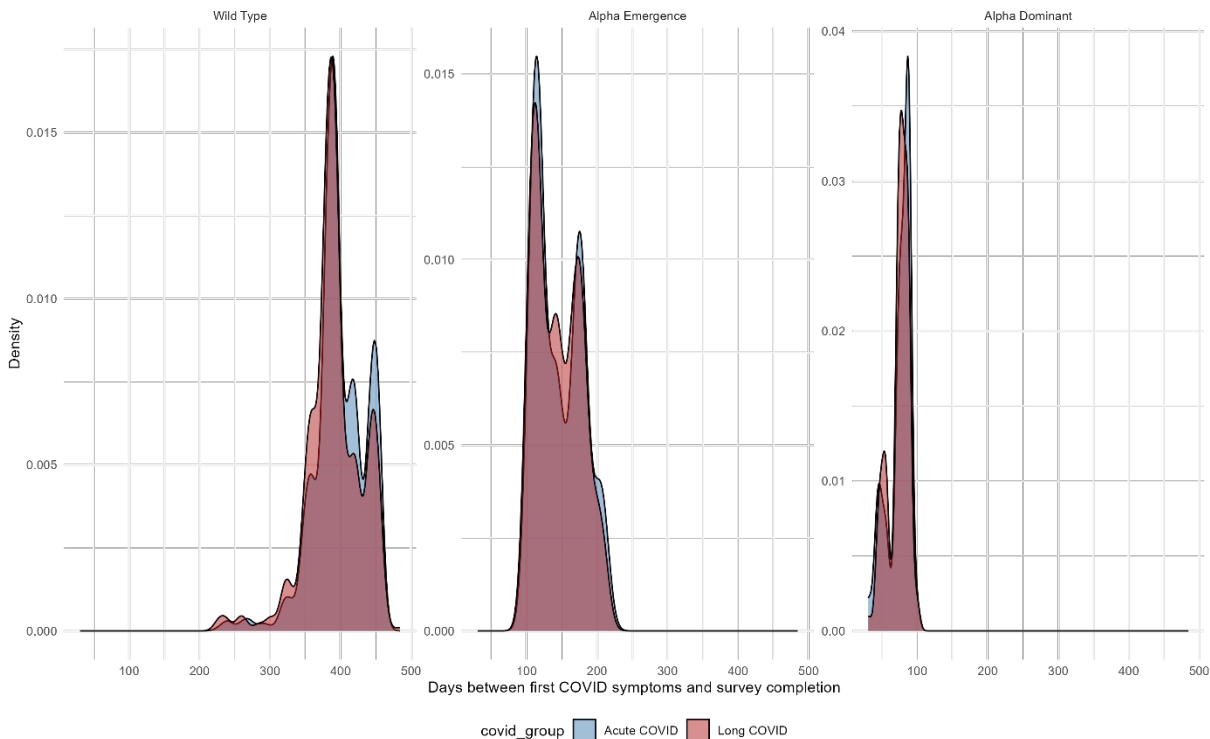
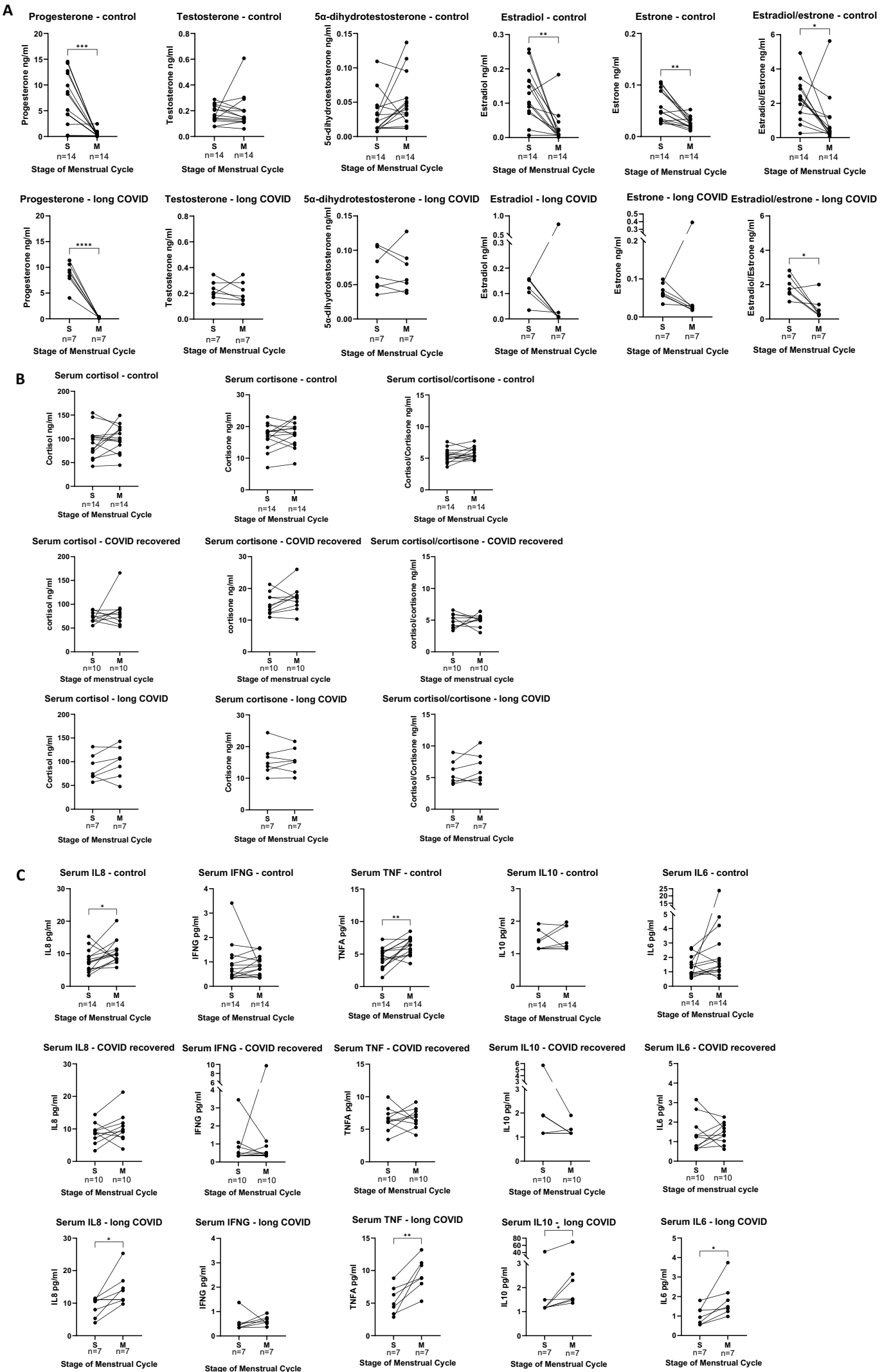


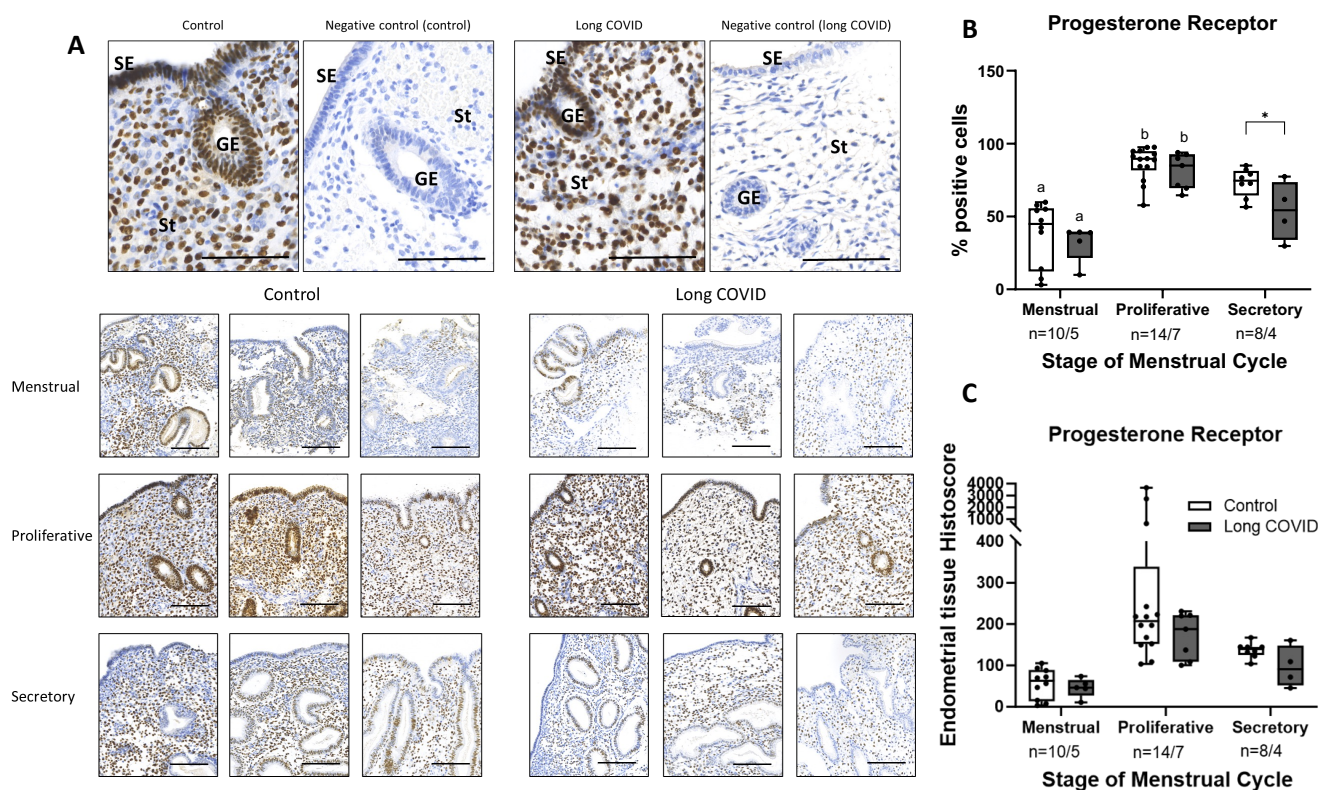
Time from COVID Symptom Onset to Survey Completion  
By Variant and COVID Group



**Figure S1. Distribution of time from COVID symptom onset to survey completion across variant and disease groups.** To evaluate whether differences between disease groups were attributable to different COVID variants, we compared variant distributions across Long COVID and Acute COVID participants. We assigned the dominant viral variant based on symptom onset timing: Wild Type (January-August 2020, n=1,666), Alpha Emergence (September-December 2020, n=850), and Alpha Dominant (January-March 2021, n=248). Chi-square analysis revealed significant differences in variant distribution between Long COVID and Acute COVID groups ( $\chi^2=37.14$ ,  $df=2$ ,  $p<0.001$ ), indicating differential exposure to variants between disease groups. However, when examining timing within each variant period, Wilcoxon-Mann-Whitney tests showed only minimal differences for the Wild Type variant ( $p < 0.001$ ), with participants with acute COVID having a slightly longer time from symptom onset to survey completion (median=394 days) compared to those with Long COVID (median=389 days), representing a clinically negligible difference of 5 days. No significant timing differences were observed for Alpha Emergence ( $p=0.327$ ) or Alpha Dominant ( $p=0.140$ ) variants. While variant exposure differs between groups, the minimal timing differences within variants suggest this is unlikely to substantially confound disease group comparison.



