Supplementary file 1. Outcomes of logistic regression models for the main analysis

Table S1A. Odds ratios for seroconversion among participants with and without reported infection.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **Reported infection –** **univariable** | **Reported infection –** **multivariable** | **No reported infection –** **univariable** | **No reported infection –** **multivariable** |
|  |  | **OR** | **CI.low** | **CI.high** | **p.value** | **OR** | **CI.low** | **CI.high** | **p.value** | **OR** | **CI.low** | **CI.high** | **p.value** | **OR** | **CI.low** | **CI.high** | **p.value** |
| Age group | 18-59 | ref |  |  |  | ref |  |  |  | ref |  |  |  | ref |  |  |  |
|  | 60-85 | 0.97 | 0.88 | 1.08 | 0.614 | 1.25 | 1.10 | 1.41 | <0.001 | 0.78 | 0.73 | 0.84 | <0.001 | 1.04 | 0.95 | 1.14 | 0.412 |
| Vaccination status | Unvaccinated | ref |  |  |  | ref |  |  |  | ref |  |  |  | ref |  |  |  |
| Primary series | 0.44 | 0.29 | 0.67 | <0.001 | 0.47 | 0.30 | 0.73 | 0.001 | 0.17 | 0.13 | 0.23 | <0.001 | 0.67 | 0.46 | 1.00 | 0.047 |
| First booster | 0.79 | 0.53 | 1.17 | 0.240 | 0.26 | 0.17 | 0.42 | <0.001 | 0.49 | 0.38 | 0.63 | <0.001 | 0.38 | 0.26 | 0.53 | <0.001 |
| Second booster | 0.55 | 0.37 | 0.83 | 0.004 | 0.11 | 0.07 | 0.18 | <0.001 | 0.56 | 0.43 | 0.72 | <0.001 | 0.21 | 0.15 | 0.30 | <0.001 |
| Third booster | 0.59 | 0.39 | 0.90 | 0.014 | 0.07 | 0.04 | 0.12 | <0.001 | 0.76 | 0.59 | 0.99 | 0.044 | 0.16 | 0.11 | 0.24 | <0.001 |
| Time period | 2021 Q4 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 2022 Q1 | 1.00 | 0.71 | 1.39 | 0.979 | 1.22 | 0.86 | 1.73 | 0.266 | 1.49 | 1.09 | 2.03 | 0.012 | 2.16 | 1.55 | 3.02 | <0.001 |
|  | 2022 Q2 | 4.07 | 2.98 | 5.56 | <0.001 | 8.04 | 5.41 | 11.93 | <0.001 | 10.69 | 8.20 | 13.93 | <0.001 | 23.26 | 16.96 | 31.90 | <0.001 |
|  | 2022 Q3 | 3.11 | 2.25 | 4.30 | <0.001 | 7.12 | 4.72 | 10.73 | <0.001 | 17.74 | 13.50 | 23.31 | <0.001 | 38.99 | 28.26 | 53.80 | <0.001 |
|  | 2022 Q4 | 4.57 | 3.31 | 6.30 | <0.001 | 18.68 | 12.03 | 29.00 | <0.001 | 16.33 | 12.49 | 21.37 | <0.001 | 50.53 | 36.37 | 70.20 | <0.001 |
|  | 2023 Q1 | 4.08 | 2.91 | 5.74 | <0.001 | 19.28 | 12.13 | 30.63 | <0.001 | 23.21 | 17.64 | 30.55 | <0.001 | 74.89 | 53.52 | 104.79 | <0.001 |
|  | 2023 Q2 | 4.18 | 1.50 | 11.66 | 0.006 | 24.39 | 6.65 | 89.45 | <0.001 | 27.66 | 15.56 | 49.15 | <0.001 | 82.86 | 44.61 | 153.90 | <0.001 |
| Severity of infection | Asymptomatic | ref |  |  |  | ref |  |  |  |  |  |  |  |  |  |  |  |
