

**Supplementary Table 1:** Categorization of immune compromising conditions and medications in the Stop the Spread Ottawa (SSO) cohort, according to the strength of previously reported immunosuppressive effects. In the case of a participant reporting multiple IC states, the classification was determined by the highest-level condition.

<b>High-Level Immune Compromising States</b>		
Systemic immunosuppressant medication (e.g., corticosteroids, biologics)	Abemaciclib <sup>1</sup>	Mycophenolate mofetil <sup>15</sup>
	Adalimumab <sup>2</sup>	Ocrelizumab <sup>16</sup>
	Azathioprine <sup>3</sup>	Prednisone <sup>17</sup>
	Budesonide <sup>4</sup>	Risankizumab <sup>18</sup>
	Cladribine <sup>5</sup>	Rituximab <sup>19</sup>
	Cyclosporine <sup>6</sup>	Secukinumab <sup>20</sup>
	Dupilumab <sup>7</sup>	Sirolimus <sup>21</sup>
	Etanercept <sup>8</sup>	Sulfasalazine <sup>22</sup>
	Glatiramer acetate <sup>9</sup>	Tacrolimus <sup>23</sup>
	Guselkumab <sup>10</sup>	Teriflunomide <sup>24</sup>
	Infliximab <sup>11</sup>	Tocilizumab <sup>25</sup>
	Intravenous immunoglobulin <sup>12</sup>	Tofacitinib <sup>26</sup>
	Leflunomide <sup>13</sup>	Upadacitinib <sup>27</sup>
	Methotrexate <sup>14</sup>	Ustekinumab <sup>28</sup>
Conditions	Malignancy (current or past) <sup>29,30</sup>	
	Primary immunodeficiency (antibody deficiency, hypogammaglobulinemia) <sup>31</sup>	
	Organ/bone marrow transplant <sup>32</sup>	
	HIV (not suppressed: detectable viral load $\geq 20$ IU/mL) <sup>33</sup>	
	Rheumatological condition (rheumatoid arthritis, active systemic lupus erythematosus, polymyalgia rheumatica, polymyositis, ankylosing spondylitis, scleroderma/CREST syndrome) <sup>34</sup>	
	Neuromuscular autoimmune diseases (multiple sclerosis, Myasthenia gravis) <sup>35</sup>	
	Severe liver cirrhosis <sup>36</sup>	
<b>Low-Level Immune Compromising States</b>		
Asthma/COPD treated with (non-systemic) medication	Inhaled medications: <sup>37</sup>	
	Albuterol	Fluticasone and salmeterol
	Budesonide	Fluticasone and vilanterol
	Budesonide and formoterol	Mometasone furoate and formoterol fumarate
	Ciclesonide	dihydrate
	Fluticasone	Omalizumab
	Nasal sprays containing corticosteroids: <sup>37</sup>	
	Apo-mometasone	Fluticasone furoate

	Azelastine and fluticasone Budesonide Ciclesonide	Fluticasone propionate Mometasone
Autoimmune conditions	Celiac disease <sup>38</sup> Autoimmune hepatitis <sup>39</sup> Graves' disease <sup>40</sup>	
Other conditions	Diabetes <sup>41</sup> Mild liver cirrhosis (fibrosis) <sup>36</sup> Chronic kidney disease <sup>42</sup> SLE in remission <sup>43</sup> HIV (suppressed: viral load <20 IU/mL) <sup>33</sup> Inflammatory bowel disease (not treated with medication) <sup>44</sup>	

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**Supplementary Table 2:** Median log-adjusted IgG (log<sub>10</sub> BAU/mL), IgA and IgM (log<sub>10</sub> µg/mL) titres against the SARS-CoV-2 spike (S) and receptor-binding domain (RBD) proteins at time points prior to and following COVID-19 vaccine doses for participants with no prior SARS-CoV-2 infection, according to immune status at baseline (n=932 participants).<sup>†</sup>

Antibody Titre Median (IQR) Range (min, max)	All Participants N=932	IC – High level N=104	NIC and IC – Low level N=828	P
Anti-S IgG (log <sub>10</sub> BAU/mL):				
7-21 days (14) after dose 1	N=110 2.57 (1.63, 3.00) 4.45 (0, 4.45)	N=10 1.58 (0.59, 1.90) 2.96 (0, 2.96)	N=100 2.69 (1.74, 3.02) 4.45 (0, 4.45)	0.003*
1-2 months (1.5) after dose 1	N=100 2.78 (2.08, 3.06) 2.24 (1.27, 3.51)	N=11 1.95 (1.45, 2.84) 1.98 (1.27, 3.25)	N=89 2.82 (2.14, 3.08) 2.16 (1.35, 3.51)	0.02*
7-21 days (14) after dose 2	N=106 3.84 (3.48, 4.08) 4.45 (0, 4.45)	N=9 2.06 (2.02, 3.55) 4.22 (0, 4.22)	N=97 3.86 (3.60, 4.09) 2.66 (1.80, 4.45)	0.005*
1-2 months (1.5) after dose 2	N=208 3.52 (3.29, 3.70) 4.45 (0, 4.45)	N=30 3.25 (2.03, 3.55) 4.43 (0, 4.43)	N=176 3.54 (3.34, 3.72) 3.95 (0.50, 4.45)	0.0001*
2.5-4.5 months (3) after dose 2	N=391 3.36 (3.13, 3.51) 4.45 (0, 4.45)	N=41 3.17 (2.09, 3.46) 4.45 (0, 4.45)	N=350 3.36 (3.14, 3.51) 3.55 (0.90, 4.45)	0.02*
5.5-6.5 months (6) after dose 2	N=162 3.05 (2.73, 3.21) 2.23 (1.51, 3.74)	N=6 2.87 (2.14, 3.40) 1.63 (1.83, 3.46)	N=156 3.05 (2.77, 3.21) 2.23 (1.51, 3.74)	0.83
1-2 months (1.5) after dose 3	N=32 3.76 (3.56, 3.91) 2.70 (1.75, 4.45)	N=11 3.60 (2.14, 4.14) 2.64 (1.75, 4.39)	N=21 3.76 (3.63, 3.88) 1.11 (3.34, 4.45)	0.50
2.5-4.5 months (3) after dose 3	N=136 3.50 (3.35, 3.72) 3.44 (1.07, 4.50)	N=18 3.37 (2.72, 3.52) 2.34 (1.68, 4.02)	N=118 3.52 (3.37, 3.73) 3.44 (1.07, 4.50)	0.01*
5.5-6.5 months (6) after dose 3	N=43 3.23 (3.04, 3.48) 4.12 (0.00, 4.12)	N=5 3.05 (2.91, 3.43) 3.69 (0.00, 3.69)	N=38 3.24 (3.10, 3.48) 1.45 (2.67, 4.12)	0.39
2.5-4.5 months (3) after dose 4	N=45 3.65 (3.37, 3.77) 1.38 (2.86, 4.24)	N=14 3.67 (3.26, 3.91) 1.38 (2.86, 4.24)	N=31 3.63 (3.39, 3.73) 0.86 (3.09, 3.96)	0.99
5.5-6.5 months (6) after dose 4	N=20 3.33 (3.04, 3.55) 1.28 (2.63, 3.91)	N=5 3.41 (2.92, 3.67) 1.28 (2.63, 3.91)	N=15 3.32 (3.05, 3.52) 0.95 (2.87, 3.82)	0.83
1-2 months (1.5) after dose 5	N=16 3.58 (3.50, 3.77) 1.34 (3.23, 4.57)	N=4 3.58 (3.43, 4.08) 1.27 (3.30, 4.57)	N=12 3.58 (3.50, 3.77) 0.78 (3.23, 4.01)	0.81
2.5-4.5 months (3) after dose 5	N=26 3.44 (3.37, 3.73) 2.46 (1.46, 3.92)	N=9 3.48 (3.40, 3.53) 0.52 (3.37, 3.88)	N=17 3.42 (3.36, 3.76) 2.46 (1.45, 3.92)	0.54
5.5-6.5 months (6) after dose 5	N=24 3.30 (2.75, 3.55) 2.32 (1.59, 3.91)	N=4 3.30 (2.91, 3.61) 1.49 (2.52, 3.91)	N=20 3.32 (2.75, 3.55) 2.04 (1.59, 3.64)	0.88
1-2 months (1.5) after dose 6	N=9 3.73 (3.52, 3.84) 2.72 (1.52, 4.24)	N=4 3.68 (3.52, 3.87) 0.37 (3.52, 3.89)	N=5 3.73 (3.32, 3.83) 2.72 (1.52, 4.24)	0.62
2.5-4.5 months (3) after dose 6	N=11	N=5	N=6	0.47

