Supplementary Figure 1: Conversion distributions for repeat-tested patients with initial SARS-CoV-2 negative (a, c, e, and g) and positive (b, d, f, and h) results. For the analyses in a to d only the first conversion events (i.e. negative to positive - a and c - or positive to negative - b and d) were considered. N represents the total numbers of patients analyzed. The distributions in a to d are represented by density-adjusted histograms (in grey bars), kernel probability density lines (in blue), unadjusted cumulative distributions (red line) and Kaplan-Meier hazard rates (green); the timing of individual results are represented by the black marks along the x-axis. For the Kaplan Meier estimated hazard rates (e to h), in addition to the conversion events, patients were considered censored at the time of the last unchanged result were included and the number of patients at risk for conversion at each time point are shown in g and h.
Supplementary Figure 2: SARS-CoV-2 results from repeat-tested patients that converted from negative to positive and back to negative (A) or from positive to negative and back to positive (B). SARS-CoV-2 negative results are represented by blue dots, indeterminate results by purple dots, and positive results are in orange (Target1 Ct value > 30), filled red (Target1 Ct value <= 30), or open red dots (Ct not available), plotted on a time scale from the date of the first test.
Supplementary Tables

Supplementary Table 1: Numbers of unique patients in the Columbia Clinical COVID-19 dataset, NYP Laboratory SARS-CoV-2 Testing dataset, and the merged dataset.

| Unique Patients                  | Merged dataset | Laboratory dataset only | Clinical dataset only |
|----------------------------------|----------------|------------------------|----------------------|
| Total                            | 1588           | 20750                  | 36                   |
| SARS-CoV-2 Positive              | 990            | 9653                   | 11                   |
| Repeat-tested                    | 275            | 3157                   | 0                    |
| With symptoms                    | 529            | 0                      | 8                    |
| Deceased                         | 84             | 0                      | 0                    |

| SARS-CoV-2 Tests                  | Total         | Laboratory dataset only | Clinical dataset only |
|-----------------------------------|---------------|------------------------|----------------------|
| Total                            | 2023          | 25354                  | 2                    |
| SARS-CoV-2 Positive              | 1266          | 11454                  | 4                    |
| Repeat-tested                    | 710           | 7761                   | 0                    |
| With symptoms                    | 707           | 0                      | 1                    |
| Deceased                         | 115           | 0                      | 0                    |
Supplementary Table 2: Patient characteristics, grouped by highest SARS-2-CoV2 result in each patient. **Negative** indicates a result of “Not Detected” and **Positive** includes results reported as “Detected” or “Indeterminate”. Time-dependent clinical factors, such as age group, symptom start to test interval, and encounter type at time of test order, are counted at the time of the first test.

|                          | Negative (N=11352) | Positive (N=10920) | Total (N=22272) | p value |
|--------------------------|--------------------|--------------------|-----------------|---------|
| **Gender at birth**      | < 0.001           |                    |                 |         |
| Female                   | 7045 (62.1%)       | 5061 (46.4%)       | 12106 (54.4%)   |         |
| Male                     | 4291 (37.8%)       | 5851 (53.6%)       | 10142 (45.5%)   |         |
| Unknown                  | 16 (0.1%)          | 7 (0.1%)           | 23 (0.1%)       |         |
| **Age at order**         | < 0.001           |                    |                 |         |
| Median                   | 42.9              | 61.5              | 54.4            |         |
| Mean (sd)                | 46.5 (23.0)        | 60.0 (19.3)        | 53.1 (22.3)     |         |
| Q1, Q3                   | 31.4, 64.0         | 46.5, 74.5         | 35.5, 70.4      |         |
| Range                    | 0.0 - 120.3        | 0.0 - 144.7        | 0.0 - 144.7     |         |
| **Age group (y)**        | < 0.001           |                    |                 |         |
| 0-19                     | 1069 (9.4%)        | 155 (1.4%)         | 1224 (5.5%)     |         |
| 20-44                    | 4912 (43.3%)       | 2387 (21.9%)       | 7299 (32.8%)    |         |
| 45-54                    | 1255 (11.1%)       | 1533 (14.0%)       | 2788 (12.5%)    |         |
| 55-64                    | 1389 (12.2%)       | 2148 (19.7%)       | 3537 (15.9%)    |         |
| 65-74                    | 1236 (10.9%)       | 2065 (18.9%)       | 3301 (14.8%)    |         |
| 75-84                    | 868 (7.7%)         | 1588 (14.5%)       | 2456 (11.0%)    |         |
| >=85                     | 616 (5.4%)         | 1044 (9.6%)        | 1660 (7.5%)     |         |
| **Ethnicity**            | < 0.001           |                    |                 |         |
| Hispanic/Latino          | 154 (26.3%)        | 308 (31.0%)        | 462 (29.3%)     |         |
| Not Hispanic/Latino      | 311 (53.2%)        | 409 (41.2%)        | 720 (45.7%)     |         |
| Not Specified            | 120 (20.5%)        | 275 (27.7%)        | 395 (25.0%)     |         |
| **Race**                 | < 0.001           |                    |                 |         |
| Asian                    | 752 (6.6%)         | 531 (4.9%)         | 1283 (5.8%)     |         |
| Black or African American| 1629 (14.3%)       | 1833 (16.8%)       | 3462 (15.5%)    |         |
| Caucasian                | 3586 (31.6%)       | 2356 (21.6%)       | 5942 (26.7%)    |         |
| Declined                 | 1593 (14.0%)       | 1308 (12.0%)       | 2901 (13.0%)    |         |
| Other                    | 1769 (15.6%)       | 2287 (20.9%)       | 4056 (18.2%)    |         |
| Pacific Islander         | 20 (0.2%)          | 25 (0.2%)          | 45 (0.2%)       |         |
| Unavailable              | 2003 (17.6%)       | 2580 (23.6%)       | 4583 (20.6%)    |         |
| **N**                    | 11352              | 10920              | 22272           |         |
| Highest level of care               | Negative (N=11352) | Positive (N=10920) | Total (N=22272) | p value |
|------------------------------------|--------------------|--------------------|----------------|---------|
| Admitted                           | 229 (41.4%)        | 305 (35.1%)        | 534 (37.6%)    | 0.025   |
| Discharged from ED                 | 58 (10.5%)         | 71 (8.2%)          | 129 (9.1%)     |         |
| ICU-level Care                     | 69 (12.5%)         | 119 (13.7%)        | 188 (13.2%)    |         |
| Outpatient                         | 197 (35.6%)        | 373 (43.0%)        | 570 (40.1%)    |         |
| N                                  | 553                | 868                | 1421           |         |