| Local | 1.97 | 1.44 | 2.68 | <0.001 | 1.92 | 1.40 | 2.65 | <0.001 |  |  |  |  |  |  |  |  |
| Systemic | 2.06 | 1.53 | 2.76 | <0.001 | 1.81 | 1.34 | 2.45 | <0.001 |  |  |  |  |  |  |  |  |
| Other symptoms | 1.45 | 0.70 | 2.99 | 0.312 | 1.50 | 0.70 | 3.25 | 0.299 |  |  |  |  |  |  |  |  |
| Symptoms unknown | 1.54 | 1.12 | 2.12 | 0.008 | 1.45 | 1.04 | 2.01 | 0.027 |  |  |  |  |  |  |  |  |

OR = Odds ratio; CI = 95% confidence interval

Table S1B. Odds ratios for 1.5-fold increase among participants with and without reported infection.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **Reported infection –** **univariable** | **Reported infection –** **multivariable** | **No reported infection –** **univariable** | **No reported infection –** **multivariable** |
|  |  | **OR** | **CI.low** | **CI.high** | **p.value** | **OR** | **CI.low** | **CI.high** | **p.value** | **OR** | **CI.low** | **CI.high** | **p.value** | **OR** | **CI.low** | **CI.high** | **p.value** |
| Age group | 18-59 | ref |  |  |  | ref |  |  |  | ref |  |  | ref | ref |  |  |  |
|  | 60-85 | 0.91 | 0.75 | 1.11 | 0.353 | 1.07 | 0.83 | 1.37 | 0.615 | 0.78 | 0.72 | 0.84 | <0.001 | 0.90 | 0.82 | 0.99 | 0.025 |
| Vaccination status | Unvaccinated | ref |  |  |  | ref |  |  |  | ref |  |  | ref | Ref |  |  |  |
| Primary series | 2.42 | 1.61 | 3.64 | <0.001 | 1.07 | 0.65 | 1.76 | 0.799 | 0.51 | 0.41 | 0.63 | <0.001 | 0.50 | 0.40 | 0.63 | <0.001 |
| First booster | 2.80 | 2.05 | 3.83 | <0.001 | 1.08 | 0.73 | 1.62 | 0.697 | 0.53 | 0.45 | 0.63 | <0.001 | 0.43 | 0.35 | 0.52 | <0.001 |
| Second booster | 2.32 | 1.64 | 3.26 | <0.001 | 0.92 | 0.59 | 1.43 | 0.709 | 0.48 | 0.40 | 0.57 | <0.001 | 0.37 | 0.30 | 0.45 | <0.001 |
| Third booster | 1.79 | 1.19 | 2.70 | 0.005 | 0.58 | 0.33 | 1.01 | 0.054 | 0.43 | 0.36 | 0.51 | <0.001 | 0.34 | 0.27 | 0.42 | <0.001 |
| Time period | 2022 Q1 | ref |  |  |  | ref |  |  |  | ref |  |  | ref | ref |  |  |  |
|  | 2022 Q2 | 3.37 | 2.18 | 5.21 | <0.001 | 3.01 | 1.66 | 5.47 | <0.001 | 6.48 | 4.65 | 9.04 | <0.001 | 6.57 | 4.73 | 9.13 | <0.001 |
|  | 2022 Q3 | 3.41 | 2.10 | 5.52 | <0.001 | 3.21 | 1.70 | 6.06 | <0.001 | 9.68 | 6.87 | 13.63 | <0.001 | 9.07 | 6.45 | 12.75 | <0.001 |
|  | 2022 Q4 | 3.41 | 2.24 | 5.20 | <0.001 | 4.06 | 2.24 | 7.35 | <0.001 | 5.36 | 3.88 | 7.42 | <0.001 | 6.40 | 4.62 | 8.88 | <0.001 |
|  | 2023 Q1 | 2.78 | 1.80 | 4.29 | <0.001 | 4.45 | 2.44 | 8.12 | <0.001 | 5.71 | 4.10 | 7.93 | <0.001 | 6.99 | 5.01 | 9.76 | <0.001 |