	3.54 (3.29, 3.66) 2.41 (1.67, 4.08) N=8	3.42 (3.29, 3.54) 0.65 (3.23, 3.88) N=4	3.64 (3.34, 3.66) 2.41 (1.67, 4.08) N=4	
5.5-6.5 months (6) after dose 6	3.43 (3.18, 3.59) 0.87 (2.92, 3.79)	3.42 (3.10) 0.70 (3.59)	3.43 (3.21, 3.65) 0.72 (3.07, 3.79)	0.77
Anti-RBD IgG (log <sub>10</sub> BAU/mL):				
7-21 days (14) after dose 1	N=110 2.10 (1.46, 2.47) 4.19 (0, 4.19)	N=10 1.52 (0.89, 1.86) 1.81 (0.54, 2.36)	N=100 2.15 (1.58, 2.51) 4.19 (0, 4.19)	0.01*
1-2 months (1.5) after dose 1	N=100 2.28 (2.01, 2.55) 2.54 (1.12, 3.66)	N=11 1.77 (1.59, 2.54) 1.95 (1.12, 3.07)	N=89 2.30 (2.05, 2.55) 2.35 (1.31, 3.66)	0.04*
7-21 days (14) after dose 2	N=106 3.87 (3.55, 4.05) 4.64 (0.45, 5.09)	N=9 3.45 (2.33, 3.61) 3.62 (0.45, 4.07)	N=97 3.88 (3.62, 4.07) 3.16 (1.93, 5.09)	0.004*
1-2 months (1.5) after dose 2	N=206 3.47 (2.67, 3.73) 3.87 (0.54, 4.41)	N=30 3.06 (2.53, 3.52) 3.46 (0.54, 4.01)	N=176 3.51 (3.18, 3.75) 3.62 (0.80, 4.41)	0.001*
2.5-4.5 months (3) after dose 2	N=391 3.32 (2.66, 3.53) 3.79 (0.70, 4.49)	N=41 2.59 (2.34, 3.48) 3.79 (0.70, 4.49)	N=350 3.33 (2.91, 3.54) 3.32 (0.92, 4.25)	0.0006*
5.5-6.5 months (6) after dose 2	N=162 2.65 (2.38, 3.15) 2.10 (1.52, 3.62)	N=6 2.79 (2.34, 3.23) 1.10 (2.18, 3.28)	N=156 2.65 (2.39, 3.15) 2.10 (1.52, 3.62)	0.86
1-2 months (1.5) after dose 3	N=32 3.84 (3.60, 4.02) 2.97 (1.61, 4.58)	N=11 3.61 (1.80, 4.12) 2.69 (1.61, 4.30)	N=21 3.85 (3.69, 3.91) 1.27 (3.31, 4.58)	0.31
2.5-4.5 months (3) after dose 3	N=136 3.51 (3.28, 3.75) 3.12 (1.38, 4.50)	N=18 3.27 (1.73, 3.50) 2.62 (1.38, 3.99)	N=118 3.56 (3.31, 3.76) 3.03 (1.46, 4.50)	0.008*
5.5-6.5 months (6) after dose 3	N=43 3.25 (2.95, 3.41) 3.20 (1.03, 4.23)	N=5 2.85 (2.61, 3.34) 2.67 (1.03, 3.71)	N=38 3.25 (2.99, 3.41) 2.07 (2.17, 4.23)	0.28
2.5-4.5 months (3) after dose 4	N=45 3.70 (3.37, 3.85) 2.19 (2.10, 4.28)	N=14 3.73 (2.97, 3.91) 2.19 (2.10, 4.28)	N=31 3.70 (3.42, 3.81) 1.04 (3.12, 4.15)	0.74
5.5-6.5 months (6) after dose 4	N=20 3.43 (3.14, 3.65) 1.93 (2.03, 3.96)	N=5 3.26 (3.17, 3.70) 1.68 (2.03, 3.71)	N=15 3.47 (3.11, 3.63) 1.23 (2.73, 3.96)	0.76
1-2 months (1.5) after dose 5	N=16 3.65 (3.55, 3.82) 1.21 (3.23, 4.44)	N=4 3.69 (3.45, 4.11) 1.13 (3.31, 4.44)	N=12 3.65 (3.55, 3.82) 0.78 (3.23, 4.01)	0.72
2.5-4.5 months (3) after dose 5	N=26 3.60 (3.36, 3.79) 2.50 (1.63, 4.12)	N=9 3.62 (3.51, 3.65) 0.84 (3.28, 3.12)	N=17 3.44 (3.35, 3.79) 2.49 (1.63, 4.11)	0.54
5.5-6.5 months (6) after dose 5	N=24 3.52 (2.81, 3.63) 2.30 (1.78, 4.08)	N=4 3.53 (2.90, 3.84) 1.74 (2.34, 4.08)	N=20 3.37 (2.81, 3.63) 1.98 (1.78, 3.77)	0.82
1-2 months (1.5) after dose 6	N=9 3.85 (3.35, 3.95) 2.46 (1.59, 4.06)	N=4 3.72 (3.47, 3.93) 0.67 (3.35, 4.02)	N=5 3.90 (3.31, 3.95) 2.46 (1.59, 4.06)	1.00
2.5-4.5 months (3) after dose 6	N=11 3.51 (3.36, 3.82) 1.31 (2.72, 4.04)	N=5 3.48 (3.36, 3.51) 0.83 (3.07, 3.91)	N=6 3.73 (3.36, 3.82) 1.32 (2.72, 4.04)	0.47
5.5-6.5 months (6) after dose 6	N=8 3.40 (3.18, 3.59)	N=4 3.40 (2.82, 3.56)	N=4 3.42 (3.18, 3.64)	0.77

	1.49 (2.27, 3.76)	1.40 (2.27, 3.68)	0.73 (3.03, 3.76)	
Anti-S IgA (log <sub>10</sub> µg/mL):				
7-21 days (14) after dose 1	N=111 0.44 (0.26, 0.59) 1.21 (0, 1.21)	N=10 0 (0, 0.28) 0.42 (0, 0.42)	N=101 0.47 (0.31, 0.61) 1.21 (0, 1.21)	0.0002*
1-2 months (1.5) after dose 1	N=103 0.15 (0, 0.30) 0.68 (0, 0.68)	N=11 0 (0, 0.28) 0.68 (0, 0.68)	N=92 0.15 (0, 0.30) 0.63 (0, 0.63)	0.51
7-21 days (14) after dose 2	N=114 0.68 (0.56, 0.79) 1.16 (0, 1.16)	N=9 0.68 (0.50, 0.71) 0.79 (0, 0.79)	N=105 0.68 (0.56, 0.79) 1.16 (0, 1.16)	0.33
1-2 months (1.5) after dose 2	N=214 0.45 (0.31, 0.59) 1.09 (0, 1.09)	N=31 0.39 (0.14, 0.53) 0.79 (0, 0.79)	N=183 0.45 (0.31, 0.59) 1.09 (0, 1.09)	0.10
2.5-4.5 months (3) after dose 2	N=395 0.43 (0.29, 0.56) 1.09 (0, 1.09)	N=41 0.32 (0.15, 0.43) 0.82 (0, 0.82)	N=354 0.44 (0.30, 0.56) 1.09 (0, 1.09)	0.0002*
5.5-6.5 months (6) after dose 2	N=160 0.37 (0.25, 0.48) 0.75 (0, 0.75)	N=6 0.27 (0.19, 0.34) 0.42 (0, 0.42)	N=154 0.38 (0.26, 0.49) 0.75 (0, 0.75)	0.09
1-2 months (1.5) after dose 3	N=34 0.48 (0.37, 0.70) 1.18 (0.08, 1.26)	N=11 0.60 (0.37, 0.73) 0.73 (0.19, 0.92)	N=23 0.47 (0.37, 0.67) 1.18 (0.08, 1.26)	0.38
2.5-4.5 months (3) after dose 3	N=137 0.44 (0.31, 0.57) 1.45 (0, 1.45)	N=18 0.42 (0.13, 0.51) 0.85 (0, 0.85)	N=119 0.46 (0.31, 0.58) 1.45 (0, 1.45)	0.22
5.5-6.5 months (6) after dose 3	N=42 0.47 (0.32, 0.61) 1.18 (0, 1.18)	N=5 0.60 (0.08, 0.75) 1.06 (0, 1.06)	N=37 0.47 (0.34, 0.60) 1.18 (0, 1.18)	0.82
2.5-4.5 months (3) after dose 4	N=44 0.41 (0.28, 0.58) 1.45 (0, 1.45)	N=13 0.37 (0.26, 0.64) 0.89 (0, 0.89)	N=31 0.41 (0.30, 0.57) 1.45 (0, 1.45)	0.81
5.5-6.5 months (6) after dose 4	N=19 0.33 (0, 0.44) 0.59 (0, 0.59)	N=4 0.44 (0.21, 0.51) 0.56 (0, 0.56)	N=15 0.29 (0, 0.41) 0.59 (0, 0.59)	0.31
1-2 months (1.5) after dose 5	N=16 0.41 (0.21, 0.57) 0.60 (0, 0.60)	N=4 0.41 (0.21, 0.58) 0.41 (0.17, 0.58)	N=12 0.41 (0.15, 0.52) 0.60 (0, 0.60)	0.86
2.5-4.5 months (3) after dose 5	N=27 0.18 (0, 0.43) 1.13 (0, 1.13)	N=10 0.34 (0.18, 0.46) 0.84 (0, 0.84)	N=17 0 (0, 0.29) 1.13 (0, 1.13)	0.057
5.5-6.5 months (6) after dose 5	N=22 0 (0, 0.36) 0.76 (0, 0.76)	N=4 0.11 (0, 0.39) 0.55 (0, 0.55)	N=18 0 (0, 0.36) 0.76 (0, 0.76)	0.75
1-2 months (1.5) after dose 6	N=9 0 (0, 0.36) 0.63 (0, 0.63)	N=4 0.18 (0, 0.46) 0.57 (0, 0.57)	N=5 0 (0, 0.23) 0.63 (0, 0.63)	0.89
2.5-4.5 months (3) after dose 6	N=10 0.26 (0, 0.45) 0.58 (0, 0.58)	N=4 0.16 (0.06, 0.29) 0.37 (0, 0.37)	N=6 0.38 (0, 0.57) 0.58 (0, 0.58)	0.45
5.5-6.5 months (6) after dose 6	N=8 0.28 (0.05, 0.58) 1.43 (0, 1.43)	N=4 0.13 (0, 0.84) 1.43 (0, 1.43)	N=4 0.37 (0.19, 0.58) 0.64 (0.09, 0.72)	0.47
Anti-RBD IgA (log <sub>10</sub> µg/mL):				
7-21 days (14) after dose 1	N=111	N=10	N=101	