**Suppl. Fig. 2. Paired secretory (S) and menstrual (M) phase serum samples from the same woman.** (A) Serum ovarian hormone levels in women who have never had COVID (upper row) and those who had long COVID (lower row). In women who had never had COVID, there was a significantly lower level of serum progesterone ( $p=0.0006$ ), estradiol ( $p=0.0012$ ) and estradiol/estrone ratio ( $p=0.0134$ ) in the menstrual phase compared to the secretory phase. In those with long COVID, there was a significantly lower level of serum progesterone ( $p<0.0001$ ) and estradiol/estrone ratio ( $p=0.0469$ ) in the menstrual phase compared to secretory phase. (B) Serum glucocorticoids in women who have never had COVID (upper row), who had recovered from acute COVID (middle row) and those who had long COVID (lower row). (C) Serum inflammatory mediators in women who have never had COVID (upper row), those who had recovered from acute COVID (middle row) and those who had long COVID (lower row). In women who had never had COVID, there was a significantly higher level of serum IL8 ( $p=0.0525$ ) and TNF ( $p=0.0014$ ) in the menstrual phase compared to secretory phase. In those with long COVID, there was a significantly higher level of serum IL8 ( $p=0.0166$ ), TNF ( $p=0.0039$ ), IL10 ( $p=0.0156$ ) and IL6 ( $p=0.0336$ ) in the menstrual phase compared to secretory phase. Statistical analysis: paired t-test or Wilcoxon signed-rank test. \* $p<0.05$ , \*\* $p<0.01$ , \*\*\* $p<0.001$ , \*\*\*\* $p<0.0001$ .



**Suppl. Fig 3. Immunohistochemical staining of progesterone receptor (PGR) in endometrial tissue.** (A) Representative endometrial PGR staining from women who had never had COVID (control, n=3) and those with long COVID (n=3). Upper panels are high power images and negative controls, lower panels show staining in the menstrual, proliferative and secretory phases in controls and those with long COVID. Scale bar = 100 $\mu$ M. (B) Quantification of the percentage of endometrial cells positive for PGR. There was a significantly lower number of cells positive for PGR in the secretory phase in those with long COVID versus controls (p=0.0412). (C) Histoscore (number and intensity of staining) for PGR. Box and whisker plots: box represents upper and lower quartiles with horizontal line representing the median, whiskers represent minimum and maximum values. Statistical analysis: Two way ANOVA with Tukey's multiple comparisons test: \*p<0.05, a-b p<0.01.

Table S1

## Pooled Multivariate Models (Cycle Frequency) \_LONGCOVID

| y.level    | term                                                | RRR   | LowCI | HighCI | p.value | q.value |
|------------|-----------------------------------------------------|-------|-------|--------|---------|---------|
| Frequent   | (Intercept)                                         | 0.13  | 0.11  | 0.15   | 0       | 0       |
| Frequent   | age_scaled                                          | 1.13  | 1.05  | 1.21   | 0.0018  | 0.0088  |
| Frequent   | bmi_groupObese                                      | 1.04  | 0.82  | 1.33   | 0.7233  | 0.8777  |
| Frequent   | bmi_groupOverweight                                 | 1.01  | 0.82  | 1.24   | 0.9502  | 0.9502  |
| Frequent   | bmi_groupUnderweight                                | 1.09  | 0.67  | 1.77   | 0.7314  | 0.8777  |
| Frequent   | covid_groupAcute COVID                              | 1.19  | 1     | 1.43   | 0.0519  | 0.1296  |
| Frequent   | covid_groupLong COVID                               | 1.27  | 1.01  | 1.59   | 0.0391  | 0.1247  |
| Frequent   | cyclelength_before_groupFrequent (<24 days)         | 13.37 | 11.72 | 15.25  | 0       | 0       |
| Frequent   | cyclelength_before_groupInfrequent (>38 days)       | 1.4   | 0.71  | 2.76   | 0.3287  | 0.519   |
| Frequent   | contra_past12mo_groupallCombined estrogen-progestin | 1.22  | 1.02  | 1.46   | 0.0309  | 0.116   |
| Frequent   | contra_past12mo_groupallCopper IUD                  | 1.08  | 0.84  | 1.39   | 0.5419  | 0.739   |
| Frequent   | contra_past12mo_groupallOther                       | 1.04  | 0.7   | 1.55   | 0.8406  | 0.9339  |
| Frequent   | contra_past12mo_groupallProgestin only              | 1.51  | 1.24  | 1.84   | 1e-04   | 3e-04   |
| Frequent   | contra_past12mo_groupallSterilization               | 1.41  | 0.94  | 2.12   | 0.0953  | 0.22    |
| Frequent   | disease_before_binary_num                           | 0.99  | 0.84  | 1.17   | 0.9324  | 0.9502  |
| Infrequent | (Intercept)                                         | 0.02  | 0.01  | 0.03   | 0       | 0       |
| Infrequent | age_scaled                                          | 0.95  | 0.79  | 1.15   | 0.6066  | 0.7912  |
| Infrequent | bmi_groupObese                                      | 1.71  | 1.07  | 2.73   | 0.03    | 0.116   |
| Infrequent | bmi_groupOverweight                                 | 0.97  | 0.61  | 1.56   | 0.9049  | 0.9502  |
| Infrequent | bmi_groupUnderweight                                | 2.44  | 1.02  | 5.82   | 0.0458  | 0.125   |
| Infrequent | covid_groupAcute COVID                              | 1.16  | 0.75  | 1.81   | 0.5018  | 0.7168  |
| Infrequent | covid_groupLong COVID                               | 1.5   | 0.87  | 2.56   | 0.1411  | 0.2845  |
| Infrequent | cyclelength_before_groupFrequent (<24 days)         | 1.42  | 0.88  | 2.28   | 0.1484  | 0.2845  |
| Infrequent | cyclelength_before_groupInfrequent (>38 days)       | 68.31 | 45.4  | 102.76 | 0       | 0       |
| Infrequent | contra_past12mo_groupallCombined estrogen-progestin | 1.35  | 0.9   | 2.04   | 0.1517  | 0.2845  |
| Infrequent | contra_past12mo_groupallCopper IUD                  | 0.41  | 0.17  | 0.97   | 0.0416  | 0.1247  |
| Infrequent | contra_past12mo_groupallOther                       | 0.36  | 0.08  | 1.59   | 0.1788  | 0.3155  |
| Infrequent | contra_past12mo_groupallProgestin only              | 1.3   | 0.84  | 1.99   | 0.2351  | 0.3918  |
| Infrequent | contra_past12mo_groupallSterilization               | 1.14  | 0.4   | 3.23   | 0.8069  | 0.9311  |
| Infrequent | disease_before_binary_num                           | 1.16  | 0.79  | 1.7    | 0.446   | 0.669   |