| Encounter type at order            |                    |                    |                | < 0.001 |
|------------------------------------|--------------------|--------------------|----------------|---------|
| Emergency                          | 2706 (23.8%)       | 4748 (43.5%)       | 7454 (33.5%)   |         |
| Inpatient                          | 3827 (33.7%)       | 2555 (23.4%)       | 6382 (28.7%)   |         |
| Outpatient                         | 4819 (42.5%)       | 3617 (33.1%)       | 8436 (37.9%)   |         |
| N                                  | 11352              | 10920              | 22272          |         |

| Number of admissions               |                    |                    |                | 0.008   |
|------------------------------------|--------------------|--------------------|----------------|---------|
| Median                             | 1.0                | 0.0                | 0.0            |         |
| Mean (sd)                          | 0.5 (0.5)          | 0.5 (0.5)          | 0.5 (0.5)      |         |
| Q1, Q3                             | 0.0, 1.0           | 0.0, 1.0           | 0.0, 1.0       |         |
| Range                              | 0.0 - 2.0          | 0.0 - 2.0          | 0.0 - 2.0      |         |
| N                                  | 584                | 995                | 1579           |         |

| Admission duration (d)             |                    |                    |                | 0.046   |
|------------------------------------|--------------------|--------------------|----------------|---------|
| Median                             | 1.0                | 0.6                | 0.7            |         |
| Mean (sd)                          | 5.7 (13.9)         | 4.5 (8.1)          | 4.9 (10.6)     |         |
| Q1, Q3                             | 0.4, 4.0           | 0.3, 4.9           | 0.3, 4.5       |         |
| Range                              | 0.0 - 139.0        | 0.0 - 82.2         | 0.0 - 139.0    |         |
| N                                  | 584                | 995                | 1579           |         |

| Admission 1 to test 1 (d)          |                    |                    |                | < 0.001 |
|------------------------------------|--------------------|--------------------|----------------|---------|
| Median                             | 0.4                | 0.2                | 0.3            |         |
| Mean (sd)                          | 3.0 (11.4)         | 0.7 (2.6)          | 1.6 (7.4)      |         |
| Q1, Q3                             | 0.2, 1.1           | 0.1, 0.6           | 0.2, 0.9       |         |
| Range                              | -13.9 - 133.1      | 0.0 - 55.4         | -13.9 - 133.1  |         |
| N                                  | 555                | 924                | 1479           |         |

| Primary Outcome                    |                    |                    |                | < 0.001 |
|------------------------------------|--------------------|--------------------|----------------|---------|
| Deceased/Discharged to Hospice     | 29 (5.0%)          | 72 (7.2%)          | 101 (6.4%)     |         |
| Discharged (not death)             | 542 (92.8%)        | 865 (86.9%)        | 1407 (89.1%)   |         |
| Intubated (still admitted)         | 1 (0.2%)           | 44 (4.4%)          | 45 (2.8%)      |         |
| Still admitted (not intubated)     | 12 (2.1%)          | 14 (1.4%)          | 26 (1.6%)      |         |
| N                                  | 584                | 995                | 1579           |         |