	0.04 (0, 0.27) 0.69 (0, 0.69) N=103 0 (0, 0) 0.46 (0, 0.46)	0 (0, 0) 0.16 (0, 0.16) N=11 0 (0, 0) 0.30 (0, 0.30)	0.12 (0, 0.28) 0.69 (0, 0.69) N=92 0 (0, 0) 0.46 (0, 0.46)	0.007*
1-2 months (1.5) after dose 1				0.70
7-21 days (14) after dose 2	N=114 0.38 (0.24, 0.50) 0.91 (0, 0.91)	N=9 0.26 (0.06, 0.41) 0.50 (0, 0.50)	N=105 0.38 (0.24, 0.51) 0.91 (0, 0.91)	0.12
1-2 months (1.5) after dose 2	N=214 0.09 (0, 0.29) 0.81 (0, 0.81)	N=31 0 (0, 0.17) 0.68 (0, 0.68)	N=183 0.12 (0, 0.31) 0.81 (0, 0.81)	0.01*
2.5-4.5 months (3) after dose 2	N=395 0 (0, 0.23) 0.81 (0, 0.81)	N=41 0 (0, 0) 0.58 (0, 0.58)	N=354 0 (0, 0.25) 0.81 (0, 0.81)	0.007*
5.5-6.5 months (6) after dose 2	N=161 0 (0, 0.13) 0.50 (0, 0.50)	N=6 0 (0, 0) 0 (0, 0)	N=154 0 (0, 0.13) 0.50 (0, 0.50)	0.11
1-2 months (1.5) after dose 3	N=34 0.22 (0, 0.35) 0.83 (0, 0.83)	N=11 0.30 (0, 0.37) 0.55 (0, 0.55)	N=23 0.21 (0, 0.33) 0.83 (0, 0.83)	0.97
2.5-4.5 months (3) after dose 3	N=137 0.04 (0, 0.29) 0.94 (0, 0.94)	N=18 0.03 (0, 0.21) 0.53 (0, 0.53)	N=119 0.04 (0, 0.30) 0.94 (0, 0.94)	0.59
5.5-6.5 months (6) after dose 3	N=42 0 (0, 0.28) 0.75 (0, 0.75)	N=5 0 (0, 0.26) 0.72 (0, 0.72)	N=37 0 (0, 0.28) 0.75 (0, 0.75)	0.93
2.5-4.5 months (3) after dose 4	N=44 0.11 (0, 0.34) 0.93 (0, 0.93)	N=13 0.03 (0, 0.44) 0.57 (0, 0.57)	N=31 0.12 (0, 0.33) 0.93 (0, 0.93)	1.00
5.5-6.5 months (6) after dose 4	N=19 0 (0, 0.38) 0.60 (0, 0.60)	N=4 0.05 (0, 0.17) 0.25 (0, 0.25)	N=15 0 (0, 0.40) 0.60 (0, 0.60)	0.63
1-2 months (1.5) after dose 5	N=16 0.19 (0.01, 0.37) 0.71 (0, 0.71)	N=4 0.21 (0, 0.44) 0.46 (0, 0.46)	N=12 0.19 (0.03, 0.29) 0.71 (0, 0.71)	0.86
2.5-4.5 months (3) after dose 5	N=27 0.22 (0, 0.42) 1.00 (0, 1.00)	N=10 0 (0, 0.27) 1.00 (0, 1.00)	N=17 0.30 (0, 0.43) 0.86 (0, 0.86)	0.11
5.5-6.5 months (6) after dose 5	N=22 0.29 (0, 0.41) 1.16 (0, 1.16)	N=4 0.19 (0, 0.52) 0.66 (0, 0.66)	N=18 0.29 (0, 0.41) 1.16 (0, 1.16)	1.00
1-2 months (1.5) after dose 6	N=9 0.29 (0, 0.34) 1.00 (0, 1.00)	N=4 0.28 (0.11, 0.67) 1.00 (0, 1.00)	N=5 0.29 (0, 0.29) 0.37 (0, 0.37)	0.71
2.5-4.5 months (3) after dose 6	N=10 0.29 (0, 0.59) 1.17 (0, 1.17)	N=4 0.29 (0.15, 0.73) 1.17 (0, 1.17)	N=6 0.16 (0, 0.59) 0.87 (0, 0.87)	0.83
5.5-6.5 months (6) after dose 6	N=8 0.12 (0, 0.21) 0.38 (0, 0.38)	N=4 0.21 (0.14, 0.30) 0.28 (0.09, 0.38)	N=4 0 (0, 0.08) 0.15 (0, 0.15)	0.06
Anti-S IgM (log <sub>10</sub> µg/mL):				
7-21 days (14) after dose 1	N=111 0.26 (0.00, 0.47) 0.88 (0.00, 0.88)	N=10 0.10 (0, 0.35) 0.70 (0, 0.70)	N=101 0.27 (0.00, 0.47) 0.88 (0.00, 0.88)	0.21
1-2 months (1.5) after dose 1	N=103	N=11	N=92	0.75

