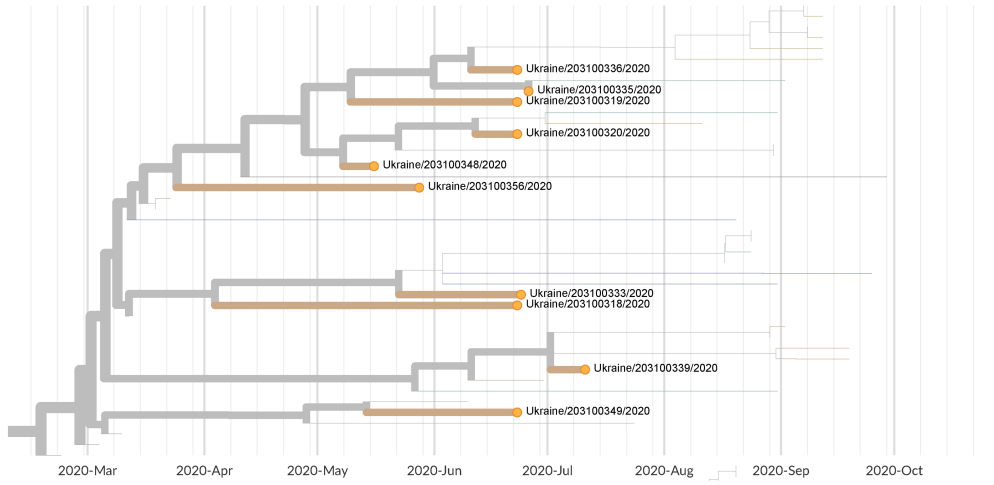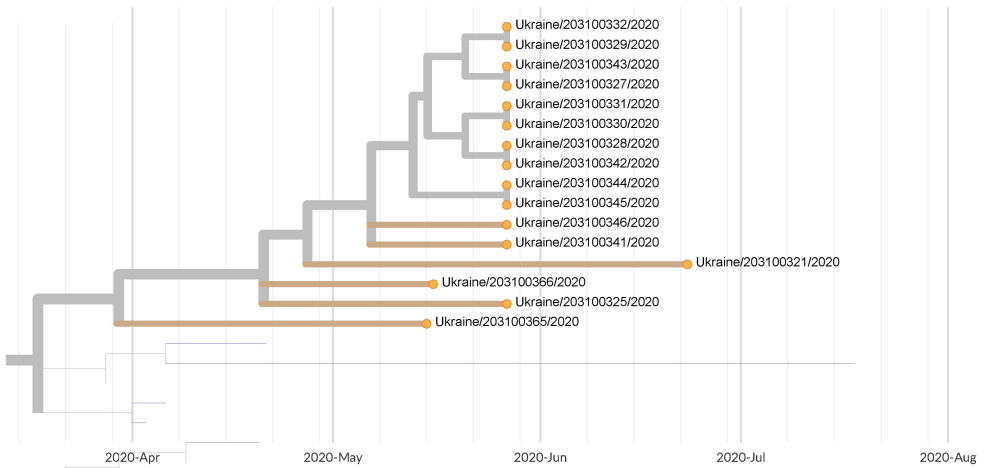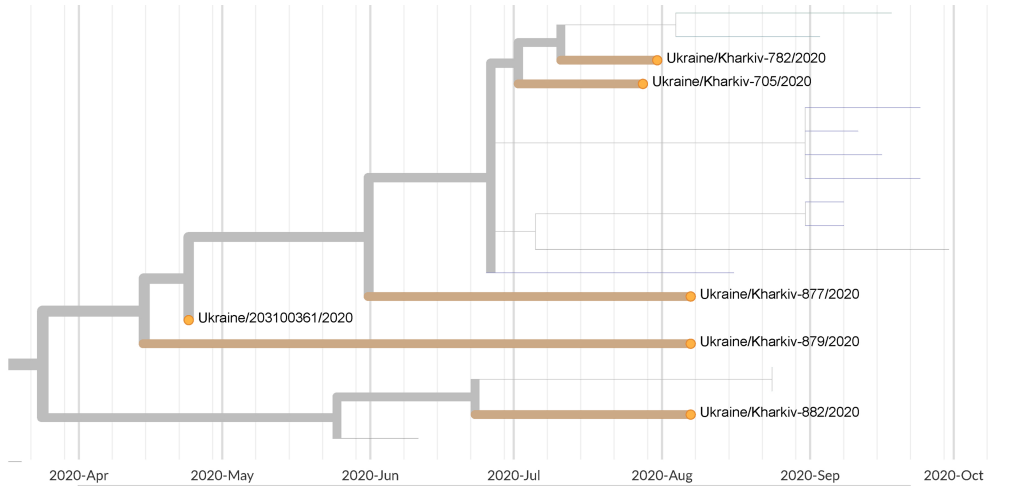