| Deceased                           |                    |                    |                | 0.048   |
|------------------------------------|--------------------|--------------------|----------------|---------|
| Yes                                | 22 (3.8%)          | 62 (6.2%)          | 84 (5.3%)      |         |
| N                                  | 584                | 995                | 1579           |         |
|                    | Negative (N=11352) | Positive (N=10920) | Total (N=22272) | p value |
|--------------------|---------------------|---------------------|-----------------|---------|
| **Symptomatic**    |                     |                     |                 | 0.004¹  |
| No                 | 2 (6.9%)            | 10 (1.8%)           | 12 (2.0%)       |         |
| Unknown            | 6 (20.7%)           | 36 (6.4%)           | 42 (7.1%)       |         |
| Yes                | 21 (72.4%)          | 514 (91.8%)         | 535 (90.8%)     |         |
| N                  | 29                  | 560                 | 589             |         |
| **Intubated**      |                     |                     |                 | 0.026¹  |
| Yes                | 41 (7.0%)           | 106 (10.7%)         | 147 (9.3%)      |         |
| N                  | 584                 | 995                 | 1579            |         |
| **Decompensated**  |                     |                     |                 | 0.005¹  |
| Yes                | 49 (8.4%)           | 133 (13.4%)         | 182 (11.5%)     |         |
| N                  | 584                 | 995                 | 1579            |         |
| **Number of tests**|                     |                     |                 | < 0.001²|
| Median             | 1.0                 | 1.0                 | 1.0             |         |
| Mean (sd)          | 1.2 (0.6)           | 1.2 (0.7)           | 1.2 (0.7)       |         |
| Q1, Q3             | 1.0, 1.0            | 1.0, 1.0            | 1.0, 1.0        |         |
| Range              | 1.0 - 8.0           | 1.0 - 41.0          | 1.0 - 41.0      |         |
| N                  | 11352               | 10920               | 22272           |         |

1. Pearson’s Chi-squared test (adjusted for multiple comparisons)
2. Linear Model ANOVA (adjusted for multiple comparisons)
3. Trend test for ordinal variables (adjusted for multiple comparisons)
Supplementary Table 3: Patient characteristics comparing repeat-tested with single-tested patients.