Table S2

## Pooled Multivariate Models (Cycle Regularity)\_LONGCOVID

| y.level                | term                                                | RRR   | LowCI | HighCI | p.value | q.value |
|------------------------|-----------------------------------------------------|-------|-------|--------|---------|---------|
| Irregular (> 20 days)  | (Intercept)                                         | 0.04  | 0.03  | 0.06   | 0       | 0       |
| Irregular (> 20 days)  | age_scaled                                          | 1.08  | 0.98  | 1.19   | 0.1502  | 0.267   |
| Irregular (> 20 days)  | bmi_groupObese                                      | 1.39  | 1.04  | 1.86   | 0.0468  | 0.1069  |
| Irregular (> 20 days)  | bmi_groupOverweight                                 | 0.98  | 0.75  | 1.28   | 0.886   | 0.886   |
| Irregular (> 20 days)  | bmi_groupUnderweight                                | 1.24  | 0.58  | 2.65   | 0.5806  | 0.6407  |
| Irregular (> 20 days)  | covid_groupAcute COVID                              | 0.98  | 0.75  | 1.27   | 0.8664  | 0.886   |
| Irregular (> 20 days)  | covid_groupLong COVID                               | 1.19  | 0.84  | 1.71   | 0.3404  | 0.487   |
| Irregular (> 20 days)  | cycle_irreg_before_groupI did not have periods      | 3.68  | 2.4   | 5.62   | 0       | 2e-04   |
| Irregular (> 20 days)  | cycle_irreg_before_groupIrregular (> 20 days)       | 58.16 | 18.81 | 179.84 | 0.0018  | 0.0094  |
| Irregular (> 20 days)  | cycle_irreg_before_groupIrregular (10-20 days)      | 13.98 | 6.16  | 31.76  | 0.0017  | 0.0094  |
| Irregular (> 20 days)  | contra_past12mo_groupallCombined estrogen-progestin | 0.55  | 0.38  | 0.79   | 0.0049  | 0.0173  |
| Irregular (> 20 days)  | contra_past12mo_groupallCopper IUD                  | 0.77  | 0.47  | 1.24   | 0.2854  | 0.4567  |
| Irregular (> 20 days)  | contra_past12mo_groupallOther                       | 0.67  | 0.38  | 1.19   | 0.1717  | 0.2891  |
| Irregular (> 20 days)  | contra_past12mo_groupallProgestin only              | 2.12  | 1.5   | 2.99   | 0.003   | 0.0119  |
| Irregular (> 20 days)  | contra_past12mo_groupallSterilization               | 1.37  | 0.76  | 2.48   | 0.3056  | 0.4656  |
| Irregular (> 20 days)  | disease_before_binary_num                           | 1.33  | 1     | 1.76   | 0.0788  | 0.1576  |
| Irregular (10-20 days) | (Intercept)                                         | 0.06  | 0.04  | 0.08   | 0       | 0       |
| Irregular (10-20 days) | age_scaled                                          | 0.95  | 0.87  | 1.05   | 0.35    | 0.487   |
| Irregular (10-20 days) | bmi_groupObese                                      | 1.5   | 1.17  | 1.93   | 0.0066  | 0.0196  |
| Irregular (10-20 days) | bmi_groupOverweight                                 | 1.09  | 0.86  | 1.39   | 0.4627  | 0.5923  |
| Irregular (10-20 days) | bmi_groupUnderweight                                | 1.33  | 0.69  | 2.56   | 0.3966  | 0.5287  |
| Irregular (10-20 days) | covid_groupAcute COVID                              | 0.96  | 0.74  | 1.25   | 0.7648  | 0.8158  |
| Irregular (10-20 days) | covid_groupLong COVID                               | 1.39  | 1.03  | 1.87   | 0.0369  | 0.0909  |
| Irregular (10-20 days) | cycle_irreg_before_groupI did not have periods      | 2.08  | 1.06  | 4.08   | 0.0746  | 0.1576  |
| Irregular (10-20 days) | cycle_irreg_before_groupIrregular (> 20 days)       | 11.95 | 2.7   | 52.86  | 0.0295  | 0.0786  |
| Irregular (10-20 days) | cycle_irreg_before_groupIrregular (10-20 days)      | 18.8  | 7.37  | 47.95  | 0.0026  | 0.0119  |
| Irregular (10-20 days) | contra_past12mo_groupallCombined estrogen-progestin | 0.63  | 0.47  | 0.86   | 0.0067  | 0.0196  |
| Irregular (10-20 days) | contra_past12mo_groupallCopper IUD                  | 0.87  | 0.57  | 1.32   | 0.5126  | 0.6309  |
| Irregular (10-20 days) | contra_past12mo_groupallOther                       | 0.6   | 0.33  | 1.09   | 0.0967  | 0.182   |
| Irregular (10-20 days) | contra_past12mo_groupallProgestin only              | 2.13  | 1.6   | 2.84   | 5e-04   | 0.0038  |
| Irregular (10-20 days) | contra_past12mo_groupallSterilization               | 1.21  | 0.63  | 2.35   | 0.5738  | 0.6407  |
| Irregular (10-20 days) | disease_before_binary_num                           | 1.08  | 0.84  | 1.39   | 0.5502  | 0.6407  |

Table S3

## Pooled Multivariate Models (Period Flow) Long COVID

| y.level           | term                                                | RRR  | LowCI | HighCI | p.value | q.value              |
|-------------------|-----------------------------------------------------|------|-------|--------|---------|----------------------|
| Heavier           | (Intercept)                                         | 0.32 | 0.29  | 0.37   | 0       | 0                    |
| Heavier           | age_scaled                                          | 0.99 | 0.94  | 1.05   | 0.8193  | 0.819273195873194    |
| Heavier           | bmi_groupObese                                      | 1.63 | 1.39  | 1.93   | 0       | 1.93901112247967e-05 |
| Heavier           | bmi_groupOverweight                                 | 1.35 | 1.16  | 1.58   | 0.0017  | 0.00174775781766423  |
| Heavier           | bmi_groupUnderweight                                | 0.88 | 0.5   | 1.55   | 0.7631  | 0.763112496296611    |
| Heavier           | covid_groupAcute COVID                              | 1.19 | 1.03  | 1.38   | 0.0538  | 0.0537835902556836   |
| Heavier           | covid_groupLong COVID                               | 1.93 | 1.59  | 2.35   | 0       | 3.45990436301236e-09 |
| Heavier           | heavyperiod_beforeYes                               | 2.22 | 1.99  | 2.49   | 0       | 0                    |
| Heavier           | contra_past12mo_groupallCombined estrogen-progestin | 0.87 | 0.75  | 1.02   | 0.1366  | 0.136572665227466    |
| Heavier           | contra_past12mo_groupallCopper IUD                  | 1.25 | 1.02  | 1.54   | 0.0731  | 0.0731292438257093   |
| Heavier           | contra_past12mo_groupallOther                       | 1.02 | 0.73  | 1.41   | 0.944   | 0.943989350702853    |
| Heavier           | contra_past12mo_groupallProgestin only              | 1.2  | 1.03  | 1.39   | 0.0493  | 0.0493051602000966   |
| Heavier           | contra_past12mo_groupallSterilization               | 1.45 | 1.02  | 2.06   | 0.08    | 0.0800367789164853   |
| Heavier           | disease_before_binary_num                           | 1.16 | 1.02  | 1.32   | 0.0651  | 0.0651144671835299   |
| Lighter           | (Intercept)                                         | 0.27 | 0.24  | 0.31   | 0       | 0                    |
| Lighter           | age_scaled                                          | 1.07 | 1     | 1.14   | 0.115   | 0.115004396531436    |
| Lighter           | bmi_groupObese                                      | 0.95 | 0.78  | 1.15   | 0.7631  | 0.763112496296611    |
| Lighter           | bmi_groupOverweight                                 | 1.1  | 0.92  | 1.3    | 0.4517  | 0.451730126299075    |
| Lighter           | bmi_groupUnderweight                                | 0.99 | 0.63  | 1.54   | 0.9478  | 0.947818415760793    |
| Lighter           | covid_groupAcute COVID                              | 1.1  | 0.93  | 1.31   | 0.4191  | 0.419111980115607    |
| Lighter           | covid_groupLong COVID                               | 1.36 | 1.08  | 1.71   | 0.0286  | 0.0285771694423498   |
| Lighter           | heavyperiod_beforeYes                               | 1.29 | 1.13  | 1.48   | 9e-04   | 0.000940631064506814 |
| Lighter           | contra_past12mo_groupallCombined estrogen-progestin | 1.15 | 0.97  | 1.36   | 0.1819  | 0.18193140332603     |
| Lighter           | contra_past12mo_groupallCopper IUD                  | 1.09 | 0.84  | 1.43   | 0.6597  | 0.659746920844253    |
| Lighter           | contra_past12mo_groupallOther                       | 0.66 | 0.4   | 1.08   | 0.1612  | 0.161232781395383    |
| Lighter           | contra_past12mo_groupallProgestin only              | 1.78 | 1.52  | 2.08   | 0       | 2.66004995808089e-11 |
| Lighter           | contra_past12mo_groupallSterilization               | 0.92 | 0.57  | 1.51   | 0.813   | 0.813037970584817    |
| Lighter           | disease_before_binary_num                           | 1.22 | 1.05  | 1.42   | 0.0308  | 0.0307673802773722   |
| Lighter & Heavier | (Intercept)                                         | 0.34 | 0.3   | 0.4    | 0       | 0                    |
| Lighter & Heavier | age_scaled                                          | 0.93 | 0.88  | 0.99   | 0.0651  | 0.0651144671835299   |
| Lighter & Heavier | bmi_groupObese                                      | 1.3  | 1.1   | 1.53   | 0.0084  | 0.00844465629066304  |
| Lighter & Heavier | bmi_groupOverweight                                 | 1.17 | 1     | 1.38   | 0.1073  | 0.10734425179191     |
| Lighter & Heavier | bmi_groupUnderweight                                | 0.83 | 0.52  | 1.31   | 0.5929  | 0.592873185204011    |
| Lighter & Heavier | covid_groupAcute COVID                              | 1.06 | 0.89  | 1.26   | 0.6597  | 0.659746920844253    |
| Lighter & Heavier | covid_groupLong COVID                               | 1.57 | 1.26  | 1.96   | 3e-04   | 0.000296832760392984 |
| Lighter & Heavier | heavyperiod_beforeYes                               | 1.71 | 1.5   | 1.96   | 0       | 2.04124717129162e-11 |
| Lighter & Heavier | contra_past12mo_groupallCombined estrogen-progestin | 0.63 | 0.52  | 0.76   | 0       | 1.81851814923251e-05 |
| Lighter & Heavier | contra_past12mo_groupallCopper IUD                  | 1.04 | 0.83  | 1.31   | 0.8034  | 0.803416650724976    |
| Lighter & Heavier | contra_past12mo_groupallOther                       | 1.16 | 0.81  | 1.65   | 0.5929  | 0.592873185204011    |
| Lighter & Heavier | contra_past12mo_groupallProgestin only              | 1.05 | 0.84  | 1.32   | 0.7631  | 0.763112496296611    |
| Lighter & Heavier | contra_past12mo_groupallSterilization               | 1.09 | 0.71  | 1.65   | 0.7944  | 0.794354706883351    |
| Lighter & Heavier | disease_before_binary_num                           | 1.04 | 0.9   | 1.21   | 0.7277  | 0.727726266567449    |

Table S4

## Pooled Multivariate Models (Period Duration) LONG COVID

| term                                                | PR     | LowCI | HighCI | p.value | q.value |
|-----------------------------------------------------|--------|-------|--------|---------|---------|
| (Intercept)                                         | 0.15   | 0.11  | 0.21   | 0       | 0       |
| age_scaled                                          | 0.74   | 0.64  | 0.86   | 1e-04   | 3e-04   |
| bmi_groupObese                                      | 1.45   | 0.98  | 2.13   | 0.0679  | 0.1057  |
| bmi_groupOverweight                                 | 1.07   | 0.62  | 1.84   | 0.816   | 0.816   |
| bmi_groupUnderweight                                | 2.12   | 0.77  | 5.8    | 0.1454  | 0.2036  |
| covid_groupAcute COVID                              | 1.22   | 0.85  | 1.77   | 0.2856  | 0.3332  |
| covid_groupLong COVID                               | 2.26   | 1.46  | 3.49   | 3e-04   | 6e-04   |
| period_lengh_before_groupProlonged (8 days+)        | 136.75 | 27.81 | 672.41 | 2e-04   | 6e-04   |
| contra_past12mo_groupallCombined estrogen-progestin | 0.69   | 0.4   | 1.2    | 0.1963  | 0.2498  |
| contra_past12mo_groupallCopper IUD                  | 7.37   | 4.14  | 13.12  | 0       | 0       |
| contra_past12mo_groupallOther                       | 1.17   | 0.39  | 3.46   | 0.7788  | 0.816   |
| contra_past12mo_groupallProgestin only              | 2.64   | 1.87  | 3.72   | 0       | 0       |
| contra_past12mo_groupallSterilization               | 2.7    | 1.07  | 6.81   | 0.0352  | 0.0616  |
| disease_before_binary_num                           | 1.69   | 1.21  | 2.36   | 0.0022  | 0.0044  |