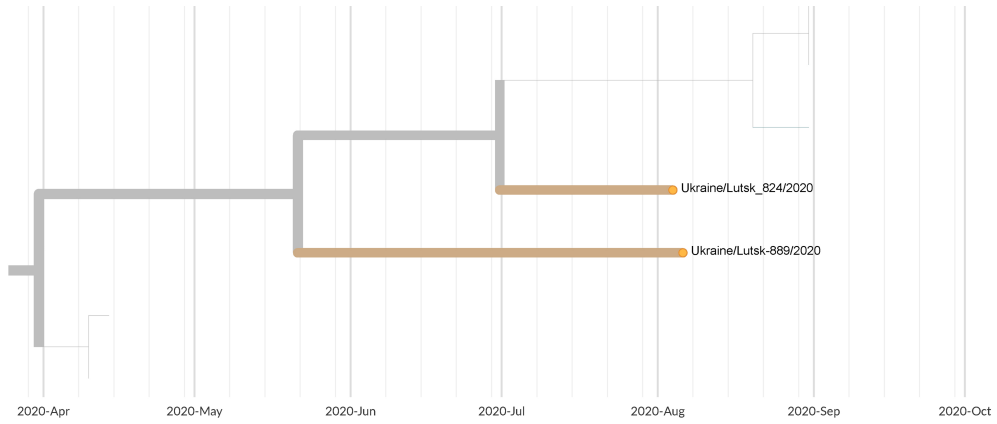Figure A1: Cluster 1.

Figure A2: Cluster 2.

Figure A3: Cluster 3.
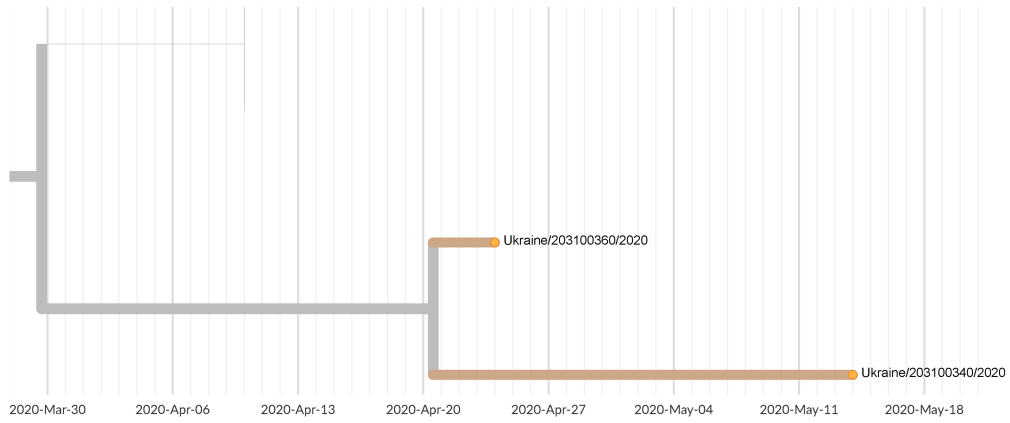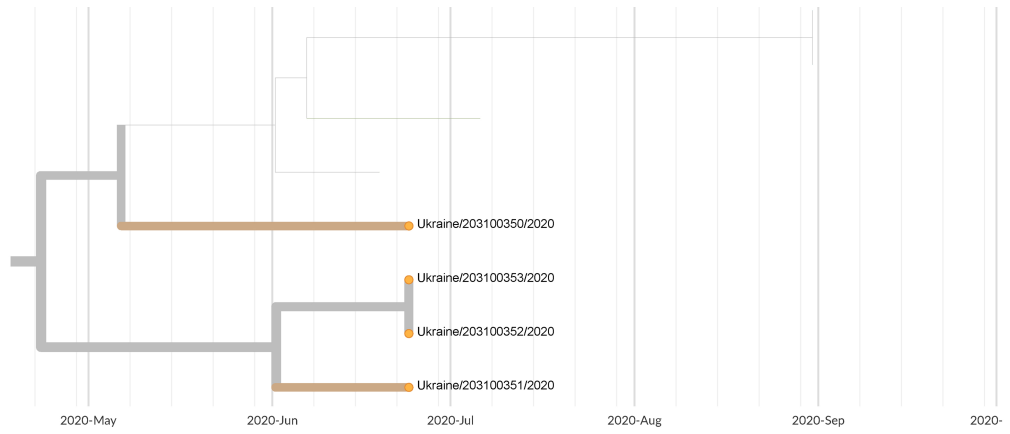

Figure A4: Cluster 4.