|                      | Repeat (N=3432) | Single (N=18906) | Total (N=22338) | p value |
|----------------------|-----------------|------------------|-----------------|---------|
| **Gender at birth**  |                 |                  |                 | <0.001^1 |
| Female               | 1644 (47.9%)    | 10503 (55.6%)    | 12147 (54.4%)   |         |
| Male                 | 1787 (52.1%)    | 8380 (44.3%)     | 10167 (45.5%)   |         |
| Unknown              | 1 (0.0%)        | 22 (0.1%)        | 23 (0.1%)       |         |
| N                    | 3432            | 18905            | 22337           |         |
| **Age at order**     |                 |                  |                 | <0.001^2 |
| Median               | 59.7            | 53.4             | 54.4            |         |
| Mean (sd)            | 55.5 (23.3)     | 52.7 (22.1)      | 53.1 (22.3)     |         |
| Q1, Q3               | 39.6, 72.3      | 35.0, 70.0       | 35.5, 70.4      |         |
| Range                | 0.0 - 120.3     | 0.0 - 144.7      | 0.0 - 144.7     |         |
| N                    | 3432            | 18905            | 22338           |         |
| **Age group (y)**    |                 |                  |                 | <0.001^3 |
| 0-19                 | 278 (8.1%)      | 949 (5.0%)       | 1227 (5.5%)     |         |
| 20-44                | 751 (21.9%)     | 6569 (34.8%)     | 7320 (32.8%)    |         |
| 45-54                | 413 (12.0%)     | 2384 (12.6%)     | 2797 (12.5%)    |         |
| 55-64                | 604 (17.6%)     | 2943 (15.6%)     | 3547 (15.9%)    |         |
| 65-74                | 673 (19.6%)     | 2639 (14.0%)     | 3312 (14.8%)    |         |
| 75-84                | 450 (13.1%)     | 2017 (10.7%)     | 2467 (11.0%)    |         |
| >=85                 | 259 (7.6%)      | 1402 (7.4%)      | 1661 (7.4%)     |         |
| N                    | 3428            | 18903            | 22331           |         |
| **Ethnicity**        |                 |                  |                 | 0.231^1 |
| Hispanic/Latino      | 92 (33.5%)      | 371 (28.3%)      | 463 (29.2%)     |         |
| Not Hispanic/Latino  | 121 (44.0%)     | 602 (46.0%)      | 723 (45.6%)     |         |
| Not Specified        | 62 (22.5%)      | 337 (25.7%)      | 399 (25.2%)     |         |
| N                    | 275             | 1310             | 1585            |         |
| **Race**             |                 |                  |                 | < 0.001^1 |
| Asian                | 220 (6.4%)      | 1065 (5.6%)      | 1285 (5.8%)     |         |
| Black or African American | 620 (18.1%) | 2856 (15.1%) | 3476 (15.6%) | |
| Caucasian            | 963 (28.1%)     | 5006 (26.5%)     | 5969 (26.7%)    |         |
| Declined             | 476 (13.9%)     | 2432 (12.9%)     | 2908 (13.0%)    |         |
| Other                | 633 (18.4%)     | 3431 (18.1%)     | 4064 (18.2%)    |         |
| Pacific Islander     | 12 (0.3%)       | 34 (0.2%)        | 46 (0.2%)       |         |
| Unavailable          | 508 (14.8%)     | 4082 (21.6%)     | 4590 (20.5%)    |         |
| N                    | 3432            | 18906            | 22338           |         |
| **Highest level of care** |            |                  |                 | <0.001^1 |
| Admitted             | 120 (45.1%)     | 414 (35.6%)      | 534 (37.4%)     |         |
| Discharged from ED   | 16 (6.0%)       | 113 (9.7%)       | 129 (9.0%)      |         |
| ICU-level Care       | 79 (29.7%)      | 109 (9.4%)       | 188 (13.2%)     |         |
|                          | Repeat (N=3432) | Single (N=18906) | Total (N=22338) | p value |
|--------------------------|-----------------|------------------|-----------------|---------|
| **Repeat (N=3432)**     |                 |                  |                 |         |
| Outpatient               | 51 (19.2%)      | 526 (45.3%)      | 577 (40.4%)     |         |
| N                        | 266             | 1162             | 1428            |         |
| **Single (N=18906)**    |                 |                  |                 |         |
| Total                    |                 |                  |                 |         |
| **Total (N=22338)**     |                 |                  |                 |         |
| p value                  |                 |                  |                 |         |
| **Encounter type at order** |               |                  |                 | <0.001^1 |
| Emergency                | 1273 (37.1%)    | 6197 (32.8%)     | 7470 (33.4%)    |         |
| Inpatient                | 1400 (40.8%)    | 4998 (26.4%)     | 6398 (28.6%)    |         |
| Outpatient               | 759 (22.1%)     | 7711 (40.8%)     | 8470 (37.9%)    |         |
| N                        | 3432            | 18906            | 22338           |         |
| **Number of admissions** |                 |                  |                 | <0.001^2 |
| Median                   | 1.0             | 0.0              | 0.0             |         |
| Mean (sd)                | 0.9 (0.6)       | 0.4 (0.5)        | 0.5 (0.5)       |         |
| Q1, Q3                   | 0.0, 1.0        | 0.0, 1.0         | 0.0, 1.0        |         |
| Range                    | 0.0 - 2.0       | 0.0 - 1.0        | 0.0 - 2.0       |         |
| N                        | 275             | 1312             | 1587            |         |
| **Admission duration (d)** |               |                  |                 | <0.001^2 |
| Median                   | 5.8             | 0.6              | 0.7             |         |
| Mean (sd)                | 11.6 (13.5)     | 3.5 (9.3)        | 4.9 (10.6)      |         |
| Q1, Q3                   | 1.0, 19.4       | 0.3, 2.9         | 0.3, 4.4        |         |
| Range                    | 0.0 - 83.5      | 0.0 - 139.0      | 0.0 - 139.0     |         |
| N                        | 275             | 1312             | 1587            |         |
| **Admission 1 to test 1 (d)** |         |                  |                 | 0.112^2 |
| Median                   | 0.4             | 0.3              | 0.3             |         |
| Mean (sd)                | 2.3 (6.7)       | 1.4 (7.5)        | 1.6 (7.3)       |         |
| Q1, Q3                   | 0.2, 1.1        | 0.2, 0.9         | 0.2, 0.9        |         |
| Range                    | -13.9 - 56.1    | 0.0 - 133.1      | -13.9 - 133.1   |         |
| N                        | 268             | 1218             | 1486            |         |
| **Admission 2 to test 1 (d)** |         |                  |                 | <0.001^2 |
| Median                   | -9.0            | 0.1              | -8.3            |         |
| Mean (sd)                | -10.6 (7.8)     | -2.6 (5.9)       | -9.4 (8.1)      |         |
| Q1, Q3                   | -15.8, -4.0     | -12.0, 2.2       | -15.4, -1.5     |         |
| Range                    | -29.0 - 0.5     | -19.1 - 1.2      | -29.0 - 1.2     |         |
| N                        | 88              | 16               | 104             |         |
| **Primary Outcome**      |                 |                  |                 | <0.001^1 |
| Deceased/Discharged to   | 27 (9.8%)       | 74 (5.6%)        | 101 (6.4%)      |         |
| Hospice                  |                 |                  |                 |         |
| Discharged (not death)   | 196 (71.3%)     | 1219 (92.9%)     | 1415 (89.2%)    |         |
| Intubated (still admitted)| 31 (11.3%)      | 14 (1.1%)        | 45 (2.8%)       |         |
| Still admitted (not      | 21 (7.6%)       | 5 (0.4%)         | 26 (1.6%)       |         |
| intubated)               |                 |                  |                 |         |
| N                        | 275             | 1312             | 1587            |         |
|                                | Repeat (N=3432) | Single (N=18906) | Total (N=22338) | p value |
|--------------------------------|----------------|-----------------|-----------------|---------|
| **Deceased**                   |                |                 |                 | **0.038** |
| Yes                            | 22 (8.0%)      | 62 (4.7%)       | 84 (5.3%)       |         |
| N                              | 275            | 1312            | 1587            |         |
| **Symptomatic**                |                |                 |                 | **0.035** |
| No                             | 4 (3.8%)       | 8 (1.6%)        | 12 (2.0%)       |         |
| Unknown                        | 2 (1.9%)       | 42 (8.6%)       | 44 (7.4%)       |         |
| Yes                            | 99 (94.3%)     | 436 (89.7%)     | 535 (90.5%)     |         |
| N                              | 105            | 486             | 591             |         |
| **Intubated**                  |                |                 |                 | **<0.001** |
| Yes                            | 67 (24.4%)     | 80 (6.1%)       | 147 (9.3%)      |         |
| N                              | 275            | 1312            | 1587            |         |
| **Decompensated**              |                |                 |                 | **<0.001** |
| Yes                            | 76 (27.6%)     | 106 (8.1%)      | 182 (11.5%)     |         |
| N                              | 275            | 1312            | 1587            |         |
| **Symptoms start to first test (d)** |         |                 |                 |         |
| Median                         | 5.3            | 4.6             | 4.7             |         |
| Mean (sd)                      | 9.8 (36.8)     | 6.3 (6.4)       | 6.9 (16.9)      |         |
| Q1, Q3                         | 2.1, 8.3       | 2.8, 7.8        | 2.7, 7.9        |         |
| Range                          | -4.3 - 366.8   | -29.4 - 60.8    | -29.4 - 366.8   |         |
| N                              | 98             | 431             | 529             |         |
| **Number of tests**            |                |                 |                 | **<0.001** |
| Median                         | 2.0            | 1.0             | 1.0             |         |
| Mean (sd)                      | 2.5 (1.1)      | 1.0 (0.0)       | 1.2 (0.7)       |         |
| Q1, Q3                         | 2.0, 3.0       | 1.0, 1.0        | 1.0, 1.0        |         |
| Range                          | 1.0 - 41.0     | 1.0 - 1.0       | 1.0 - 41.0      |         |
| N                              | 3432           | 18906           | 22338           |         |
| **Highest SARS-CoV-2 Result**  |                |                 |                 | **<0.001** |
| Invalid                        | 1 (0.0%)       | 65 (0.3%)       | 66 (0.3%)       |         |
| Not Detected                   | 1960 (57.1%)   | 9392 (49.7%)    | 11352 (50.8%)   |         |
| Indeterminate                  | 100 (2.9%)     | 177 (0.9%)      | 277 (1.2%)      |         |
| Detected                       | 1371 (39.9%)   | 9272 (49.0%)    | 10643 (47.6%)   |         |
| N                              | 3432           | 18906           | 22338           |         |