	0.25 (0, 0.44) 0.88 (0, 0.88)	0.15 (0, 0.45) 0.86 (0, 0.86)	0.25 (0, 0.42) 0.88 (0, 0.88)	
7-21 days (14) after dose 2	N=114 0.33 (0.21, 0.48) 1.44 (0, 1.44)	N=9 0.22 (0, 0.34) 0.50 (0, 0.50)	N=105 0.33 (0.22, 0.48) 1.44 (0, 1.44)	0.09
1-2 months (1.5) after dose 2	N=214 0.21 (0.00, 0.38) 1.54 (0.00, 1.54)	N=31 0.15 (0.00, 0.40) 1.54 (0.00, 1.54)	N=183 0.22 (0.00, 0.39) 1.24 (0.00, 1.24)	0.61
2.5-4.5 months (3) after dose 2	N=395 0.18 (0.00, 0.37) 1.62 (0.00, 1.62)	N=41 0.002 (0.00, 0.23) 1.38 (0.00, 1.38)	N=354 0.20 (0.00, 0.37) 1.62 (0.00, 1.62)	0.05
5.5-6.5 months (6) after dose 2	N=160 0.08 (0.00, 0.29) 1.10 (0.00, 1.10)	N=6 0.22 (0.00, 0.84) 0.87 (0.00, 0.87)	N=154 0.07 (0.00, 0.29) 1.10 (0.00, 1.10)	0.23
1-2 months (1.5) after dose 3	N=34 0.18 (0, 0.34) 1.54 (0, 1.54)	N=11 0.18 (0, 0.32) 1.54 (0, 0.57)	N=23 0.23 (0, 0.42) 0.91 (0, 0.91)	0.65
2.5-4.5 months (3) after dose 3	N=137 0.21 (0.00, 0.12, 0.34) 1.84 (0.00, 1.84)	N=18 0.15 (0.00, 0.32) 1.15 (0.00, 1.15)	N=119 0.21 (0.15, 0.34) 1.84 (0.00, 1.84)	0.13
5.5-6.5 months (6) after dose 3	N=42 0.24 (0.13, 0.39) 0.66 (0.01, 0.66)	N=5 0.31 (0.23, 0.36) 0.55 (0.09, 0.64)	N=37 0.22 (0.13, 0.39) 0.64 (0.01, 0.66)	0.49
2.5-4.5 months (3) after dose 4	N=44 0.17 (0.09, 0.40) 2.19 (0, 2.19)	N=13 0.30 (0.12, 0.51) 1.69 (0, 1.69)	N=31 0.16 (0.09, 0.35) 2.16 (0.02, 2.19)	0.23
5.5-6.5 months (6) after dose 4	N=19 0.07 (0.04, 0.36) 0.95 (0, 0.95)	N=4 0.59 (0.25, 0.84) 0.89 (0.06, 0.95)	N=15 0.06 (0.03, 0.18) 0.52 (0, 0.52)	0.04*
1-2 months (1.5) after dose 5	N=16 0.13 (0.04, 0.29) 1.69 (0, 1.69)	N=4 0.27 (0.02, 1.10) 1.68 (0.01, 1.69)	N=12 0.13 (0.07, 0.21) 0.40 (0, 0.40)	0.76
2.5-4.5 months (3) after dose 5	N=27 0.06 (0.02, 0.25) 2.28 (0, 2.28)	N=10 0.23 (0.02, 1.01) 2.28 (0, 2.28)	N=17 0.06 (0.01, 0.16) 0.47 (0, 0.47)	0.21
5.5-6.5 months (6) after dose 5	N=22 0.08 (0, 0.13) 2.47 (0, 2.47)	N=4 0.20 (0.06, 1.37) 2.47 (0, 2.47)	N=18 0.08 (0, 0.11) 1.34 (0, 1.34)	0.23
1-2 months (1.5) after dose 6	N=9 0.14 (0.07, 0.38) 1.28 (0, 1.28)	N=4 0.54 (0.24, 0.99) 1.17 (0.11, 1.28)	N=5 0.07 (0.04, 0.14) 0.19 (0, 0.19)	0.07
2.5-4.5 months (3) after dose 6	N=10 0.16 (0.04, 0.40) 1.05 (0.03, 1.08)	N=4 0.26 (0.12, 0.47) 0.43 (0.11, 0.54)	N=6 0.11 (0.04, 0.37) 1.05 (0.03, 1.08)	0.46
5.5-6.5 months (6) after dose 6	N=8 0.17 (0.07, 0.24) 1.26 (0, 1.26)	N=4 0.12 (0.03, 0.72) 1.26 (0, 1.26)	N=4 0.20 (0.12, 0.24) 0.17 (0.08, 0.25)	0.67
Anti-RBD IgM (log <sub>10</sub> µg/mL):				
7-21 days (14) after dose 1	N=111 0.17 (0.06, 0.26) 0.78 (0, 0.78)	N=10 0.05 (0, 0.17) 0.32 (0, 0.32)	N=101 0.17 (0.07, 0.26) 0.78 (0, 0.78)	0.09
1-2 months (1.5) after dose 1	N=103 0.17 (0.08, 0.27) 0.59 (0, 0.59)	N=11 0.09 (0.00, 0.22) 0.42 (0.00, 0.42)	N=92 0.18 (0.09, 0.27) 0.59 (0, 0.59)	0.21
7-21 days (14) after dose 2	N=114 0.16 (0.09, 0.30)	N=9 0.07 (0, 0.11)	N=105 0.17 (0.10, 0.30)	0.03*

1-2 months (1.5) after dose 2	1.22 (0, 1.22) N=214 0.11 (0.04, 0.23) 1.06 (0.00, 1.06) N=395	1.22 (0, 1.22) N=31 0.07 (0.00, 0.17) 1.06 (0.00, 1.06) N=41	1.16 (0, 1.16) N=183 0.11 (0.06, 0.23) 1.02 (0.00, 1.02) N=354	0.15
2.5-4.5 months (3) after dose 2	0.12 (0.02, 0.22) 1.20 (0, 1.20) N=160	0.11 (0, 0.18) 1.09 (0, 1.09) N=6	0.12 (0.03, 0.22) 1.20 (0, 1.20) N=154	0.44
5.5-6.5 months (6) after dose 2	0.06 (0.00, 0.15) 1.82 (0.00, 1.82)	0.05 (0.03, 0.26) 0.29 (0, 0.29)	0.06 (0.00, 0.15) 1.82 (0.00, 1.81)	0.79
1-2 months (1.5) after dose 3	N=34 0.12 (0.004, 0.20) 0.81 (0, 0.81) N=137	N=11 0.12 (0, 0.28) 0.81 (0, 0.81) N=18	N=23 0.12 (0.004, 0.19) 0.71 (0, 0.71) N=119	0.67
2.5-4.5 months (3) after dose 3	0.08 (0.03, 0.17) 1.21 (0, 1.21) N=42	0.18 (0.004, 0.32) 0.52 (0, 0.52) N=5	0.08 (0.03, 0.15) 1.21 (0.00, 1.21) N=37	0.28
5.5-6.5 months (6) after dose 3	0.10 (0.02, 0.21) 1.95 (0, 1.95)	0.07 (0, 0.32) 0.50 (0, 0.50)	0.11 (0.03, 0.20) 1.95 (0, 1.95)	0.82
2.5-4.5 months (3) after dose 4	N=44 0.08 (0.03, 0.17) 1.88 (0, 1.88) N=19	N=13 0.15 (0.02, 0.18) 0.95 (0, 0.95) N=4	N=31 0.07 (0.03, 0.13) 1.88 (0, 1.88) N=15	0.45
5.5-6.5 months (6) after dose 4	0.12 (0.06, 0.16) 0.95 (0.02, 0.97)	0.16 (0.10, 0.57) 0.88 (0.06, 0.95)	0.11 (0.06, 0.14) 0.95 (0.02, 0.97)	0.34
1-2 months (1.5) after dose 5	N=16 0.07 (0.03, 0.22) 0.40 (0, 0.40) N=27	N=4 0.03 (0.01, 0.06) 0.08 (0, 0.08) N=10	N=12 0.09 (0.05, 0.24) 0.40 (0, 0.40) N=17	0.12
2.5-4.5 months (3) after dose 5	0.08 (0.002, 0.16) 1.55 (0, 1.55) N=22	0.06 (0.02, 0.27) 1.55 (0, 1.55) N=4	0.08 (0, 0.14) 0.57 (0, 0.57) N=18	0.84
5.5-6.5 months (6) after dose 5	0.11 (0.02, 0.21) 2.13 (0, 2.13)	0.13 (0.05, 1.15) 2.13 (0, 2.13)	0.10 (0.02, 0.21) 1.57 (0, 1.57)	0.70
1-2 months (1.5) after dose 6	N=9 0.11 (0.06, 0.25) 1.53 (0, 1.53) N=10	N=4 0.38 (0.14, 1.05) 1.47 (0.07, 1.53) N=4	N=5 0.06 (0.06, 0.11) 0.25 (0, 0.25) N=6	0.11
2.5-4.5 months (3) after dose 6	0.11 (0.06, 0.31) 1.51 (0, 1.51) N=8	0.29 (0.15, 0.75) 1.18 (0.02, 1.20) N=4	0.09 (0.06, 0.12) 1.51 (0, 1.51) N=4	0.46
5.5-6.5 months (6) after dose 6	0.10 (0.06, 0.20) 0.33 (0, 0.33)	0.14 (0.09, 0.24) 0.27 (0.06, 0.33)	0.07 (0.03, 0.16) 0.24 (0, 0.24)	0.47

†Samples obtained after the administration of a subsequent vaccine dose, a self-reported positive COVID-19 RAT or PCR test, or natural immunity identified by serum testing (SCO>1 for anti-N IgG titres and either anti-S or anti-RBD titres) were excluded.

A two-sided alpha level of 0.05 was used to determine statistical significance: \*P ≤ 0.05.