|  | 2023 Q2 | 2.57 | 1.20 | 5.49 | 0.015 | 3.33 | 1.38 | 8.03 | 0.008 | 7.91 | 5.13 | 12.20 | <0.001 | 8.72 | 5.59 | 13.61 | <0.001 |
| Symptom status | No symptoms | ref |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Symptoms reported | 1.49 | 1.17 | 1.89 | 0.001 |  |  |  |  |  |  |  |  |  |  |  |  |
| Severity of infection | Asymptomatic | ref |  |  |  | ref |  |  |  |  |  |  |  |  |  |  |  |
| Local | 1.93 | 1.11 | 3.35 | 0.019 | 2.82 | 1.32 | 6.01 | 0.007 |  |  |  |  |  |  |  |  |
| Systemic | 1.63 | 0.96 | 2.76 | 0.072 | 2.25 | 1.07 | 4.71 | 0.032 |  |  |  |  |  |  |  |  |
| Other symptoms | 3.63 | 0.38 | 34.58 | 0.262 | 6.97 | 0.50 | 96.64 | 0.148 |  |  |  |  |  |  |  |  |
| Symptoms unknown | 1.18 | 0.67 | 2.09 | 0.563 | 1.66 | 0.76 | 3.61 | 0.205 |  |  |  |  |  |  |  |  |
| Log Antibody concentration (BAU/mL) |  | 0.29 | 0.25 | 0.33 | <0.001 | 0.28 | 0.24 | 0.32 | <0.001 | 0.71 | 0.69 | 0.73 | <0.001 | 0.70 | 0.68 | 0.73 | <0.001 |

OR = Odds ratio; CI = 95% confidence interval

Table S1C. Odds ratios for 2-fold increase among participants with and without reported infection.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **Reported infection –** **univariable** | **Reported infection –** **multivariable** | **No reported infection –** **univariable** | **No reported infection –** **multivariable** |
|  |  | **OR** | **CI.low** | **CI.high** | **p.value** | **OR** | **CI.low** | **CI.high** | **p.value** | **OR** | **CI.low** | **CI.high** | **p.value** | **OR** | **CI.low** | **CI.high** | **p.value** |
| Age group | 18-59 | ref |  |  |  | ref |  |  |  | ref |  |  |  | ref |  |  |  |
|  | 60-85 | 0.94 | 0.78 | 1.12 | 0.472 | 1.06 | 0.83 | 1.34 | 0.653 | 0.77 | 0.71 | 0.83 | <0.001 | 0.89 | 0.80 | 0.99 | 0.029 |
| Vaccination status | Unvaccinated | ref |  |  |  | Ref |  |  |  | ref |  |  |  | ref |  |  |  |
| Primary series | 2.96 | 2.01 | 4.35 | <0.001 | 1.54 | 0.95 | 2.50 | 0.079 | 0.60 | 0.48 | 0.75 | <0.001 | 0.54 | 0.42 | 0.70 | <0.001 |
| First booster | 3.29 | 2.42 | 4.47 | <0.001 | 1.40 | 0.96 | 2.06 | 0.084 | 0.61 | 0.50 | 0.73 | <0.001 | 0.45 | 0.36 | 0.56 | <0.001 |
| Second booster | 2.84 | 2.03 | 3.96 | <0.001 | 1.31 | 0.85 | 2.00 | 0.218 | 0.53 | 0.44 | 0.64 | <0.001 | 0.38 | 0.31 | 0.47 | <0.001 |
| Third booster | 2.33 | 1.56 | 3.47 | <0.001 | 0.86 | 0.50 | 1.47 | 0.580 | 0.48 | 0.39 | 0.58 | <0.001 | 0.35 | 0.28 | 0.44 | <0.001 |
| Time period | 2022 Q1 | ref |  |  |  | ref |  |  |  | ref |  |  |  | Ref |  |  |  |
|  | 2022 Q2 | 3.44 | 2.24 | 5.26 | <0.001 | 2.73 | 1.51 | 4.94 | 0.001 | 7.83 | 5.28 | 11.61 | <0.001 | 7.76 | 5.27 | 11.43 | <0.001 |