1. Pearson’s Chi-squared test (adjusted for multiple comparisons)
2. Linear Model ANOVA (adjusted for multiple comparisons)
3. Trend test for ordinal variables (adjusted for multiple comparisons)
Supplementary Table 4: SARS-CoV-2 molecular tests in repeat-tested vs. single-tested patients. N represents the number of tests in each category.

| Method         | Repeat (N=8471) | Single (N=18906) | Total (N=27377) | p value |
|----------------|-----------------|------------------|-----------------|---------|
| cobas 6800     | 5841 (69.0%)    | 13354 (70.6%)    | 19195 (70.1%)   | <0.001 |
| Infiniti       | 1900 (22.4%)    | 4054 (21.4%)     | 5954 (21.7%)    |         |
| GeneXpert      | 91 (1.1%)       | 174 (0.9%)       | 265 (1.0%)      |         |
| ID Now         | 9 (0.1%)        | 44 (0.2%)        | 53 (0.2%)       |         |
| Panther Fusion | 11 (0.1%)       | 15 (0.1%)        | 26 (0.1%)       |         |
| QuantStudio    | 571 (6.7%)      | 1224 (6.5%)      | 1795 (6.6%)     |         |
| 7500 Fast      | 48 (0.6%)       | 41 (0.2%)        | 89 (0.3%)       |         |
| N              | 8471            | 18906            | 27377           |         |

**Initial result**

|                | Repeat (N=8471) | Single (N=18906) | Total (N=27377) | p value |
|----------------|-----------------|------------------|-----------------|---------|
| Invalid        | 554 (6.5%)      | 65 (0.3%)        | 619 (2.3%)      | <0.001 |
| Not Detected   | 5613 (66.3%)    | 9392 (49.7%)     | 15005 (54.8%)   |         |
| Indeterminate  | 265 (3.1%)      | 177 (0.9%)       | 442 (1.6%)      |         |
| Detected       | 2039 (24.1%)    | 9272 (49.0%)     | 11311 (41.3%)   |         |
| N              | 8471            | 18906            | 27377           |         |

**Highest result on day 1**

|                | Repeat (N=8471) | Single (N=18906) | Total (N=27377) | p value |
|----------------|-----------------|------------------|-----------------|---------|
| Invalid        | 367 (4.3%)      | 65 (0.3%)        | 432 (1.6%)      | <0.001 |
| Not Detected   | 5501 (64.9%)    | 9392 (49.7%)     | 14893 (54.4%)   |         |
| Indeterminate  | 267 (3.2%)      | 177 (0.9%)       | 444 (1.6%)      |         |
| Detected       | 2336 (27.6%)    | 9272 (49.0%)     | 11608 (42.4%)   |         |
| N              | 8471            | 18906            | 27377           |         |

**Highest result any day**

|                | Repeat (N=8471) | Single (N=18906) | Total (N=27377) | p value |
|----------------|-----------------|------------------|-----------------|---------|
| Invalid        | 2 (0.0%)        | 65 (0.3%)        | 67 (0.2%)       | <0.001 |
| Not Detected   | 4775 (56.4%)    | 9392 (49.7%)     | 14167 (51.7%)   |         |
| Indeterminate  | 246 (2.9%)      | 177 (0.9%)       | 423 (1.5%)      |         |
| Detected       | 3448 (40.7%)    | 9272 (49.0%)     | 12720 (46.5%)   |         |
| N              | 8471            | 18906            | 27377           |         |