**Supplementary Table 3:** Median log-adjusted IgG (log<sub>10</sub> BAU/mL), IgA and IgM (log<sub>10</sub> µg/mL) titres against the SARS-CoV-2 spike (S) and receptor-binding domain (RBD) proteins at time points prior to and following COVID-19 vaccine doses for participants with a prior SARS-CoV-2 infection, according to immune status at baseline (n=932 participants).<sup>†</sup>

Antibody Titre Median (IQR) Range (min, max)	All Participants N=932	IC – High level N=104	NIC and IC – Low level N=827	P
Anti-S IgG (log <sub>10</sub> BAU/mL)				
7-21 days (14) after dose 1	N=70 4.22 (3.64, 4.45) 2.46 (1.99, 4.45)	N=6 4.44 (4.22, 4.45) 2.43 (2.02, 4.45)	N=64 4.15 (3.63, 4.45) 2.46 (1.99, 4.45)	0.40
1-2 months (1.5) after dose 1	N=120 3.83 (3.18, 4.24) 3.67 (1.08, 4.45)	N=10 3.46 (2.12, 4.13) 2.52 (1.92, 4.44)	N=110 3.84 (3.24, 4.31) 3.37 (1.08, 4.45)	0.14
1-2 months (1.5) after dose 2	N=127 3.70 (2.07, 4.03) 2.73 (1.72, 4.45)	N=10 2.73 (2.03, 3.73) 2.48 (1.97, 4.45)	N=117 3.72 (2.09, 4.03) 2.73 (1.72, 4.45)	0.32
2.5-4.5 months (3) after dose 2	N=236 3.65 (3.42, 3.92) 2.64 (1.81, 4.45)	N=23 3.71 (3.41, 3.98) 2.41 (2.04, 4.45)	N=213 3.65 (3.43, 3.92) 2.64 (1.81, 4.45)	0.64
5.5-6.5 months (6) after dose 2	N=73 3.40 (3.21, 3.65) 2.41 (2.04, 4.45)	N=4 3.23 (3.15, 3.44) 0.58 (3.08, 3.66)	N=69 3.40 (3.21, 3.65) 2.41 (2.04, 4.45)	0.39
1-2 months (1.5) after dose 3	N=51 3.79 (3.61, 4.01) 2.55 (2.02, 4.57)	N=6 3.77 (3.54, 4.30) 1.00 (3.45, 4.45)	N=45 3.79 (3.64, 4.00) 2.55 (2.02, 4.57)	1.00
2.5-4.5 months (3) after dose 3	N=95 3.76 (3.57, 3.92) 1.63 (2.66, 4.29)	N=12 3.75 (3.55, 3.88) 0.85 (3.33, 4.17)	N=83 3.76 (3.57, 3.93) 1.63 (2.66, 4.29)	0.73
1-2 months (1.5) after dose 4	N=29 3.87 (3.73, 3.99) 1.10 (3.36, 4.45)	N=4 3.91 (3.66, 4.04) 0.70 (3.44, 4.14)	N=25 3.84 (3.73, 3.99) 1.10 (3.36, 4.45)	0.87
2.5-4.5 months (3) after dose 4	N=73 3.69 (3.57, 3.88) 2.49 (2.08, 4.57)	N=6 3.61 (3.50, 3.83) 2.49 (2.08, 4.57)	N=67 3.71 (3.57, 3.89) 1.38 (3.20, 4.57)	0.48
5.5-6.5 months (6) after dose 4	N=66 3.55 (3.43, 3.79) 1.33 (2.82, 4.14)	N=4 3.50 (3.36, 3.64) 0.47 (3.27, 3.74)	N=62 3.56 (3.43, 3.81) 1.33 (2.82, 4.14)	0.44
1-2 months (1.5) after dose 5	N=22 3.88 (3.65, 4.02) 1.03 (3.43, 4.45)	N=4 3.66 (3.50, 3.88) 0.59 (3.43, 4.02)	N=18 3.94 (3.68, 4.12) 1.00 (3.45, 4.45)	0.19
2.5-4.5 months (3) after dose 5	N=49 3.74 (3.58, 3.86) 1.34 (3.12, 4.45)	N=7 3.35 (3.28, 3.74) 0.70 (3.12, 3.82)	N=42 3.78 (3.64, 3.89) 1.19 (3.27, 4.45)	0.005*
5.5-6.5 months (6) after dose 5	N=37 3.57 (3.39, 3.64) 1.38 (3.08, 4.45)	N=4 3.44 (3.25, 3.54) 0.55 (3.08, 3.62)	N=33 3.57 (3.39, 3.66) 1.34 (3.11, 4.45)	0.25
Anti-RBD IgG (log <sub>10</sub> BAU/mL)				
7-21 days (14) after dose 1	N=70 3.92 (3.61, 4.16)	N=6 4.13 (4.08, 4.17)	N=64 3.92 (3.61, 4.16)	0.32

1-2 months (1.5) after dose 1	2.91 (1.98, 4.89) N=120 3.77 (2.64, 4.02) 3.90 (1.19, 5.09)	2.15 (2.09, 4.25) N=10 3.86 (3.29, 4.02) 2.75 (2.33, 5.09)	2.91 (1.98, 4.89) N=110 3.76 (2.61, 4.02) 3.90 (1.19, 5.09)	0.88
1-2 months (1.5) after dose 2	N=127 3.73 (2.67, 4.01) 2.84 (2.24, 5.09)	N=10 3.93 (3.21, 4.07) 2.13 (2.48, 4.61)	N=117 3.72 (2.67, 3.98) 2.84 (2.24, 5.09)	0.48
2.5-4.5 months (3) after dose 2	N=236 3.66 (3.41, 3.98) 2.66 (2.42, 5.09)	N=23 3.63 (3.30, 4.11) 2.49 (2.59, 5.09)	N=213 3.67 (3.45, 3.96) 2.66 (2.42, 5.09)	0.86
5.5-6.5 months (6) after dose 2	N=73 3.33 (3.14, 3.56) 2.01 (2.20, 4.21)	N=4 2.90 (2.54, 3.52) 1.34 (2.50, 3.83)	N=69 3.33 (3.14, 3.56) 2.01 (2.20, 4.21)	0.34
1-2 months (1.5) after dose 3	N=51 3.82 (3.61, 4.01) 2.34 (2.50, 4.84)	N=6 3.58 (3.33, 3.95) 2.00 (2.50, 4.49)	N=45 3.82 (3.63, 4.01) 1.67 (3.17, 4.84)	0.25
2.5-4.5 months (3) after dose 3	N=95 3.75 (3.57, 3.96) 2.22 (2.16, 4.38)	N=12 3.71 (3.47, 3.84) 1.38 (2.91, 4.29)	N=83 3.76 (3.57, 3.96) 2.22 (2.16, 4.38)	0.46
1-2 months (1.5) after dose 4	N=29 3.94 (3.80, 4.14) 1.03 (3.39, 4.42)	N=4 4.01 (3.69, 4.17) 0.91 (3.39, 4.31)	N=25 3.93 (3.80, 4.14) 0.98 (3.44, 4.42)	0.87
2.5-4.5 months (3) after dose 4	N=73 3.82 (3.63, 4.03) 2.96 (2.04, 5.00)	N=6 3.68 (3.26, 3.94) 2.96 (2.04, 5.00)	N=67 3.84 (3.64, 4.03) 1.84 (3.12, 4.96)	0.29
5.5-6.5 months (6) after dose 4	N=66 3.74 (3.53, 3.97) 1.79 (2.68, 4.47)	N=4 3.67 (3.31, 3.89) 0.97 (3.05, 4.01)	N=62 3.74 (3.53, 3.97) 1.79 (2.68, 4.47)	0.56
1-2 months (1.5) after dose 5	N=22 4.06 (3.76, 4.22) 1.04 (3.48, 4.52)	N=4 3.76 (3.60, 4.01) 0.75 (3.48, 4.22)	N=18 4.09 (3.79, 4.33) 1.02 (3.51, 4.52)	0.16
2.5-4.5 months (3) after dose 5	N=49 3.83 (3.70, 4.00) 1.75 (2.83, 4.58)	N=7 3.44 (3.25, 3.70) 1.13 (2.83, 3.96)	N=42 3.89 (3.75, 4.03) 1.36 (3.22, 4.58)	0.002*
5.5-6.5 months (6) after dose 5	N=37 3.66 (3.45, 3.79) 1.34 (3.14, 4.47)	N=4 3.42 (3.35, 3.60) 0.45 (3.31, 3.76)	N=33 3.66 (3.51, 3.79) 1.34 (3.14, 4.47)	0.18
Anti-S IgA (log <sub>10</sub> µg/mL):				
7-21 days (14) after dose 1	N=77 0.80 (0.54, 1.00) 1.32 (0.00, 1.32)	N=6 0.36 (0.00, 0.80) 1.22 (0.00, 1.22)	N=71 0.80 (0.56, 1.00) 1.32 (0.00, 1.32)	0.11
1-2 months (1.5) after dose 1	N=122 0.64 (0.38, 0.79) 1.39 (0.00, 1.39)	N=10 0.61 (0.00, 0.74) 0.80 (0.00, 0.80)	N=112 0.64 (0.40, 0.80) 1.39 (0.00, 1.39)	0.24
1-2 months (1.5) after dose 2	N=130 0.66 (0.51, 0.83) 1.42 (0.00, 1.42)	N=11 (0.33, 0.76) 0.97 (0.00, 0.97)	N=119 0.66 (0.52, 0.83) 1.42 (0.00, 1.42)	0.07
2.5-4.5 months (3) after dose 2	N=236 0.65 (0.47, 0.79) 1.45 (0.00, 1.45)	N=23 0.70 (0.33, 0.80) 1.27 (0.00, 1.27)	N=213 0.64 (0.49, 0.79) 1.45 (0.00, 1.45)	0.37
5.5-6.5 months (6) after dose 2	N=73	N=4	N=69	0.16