Table S5

## Pooled Multivariate Models (Inter-Menstrual Bleeding)

| y.level                           | term                                                | RRR  | LowCI | HighCI | p.value | q.value |
|-----------------------------------|-----------------------------------------------------|------|-------|--------|---------|---------|
| Less                              | (Intercept)                                         | 0.02 | 0.01  | 0.03   | 0       | 0       |
| Less                              | age_scaled                                          | 1.05 | 0.9   | 1.22   | 0.5473  | 0.6841  |
| Less                              | bmi_groupObese                                      | 1.06 | 0.72  | 1.55   | 0.7622  | 0.8795  |
| Less                              | bmi_groupOverweight                                 | 1.24 | 0.83  | 1.86   | 0.3054  | 0.4907  |
| Less                              | bmi_groupUnderweight                                | 0.62 | 0.16  | 2.39   | 0.4839  | 0.6804  |
| Less                              | covid_groupAcute COVID                              | 0.89 | 0.58  | 1.34   | 0.5639  | 0.6858  |
| Less                              | covid_groupLong COVID                               | 1.19 | 0.74  | 1.9    | 0.4735  | 0.6804  |
| Less                              | cyclelength_before_groupFrequent (<24 days)         | 1.3  | 0.95  | 1.76   | 0.0972  | 0.2082  |
| Less                              | cyclelength_before_groupInfrequent (>38 days)       | 3.03 | 1.65  | 5.56   | 3e-04   | 0.0013  |
| Less                              | contra_past12mo_groupallCombined estrogen-progestin | 1.5  | 1     | 2.25   | 0.0488  | 0.1157  |
| Less                              | contra_past12mo_groupallCopper IUD                  | 2.76 | 1.71  | 4.47   | 0       | 1e-04   |
| Less                              | contra_past12mo_groupallOther                       | 0.98 | 0.35  | 2.7    | 0.9659  | 0.9659  |
| Less                              | contra_past12mo_groupallProgestin only              | 2.75 | 1.92  | 3.93   | 0       | 0       |
| Less                              | contra_past12mo_groupallSterilization               | 1.49 | 0.64  | 3.5    | 0.3575  | 0.5548  |
| Less                              | disease_before_binary_num                           | 1.67 | 1.21  | 2.3    | 0.0016  | 0.0052  |
| More                              | (Intercept)                                         | 0.15 | 0.12  | 0.19   | 0       | 0       |
| More                              | age_scaled                                          | 0.91 | 0.85  | 0.98   | 0.0109  | 0.0326  |
| More                              | bmi_groupObese                                      | 0.98 | 0.82  | 1.17   | 0.8057  | 0.9064  |
| More                              | bmi_groupOverweight                                 | 1.06 | 0.89  | 1.26   | 0.5306  | 0.6841  |
| More                              | bmi_groupUnderweight                                | 0.97 | 0.59  | 1.59   | 0.9056  | 0.9261  |
| More                              | covid_groupAcute COVID                              | 1.15 | 0.97  | 1.36   | 0.1076  | 0.22    |
| More                              | covid_groupLong COVID                               | 1.59 | 1.29  | 1.97   | 0       | 1e-04   |
| More                              | cyclelength_before_groupFrequent (<24 days)         | 1.05 | 0.91  | 1.2    | 0.531   | 0.6841  |
| More                              | cyclelength_before_groupInfrequent (>38 days)       | 1.22 | 0.84  | 1.78   | 0.2916  | 0.4861  |
| More                              | contra_past12mo_groupallCombined estrogen-progestin | 1.23 | 1.03  | 1.47   | 0.0222  | 0.0554  |
| More                              | contra_past12mo_groupallCopper IUD                  | 2.67 | 2.08  | 3.43   | 0       | 0       |
| More                              | contra_past12mo_groupallOther                       | 1.29 | 0.89  | 1.88   | 0.1839  | 0.3449  |
| More                              | contra_past12mo_groupallProgestin only              | 2.75 | 2.32  | 3.26   | 0       | 0       |
| More                              | contra_past12mo_groupallSterilization               | 1.07 | 0.69  | 1.66   | 0.7551  | 0.8795  |
| More                              | disease_before_binary_num                           | 1.43 | 1.23  | 1.66   | 0       | 0       |
| Sometimes less and sometimes more | (Intercept)                                         | 0.04 | 0.03  | 0.05   | 0       | 0       |
| Sometimes less and sometimes more | age_scaled                                          | 0.94 | 0.83  | 1.05   | 0.2735  | 0.4733  |
| Sometimes less and sometimes more | bmi_groupObese                                      | 1.12 | 0.82  | 1.52   | 0.4744  | 0.6804  |
| Sometimes less and sometimes more | bmi_groupOverweight                                 | 1.04 | 0.74  | 1.45   | 0.836   | 0.9175  |
| Sometimes less and sometimes more | bmi_groupUnderweight                                | 0.95 | 0.43  | 2.11   | 0.9055  | 0.9261  |
| Sometimes less and sometimes more | covid_groupAcute COVID                              | 0.81 | 0.59  | 1.1    | 0.1784  | 0.3449  |
| Sometimes less and sometimes more | covid_groupLong COVID                               | 1.03 | 0.71  | 1.5    | 0.8572  | 0.9184  |
| Sometimes less and sometimes more | cyclelength_before_groupFrequent (<24 days)         | 1.44 | 1.15  | 1.8    | 0.0016  | 0.0052  |
| Sometimes less and sometimes more | cyclelength_before_groupInfrequent (>38 days)       | 1.67 | 0.94  | 2.96   | 0.0821  | 0.1847  |
| Sometimes less and sometimes more | contra_past12mo_groupallCombined estrogen-progestin | 1.43 | 1.06  | 1.93   | 0.0179  | 0.0495  |
| Sometimes less and sometimes more | contra_past12mo_groupallCopper IUD                  | 3.2  | 2.27  | 4.51   | 0       | 0       |
| Sometimes less and sometimes more | contra_past12mo_groupallOther                       | 0.55 | 0.2   | 1.51   | 0.2452  | 0.4414  |
| Sometimes less and sometimes more | contra_past12mo_groupallProgestin only              | 2.88 | 2.21  | 3.77   | 0       | 0       |
| Sometimes less and sometimes more | contra_past12mo_groupallSterilization               | 0.75 | 0.3   | 1.86   | 0.5352  | 0.6841  |
| Sometimes less and sometimes more | disease_before_binary_num                           | 1.36 | 1.05  | 1.76   | 0.0187  | 0.0495  |

Table S6

Pooled Multivariate Models (Periods Stopped)\_LONGCOVID

|                                                     | term                   | PR   | LowCI | HighCI | p.value | q.value |
|-----------------------------------------------------|------------------------|------|-------|--------|---------|---------|
|                                                     | (Intercept)            | 0.04 | 0.04  | 0.05   | 0       | 0       |
|                                                     | age_scaled             | 0.79 | 0.74  | 0.86   | 0       | 0       |
|                                                     | bmi_groupObese         | 1.44 | 1.22  | 1.7    | 0       | 1e-04   |
|                                                     | bmi_groupOverweight    | 1.11 | 0.92  | 1.35   | 0.2664  | 0.305   |
|                                                     | bmi_groupUnderweight   | 1.38 | 0.88  | 2.15   | 0.1596  | 0.2305  |
|                                                     | covid_groupAcute COVID | 1.15 | 0.97  | 1.37   | 0.1073  | 0.1743  |
|                                                     | covid_groupLong COVID  | 1.39 | 1.13  | 1.7    | 0.0015  | 0.0033  |
| contra_past12mo_groupallCombined estrogen-progestin |                        | 1.26 | 1.03  | 1.55   | 0.026   | 0.0483  |
| contra_past12mo_groupallCopper IUD                  |                        | 0.82 | 0.57  | 1.19   | 0.305   | 0.305   |
| contra_past12mo_groupallOther                       |                        | 0.71 | 0.37  | 1.36   | 0.2998  | 0.305   |
| contra_past12mo_groupallProgestin only              |                        | 2.79 | 2.39  | 3.25   | 0       | 0       |
| contra_past12mo_groupallSterilization               |                        | 1.4  | 0.81  | 2.41   | 0.2262  | 0.2941  |
| disease_before_binary_num                           |                        | 1.4  | 1.21  | 1.62   | 0       | 0       |

Table S7. Number of daily Long COVID symptoms across the menstrual cycle

| <i>Predictors</i>                                    | <b>Number of distinct symptoms</b> |               |                  |
|------------------------------------------------------|------------------------------------|---------------|------------------|
|                                                      | <i>Incidence Rate Ratios</i>       | <i>CI</i>     | <i>p</i>         |
| (Intercept)                                          | 12.19                              | 10.05 – 14.80 | <b>&lt;0.001</b> |
| phase all [LS/M]                                     | 1.03                               | 0.99 – 1.07   | 0.148            |
| phase all [P]                                        | 1.00                               | 0.95 – 1.05   | 0.878            |
| age group [40 years+]                                | 1.03                               | 0.79 – 1.32   | 0.849            |
| <b>Random Effects</b>                                |                                    |               |                  |
| $\sigma^2$                                           | 0.07                               |               |                  |
| $\tau_{00}$ phase_all:id                             | 0.00                               |               |                  |
| $\tau_{00}$ id                                       | 0.21                               |               |                  |
| ICC                                                  | 0.75                               |               |                  |
| N <sub>phase_all</sub>                               | 3                                  |               |                  |
| N <sub>id</sub>                                      | 54                                 |               |                  |
| Observations                                         | 1333                               |               |                  |
| Marginal R <sup>2</sup> / Conditional R <sup>2</sup> | 0.001 / 0.755                      |               |                  |