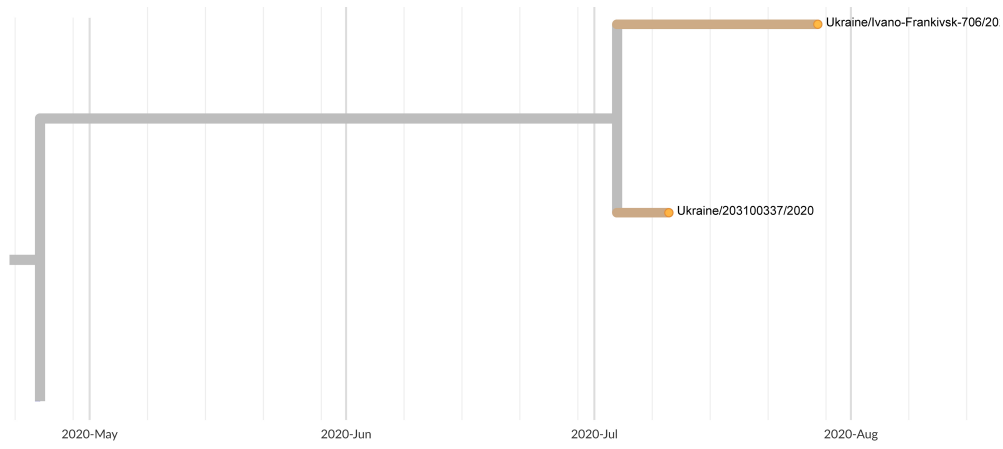Figure A5: Cluster 5.

Figure A6: Cluster 6.

Figure A7: Cluster 7.

TMRCAs

The TMRCAs have been produced using Nextstrain together with the corresponding 95% confidence intervals. The results are presented in Table A2.

Name	TMRCA & CI	Parent TMRCA & CI	March 17
Cluster 1	2020-03-06 (2020-02-29; 2020-03-10)	2020-03-02 (2020-02-24; 2020-03-08)	Before
Cluster 2	2020-03-30 (2020-03-11; 2020-05-03)	2020-03-18 (2020-03-11; 2020-03-26)	Undecided
Cluster 3	2020-03-25 (2020-03-15; 2020-04-12)	2020-03-14 (2020-03-05; 2020-03-19)	Undecided
Cluster 4	2020-05-22 (2020-03-25; 2020-06-17)	2020-03-31 (2020-03-22; 2020-04-07)	After
Cluster 5	2020-04-21 (2020-04-12; 2020-04-24)	2020-03-30 (2020-03-19; 2020-04-07)	After
Cluster 6	2020-04-23 (2020-03-29; 2020-05-15)	2020-03-22 (2020-03-07; 2020-04-20)	Undecided
Cluster 7	2020-07-04 (2020-06-08; 2020-07-10)	2020-04-25 (2020-04-13; 2020-04-25)	After

Table A1: TMRCAs and parent TMRCAs of clusters on a global tree.

Exponential Growth Rate

The estimates of the exponential growth rate f have been produced using BEAST v1.10.4 together with the corresponding 95% uncertainty (i.e. highest posterior density interval or HPDI) intervals. The results are presented in Table A2.

Cluster	Model	$\hat{f}$ & 95% HPDI (Annual)	$\hat{f}$ & 95% HPDI (Daily)
First	Exp. Growth	19.206 (8.301; 30.011)	0.052 (0.023; 0.082)
Second	Exp. Growth	27.879 (6.499; 49.853)	0.076 (0.018; 0.136)
Third	Exp. Growth	28.050 (10.470; 48.294)	0.077 (0.029; 0.132)

Table A2: Estimates of exponential growth rate for the Ukrainian SARS-CoV-2 for the three largest clusters.