

## Supplement

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### **Age distribution of 8,437 individuals included in the first analysis (not controlled for time since symptom onset)**

Age category	N vaccinated	N unvaccinated
09	1	263
19	76	1463
29	220	2644
39	171	1446
49	131	805
59	125	567
69	96	194
79	82	66
89	32	36
90+	8	9
Other/Unknown	1	1

### **Sex of 8,437 individuals included in the first analysis (not controlled for time since symptom onset)**

Sex	N vaccinated	N unvaccinated
F	394	2780
M	330	2679
Unknown	219	2035

**Age distribution of 3,439 individuals included in the second analysis (controlled for time since symptom onset)**

Age category	N vaccinated	N unvaccinated
19	31	554
29	116	1118
39	72	609
49	51	330
59	69	211
69	37	74
79	33	19
89	16	11
90+	1	2
Other/Unknown	1	0

**Sex of 3,439 individuals included in the second analysis (controlled for time since symptom onset)**

Sex	N vaccinated	N unvaccinated
F	189	1378
M	142	1288
Unknown	96	346

## Variables

name	type	description
sympf	factor (0, 1)	Whether the individual is fully vaccinated (1) or not (0)
deltaf	factor (0, 1)	Whether the L452R is detected (1) or not (0)
vacf	factor (0, 1)	Whether the individual is fully vaccinated (1) or not (0)
Ct	numeric	Ct value, RdRp gene
tSS	numeric	Time since symptom onset (days)

## Linear Model not controlling for time since symptom onset

```
mdlAov$call
```

```
## aov(formula = Ct ~ vacf * sympf * deltaf, data = tmp)
```

```
summary(mdlAov)
```

```
##           Df Sum Sq Mean Sq  F value    Pr(>F)
## vacf       1     351      351    12.108 0.000505 ***
## sympf      1    15200    15200   524.896 < 2e-16 ***
## deltaf     1    32358    32358  1117.379 < 2e-16 ***
## vacf:sympf 1     775      775    26.766 2.35e-07 ***
## vacf:deltaf 1     144      144     4.970 0.025819 *
## sympf:deltaf 1     359      359    12.412 0.000429 ***
## vacf:sympf:deltaf 1     227      227     7.837 0.005130 **
## Residuals 8429  244096      29
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
thsd
```

```
## Tukey multiple comparisons of means
## 95% family-wise confidence level
##
## Fit: aov(formula = Ct ~ vacf * sympf * deltaf, data = tmp)
##
## $vacf
##           diff          lwr          upr      p adj
## 1-0 0.6470032 0.2825148 1.011492 0.0005046
##
## $sympf
##           diff          lwr          upr      p adj
## 1-0 -2.726566 -2.960009 -2.493124 0
##
## $deltaf
##           diff          lwr          upr      p adj
## 1-0 -6.72394 -7.121566 -6.326314 0
##
## `$vacf:sympf`
##           diff          lwr          upr      p adj
```

```

## 1:0-0:0  1.6816459  1.0341760  2.3291159  0.0000000
## 0:1-0:0  -2.5080529 -2.8335307 -2.1825750  0.0000000
## 1:1-0:0  -2.7595748 -3.4541112 -2.0650384  0.0000000
## 0:1-1:0  -4.1896988 -4.8526381 -3.5267595  0.0000000
## 1:1-1:0  -4.4412207 -5.3445110 -3.5379303  0.0000000
## 1:1-0:1  -0.2515219 -0.9605014  0.4574576  0.7986775
##
## $`vacf:deltaf`
##          diff          lwr          upr          p adj
## 1:0-0:0  2.0758433  0.4153934  3.736293  0.0072293
## 0:1-0:0 -6.5769166 -7.1265213 -6.027312  0.0000000
## 1:1-0:0 -5.9746925 -6.6780558 -5.271329  0.0000000
## 0:1-1:0 -8.6527600 -10.2374675 -7.068052  0.0000000
## 1:1-1:0 -8.0505358 -9.6949058 -6.406166  0.0000000
## 1:1-0:1  0.6022242  0.1033012  1.101147  0.0104180
##
## $`sympf:deltaf`
##          diff          lwr          upr p adj
## 1:0-0:0 -3.824406 -5.040470 -2.608343  0
## 0:1-0:0 -7.225312 -7.822622 -6.628002  0
## 1:1-0:0 -9.324285 -9.933266 -8.715303  0
## 0:1-1:0 -3.400906 -4.500778 -2.301033  0
## 1:1-1:0 -5.499879 -6.606133 -4.393624  0
## 1:1-0:1 -2.098973 -2.417982 -1.779963  0
##
## $`vacf:sympf:deltaf`
##          diff          lwr          upr          p adj
## 1:0:0-0:0:0  4.0748024  1.8402263  6.30937863  0.0000009
## 0:1:0-0:0:0 -3.1720965 -4.6903764 -1.65381653  0.0000000
## 1:1:0-0:0:0 -5.0857054 -8.9932302 -1.17818060  0.0020482
## 0:0:1-0:0:0 -6.9645855 -7.7063452 -6.22282583  0.0000000
## 1:0:1-0:0:0 -5.5406910 -6.5774897 -4.50389237  0.0000000
## 0:1:1-0:0:0 -8.8873726 -9.6453033 -8.12944188  0.0000000
## 1:1:1-0:0:0 -9.0238193 -10.0823280 -7.96531060  0.0000000
## 0:1:0-1:0:0 -7.2468989 -9.7636751 -4.73012268  0.0000000
## 1:1:0-1:0:0 -9.1605078 -13.5534270 -4.76758868  0.0000000
## 0:0:1-1:0:0 -11.0393880 -13.1792936 -8.89948235  0.0000000
## 1:0:1-1:0:0 -9.6154935 -11.8746836 -7.35630334  0.0000000
## 0:1:1-1:0:0 -12.9621750 -15.1077397 -10.81661041  0.0000000
## 1:1:1-1:0:0 -13.0986217 -15.3678571 -10.82938634  0.0000000
## 1:1:0-0:1:0 -1.9136089 -5.9890944  2.16187654  0.8466421
## 0:0:1-0:1:0 -3.7924891 -5.1676397 -2.41733844  0.0000000
## 1:0:1-0:1:0 -2.3685946 -3.9228736 -0.81431555  0.0001056
## 0:1:1-0:1:0 -5.7152761 -7.0992165 -4.33133582  0.0000000
## 1:1:1-0:1:0 -5.8517228 -7.4205671 -4.28287852  0.0000000
## 0:0:1-1:1:0 -1.8788802 -5.7330487  1.97528842  0.8194703
## 1:0:1-1:1:0 -0.4549857 -4.3766383  3.46666698  0.9999686
## 0:1:1-1:1:0 -3.8016672 -7.6589806  0.05564621  0.0567588
## 1:1:1-1:1:0 -3.9381139 -7.8655620 -0.01066581  0.0488069
## 1:0:1-0:0:1  1.4238945  0.6109881  2.23680092  0.0000031