	0.58 (0.38, 0.77) 1.31 (0.00, 1.31)	0.14 (0.00, 0.72) 1.16 (0.00, 1.16)	0.59 (0.38, 0.77) 1.31 (0.00, 1.31)	
1-2 months (1.5) after dose 3	N=52 0.51 (0.40, 0.73) 1.45 (0.00, 1.45)	N=7 0.50 (0.29, 0.73) 0.91 (0.00, 0.91)	N=45 0.55 (0.40, 0.73) 1.45 (0.00, 1.45)	0.38
2.5-4.5 months (3) after dose 3	N=94 0.58 (0.41, 0.80) 1.45 (0.00, 1.45)	N=13 0.49 (0.40, 0.71) 1.08 (0.00, 1.08)	N=81 0.59 (0.41, 0.81) 1.18 (0.28, 1.45)	0.48
2.5-4.5 months (3) after dose 4	N=72 0.51 (0.42, 0.70) 1.45 (0.00, 1.45)	N=5 0.50 (0.00, 0.63) 0.71 (0.00, 0.71)	N=67 0.51 (0.42, 0.70) 1.45 (0.00, 1.45)	0.41
5.5-6.5 months (6) after dose 4	N=65 0.45 (0.31, 0.60) 1.06 (0.00, 1.06)	N=4 0.58 (0.54, 0.69) 0.27 (0.51, 0.78)	N=61 0.45 (0.31, 0.59) 1.06 (0.00, 1.06)	0.09
1-2 months (1.5) after dose 5	N=23 0.61 (0.48, 0.88) 0.89 (0.25, 1.14)	N=4 0.60 (0.29, 0.87) 0.63 (0.25, 0.88)	N=19 0.61 (0.48, 0.94) 0.82 (0.32, 1.14)	0.49
2.5-4.5 months (3) after dose 5	N=48 0.50 (0.29, 0.73) 1.18 (0.00, 1.18)	N=6 0.20 (0.07, 0.86) 0.88 (0.00, 0.88)	N=42 0.51 (0.35, 0.72) 1.18 (0.00, 1.18)	0.23
5.5-6.5 months (6) after dose 5	N=37 0.44 (0.24, 0.55) 0.93 (0.00, 0.93)	N=4 0.32 (0.13, 0.71) 0.83 (0.10, 0.93)	N=33 0.44 (0.24, 0.55) 0.88 (0.00, 0.88)	0.86
Anti-RBD IgA (log <sub>10</sub> µg/mL):				
7-21 days (14) after dose 1	N=77 0.60 (0.35, 0.72) 1.34 (0.00, 1.34)	N=6 0.45 (0.00, 0.72) 0.95 (0.00, 0.95)	N=71 0.60 (0.39, 0.75) 1.34 (0.00, 1.34)	0.39
1-2 months (1.5) after dose 1	N=122 0.41 (0.17, 0.56) 1.08 (0.00, 1.08)	N=10 0.47 (0.12, 0.51) 0.87 (0.00, 0.87)	N=112 0.41 (0.17, 0.57) 1.08 (0.00, 1.08)	0.92
1-2 months (1.5) after dose 2	N=130 0.46 (0.30, 0.61) 1.16 (0.00, 1.16)	N=11 0.13 (0.00, 0.50) 0.74 (0.00, 0.74)	N=119 0.46 (0.31, 0.62) 1.16 (0.00, 1.16)	0.06
2.5-4.5 months (3) after dose 2	N=236 0.39 (0.19, 0.54) 1.33 (0.00, 1.33)	N=23 0.42 (0.00, 0.58) 1.12 (0.00, 1.12)	N=213 0.39 (0.21, 0.54) 1.33 (0.00, 1.33)	0.40
5.5-6.5 months (6) after dose 2	N=73 0.27 (0.00, 0.51) 1.08 (0.00, 1.08)	N=4 0.00 (0.00, 0.47) 0.94 (0.00, 0.94)	N=69 0.27 (0.00, 0.51) 1.08 (0.00, 1.08)	0.30
1-2 months (1.5) after dose 3	N=52 0.36 (0.15, 0.50) 0.87 (0.00, 0.87)	N=7 0.34 (0.00, 0.63) 0.73 (0.00, 0.73)	N=45 0.37 (0.19, 0.49) 0.87 (0.00, 0.87)	0.56
2.5-4.5 months (3) after dose 3	N=94 0.36 (0.15, 0.56) 1.25 (0.00, 1.25)	N=13 0.34 (0.32, 0.68) 1.25 (0.00, 1.25)	N=81 0.36 (0.15, 0.56) 1.14 (0.00, 1.14)	0.78
2.5-4.5 months (3) after dose 4	N=72 0.44 (0.25, 0.59) 1.41 (0.00, 1.41)	N=5 0.17 (0.00, 0.51) 0.59 (0.00, 0.59)	N=67 0.44 (0.27, 0.59) 1.41 (0.00, 1.41)	0.20
5.5-6.5 months (6) after dose 4	N=65 0.58 (0.44, 0.70) 1.31 (0.00, 1.31)	N=4 0.48 (0.39, 0.63) 0.37 (0.35, 0.72)	N=61 0.58 (0.45, 0.70) 1.31 (0.00, 1.31)	0.42

1-2 months (1.5) after dose 5	N=23 0.58 (0.45, 0.74) 0.71 (0.23, 0.94)	N=4 0.54 (0.45, 0.64) 0.21 (0.44, 0.65)	N=19 0.58 (0.46, 0.74) 0.71 (0.23, 0.94)	0.66
2.5-4.5 months (3) after dose 5	N=48 0.56 (0.42, 0.66) 1.10 (0.00, 1.10)	N=6 0.47 (0.39, 0.64) 0.64 (0.00, 0.64)	N=42 0.56 (0.43, 0.68) 1.10 (0.00, 1.10)	0.32
5.5-6.5 months (6) after dose 5	N=37 0.55 (0.44, 0.66) 1.32 (0.22, 1.54)	N=4 0.51 (0.38, 0.72) 0.43 (0.37, 0.80)	N=33 0.55 (0.44, 0.66) 1.32 (0.22, 1.54)	0.71
Anti-S IgM (log <sub>10</sub> µg/mL):				
7-21 days (14) after dose 1	N=77 0.39 (0.25, 0.53) 1.52 (0.00, 1.52)	N=6 0.44 (0.43, 0.53) 0.42 (0.21, 0.63)	N=71 0.36 (0.24, 0.55) 1.52 (0.00, 1.52)	0.46
1-2 months (1.5) after dose 1	N=122 0.32 (0.19, 0.48) 1.54 (0.00, 1.54)	N=10 0.20 (0.00, 0.36) 1.27 (0.00, 1.27)	N=112 0.33 (0.21, 0.49) 1.54 (0.00, 1.54)	0.16
1-2 months (1.5) after dose 2	N=130 0.34 (0.20, 0.49) 1.62 (0.00, 1.62)	N=11 0.47 (0.00, 0.63) 1.21 (0.00, 1.21)	N=119 0.34 (0.20, 0.48) 1.62 (0.00, 1.62)	0.86
2.5-4.5 months (3) after dose 2	N=236 0.28 (0.16, 0.43) 1.57 (0.00, 1.57)	N=23 0.23 (0.00, 0.41) 1.36 (0.00, 1.36)	N=213 0.28 (0.16, 0.43) 1.57 (0.00, 1.57)	0.50
5.5-6.5 months (6) after dose 2	N=73 0.23 (0.00, 0.37) 1.80 (0.00, 1.80)	N=4 0.26 (0.21, 0.32) 0.14 (0.21, 0.34)	N=69 0.23 (0.00, 0.37) 1.80 (0.00, 1.80)	0.72
1-2 months (1.5) after dose 3	N=52 0.25 (0.05, 0.39) 0.91 (0.00, 0.91)	N=7 0.03 (0.00, 0.32) 0.60 (0.00, 0.60)	N=45 0.27 (0.11, 0.40) 0.91 (0.00, 0.91)	0.29
2.5-4.5 months (3) after dose 3	N=94 0.24 (0.11, 0.41) 1.38 (0.00, 1.38)	N=13 0.36 (0.00, 0.40) 1.33 (0.00, 1.33)	N=81 0.23 (0.12, 0.41) 1.38 (0.00, 1.38)	0.99
1-2 months (1.5) after dose 4	N=27 0.26 (0.10, 0.41) 0.73 (0.00, 0.73)	N=3 0.09 (0.00, 0.09) 0.09 (0.00, 0.09)	N=24 0.26 (0.17, 0.42) 0.66 (0.07, 0.73)	0.02*
2.5-4.5 months (3) after dose 4	N=72 0.23 (0.10, 0.41) 2.49 (0.00, 2.49)	N=5 0.03 (0.00, 0.10) 1.45 (0.00, 1.45)	N=67 0.23 (0.13, 0.42) 2.49 (0.00, 2.49)	0.06
5.5-6.5 months (6) after dose 4	N=65 0.14 (0.07, 0.26) 1.07 (0.00, 1.07)	N=4 0.03 (0.01, 0.10) 0.17 (0.00, 0.17)	N=61 0.15 (0.08, 0.27) 1.07 (0.00, 1.07)	0.04*
1-2 months (1.5) after dose 5	N=23 0.30 (0.15, 0.53) 1.10 (0.00, 1.10)	N=4 0.29 (0.12, 0.61) 0.88 (0.00, 0.88)	N=19 0.30 (0.15, 0.53) 1.10 (0.00, 1.10)	0.94
2.5-4.5 months (3) after dose 5	N=48 0.16 (0.08, 0.42) 1.15 (0.00, 1.15)	N=6 0.12 (0.00, 0.45) 0.45 (0.00, 0.45)	N=42 0.16 (0.09, 0.39) 1.15 (0.00, 1.15)	0.43
5.5-6.5 months (6) after dose 5	N=37 0.06 (0.009, 0.26) 1.45 (0.00, 1.45)	N=4 0.04 (0.02, 0.05) 0.06 (0.00, 0.06)	N=33 0.06 (0.009, 0.26) 1.45 (0.00, 1.45)	0.26
Anti-RBD IgM (log <sub>10</sub> µg/mL):				
7-21 days (14) after dose 1	N=77	N=6	N=71	0.93