|  | 2022 Q3 | 3.40 | 2.14 | 5.42 | <0.001 | 2.85 | 1.51 | 5.38 | 0.001 | 10.44 | 6.97 | 15.64 | <0.001 | 9.63 | 6.45 | 14.35 | <0.001 |
|  | 2022 Q4 | 3.59 | 2.37 | 5.44 | <0.001 | 3.83 | 2.14 | 6.89 | <0.001 | 5.99 | 4.07 | 8.82 | <0.001 | 7.19 | 4.89 | 10.58 | <0.001 |
|  | 2023 Q1 | 2.84 | 1.86 | 4.34 | <0.001 | 4.07 | 2.25 | 7.35 | <0.001 | 6.43 | 4.35 | 9.52 | <0.001 | 8.05 | 5.44 | 11.92 | <0.001 |
|  | 2023 Q2 | 2.36 | 1.17 | 4.79 | 0.017 | 2.60 | 1.14 | 5.96 | 0.024 | 9.88 | 6.06 | 16.11 | <0.001 | 11.47 | 6.96 | 18.90 | <0.001 |
| Symptom status | No symptoms | ref |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Symptoms reported | 1.39 | 1.11 | 1.74 | 0.004 |  |  |  |  |  |  |  |  |  |  |  |  |
| Severity of infection | Asymptomatic | ref |  |  |  | ref |  |  |  |  |  |  |  |  |  |  |  |
| Local | 1.92 | 1.14 | 3.25 | 0.015 | 2.99 | 1.45 | 6.16 | 0.003 |  |  |  |  |  |  |  |  |
| Systemic | 1.68 | 1.01 | 2.78 | 0.045 | 2.46 | 1.21 | 5.00 | 0.012 |  |  |  |  |  |  |  |  |
| Other symptoms | 2.17 | 0.40 | 11.87 | 0.371 | 5.06 | 0.72 | 35.31 | 0.102 |  |  |  |  |  |  |  |  |
| Symptoms unknown | 1.31 | 0.76 | 2.26 | 0.334 | 2.04 | 0.97 | 4.31 | 0.062 |  |  |  |  |  |  |  |  |
| Log Antibody concentration (BAU/mL) |  | 0.25 | 0.21 | 0.28 | <0.001 | 0.24 | 0.21 | 0.28 | <0.001 | 0.64 | 0.62 | 0.66 | <0.001 | 0.63 | 0.61 | 0.65 | <0.001 |

OR = Odds ratio; CI = 95% confidence interval

Table S1D. Odds ratios for 3-fold increase among participants with and without reported infection.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **Reported infection –** **univariable** | **Reported infection –** **multivariable** | **No reported infection –** **univariable** | **No reported infection –** **multivariable** |
|  |  | **OR** | **CI.low** | **CI.high** | **p.value** | **OR** | **CI.low** | **CI.high** | **p.value** | **OR** | **CI.low** | **CI.high** | **p.value** | **OR** | **CI.low** | **CI.high** | **p.value** |
| Age group | 18-59 | ref |  |  |  | ref |  |  |  | ref |  |  |  | ref |  |  |  |
|  | 60-85 | 0.94 | 0.80 | 1.11 | 0.488 | 1.12 | 0.88 | 1.41 | 0.355 | 0.74 | 0.67 | 0.81 | <0.001 | 0.85 | 0.76 | 0.96 | 0.008 |
| Vaccination status | Unvaccinated | ref |  |  |  | ref |  |  |  | ref |  |  |  | ref |  |  |  |
| Primary series | 2.71 | 1.89 | 3.90 | <0.001 | 1.53 | 0.94 | 2.49 | 0.087 | 0.66 | 0.51 | 0.85 | 0.001 | 0.55 | 0.41 | 0.73 | <0.001 |