| Symptom                 | Term                    | Estimate | StdError | ZValue | PValue | AdjustedPValue | OddsRatio | CI_Lower | CI_Upper  |
|-------------------------|-------------------------|----------|----------|--------|--------|----------------|-----------|----------|-----------|
| Brain fog               | (Intercept)             | 5.387    | 1.266    | 4.255  | 0      | 0              | 218.547   | 18.277   | 2613.276  |
|                         | phase_allLS/M           | 0.1      | 0.232    | 0.431  | 0.666  | 0.822          | 1.105     | 0.701    | 1.741     |
|                         | phase_allP              | -0.085   | 0.336    | -0.251 | 0.802  | 0.899          | 0.919     | 0.475    | 1.775     |
| Brain fog               | age_groupBelow 40 years | -1.518   | 1.347    | -1.127 | 0.26   | 0.539          | 0.219     | 0.016    | 3.071     |
| Memory issues           | (Intercept)             | 2.926    | 0.903    | 3.24   | 0.001  | 0.008          | 18.653    | 3.178    | 109.495   |
|                         | phase_allLS/M           | -0.021   | 0.219    | -0.094 | 0.925  | 0.958          | 0.979     | 0.637    | 1.504     |
|                         | phase_allP              | -0.272   | 0.338    | -0.806 | 0.42   | 0.69           | 0.762     | 0.393    | 1.478     |
| Memory issues           | age_groupBelow 40 years | -0.624   | 1.281    | -0.487 | 0.626  | 0.807          | 0.536     | 0.044    | 6.598     |
| Speech issues           | (Intercept)             | 2.001    | 0.736    | 2.72   | 0.007  | 0.043          | 7.396     | 1.748    | 31.298    |
|                         | phase_allLS/M           | 0.286    | 0.185    | 1.544  | 0.123  | 0.332          | 1.331     | 0.926    | 1.913     |
|                         | phase_allP              | -0.222   | 0.288    | -0.769 | 0.442  | 0.699          | 0.801     | 0.455    | 1.408     |
| Speech issues           | age_groupBelow 40 years | -1.153   | 1.064    | -1.084 | 0.278  | 0.556          | 0.316     | 0.039    | 2.541     |
| Sensorimotor issues     | (Intercept)             | -0.435   | 0.547    | -0.795 | 0.426  | 0.69           | 0.647     | 0.222    | 1.891     |
|                         | phase_allLS/M           | 0.287    | 0.159    | 1.806  | 0.071  | 0.206          | 1.332     | 0.976    | 1.82      |
|                         | phase_allP              | -0.001   | 0.231    | -0.002 | 0.998  | 0.998          | 0.999     | 0.635    | 1.571     |
| Sensorimotor issues     | age_groupBelow 40 years | 0.227    | 0.811    | 0.28   | 0.779  | 0.899          | 1.255     | 0.256    | 6.151     |
| Dizziness               | (Intercept)             | 0.756    | 0.592    | 1.276  | 0.202  | 0.442          | 2.13      | 0.667    | 6.796     |
|                         | phase_allLS/M           | 0.41     | 0.162    | 2.522  | 0.012  | 0.063          | 1.507     | 1.097    | 2.07      |
|                         | phase_allP              | 0.083    | 0.245    | 0.337  | 0.736  | 0.88           | 1.087     | 0.672    | 1.756     |
| Dizziness               | age_groupBelow 40 years | -0.644   | 0.884    | -0.728 | 0.467  | 0.7            | 0.525     | 0.093    | 2.97      |
| Smell/Taste change      | (Intercept)             | -2.681   | 1.349    | -1.987 | 0.047  | 0.16           | 0.068     | 0.005    | 0.964     |
|                         | phase_allLS/M           | -0.168   | 0.284    | -0.59  | 0.555  | 0.766          | 0.845     | 0.484    | 1.475     |
|                         | phase_allP              | 0.179    | 0.453    | 0.394  | 0.694  | 0.839          | 1.196     | 0.492    | 2.906     |
| Smell/Taste change      | age_groupBelow 40 years | -0.876   | 1.913    | -0.458 | 0.647  | 0.816          | 0.416     | 0.01     | 17.699    |
| Insomnia                | (Intercept)             | -0.375   | 0.516    | -0.727 | 0.467  | 0.7            | 0.687     | 0.25     | 1.89      |
|                         | phase_allLS/M           | -0.304   | 0.163    | -1.862 | 0.063  | 0.198          | 0.738     | 0.536    | 1.016     |
|                         | phase_allP              | -0.165   | 0.238    | -0.694 | 0.488  | 0.715          | 0.848     | 0.532    | 1.352     |
| Insomnia                | age_groupBelow 40 years | 0.182    | 0.766    | 0.238  | 0.812  | 0.899          | 1.2       | 0.267    | 5.384     |
| Headache                | (Intercept)             | 0.36     | 0.416    | 0.864  | 0.388  | 0.654          | 1.433     | 0.634    | 3.239     |
|                         | phase_allLS/M           | 0.384    | 0.154    | 2.49   | 0.013  | 0.066          | 1.468     | 1.086    | 1.985     |
|                         | phase_allP              | 0.237    | 0.225    | 1.053  | 0.292  | 0.561          | 1.267     | 0.815    | 1.97      |
| Headache                | age_groupBelow 40 years | 0.27     | 0.626    | 0.432  | 0.666  | 0.822          | 1.31      | 0.384    | 4.468     |
| Disturbed sleep         | (Intercept)             | 1.266    | 0.446    | 2.84   | 0.005  | 0.034          | 3.547     | 1.48     | 8.501     |
|                         | phase_allLS/M           | -0.279   | 0.152    | -1.832 | 0.067  | 0.205          | 0.757     | 0.562    | 1.019     |
|                         | phase_allP              | -0.303   | 0.216    | -1.406 | 0.16   | 0.361          | 0.739     | 0.484    | 1.128     |
| Disturbed sleep         | age_groupBelow 40 years | -0.173   | 0.652    | -0.266 | 0.79   | 0.899          | 0.841     | 0.234    | 3.019     |
| Fatigue                 | (Intercept)             | 7.937    | 1.725    | 4.601  | 0      | 0              | 2798.951  | 95.202   | 82289.599 |
|                         | phase_allLS/M           | -0.461   | 0.319    | -1.444 | 0.149  | 0.353          | 0.631     | 0.337    | 1.178     |
|                         | phase_allP              | -0.487   | 0.462    | -1.054 | 0.292  | 0.561          | 0.614     | 0.248    | 1.52      |
| Fatigue                 | age_groupBelow 40 years | 0.443    | 1.453    | 0.305  | 0.76   | 0.899          | 1.557     | 0.09     | 26.866    |
| Post-exertional malaise | (Intercept)             | 5.906    | 1.809    | 3.265  | 0.001  | 0.008          | 367.234   | 10.595   | 12729.024 |
|                         | phase_allLS/M           | -0.488   | 0.268    | -1.821 | 0.069  | 0.205          | 0.614     | 0.363    | 1.038     |
|                         | phase_allP              | 0.091    | 0.441    | 0.207  | 0.836  | 0.899          | 1.095     | 0.461    | 2.6       |
| Post-exertional malaise | age_groupBelow 40 years | 2.396    | 1.627    | 1.472  | 0.141  | 0.348          | 10.979    | 0.453    | 266.379   |
| Chills/Sweats           | (Intercept)             | -2.3     | 0.467    | -4.922 | 0      | 0              | 0.1       | 0.04     | 0.25      |
|                         | phase_allLS/M           | 0.831    | 0.173    | 4.81   | 0      | 0              | 2.296     | 1.635    | 3.222     |
|                         | phase_allP              | 0.598    | 0.25     | 2.393  | 0.017  | 0.082          | 1.818     | 1.114    | 2.968     |
| Chills/Sweats           | age_groupBelow 40 years | 1.008    | 0.671    | 1.502  | 0.133  | 0.335          | 2.74      | 0.736    | 10.208    |
| Elevated temperature    | (Intercept)             | -4.283   | 0.84     | -5.097 | 0      | 0              | 0.014     | 0.003    | 0.072     |
|                         | phase_allLS/M           | 0.559    | 0.255    | 2.189  | 0.029  | 0.116          | 1.749     | 1.061    | 2.883     |
|                         | phase_allP              | -0.667   | 0.441    | -1.512 | 0.13   | 0.335          | 0.513     | 0.216    | 1.218     |
| Elevated temperature    | age_groupBelow 40 years | -0.217   | 1.041    | -0.208 | 0.835  | 0.899          | 0.805     | 0.105    | 6.193     |
| Heart palpitations      | (Intercept)             | -0.334   | 0.684    | -0.489 | 0.625  | 0.807          | 0.716     | 0.187    | 2.736     |
|                         | phase_allLS/M           | 0.167    | 0.182    | 0.921  | 0.357  | 0.618          | 1.182     | 0.827    | 1.688     |
|                         | phase_allP              | -0.082   | 0.28     | -0.292 | 0.771  | 0.899          | 0.921     | 0.532    | 1.595     |
| Heart palpitations      | age_groupBelow 40 years | 0.413    | 1.026    | 0.403  | 0.687  | 0.839          | 1.511     | 0.202    | 11.29     |
| Tachycardia             | (Intercept)             | -0.607   | 0.842    | -0.721 | 0.471  | 0.7            | 0.545     | 0.105    | 2.839     |
|                         | phase_allLS/M           | -0.029   | 0.204    | -0.143 | 0.886  | 0.943          | 0.971     | 0.651    | 1.449     |
|                         | phase_allP              | -0.351   | 0.322    | -1.087 | 0.277  | 0.556          | 0.704     | 0.375    | 1.323     |
| Tachycardia             | age_groupBelow 40 years | 1.277    | 1.273    | 1.003  | 0.316  | 0.582          | 3.586     | 0.296    | 43.47     |
| Chest pain              | (Intercept)             | -1.121   | 0.688    | -1.629 | 0.103  | 0.291          | 0.326     | 0.085    | 1.255     |
|                         | phase_allLS/M           | -0.154   | 0.179    | -0.862 | 0.389  | 0.654          | 0.857     | 0.604    | 1.218     |
|                         | phase_allP              | -0.217   | 0.288    | -0.752 | 0.452  | 0.699          | 0.805     | 0.458    | 1.415     |
| Chest pain              | age_groupBelow 40 years | 0.999    | 1.025    | 0.975  | 0.33   | 0.589          | 2.716     | 0.364    | 20.247    |
| Chest tightness         | (Intercept)             | 0.032    | 0.66     | 0.048  | 0.962  | 0.97           | 1.033     | 0.283    | 3.764     |
|                         | phase_allLS/M           | 0.096    | 0.181    | 0.53   | 0.596  | 0.786          | 1.101     | 0.772    | 1.57      |
|                         | phase_allP              | -0.183   | 0.29     | -0.632 | 0.527  | 0.746          | 0.833     | 0.472    | 1.47      |
| Chest tightness         | age_groupBelow 40 years | 0.535    | 0.988    | 0.542  | 0.588  | 0.784          | 1.707     | 0.246    | 11.84     |
| Muscle aches            | (Intercept)             | 1.986    | 0.681    | 2.917  | 0.004  | 0.029          | 7.286     | 1.918    | 27.681    |
|                         | phase_allLS/M           | -0.012   | 0.186    | -0.062 | 0.95   | 0.967          | 0.988     | 0.686    | 1.423     |
|                         | phase_allP              | -0.061   | 0.268    | -0.229 | 0.819  | 0.899          | 0.941     | 0.556    | 1.591     |
| Muscle aches            | age_groupBelow 40 years | 0.583    | 0.972    | 0.6    | 0.548  | 0.766          | 1.791     | 0.267    | 12.039    |
| Joint pain              | (Intercept)             | 1.676    | 0.829    | 2.022  | 0.043  | 0.16           | 5.344     | 1.052    | 27.135    |
|                         | phase_allLS/M           | 0.469    | 0.209    | 2.245  | 0.025  | 0.107          | 1.598     | 1.061    | 2.408     |
|                         | phase_allP              | 0.693    | 0.302    | 2.293  | 0.022  | 0.098          | 2         | 1.106    | 3.614     |
| Joint pain              | age_groupBelow 40 years | -1.095   | 1.17     | -0.936 | 0.349  | 0.613          | 0.335     | 0.034    | 3.314     |
| Sore throat             | (Intercept)             | -1.76    | 0.47     | -3.747 | 0      | 0              | 0.172     | 0.068    | 0.432     |
|                         | phase_allLS/M           | -0.035   | 0.168    | -0.206 | 0.837  | 0.899          | 0.966     | 0.695    | 1.342     |
|                         | phase_allP              | -0.528   | 0.264    | -2.002 | 0.045  | 0.16           | 0.59      | 0.352    | 0.989     |
| Sore throat             | age_groupBelow 40 years | -0.047   | 0.7      | -0.067 | 0.947  | 0.967          | 0.954     | 0.242    | 3.762     |
| Vision issues           | (Intercept)             | -1.576   | 0.795    | -1.983 | 0.047  | 0.16           | 0.207     | 0.044    | 0.982     |
|                         | phase_allLS/M           | 0.734    | 0.214    | 3.423  | 0.001  | 0.008          | 2.083     | 1.37     | 3.169     |
|                         | phase_allP              | 0.594    | 0.303    | 1.957  | 0.05   | 0.166          | 1.811     | 1        | 3.28      |
| Vision issues           | age_groupBelow 40 years | -1.483   | 1.176    | -1.262 | 0.207  | 0.445          | 0.227     | 0.023    | 2.275     |
| Tinnitus                | (Intercept)             | -3.43    | 1.316    | -2.606 | 0.009  | 0.052          | 0.032     | 0.002    | 0.427     |
|                         | phase_allLS/M           | -0.389   | 0.243    | -1.601 | 0.109  | 0.301          | 0.678     | 0.421    | 1.091     |
|                         | phase_allP              | -0.492   | 0.352    | -1.398 | 0.162  | 0.361          | 0.611     | 0.307    | 1.219     |
| Tinnitus                | age_groupBelow 40 years | 2.929    | 1.915    | 1.529  | 0.126  | 0.332          | 18.709    | 0.438    | 798.233   |
| Breathlessness          | (Intercept)             | 0.074    | 0.713    | 0.103  | 0.918  | 0.958          | 1.077     | 0.266    | 4.356     |
|                         | phase_allLS/M           | -0.086   | 0.185    | -0.465 | 0.642  | 0.816          | 0.918     | 0.639    | 1.319     |
|                         | phase_allP              | -0.759   | 0.283    | -2.679 | 0.007  | 0.043          | 0.468     | 0.269    | 0.815     |
| Breathlessness          | age_groupBelow 40 years | 0.581    | 1.071    | 0.543  | 0.587  | 0.784          | 1.788     | 0.219    | 14.587    |
| Dry cough               | (Intercept)             | -1.861   | 0.518    | -3.597 | 0      | 0              | 0.156     | 0.056    | 0.429     |
|                         | phase_allLS/M           | 0.268    | 0.189    | 1.413  | 0.158  | 0.361          | 1.307     | 0.903    | 1.894     |
|                         | phase_allP              | -0.815   | 0.374    | -2.177 | 0.029  | 0.116          | 0.443     | 0.213    | 0.921     |
| Dry cough               | age_groupBelow 40 years | -1.66    | 0.812    | -2.045 | 0.041  | 0.159          | 0.19      | 0.039    | 0.934     |
| Breathing issues        | (Intercept)             | -2.723   | 0.938    | -2.902 | 0.004  | 0.029          | 0.066     | 0.01     | 0.413     |
|                         | phase_allLS/M           | 0.056    | 0.213    | 0.263  | 0.793  | 0.899          | 1.058     | 0.697    | 1.606     |
|                         | phase_allP              | -0.037   | 0.333    | -0.111 | 0.912  | 0.958          | 0.964     | 0.502    | 1.851     |
| Breathing issues        | age_groupBelow 40 years | 1.488    | 1.317    | 1.129  | 0.259  | 0.539          | 4.428     | 0.335    | 58.517    |
| Diarrhea                | (Intercept)             | -3.144   | 0.463    | -6.796 | 0      | 0              | 0.043     | 0.017    | 0.107     |
|                         | phase_allLS/M           | 0.294    | 0.204    | 1.443  | 0.149  | 0.353          | 1.342     | 0.9      | 2.001     |
|                         | phase_allP              | 0.231    | 0.291    | 0.793  | 0.428  | 0.69           | 1.26      | 0.712    | 2.229     |
| Diarrhea                | age_groupBelow 40 years | 0.651    | 0.622    | 1.047  | 0.295  | 0.561          | 1.917     | 0.567    | 6.489     |
| Loss of appetite        | (Intercept)             | -2.817   | 0.592    | -4.758 | 0      | 0              | 0.06      | 0.019    | 0.191     |
|                         | phase_allLS/M           | 0.464    | 0.182    | 2.553  | 0.011  | 0.061          | 1.59      | 1.113    | 2.272     |
|                         | phase_allP              | 0.268    | 0.275    | 0.973  | 0.33   | 0.589          | 1.307     | 0.763    | 2.241     |
| Loss of appetite        | age_groupBelow 40 years | 0.612    | 0.804    | 0.761  | 0.447  | 0.699          | 1.844     | 0.381    | 8.916     |
| Nausea                  | (Intercept)             | -2.658   | 0.566    | -4.698 | 0      | 0              | 0.07      | 0.023    | 0.213     |
|                         | phase_allLS/M           | 0.331    | 0.177    | 1.869  | 0.062  | 0.198          | 1.392     | 0.984    | 1.97      |
|                         | phase_allP              | 0.179    | 0.276    | 0.65   | 0.515  | 0.738          | 1.196     | 0.696    | 2.054     |
| Nausea                  | age_groupBelow 40 years | 1.807    | 0.786    | 2.298  | 0.022  | 0.098          | 6.092     | 1.305    | 28.433    |
| Abdominal pain          | (Intercept)             | -3.524   | 0.813    | -4.332 | 0      | 0              | 0.029     | 0.006    | 0.145     |
|                         | phase_allLS/M           | 0.156    | 0.227    | 0.686  | 0.493  | 0.715          | 1.169     | 0.749    | 1.824     |
|                         | phase_allP              | 0.197    | 0.345    | 0.571  | 0.568  | 0.775          | 1.218     | 0.619    | 2.395     |
| Abdominal pain          | age_groupBelow 40 years | 1.114    | 1.081    | 1.03   | 0.303  | 0.567          | 3.047     | 0.366    | 25.35     |