1-2 months (1.5) after dose 1	0.27 (0.19, 0.41) 1.21 (0.00, 1.21) N=122 0.20 (0.10, 0.31) 1.76 (0.00, 1.76)	0.28 (0.17, 0.42) 0.39 (0.10, 0.49) N=10 0.16 (0.09, 0.24) 0.82 (0.00, 0.82)	0.27 (0.19, 0.41) 1.21 (0.00, 1.21) N=112 0.20 (0.11, 0.32) 1.76 (0.00, 1.76)	0.39
1-2 months (1.5) after dose 2	N=130 0.19 (0.09, 0.33) 1.33 (0.00, 1.33)	N=11 0.26 (0.00, 0.43) 1.33 (0.00, 1.33)	N=119 0.19 (0.10, 0.32) 1.01 (0.00, 1.01)	0.98
2.5-4.5 months (3) after dose 2	N=236 0.17 (0.08, 0.28) 1.72 (0.00, 1.72)	N=23 0.11 (0.06, 0.24) 1.31 (0.00, 1.31)	N=213 0.17 (0.08, 0.29) 1.72 (0.00, 1.72)	0.23
5.5-6.5 months (6) after dose 2	N=73 0.15 (0.06, 0.25) 1.32 (0.00, 1.32)	N=4 0.16 (0.13, 0.18) 0.07 (0.11, 0.18)	N=69 0.13 (0.02, 0.26) 1.32 (0.00, 1.32)	0.89
1-2 months (1.5) after dose 3	N=52 0.11 (0.006, 0.23) 0.66 (0.00, 0.66)	N=7 0.10 (0.00, 0.22) 0.54 (0.00, 0.54)	N=45 0.12 (0.02, 0.24) 0.66 (0.00, 0.66)	0.61
2.5-4.5 months (3) after dose 3	N=94 0.10 (0.03, 0.21) 1.81 (0.00, 1.81)	N=13 0.15 (0.06, 0.21) 0.54 (0.00, 0.55)	N=81 0.09 (0.03, 0.20) 1.81 (0.00, 1.81)	0.54
2.5-4.5 months (3) after dose 4	N=72 0.15 (0.06, 0.30) 2.11 (0.00, 2.11)	N=5 0.17 (0.09, 0.18) 0.65 (0.00, 0.65)	N=67 0.15 (0.06, 0.30) 2.11 (0.00, 2.11)	0.99
5.5-6.5 months (6) after dose 4	N=65 0.19 (0.11, 0.34) 0.83 (0.006, 0.84)	N=4 0.06 (0.04, 0.15) 0.22 (0.02, 0.24)	N=61 0.19 (0.11, 0.34) 0.83 (0.006, 0.84)	0.06
1-2 months (1.5) after dose 5	N=23 0.18 (0.10, 0.43) 1.85 (0.00, 1.85)	N=4 0.23 (0.07, 1.09) 1.85 (0.00, 1.85)	N=19 0.18 (0.10, 0.43) 0.96 (0.003, 0.97)	0.97
2.5-4.5 months (3) after dose 5	N=48 0.19 (0.07, 0.35) 1.84 (0.00, 1.84)	N=6 0.19 (0.00, 0.25) 0.36 (0.00, 0.36)	N=42 0.19 (0.08, 0.35) 1.84 (0.00, 1.84)	0.37
5.5-6.5 months (6) after dose 5	N=37 0.13 (0.06, 0.24) 1.76 (0.00, 1.76)	N=4 0.06 (0.01, 0.13) 0.16 (0.00, 0.16)	N=33 0.14 (0.07, 0.31) 1.76 (0.00, 1.76)	0.13

†Samples obtained after the administration of a subsequent vaccine dose were excluded.

A two-sided alpha level of 0.05 was used to determine statistical significance: \* $P \leq 0.05$ .

**Supplementary Table 4:** Multivariable linear regression of anti-receptor-binding domain (RBD) IgG, IgA, and IgM antibodies after five SARS-CoV-2 vaccine doses. For models that include separate smooths for IC groups, the difference of predicted titres between high-severity immune compromised participants (IC) and low-level IC & non-immune compromised (NIC) participants are shown below model estimates (see column “IC – NIC”). High-level IC referent: low-level & NIC. Male sex referent: female sex. Non-White race referent: White race. Time=Days since dose date. Dose 1-4 vaccine type referent: Pfizer-BioNTech. Note, for dose 5 the vaccine type referent is Pfizer-BioNTech (bivalent) for anti-RBD IgG ( $\log_{10}$  BAU/mL) and Moderna (bivalent) for anti-RBD IgA ( $\log_{10}$   $\mu\text{g/mL}$ ) and IgM ( $\log_{10}$   $\mu\text{g/mL}$ ).

A. Participants with no prior SARS-CoV-2 infection

Anti-RBD IgG ( $\log_{10}$ BAU/mL)			Anti-RBD IgA ( $\log_{10}$ $\mu\text{g/mL}$ )			Anti-RBD IgM ( $\log_{10}$ $\mu\text{g/mL}$ )		
<b>Dose 1</b>								
	Estimate	P		Estimate	P		Estimate	P
Intercept	2.66	<0.0001		0.13	<0.0001		0.25	<0.0001
High-level IC	-0.31	0.002		-0.05	0.05		-0.04	0.15
Age at dose 1	-0.01	<0.0001		-0.001	0.04		-0.002	0.01
Male sex	0.02	0.75		0.03	0.09		0.04	0.04
Non-White Ethnicity	-0.18	0.12		-0.01	0.72		-0.06	0.12
Dose Type Moderna	0.55	0.0001		0.11	0.003		0.04	0.38
Dose Type AZ	-0.13	0.17		-0.008	0.74		-0.008	0.78
Time	IC - NIC	P	Time	IC - NIC	P	Time	IC - NIC	P
15	-0.71	<0.001	0	0.05	0.42	0	0.01	0.86
25	-0.54	0.006	15	-0.17	<0.001	15	-0.05	0.24
50	-0.22	0.24	40	-0.02	0.75	30	-0.03	0.66
70	-0.59	0.24	70	-0.04	0.65	60	-0.11	0.05
<b>Dose 2</b>								
	Estimate	P		Estimate	P		Estimate	P
Intercept	3.34	<0.0001		0.24	<0.0001		0.19	<0.0001
High-level IC	-0.46	<0.0001		-0.05	0.01		-0.03	0.09
Age at dose 2	-0.01	<0.0001		-0.002	0.003		-0.001	0.005
Male sex	0.04	0.35		0.05	0.0007		-0.0003	0.97
Non-White Ethnicity	-0.03	0.62		0.04	0.07		-0.004	0.80
Dose Type Moderna	0.22	<0.0001		0.06	0.0001		0.02	0.06
Days between dose 1 & 2	0.004	<0.0001		-0.001	<0.0001		-0.001	0.001
Time	IC - NIC	P	Time	IC - NIC	P	Time	IC - NIC	P
Not applicable			-20	-0.02	0.55	-25	-0.10	<0.001
			0	-0.04	0.13	0	-0.07	<0.001
			15	-0.33	<0.001	15	-0.06	<0.001
			50	-0.06	0.007	50	-0.04	0.02
			100	-0.02	0.43	75	-0.05	0.004
			150	0.006	0.84	100	-0.03	0.05
			250	0.05	0.27	150	0.04	0.06
						225	0.03	0.32
<b>Dose 3</b>								
	Estimate	P		Estimate	P		Estimate	P
Intercept	3.84	<0.0001		0.10	0.14		0.10	0.20
High-level IC	-0.20	0.07		0.05	0.12		0.01	0.87