| First booster | 3.24 | 2.41 | 4.37 | <0.001 | 1.49 | 1.01 | 2.18 | 0.042 | 0.69 | 0.56 | 0.84 | <0.001 | 0.45 | 0.36 | 0.57 | <0.001 |
| Second booster | 2.60 | 1.88 | 3.58 | <0.001 | 1.30 | 0.84 | 1.99 | 0.238 | 0.58 | 0.47 | 0.72 | <0.001 | 0.38 | 0.30 | 0.49 | <0.001 |
| Third booster | 2.43 | 1.65 | 3.57 | <0.001 | 0.99 | 0.58 | 1.69 | 0.974 | 0.52 | 0.42 | 0.65 | <0.001 | 0.35 | 0.27 | 0.46 | <0.001 |
| Time period | 2022 Q1 | ref |  |  |  | ref |  |  |  | ref |  |  |  | ref |  |  |  |
|  | 2022 Q2 | 3.27 | 2.14 | 5.01 | <0.001 | 2.68 | 1.43 | 5.05 | 0.002 | 10.36 | 6.15 | 17.45 | <0.001 | 9.55 | 5.81 | 15.70 | <0.001 |
|  | 2022 Q3 | 2.75 | 1.75 | 4.32 | <0.001 | 2.25 | 1.16 | 4.36 | 0.016 | 13.68 | 8.04 | 23.29 | <0.001 | 11.85 | 7.09 | 19.81 | <0.001 |
|  | 2022 Q4 | 3.13 | 2.07 | 4.74 | <0.001 | 3.48 | 1.86 | 6.48 | <0.001 | 7.50 | 4.48 | 12.55 | <0.001 | 8.70 | 5.29 | 14.31 | <0.001 |
|  | 2023 Q1 | 2.41 | 1.58 | 3.68 | <0.001 | 3.55 | 1.89 | 6.70 | <0.001 | 8.38 | 4.99 | 14.09 | <0.001 | 10.40 | 6.28 | 17.22 | <0.001 |
|  | 2023 Q2 | 2.76 | 1.37 | 5.55 | 0.004 | 3.74 | 1.55 | 9.05 | 0.003 | 12.87 | 6.99 | 23.69 | <0.001 | 14.86 | 8.07 | 27.37 | <0.001 |
| Symptom status | No symptoms | ref |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Symptoms reported | 1.29 | 1.04 | 1.59 | 0.018 |  |  |  |  |  |  |  |  |  |  |  |  |
| Severity of infection | Asymptomatic | ref |  |  |  | ref |  |  |  |  |  |  |  |  |  |  |  |
| Local | 1.61 | 0.98 | 2.66 | 0.062 | 2.62 | 1.24 | 5.53 | 0.012 |  |  |  |  |  |  |  |  |
| Systemic | 1.40 | 0.86 | 2.27 | 0.176 | 2.10 | 1.01 | 4.38 | 0.048 |  |  |  |  |  |  |  |  |
| Other symptoms | 1.44 | 0.35 | 5.86 | 0.612 | 3.41 | 0.67 | 17.27 | 0.138 |  |  |  |  |  |  |  |  |
| Symptoms unknown | 1.16 | 0.69 | 1.96 | 0.580 | 1.88 | 0.87 | 4.06 | 0.109 |  |  |  |  |  |  |  |  |
| Log Antibody concentration (BAU/mL) |  | 0.21 | 0.18 | 0.24 | <0.001 | 0.20 | 0.17 | 0.24 | <0.001 | 0.53 | 0.52 | 0.55 | <0.001 | 0.53 | 0.51 | 0.55 | <0.001 |

OR = Odds ratio; CI = 95% confidence interval

Table S1E. Odds ratios for 4-fold increase among participants with and without reported infection.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  | **Reported infection –** **univariable** | **Reported infection –** **multivariable** | **No reported infection –** **univariable** | **No reported infection –** **multivariable** |
|  |  | **OR** | **CI.low** | **CI.high** | **p.value** | **OR** | **CI.low** | **CI.high** | **p.value** | **OR** | **CI.low** | **CI.high** | **p.value** | **OR** | **CI.low** | **CI.high** | **p.value** |