| Table S9. Unadjusted models for severity of daily long COVID symptoms across the menstrual cycle phases |                 |          |          |        |        |                |            |          |              |
|---------------------------------------------------------------------------------------------------------|-----------------|----------|----------|--------|--------|----------------|------------|----------|--------------|
| Symptom                                                                                                 | Term            | Estimate | StdError | ZValue | PValue | AdjustedPValue | OddsRatio  | CI_Lower | CI_Upper     |
| Brain fog                                                                                               | Minor Moderate  | 0.413    | 0.399    | 1.037  | 0.3    | 0.411          | 1.511      | 0.691    | 3.304        |
| Brain fog                                                                                               | Moderate Severe | 3.501    | 0.419    | 8.347  | 0      | 0              | 33.149     | 14.582   | 75.357       |
| Brain fog                                                                                               | phase_allLS/M   | 0.267    | 0.155    | 1.717  | 0.086  | 0.145          | 1.306      | 0.964    | 1.77         |
| Brain fog                                                                                               | phase_allP      | -0.07    | 0.226    | -0.31  | 0.757  | 0.839          | 0.932      | 0.599    | 1.452        |
| Memory issues                                                                                           | Minor Moderate  | 1.222    | 0.47     | 2.601  | 0.009  | 0.018          | 3.394      | 1.351    | 8.527        |
| Memory issues                                                                                           | Moderate Severe | 4.63     | 0.522    | 8.864  | 0      | 0              | 102.514    | 36.851   | 285.18       |
| Memory issues                                                                                           | phase_allLS/M   | 0.105    | 0.188    | 0.561  | 0.575  | 0.696          | 1.111      | 0.768    | 1.606        |
| Memory issues                                                                                           | phase_allP      | -0.083   | 0.27     | -0.306 | 0.759  | 0.839          | 0.92       | 0.542    | 1.562        |
| Speech issues                                                                                           | Minor Moderate  | 1.572    | 0.393    | 3.995  | 0      | 0              | 4.816      | 2.229    | 10.405       |
| Speech issues                                                                                           | Moderate Severe | 4.311    | 0.433    | 9.964  | 0      | 0              | 74.515     | 31.891   | 174.109      |
| Speech issues                                                                                           | phase_allLS/M   | 0.026    | 0.191    | 0.139  | 0.89   | 0.89           | 1.026      | 0.706    | 1.492        |
| Speech issues                                                                                           | phase_allP      | -0.068   | 0.271    | -0.251 | 0.802  | 0.84           | 0.934      | 0.549    | 1.589        |
| Sensorimotor issues                                                                                     | Minor Moderate  | 1.804    | 0.272    | 6.634  | 0      | 0              | 6.074      | 3.564    | 10.351       |
| Sensorimotor issues                                                                                     | Moderate Severe | 4.995    | 0.421    | 11.864 | 0      | 0              | 147.673    | 64.705   | 337.026      |
| Sensorimotor issues                                                                                     | phase_allLS/M   | 0.325    | 0.231    | 1.407  | 0.16   | 0.252          | 1.384      | 0.88     | 2.177        |
| Sensorimotor issues                                                                                     | phase_allP      | -0.191   | 0.33     | -0.578 | 0.563  | 0.689          | 0.826      | 0.433    | 1.577        |
| Dizziness                                                                                               | Minor Moderate  | 1.847    | 0.345    | 5.353  | 0      | 0              | 6.341      | 3.225    | 12.468       |
| Dizziness                                                                                               | Moderate Severe | 4.921    | 0.408    | 12.048 | 0      | 0              | 137.14     | 61.641   | 305.112      |
| Dizziness                                                                                               | phase_allLS/M   | 0.664    | 0.214    | 3.099  | 0.002  | 0.005          | 1.943      | 1.277    | 2.955        |
| Dizziness                                                                                               | phase_allP      | 0.604    | 0.294    | 2.055  | 0.04   | 0.072          | 1.829      | 1.028    | 3.255        |
| Smell/Taste change                                                                                      | Minor Moderate  | 8.673    | 1.924    | 4.507  | 0      | 0              | 5843.002   | 134.553  | 253733.555   |
| Smell/Taste change                                                                                      | Moderate Severe | 12.207   | 2.095    | 5.826  | 0      | 0              | 200185.557 | 3297.105 | 12154378.096 |
| Smell/Taste change                                                                                      | phase_allLS/M   | 0.143    | 0.427    | 0.335  | 0.738  | 0.832          | 1.154      | 0.5      | 2.664        |
| Smell/Taste change                                                                                      | phase_allP      | 0.296    | 0.585    | 0.507  | 0.612  | 0.726          | 1.344      | 0.427    | 4.232        |
| Insomnia                                                                                                | Minor Moderate  | 0.43     | 0.262    | 1.643  | 0.1    | 0.167          | 1.537      | 0.92     | 2.569        |
| Insomnia                                                                                                | Moderate Severe | 2.592    | 0.289    | 8.985  | 0      | 0              | 13.356     | 7.58     | 23.534       |
| Insomnia                                                                                                | phase_allLS/M   | 0.218    | 0.194    | 1.123  | 0.261  | 0.363          | 1.244      | 0.85     | 1.819        |
| Insomnia                                                                                                | phase_allP      | -0.069   | 0.294    | -0.233 | 0.815  | 0.844          | 0.933      | 0.525    | 1.661        |
| Disturbed sleep                                                                                         | Minor Moderate  | 0.569    | 0.24     | 2.376  | 0.017  | 0.033          | 1.766      | 1.104    | 2.828        |
| Disturbed sleep                                                                                         | Moderate Severe | 2.556    | 0.259    | 9.883  | 0      | 0              | 12.884     | 7.755    | 21.405       |
| Disturbed sleep                                                                                         | phase_allLS/M   | 0.117    | 0.161    | 0.724  | 0.469  | 0.586          | 1.124      | 0.82     | 1.541        |
| Disturbed sleep                                                                                         | phase_allP      | 0.181    | 0.238    | 0.761  | 0.447  | 0.571          | 1.198      | 0.752    | 1.911        |
| Fatigue                                                                                                 | Minor Moderate  | -1.11    | 0.352    | -3.15  | 0.002  | 0.005          | 0.33       | 0.165    | 0.657        |
| Fatigue                                                                                                 | Moderate Severe | 1.754    | 0.356    | 4.929  | 0      | 0              | 5.778      | 2.876    | 11.609       |
| Fatigue                                                                                                 | phase_allLS/M   | 0.585    | 0.134    | 4.379  | 0      | 0              | 1.795      | 1.38     | 2.334        |
| Fatigue                                                                                                 | phase_allP      | 0.175    | 0.188    | 0.931  | 0.352  | 0.46           | 1.191      | 0.824    | 1.722        |
| Post-exertional malaise                                                                                 | Minor Moderate  | -1.101   | 0.357    | -3.083 | 0.002  | 0.005          | 0.333      | 0.165    | 0.669        |
| Post-exertional malaise                                                                                 | Moderate Severe | 1.742    | 0.361    | 4.829  | 0      | 0              | 5.709      | 2.814    | 11.583       |
| Post-exertional malaise                                                                                 | phase_allLS/M   | 0.37     | 0.14     | 2.647  | 0.008  | 0.016          | 1.448      | 1.1      | 1.905        |
| Post-exertional malaise                                                                                 | phase_allP      | 0.487    | 0.194    | 2.509  | 0.012  | 0.024          | 1.627      | 1.113    | 2.38         |
| Chills/Sweats                                                                                           | Minor Moderate  | 1.461    | 0.336    | 4.346  | 0      | 0              | 4.31       | 2.231    | 8.327        |
| Chills/Sweats                                                                                           | Moderate Severe | 3.816    | 0.422    | 9.047  | 0      | 0              | 45.422     | 19.863   | 103.868      |
| Chills/Sweats                                                                                           | phase_allLS/M   | 0.35     | 0.282    | 1.24   | 0.215  | 0.307          | 1.419      | 0.817    | 2.466        |
| Chills/Sweats                                                                                           | phase_allP      | 0.23     | 0.477    | 0.482  | 0.63   | 0.732          | 1.259      | 0.494    | 3.206        |
| Elevated temperature                                                                                    | Minor Moderate  | 1.973    | 0.339    | 5.822  | 0      | 0              | 7.192      | 3.701    | 13.977       |
| Elevated temperature                                                                                    | Moderate Severe | 4.206    | 0.468    | 8.99   | 0      | 0              | 67.088     | 26.809   | 167.885      |
| Elevated temperature                                                                                    | phase_allLS/M   | 0.127    | 0.508    | 0.249  | 0.803  | 0.84           | 1.135      | 0.42     | 3.073        |
| NA                                                                                                      | NA              | NA       | NA       | NA     | NA     | NA             | NA         | NA       | NA           |
| Heart palpitations                                                                                      | Minor Moderate  | 1.115    | 0.413    | 2.701  | 0.007  | 0.015          | 3.05       | 1.357    | 6.852        |
| Heart palpitations                                                                                      | Moderate Severe | 3.823    | 0.448    | 8.528  | 0      | 0              | 45.741     | 19.009   | 110.066      |
| Heart palpitations                                                                                      | phase_allLS/M   | -0.072   | 0.209    | -0.344 | 0.731  | 0.832          | 0.931      | 0.618    | 1.402        |
| Heart palpitations                                                                                      | phase_allP      | -0.32    | 0.285    | -1.121 | 0.262  | 0.363          | 0.726      | 0.415    | 1.269        |
| Tachycardia                                                                                             | Minor Moderate  | 1.049    | 0.526    | 1.994  | 0.046  | 0.081          | 2.855      | 1.018    | 8.004        |
| Tachycardia                                                                                             | Moderate Severe | 3.997    | 0.562    | 7.117  | 0      | 0              | 54.435     | 18.092   | 163.779      |
| Tachycardia                                                                                             | phase_allLS/M   | -0.038   | 0.203    | -0.186 | 0.853  | 0.861          | 0.963      | 0.647    | 1.433        |
| Tachycardia                                                                                             | phase_allP      | -0.196   | 0.267    | -0.732 | 0.464  | 0.586          | 0.822      | 0.487    | 1.387        |
| Chest pain                                                                                              | Minor Moderate  | 0.695    | 0.303    | 2.295  | 0.022  | 0.041          | 2.004      | 1.106    | 3.629        |