**Control C<sub>T</sub>**

|                | Median | Mean (sd) | Q1, Q3 | Range | N   |              |
|----------------|--------|-----------|--------|-------|-----|--------------|
| Median         | 34.0   | 34.2 (1.1)| 33.5, 34.7| 32.5 - 41.2| 2144 | 33.9         |
| Mean (sd)      | 34.1   | 34.1 (1.0)| 33.4, 34.5| 32.4 - 40.5| 7262 | 34.1 (1.0)   |
| Q1, Q3         | 33.5   | 33.4, 34.5| 32.4 - 41.2| 32.4 - 41.2| 9406 |              |

**Target 1 C<sub>T</sub>**

|                | Median | Mean (sd) | Q1, Q3 | Range | N   |              |
|----------------|--------|-----------|--------|-------|-----|--------------|
| Median         | 27.5   | 26.7 (5.5)| 22.3, 31.4| 21.9 - 31.0| 267 |              |
| Mean (sd)      | 26.6   | 26.2 (5.5)| 21.8, 31.0| 21.9 - 31.0| 9406 |              |
| Q1, Q3         | 26.3   | 26.3 (5.5)| 21.9, 31.0| 21.9 - 31.0| 9406 |              |
|                          | Repeat (N=8471) | Single (N=18906) | Total (N=27377) | p value |
|--------------------------|----------------|------------------|-----------------|---------|
| Range                    | 13.3 - 36.8    | 12.4 - 38.0      | 12.4 - 38.0     |         |
| N                        | 744            | 4533             | 5277            |         |
| **Target 2 C<sub>r</sub>** |                |                  |                 | <0.001<sup>3</sup> |
| Median                   | 29.1           | 27.3             | 27.6            |         |
| Mean (sd)                | 28.5 (6.5)     | 27.3 (6.1)       | 27.5 (6.2)      |         |
| Q1, Q3                   | 23.2, 34.0     | 22.3, 32.5       | 22.5, 32.7      |         |
| Range                    | 13.7 - 39.8    | 12.9 - 43.7      | 12.9 - 43.7     |         |
| N                        | 795            | 4548             | 5343            |         |
| **Target 2 C<sub>r</sub> > 30** |            |                  |                 | <0.001<sup>1</sup> |
| TRUE                     | 364 (45.8%)    | 1679 (36.9%)     | 2043 (38.2%)    |         |
| N                        | 795            | 4548             | 5343            |         |

1. Pearson’s Chi-squared test (adjusted for multiple comparisons)
2. Chi-squared test for given probabilities (adjusted for multiple comparisons)
3. Linear Model ANOVA (adjusted for multiple comparisons)
Supplementary Table 5: Number of SARS-CoV-2 molecular test results of repeat-tested patients on day 1 of testing. Rows represent the initial test result and columns the highest test result on day 1.

| Highest First Day Result | Invalid (N=79) | Not Detected (N=2334) | Indeterminate (N=69) | Detected (N=950) | Total (N=3432) |
|--------------------------|----------------|-----------------------|----------------------|-----------------|----------------|
| Initial Result           |                |                       |                      |                 |                |
| Invalid                  | 79 (100%)      | 116 (5.0%)            | 0 (0.9%)             | 45 (4.7%)       | 240 (7.0%)     |
| Not Detected             | 0 (0.0%)       | 2218 (95.0%)          | 12 (17.4%)           | 51 (5.4%)       | 2281 (66.5%)   |
| Indeterminate            | 0 (0.0%)       | 0 (0.0%)              | 57 (82.6%)           | 56 (5.9%)       | 113 (3.3%)     |
| Detected                 | 0 (0.0%)       | 0 (0.0%)              | 0 (0.0%)             | 798 (84.0%)     | 798 (23.3%)    |

1. Pearson’s Chi-squared test (adjusted for multiple comparisons)

Supplementary Table 6: Number of SARS-CoV-2 molecular test results over the course of repeat testing, grouped by the initial test result on day 1.

| Highest Result Any Day ——> | Invalid (N=1) | Not Detected (N=1960) | Indeterminate (N=100) | Detected (N=1371) | Total (N=3432) |
|-----------------------------|----------------|-----------------------|----------------------|-------------------|----------------|
| Initial Result              |                |                       |                      |                   |                |
| Invalid                     | 1 (100%)       | 110 (5.6%)            | 3 (3.0%)             | 126 (9.2%)        | 240 (7.0%)     |
| Not Detected                | 0 (0.0%)       | 1850 (94.4%)          | 46 (46.0%)           | 385 (28.1%)       | 2281 (66.5%)   |
| Indeterminate               | 0 (0.0%)       | 0 (0.0%)              | 51 (51.0%)           | 62 (4.5%)         | 114 (3.3%)     |
| Detected                    | 0 (0.0%)       | 0 (0.0%)              | 0 (0.0%)             | 798 (58.2%)       | 798 (23.3%)    |