Age at dose 3	-0.01	0.001	-0.001	0.50	0.0004	0.67		
Male sex	0.05	0.55	0.03	0.24	-0.02	0.42		
Non-White Ethnicity	-0.14	0.31	0.08	0.06	0.001	0.98		
Dose Type Moderna	0.29	0.001	0.08	0.005	0.07	0.03		
Days between dose 2 & 3	-0.001	0.07	0.0001	0.56	-0.00001	0.95		
Time	IC - NIC	P	Time	IC - NIC	P	Time	IC - NIC	P
Not applicable			Not applicable			-25	0.04	0.59
Note: when separate smooths were generated for IC groups, high-level IC predicted titres were lower than low-level IC & NIC predicted titres at 25, 50, 150 days after vaccine dose.						0	0.03	0.49
						15	0.03	0.50
						75	0.02	0.80
						150	-0.02	0.78
						200	-0.05	0.70
						240	-0.07	0.70

Dose 4								
	Estimate	P	Estimate	P	Estimate	P		
Intercept	3.54	<0.0001	-0.12	0.56	0.17	0.05		
High-level IC	-0.22	0.11	-0.06	0.36	0.01	0.66		
Age at dose 4	-0.001	0.78	0.002	0.42	-0.001	0.30		
Male sex	-0.03	0.82	0.004	0.94	-0.03	0.08		
Dose Type Moderna	0.02	0.83	0.05	0.29	-0.005	0.82		
Dose Type Moderna (Bivalent)	0.21	0.28	-0.06	0.50	0.07	0.07		
Dose Type Pfizer-BioNTech (Bivalent)	-0.33	0.30	-0.30	0.05	-0.04	0.52		
Days between dose 3 & 4	-0.0001	0.91	0.001	0.06	-0.00004	0.86		
Time	IC - NIC	P	Time	IC - NIC	P	Time	IC - NIC	P
Not applicable			-35	-0.15	0.11	-25	-0.04	0.28
Note: when separate smooths were generated for IC groups, high-level IC predicted titres were lower than low-level IC & NIC predicted titres at 20 days prior to vaccine dose and 0, 25, 50 days after vaccine dose.			0	-0.08	0.28	0	-0.03	0.38
			25	-0.05	0.54	25	-0.02	0.56
			50	-0.02	0.86	50	-0.005	0.84
			100	0.02	0.84	100	0.02	0.62
			150	-0.02	0.84	200	0.05	0.26
			250	-0.15	0.28	250	0.07	0.22
300	-0.10	0.53	300	0.09	0.20			

#### B. Participants with at least one prior SARS-CoV-2 infection

Anti-RBD IgG (log <sub>10</sub> BAU/mL)			Anti-RBD IgA (log <sub>10</sub> µg/mL)		Anti-RBD IgM (log <sub>10</sub> µg/mL)	
Dose 1						
	Estimate	P	Estimate	P	Estimate	P
Intercept	2.37	<0.0001	0.23	0.0004	0.27	<0.0001
High-level IC	0.006	0.97	-0.03	0.66	-0.06	0.36
Age at dose 1	0.01	<0.0001	0.002	0.08	0.001	0.19
Male sex	-0.10	0.32	0.02	0.57	-0.03	0.43
Non-White Ethnicity	0.29	0.06	-0.01	0.85	0.08	0.12
Dose Type Moderna	0.02	0.87	-0.05	0.32	0.04	0.38
Dose Type AZ	-0.59	0.0001	-0.19	0.0005	0.009	0.86
Days since last COVID-19 infection	-0.001	0.17	-0.0002	0.08	0.0003	0.008

Time	IC - NIC	P	Time	IC - NIC	P	Time	IC - NIC	P
0	0.42	0.14	Not applicable. Note: when separate smooths were generated for IC groups, high-level IC predicted titres were lower than low-level IC & NIC predicted titres at 10 days after vaccine dose.			0	-0.02	0.77
15	-0.18	0.54		15	-0.04	0.64		
40	-0.05	0.89		40	-0.08	0.33		
60	0.54	0.13		60	-0.02	0.83		

**Dose 2**

	Estimate	P	Estimate	P	Estimate	P
Intercept	3.33	<0.0001	0.33	<0.0001	0.29	<0.0001
High-level IC	0.05	0.61	-0.02	0.74	-0.003	0.95
Age at dose 2	0.007	0.0004	-0.001	0.69	-0.0001	0.96
Male sex	0.07	0.24	0.05	0.15	-0.02	0.50
Non-White Ethnicity	0.06	0.49	0.03	0.55	0.02	0.61
Dose Type Moderna	0.06	0.35	0.02	0.69	-0.02	0.54
Dose Type AZ	-	-	0.02	0.90	-	-
Days between dose 1 & 2	-0.003	0.005	-0.0003	0.63	-0.001	0.27
Days since last COVID-19 infection	-0.001	0.003	-0.0003	0.004	0.0001	0.31

Time	IC - NIC	P	Time	IC - NIC	P	Time	IC - NIC	P
Not applicable			Not applicable			-15	-0.06	0.37
						0	-0.01	0.86
						15	0.03	0.59
						40	0.07	0.24
						75	0.03	0.60
						100	-0.04	0.58
						150	-0.06	0.47
						175	-0.005	0.97

**Dose 3**

	Estimate	P	Estimate	P	Estimate	P
Intercept	3.28	<0.0001	0.26	0.03	0.25	<0.0001
High-level IC	-0.05	0.56	-0.03	0.62	-0.002	0.93
Age at dose 3	0.006	0.006	0.0002	0.89	-0.002	0.009
Male sex	0.04	0.51	0.05	0.17	-0.01	0.50
Non-White Ethnicity	-0.10	0.32	0.07	0.26	0.00003	0.999
Dose Type Moderna	0.16	0.004	0.05	0.17	0.02	0.20
Days between dose 2 & 3	0.001	0.03	0.0005	0.23	-0.0002	0.29
Days since last COVID-19 infection	0.001	<0.0001	0.0001	0.07	-0.00003	0.32

Time	IC - NIC	P	Time	IC - NIC	P	Time	IC - NIC	P
Not applicable			Not applicable			0	-0.02	0.68
						15	-0.01	0.78
						50	-0.003	0.95
						100	-0.002	0.97
						200	-0.01	0.80
						300	-0.0001	1.00
						400	0.06	0.27
						485	0.13	0.13

**Dose 4**

	Estimate	P	Estimate	P	Estimate	P			
Intercept	3.70	<0.0001	0.48	0.01	0.17	0.08			
High-level IC	-0.19	0.03	-0.11	0.02	-0.07	0.11			
Age at dose 4	0.002	0.51	-0.001	0.46	0.0003	0.80			
Non-White Ethnicity	0.006	0.91	0.03	0.50	-0.01	0.60			
Male sex	-0.13	0.31	-0.09	0.41	0.11	0.06			
Dose Type Moderna	0.11	0.11	-0.02	0.74	0.05	0.11			
Dose Type Moderna (Half dose)	0.07	0.68	-0.34	0.03	-0.03	0.72			
Dose Type Moderna (Bivalent)	0.09	0.37	0.02	0.79	0.09	0.06			
Dose Type Pfizer-BioNTech (Bivalent)	0.05	0.64	-0.02	0.87	0.13	0.02			
Days between dose 3 & 4	0.0001	0.83	0.0004	0.50	-0.0003	0.37			
Days since last COVID-19 infection	0.0005	<0.0001	0.00002	0.84	0.0001	0.17			
Time	IC - NIC	P	Time	IC - NIC	P	Time	IC - NIC	P	
-30	-0.28	0.01	-30	-0.12	0.14	Not applicable			
0	-0.21	0.03	0	-0.10	0.23				
25	-0.16	0.11	25	-0.08	0.29				
50	-0.12	0.22	50	-0.08	0.33				
150	-0.14	0.21	100	-0.09	0.28				
200	-0.20	0.06	150	-0.11	0.16				
250	-0.25	0.03	200	-0.13	0.12				
300	-0.28	0.04	250	-0.13	0.12				
350	-0.27	0.05							
400	-0.24	0.11							
450	-0.21	0.27							
<b>Dose 5</b>									
	Estimate	P	Estimate	P	Estimate	P			
Intercept	3.77	<0.0001	0.53	0.003	0.01	0.93			
High-level IC	-0.44	0.0007	-0.16	0.09	-0.10	0.21			
Age at dose 5	0.000	0.97	0.00004	0.99	0.003	0.21			
Male sex	0.02	0.86	-0.02	0.79	-0.10	0.10			
Dose Type Moderna (Bivalent)	0.14	0.15	Referent	-	Referent	-			
Dose Type Pfizer (Bivalent)	Referent	-	0.04	0.58	0.10	0.08			
Days between dose 4 & 5	0.0004	0.54	0.0003	0.54	0.0002	0.70			
Days since last SARS-CoV-2 infection	0.0002	0.20	0.0001	0.35	0.0002	0.09			
Time	IC - NIC	P	Time	IC - NIC	P	Time	IC - NIC	P	
Not applicable			Not applicable			Not applicable			

An alpha level of 0.025 was used to determine statistical significance to account for bias from multiplicity.