| Chest pain                                                                                              | Moderate Severe | 4.011    | 0.374    | 10.738 | 0      | 0              | 55.202     | 26.522   | 114.897      |
| Chest pain                                                                                              | phase_allLS/M   | -0.262   | 0.212    | -1.238 | 0.216  | 0.307          | 0.77       | 0.508    | 1.166        |
| Chest pain                                                                                              | phase_allP      | 0.286    | 0.284    | 1.004  | 0.315  | 0.423          | 1.331      | 0.763    | 2.322        |
| Chest tightness                                                                                         | Minor Moderate  | 1.363    | 0.438    | 3.115  | 0.002  | 0.005          | 3.908      | 1.656    | 9.221        |
| Chest tightness                                                                                         | Moderate Severe | 5.175    | 0.498    | 10.388 | 0      | 0              | 176.797    | 66.614   | 469.224      |
| Chest tightness                                                                                         | phase_allLS/M   | 0.297    | 0.209    | 1.421  | 0.155  | 0.248          | 1.346      | 0.893    | 2.027        |
| Chest tightness                                                                                         | phase_allP      | 0.501    | 0.279    | 1.796  | 0.073  | 0.125          | 1.65       | 0.955    | 2.851        |
| Muscle aches                                                                                            | Minor Moderate  | 0.497    | 0.395    | 1.26   | 0.208  | 0.303          | 1.644      | 0.758    | 3.565        |
| Muscle aches                                                                                            | Moderate Severe | 3.547    | 0.422    | 8.405  | 0      | 0              | 34.709     | 15.179   | 79.37        |
| Muscle aches                                                                                            | phase_allLS/M   | 0.39     | 0.168    | 2.318  | 0.02   | 0.038          | 1.477      | 1.063    | 2.053        |
| Muscle aches                                                                                            | phase_allP      | 0.347    | 0.251    | 1.383  | 0.167  | 0.256          | 1.415      | 0.865    | 2.314        |
| Joint pain                                                                                              | Minor Moderate  | 0.58     | 0.425    | 1.364  | 0.172  | 0.26           | 1.786      | 0.776    | 4.108        |
| Joint pain                                                                                              | Moderate Severe | 3.127    | 0.447    | 6.993  | 0      | 0              | 22.805     | 9.496    | 54.769       |
| Joint pain                                                                                              | phase_allLS/M   | 0.163    | 0.18     | 0.905  | 0.366  | 0.473          | 1.177      | 0.827    | 1.675        |
| Joint pain                                                                                              | phase_allP      | 0.277    | 0.279    | 0.99   | 0.322  | 0.426          | 1.319      | 0.764    | 2.279        |
| Vision issues                                                                                           | Minor Moderate  | 2.497    | 0.599    | 4.169  | 0      | 0              | 12.146     | 3.755    | 39.293       |
| Vision issues                                                                                           | Moderate Severe | 7.077    | 0.841    | 8.42   | 0      | 0              | 1184.41    | 227.839  | 6157.093     |
| Vision issues                                                                                           | phase_allLS/M   | 0.093    | 0.346    | 0.27   | 0.787  | 0.84           | 1.097      | 0.557    | 2.162        |
| Vision issues                                                                                           | phase_allP      | -0.203   | 0.501    | -0.406 | 0.685  | 0.788          | 0.816      | 0.306    | 2.179        |
| Breathlessness                                                                                          | Minor Moderate  | 1.331    | 0.492    | 2.703  | 0.007  | 0.015          | 3.785      | 1.443    | 9.928        |
| Breathlessness                                                                                          | Moderate Severe | 6.505    | 0.622    | 10.466 | 0      | 0              | 668.476    | 197.528  | 2262.261     |
| Breathlessness                                                                                          | phase_allLS/M   | 0.128    | 0.234    | 0.549  | 0.583  | 0.698          | 1.137      | 0.718    | 1.798        |
| Breathlessness                                                                                          | phase_allP      | 0.509    | 0.344    | 1.481  | 0.139  | 0.225          | 1.664      | 0.848    | 3.265        |
| Dry cough                                                                                               | Minor Moderate  | 2.48     | 0.654    | 3.794  | 0      | 0              | 11.941     | 3.314    | 43.028       |
| Dry cough                                                                                               | Moderate Severe | 4.105    | 0.738    | 5.561  | 0      | 0              | 60.643     | 14.275   | 257.619      |
| Dry cough                                                                                               | phase_allLS/M   | 0.737    | 0.456    | 1.617  | 0.106  | 0.174          | 2.09       | 0.855    | 5.108        |
| Dry cough                                                                                               | phase_allP      | 0.261    | 0.999    | 0.261  | 0.794  | 0.84           | 1.298      | 0.183    | 9.198        |
| Breathing issues                                                                                        | Minor Moderate  | 2.164    | 0.767    | 2.821  | 0.005  | 0.011          | 8.706      | 1.936    | 39.147       |
| Breathing issues                                                                                        | Moderate Severe | 7.413    | 0.949    | 7.808  | 0      | 0              | 1657.391   | 258      | 10647.07     |
| Breathing issues                                                                                        | phase_allLS/M   | 0.431    | 0.311    | 1.386  | 0.166  | 0.256          | 1.539      | 0.836    | 2.831        |
| Breathing issues                                                                                        | phase_allP      | 1.145    | 0.427    | 2.678  | 0.007  | 0.015          | 3.142      | 1.361    | 7.257        |
| Headache                                                                                                | Minor Moderate  | 0.959    | 0.22     | 4.361  | 0      | 0              | 2.609      | 1.695    | 4.016        |
| Headache                                                                                                | Moderate Severe | 3.375    | 0.26     | 13.003 | 0      | 0              | 29.224     | 17.556   | 48.647       |
| Headache                                                                                                | phase_allLS/M   | 0.746    | 0.175    | 4.257  | 0      | 0              | 2.109      | 1.496    | 2.971        |
| Headache                                                                                                | phase_allP      | 1.032    | 0.237    | 4.346  | 0      | 0              | 2.807      | 1.764    | 4.466        |
| Loss of appetite                                                                                        | Minor Moderate  | 1.512    | 0.315    | 4.801  | 0      | 0              | 4.536      | 2.446    | 8.41         |
| Loss of appetite                                                                                        | Moderate Severe | 3.71     | 0.417    | 8.899  | 0      | 0              | 40.854     | 18.042   | 92.51        |
| Loss of appetite                                                                                        | phase_allLS/M   | -0.315   | 0.314    | -1.003 | 0.316  | 0.423          | 0.73       | 0.394    | 1.35         |
| Loss of appetite                                                                                        | phase_allP      | 0.214    | 0.432    | 0.495  | 0.621  | 0.729          | 1.239      | 0.531    | 2.888        |
| Nausea                                                                                                  | Minor Moderate  | 1.85     | 0.297    | 6.224  | 0      | 0              | 6.36       | 3.553    | 11.383       |
| Nausea                                                                                                  | Moderate Severe | 3.783    | 0.381    | 9.924  | 0      | 0              | 43.948     | 20.827   | 92.736       |
| Nausea                                                                                                  | phase_allLS/M   | 0.386    | 0.292    | 1.322  | 0.186  | 0.278          | 1.471      | 0.83     | 2.607        |
| Nausea                                                                                                  | phase_allP      | 0.811    | 0.375    | 2.164  | 0.03   | 0.055          | 2.25       | 1.079    | 4.693        |
| Sore throat                                                                                             | Minor Moderate  | 1.648    | 0.496    | 3.32   | 0.001  | 0.002          | 5.197      | 1.966    | 13.738       |
| Sore throat                                                                                             | Moderate Severe | 4.083    | 0.578    | 7.061  | 0      | 0              | 59.323     | 19.108   | 184.174      |
| Sore throat                                                                                             | phase_allLS/M   | 0.197    | 0.304    | 0.649  | 0.516  | 0.638          | 1.218      | 0.671    | 2.21         |
| Sore throat                                                                                             | phase_allP      | -0.915   | 0.5      | -1.829 | 0.067  | 0.117          | 0.401      | 0.15     | 1.067        |
| Diarrhea                                                                                                | Minor Moderate  | 1.923    | 0.537    | 3.579  | 0      | 0              | 6.841      | 2.388    | 19.6         |
| Diarrhea                                                                                                | Moderate Severe | 3.455    | 0.614    | 5.625  | 0      | 0              | 31.658     | 9.503    | 105.471      |
| Diarrhea                                                                                                | phase_allLS/M   | -0.116   | 0.422    | -0.276 | 0.783  | 0.84           | 0.89       | 0.389    | 2.036        |
| Diarrhea                                                                                                | phase_allP      | 0.122    | 0.643    | 0.19   | 0.849  | 0.861          | 1.13       | 0.32     | 3.984        |
| Abdominal pain                                                                                          | Minor Moderate  | 1.142    | 0.3      | 3.808  | 0      | 0              | 3.133      | 1.74     | 5.641        |
| Abdominal pain                                                                                          | Moderate Severe | 3.188    | 0.397    | 8.027  | 0      | 0              | 24.24      | 11.133   | 52.779       |
| Abdominal pain                                                                                          | phase_allLS/M   | 0.055    | 0.296    | 0.184  | 0.854  | 0.861          | 1.057      | 0.591    | 1.887        |
| Abdominal pain                                                                                          | phase_allP      | -0.723   | 0.552    | -1.311 | 0.19   | 0.28           | 0.485      | 0.164    | 1.432        |
| Tinnitus                                                                                                | Minor Moderate  | 3.266    | 0.993    | 3.29   | 0.001  | 0.002          | 26.206     | 3.742    | 183.512      |
| Tinnitus                                                                                                | Moderate Severe | 8.085    | 1.152    | 7.019  | 0      | 0              | 3245.42    | 339.366  | 31036.525    |
| Tinnitus                                                                                                | phase_allLS/M   | 0.852    | 0.359    | 2.37   | 0.018  | 0.034          | 2.344      | 1.16     | 4.738        |
| Tinnitus                                                                                                | phase_allP      | 0.157    | 0.553    | 0.284  | 0.776  | 0.84           | 1.17       | 0.396    | 3.459        |