1. Pearson’s Chi-squared test (adjusted for multiple comparisons)
Supplementary Table 7: Characteristics of initially positive repeat-tested patients comparing those that converted from positive to negative (Pos2neg) with those that remained positive (Unchanged pos).

| Age at order | Pos2neg (N=330) | Unchanged pos (N=456) | Total (N=786) | p value |
|--------------|-----------------|-----------------------|---------------|---------|
| Median       | 58.6            | 62.9                  | 61.4          | 0.010²  |
| Mean (sd)    | 56.4 (18.2)     | 60.4 (18.0)           | 58.7 (18.2)   |         |
| Q1, Q3       | 46.2, 68.2      | 49.8, 73.1            | 48.3, 71.0    |         |
| Range        | 0.0 - 100.4     | 0.0 - 96.5            | 0.0 - 100.4   |         |
| Age group (y) |                 |                       |               | 0.011³  |
| 0-19         | 11 (3.3%)       | 11 (2.4%)             | 22 (2.8%)     |         |
| 20-44        | 64 (19.4%)      | 78 (17.1%)            | 142 (18.1%)   |         |
| 45-54        | 62 (18.8%)      | 67 (14.7%)            | 129 (16.4%)   |         |
| 55-64        | 80 (24.2%)      | 95 (20.8%)            | 175 (22.3%)   |         |
| 65-74        | 72 (21.8%)      | 110 (24.1%)           | 182 (23.2%)   |         |
| 75-84        | 30 (9.1%)       | 69 (15.1%)            | 99 (12.6%)    |         |
| >=85         | 11 (3.3%)       | 26 (5.7%)             | 37 (4.7%)     |         |
| Encounter type at order |                 |                       |               | 0.003¹  |
| Emergency    | 19 (5.8%)       | 59 (13.6%)            | 78 (9.9%)     |         |
| Inpatient    | 216 (65.5%)     | 304 (67.3%)           | 520 (66.2%)   |         |
| Outpatient   | 95 (28.8%)      | 93 (19.1%)            | 188 (23.9%)   |         |
| Admission 1 to test 1 (d) |                 |                       |               | 0.010²  |
| Median       | 28.1            | 20.6                  | 25.4          |         |
| Mean (sd)    | 28.3 (10.4)     | 20.2 (12.4)           | 24.4 (12.1)   |         |
| Q1, Q3       | 23.1, 33.4      | 10.7, 31.2            | 16.3, 32.7    |         |
| Range        | 0.8 - 69.0      | 0.4 - 42.6            | 0.4 - 69.0    |         |
| N            | 43              | 39                    | 82            |         |
| Number of tests |               |                       |               | < 0.001² |
| Median       | 3.0             | 2.0                   | 2.0           |         |
| Mean (sd)    | 3.2 (2.4)       | 2.3 (0.6)             | 2.7 (1.7)     |         |
| Q1, Q3       | 2.0, 4.0        | 2.0, 2.0              | 2.0, 3.0      |         |
| Range        | 2.0 - 41.0      | 2.0 - 7.0             | 2.0 - 41.0    |         |
| Number of positive results per patient |         |                       |               | < 0.001² |
| Median       | 1.0             | 2.0                   | 2.0           |         |
| Mean (sd)    | 1.4 (1.2)       | 1.9 (0.7)             | 1.7 (1.0)     |         |
| Q1, Q3       | 1.0, 2.0        | 2.0, 2.0              | 1.0, 2.0      |         |
| Range        | 1.0 - 20.0      | 1.0 - 7.0             | 1.0 - 20.0    |         |
| Repeat testing interval (d) | Pos2neg (N=330) | Unchanged pos (N=456) | Total (N=786) | p value |
|-----------------------------|------------------|----------------------|----------------|---------|
| Median                      | 20.0             | 9.5                  | 14.0           | < 0.001 |
| Mean (sd)                   | 19.1 (10.0)      | 11.5 (9.0)           | 14.7 (10.1)    |         |
| Q1, Q3                      | 10.9, 26.9       | 3.9, 16.9            | 6.3, 22.7      |         |
| Range                       | 0.1 - 42.1       | 0.1 - 36.9           | 0.1 - 42.1     |         |
| N                           | 330              | 456                  | 786            |         |

1. Pearson’s Chi-squared test (adjusted for multiple comparisons)
2. Linear Model ANOVA (adjusted for multiple comparisons)
3. Trend test for ordinal variables (adjusted for multiple comparisons)
Supplementary Table 8: Characteristics of repeat-tested initially negative patients comparing those that converted from negative to positive (Neg2pos), with those that remained negative (Unchanged neg).