```

```
## 0:1:1-0:0:1 -1.9227871 -2.3231923 -1.52238184 0.0000000
## 1:1:1-0:0:1 -2.0592338 -2.8996539 -1.21881362 0.0000000
## 0:1:1-1:0:1 -3.3466816 -4.1743701 -2.51899298 0.0000000
## 1:1:1-1:0:1 -3.4831282 -4.5926552 -2.37360130 0.0000000
## 1:1:1-0:1:1 -0.1364467 -0.9911733 0.71827990 0.9997296
```

## Linear model controlling for time since symptom onset

### Full model

```
mdl$call
## lm(formula = Ct ~ vacf * deltaf * tSS, data = dat.nodupl)
car::Anova(mdl)
## Anova Table (Type II tests)
##
## Response: Ct
##           Sum Sq   Df F value    Pr(>F)
## vacf           27    1   1.2884  0.256427
## deltaf        3192    1 152.3081 < 2.2e-16 ***
## tSS           9487    1 452.6392 < 2.2e-16 ***
## vacf:deltaf     5    1   0.2289  0.632364
## vacf:tSS         0    1   0.0044  0.947141
## deltaf:tSS      211    1  10.0434  0.001542 **
## vacf:deltaf:tSS  44    1   2.1114  0.146299
## Residuals     71911 3431
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

### Reduced model with significant effect only (used for the Figure)

```
mdl1$call
## lm(formula = Ct ~ deltaf + tSS + deltaf * tSS, data = dat.nodupl)
car::Anova(mdl1)
## Anova Table (Type II tests)
##
## Response: Ct
##           Sum Sq   Df F value    Pr(>F)
## deltaf      3231    1 154.156 < 2.2e-16 ***
## tSS         9512    1 453.905 < 2.2e-16 ***
## deltaf:tSS   228    1  10.872 0.0009863 ***
## Residuals   71987 3435
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```