**Table S10. TaqMan qPCR Primers and UPL probes**

| Gene         | Forward Primer Sequence    | Reverse Primer Sequence | Probe |
|--------------|----------------------------|-------------------------|-------|
| <i>ATP5B</i> | agaggtcccatcaaaaccaa       | tcctgctcaacactcatttcc   | 50    |
| <i>SHDA</i>  | tccactacatgacggagcag       | ccatcttcagttctgctaaacg  | 20    |
| <i>ESR1</i>  | aaccagtgcaccattgataaaa     | tcctcttcgggtcttttcgtatc | 69    |
| <i>AR</i>    | gccttgctctctagcctcaa       | ggtcgtccacgtgtaagttg    | 14    |
| <i>PGR</i>   | tttaagagggcaatggaagg       | cggattttatcaacgatgcag   | 11    |
| <i>PRB</i>   | ggagacgagatctcctaacaattact | cttggcctccatcctgtc      | 5     |
| <i>IFNG</i>  | ggcattttgaagaattggaaag     | tttggatgctctgggtcatctt  | 21    |
| <i>IL-6</i>  | gatgagtacaaaagtcttgatcc    | ctgcagccactggttctgt     | 40    |
| <i>IL-8</i>  | agacagcagagcacacaagc       | atgggttccttcggtggt      | 72    |
| <i>IL-10</i> | tgggggagaacctgaagac        | ccttgctcttgtttcacagg    | 30    |
| <i>TNF</i>   | tccagacttccttgagacacg      | cccgggtctcccaaataaatac  | 36    |

**Table S11. Immunohistochemistry Methods and Reagents**

| <b>Target Protein</b>    | <b>Antibody</b> | <b>Type</b>       | <b>Conc.</b>   | <b>Refine Protocol</b> | <b>Epitope Retrieval</b> |
|--------------------------|-----------------|-------------------|----------------|------------------------|--------------------------|
| Androgen Receptor/AR     | Abcam ab133273  | Rabbit monoclonal | 470pg/ $\mu$ l | Mse 60', 15, 15        | HIER 2 PH9 20'           |
| Cathelicidin/CLP         | Abcam ab69484   | Rabbit polyclonal | 1.3ng/ $\mu$ l | 60', 15, no pp         | HIER 1 PH6 20'           |
| CD68                     | Dako M0814      | Mouse monoclonal  | 410pg/ $\mu$ l | Mse 60', 15, 15        | HIER 1 PH6 20'           |
| Progesterone Receptor/PG | Dako M3569      | Mouse monoclonal  | 160pg/ $\mu$ l | Mse 60', 15, 15        | HIER 1 PH6 20'           |