| Age group | 18-59 | ref |  |  |  | ref |  |  |  | ref |  |  |  | ref |  |  |  |
|  | 60-85 | 0.87 | 0.74 | 1.02 | 0.087 | 1.04 | 0.82 | 1.32 | 0.741 | 0.71 | 0.64 | 0.78 | <0.001 | 0.83 | 0.73 | 0.94 | 0.003 |
| Vaccination status | Unvaccinated | ref |  |  |  | ref |  |  |  | ref |  |  |  | ref |  |  |  |
| Primary series | 2.37 | 1.64 | 3.41 | <0.001 | 1.16 | 0.71 | 1.90 | 0.561 | 0.76 | 0.58 | 1.00 | 0.047 | 0.60 | 0.44 | 0.82 | 0.001 |
| First booster | 3.00 | 2.22 | 4.05 | <0.001 | 1.29 | 0.87 | 1.93 | 0.210 | 0.74 | 0.60 | 0.93 | 0.009 | 0.46 | 0.36 | 0.60 | <0.001 |
| Second booster | 2.27 | 1.65 | 3.14 | <0.001 | 1.09 | 0.70 | 1.70 | 0.712 | 0.65 | 0.51 | 0.81 | <0.001 | 0.41 | 0.32 | 0.53 | <0.001 |
| Third booster | 2.23 | 1.52 | 3.26 | <0.001 | 0.92 | 0.53 | 1.58 | 0.755 | 0.54 | 0.43 | 0.69 | <0.001 | 0.35 | 0.26 | 0.46 | <0.001 |
| Time period | 2022 Q1 | ref |  |  |  | ref |  |  |  | ref |  |  |  | ref |  |  |  |
|  | 2022 Q2 | 2.81 | 1.83 | 4.31 | <0.001 | 2.39 | 1.24 | 4.61 | 0.009 | 9.98 | 5.73 | 17.38 | <0.001 | 9.06 | 5.30 | 15.49 | <0.001 |
|  | 2022 Q3 | 2.63 | 1.67 | 4.15 | <0.001 | 2.49 | 1.24 | 5.01 | 0.010 | 12.11 | 6.88 | 21.29 | <0.001 | 10.27 | 5.91 | 17.86 | <0.001 |
|  | 2022 Q4 | 2.59 | 1.70 | 3.93 | <0.001 | 3.35 | 1.74 | 6.44 | <0.001 | 6.87 | 3.97 | 11.88 | <0.001 | 8.04 | 4.70 | 13.75 | <0.001 |
|  | 2023 Q1 | 2.12 | 1.39 | 3.25 | 0.001 | 3.88 | 1.99 | 7.55 | <0.001 | 8.13 | 4.68 | 14.12 | <0.001 | 10.43 | 6.06 | 17.96 | <0.001 |
|  | 2023 Q2 | 2.94 | 1.47 | 5.88 | 0.002 | 5.20 | 2.02 | 13.40 | 0.001 | 12.91 | 6.78 | 24.59 | <0.001 | 15.46 | 8.02 | 29.79 | <0.001 |
| Symptom status | No symptoms | ref |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Symptoms reported | 1.36 | 1.11 | 1.67 | 0.003 |  |  |  |  |  |  |  |  |  |  |  |  |
| Severity of infection | Asymptomatic | ref |  |  |  | ref |  |  |  |  |  |  |  |  |  |  |  |
| Local | 1.73 | 1.06 | 2.83 | 0.027 | 3.37 | 1.61 | 7.04 | 0.001 |  |  |  |  |  |  |  |  |
| Systemic | 1.42 | 0.88 | 2.28 | 0.148 | 2.31 | 1.12 | 4.74 | 0.023 |  |  |  |  |  |  |  |  |
| Other symptoms | 1.92 | 0.47 | 7.84 | 0.363 | 6.99 | 1.59 | 30.79 | 0.010 |  |  |  |  |  |  |  |  |
| Symptoms unknown | 1.13 | 0.68 | 1.88 | 0.644 | 2.03 | 0.95 | 4.33 | 0.068 |  |  |  |  |  |  |  |  |
| Log Antibody concentration (BAU/mL) |  | 0.17 | 0.15 | 0.20 | <0.001 | 0.16 | 0.14 | 0.19 | <0.001 | 0.49 | 0.47 | 0.50 | <0.001 | 0.48 | 0.46 | 0.50 | <0.001 |

OR = Odds ratio; CI = 95% confidence interval