|                          | Neg2pos (N=417) | Unchanged neg (N=1705) | Total (N=2122) | p value |
|--------------------------|-----------------|-------------------------|----------------|---------|
| **Gender at birth**      |                 |                         |                | 0.042¹  |
| Female                   | 192 (46.0%)     | 900 (52.8%)             | 1092 (51.5%)   |         |
| Male                     | 225 (54.0%)     | 805 (47.2%)             | 1030 (48.5%)   |         |
| **Age at order**         |                 |                         |                | < 0.001²|
| Median                   | 63.6            | 57.1                    | 58.8           |         |
| Mean (sd)                | 61.3 (18.8)     | 51.6 (26.2)             | 53.5 (25.2)    |         |
| Q1, Q3                   | 49.1, 75.0      | 33.6, 72.0              | 35.9, 72.7     |         |
| Range                    | 0.0 - 97.4      | 0.0 - 120.3             | 0.0 - 120.3    |         |
| **Age group (y)**        |                 |                         |                | < 0.001³|
| 0-19                     | 4 (1.0%)        | 238 (14.0%)             | 242 (11.4%)    |         |
| 20-44                    | 85 (20.4%)      | 401 (23.5%)             | 486 (22.9%)    |         |
| 45-54                    | 47 (11.3%)      | 172 (10.1%)             | 219 (10.3%)    |         |
| 55-64                    | 84 (20.1%)      | 248 (14.5%)             | 332 (15.6%)    |         |
| 65-74                    | 93 (22.3%)      | 301 (17.7%)             | 394 (18.6%)    |         |
| 75-84                    | 61 (14.6%)      | 221 (13.0%)             | 282 (13.3%)    |         |
| >=85                     | 43 (10.3%)      | 124 (7.3%)              | 167 (7.9%)     |         |
| **Encounter type at order** |               |                         |                | < 0.001¹|
| Emergency                | 84 (20.1%)      | 161 (9.4%)              | 245 (11.5%)    |         |
| Inpatient                | 228 (54.7%)     | 1130 (66.3%)            | 1358 (64.0%)   |         |
| Outpatient               | 105 (25.2%)     | 414 (24.3%)             | 519 (24.5%)    |         |
| **Location at order**    |                 |                         |                | < 0.001¹|
| Allen Hospital           | 38 (9.1%)       | 67 (3.9%)               | 105 (4.9%)     |         |
| Columbia                 | 178 (42.7%)     | 731 (42.9%)             | 909 (42.8%)    |         |
| Columbia Outreach        | 16 (3.8%)       | 39 (2.3%)               | 55 (2.6%)      |         |
| Lower Manhattan          | 11 (2.6%)       | 86 (5.0%)               | 97 (4.6%)      |         |
| NYHQ                     | 100 (24.0%)     | 223 (13.1%)             | 323 (15.2%)    |         |
| Weill Cornell            | 69 (16.5%)      | 524 (30.7%)             | 593 (27.9%)    |         |
| WESTCHESTER              | 5 (1.2%)        | 35 (2.1%)               | 40 (1.9%)      |         |
| **Admission duration (d)** |               |                         |                | 0.078²  |
| Median                   | 5.6             | 7.4                     | 7.2            |         |
| Mean (sd)                | 8.5 (8.1)       | 13.2 (15.6)             | 11.4 (13.3)    |         |
| Q1, Q3                   | 1.4, 11.9       | 1.5, 18.4               | 1.5, 15.5      |         |
| Range                    | 0.2 - 33.0      | 0.0 - 83.5              | 0.0 - 83.5     |         |
| N                        | 56              | 88                      | 144            |         |
|                                  | Neg2pos (N=417) | Unchanged neg (N=1705) | Total (N=2122) | p value |
|----------------------------------|----------------|------------------------|---------------|---------|
| **Admission 1 to test 1 (d)**    |                |                        |               | 0.078²  |
| Median                           | 8.5            | 13.2                   | 9.6           |         |
| Mean (sd)                        | 12.1 (11.7)    | 17.5 (16.0)            | 15.4 (14.7)   |         |
| Q1, Q3                           | 3.5, 20.3      | 3.3, 29.0              | 3.5, 25.9     |         |
| Range                            | 0.5 - 42.9     | 0.1 - 74.1             | 0.1 - 74.1    |         |
| N                                | 56             | 87                     | 143           |         |
| **Admission 2 to test 1 (d)**    |                |                        |               | 0.012²  |
| Median                           | 0.2            | 1.2                    | 0.3           |         |
| Mean (sd)                        | 0.4 (0.9)      | 4.7 (8.0)              | 2.4 (5.9)     |         |
| Q1, Q3                           | 0.1, 0.4       | 0.2, 4.1               | 0.1, 1.8      |         |
| Range                            | -3.8 - 2.0     | 0.0 - 33.0             | -3.8 - 33.0   |         |
| N                                | 33             | 29                     | 62            |         |
| **Extubated**                    |                |                        |               | 0.078¹  |
| Yes                              | 2 (3.6%)       | 13 (14.8%)             | 15 (10.4%)    |         |
| N                                | 56             | 88                     | 144           |         |
| **Repeat testing interval (d)**  |                |                        |               | 0.528²  |
| Median                           | 1.9            | 3.3                    | 3.1           |         |
| Mean (sd)                        | 6.1 (8.1)      | 6.5 (7.6)              | 6.4 (7.7)     |         |
| Q1, Q3                           | 0.9, 8.8       | 1.3, 8.3               | 1.1, 8.3      |         |
| Range                            | 0.0 - 41.4     | 0.0 - 47.6             | 0.0 - 47.6    |         |
| N                                | 417            | 1705                   | 2122          |         |

1. Pearson’s Chi-squared test (adjusted for multiple comparisons)
2. Linear Model ANOVA (adjusted for multiple comparisons)
3. Trend test for ordinal variables (adjusted for multiple comparisons)