Table 1 Recruiting sites NHS region(s) and postcode districts where applicable

| Site          | NHS region(s)          | Date of first recruit | Selected postcode districts |
|---------------|------------------------|-----------------------|----------------------------|
| Bradford      | Yorkshire and Humber   | 31/3/2020             | BD15 BD6                   |
| Bristol       | South West             | 9/4/2020              | BS2 BS20 BS3 BS37 BS41 BS8 |
| Imperial      | London                 | 8/2/2021              | SW1 SW3 NW6 NW8 W11 WC2    |
| Leeds         | Yorkshire and Humber   | 5/6/2020              | LS25 WF2                   |
| Manchester    | North West             | 12/6/2020             | M1 M12 M20 M23 M25 M6     |
| Newcastle     | North East             | 7/1/2021              | NE3 NE12 NE13 NE20 NE23 NE28 |
| Nottingham*   | Midlands               | 10/7/2020             | HP17 HP22 HP23 MK13 OX1 OX11 OX28 |
| Oxford        | South East             | 15/10/2019            |                           |
| Plymouth*     | East of England South West | 3/6/2020       |                           |
| Sheffield     | Yorkshire and Humber Midlands | 20/4/2020 | S14 S43                   |
| Southampton   | South East             | 12/4/2020             | SO16 SO23 SO24 SO50 SO51 SO52 |
| St Georges    | London                 | 26/3/2020             | CR4 KT18 KT6 SM3 SW11 SW20 |
| West Suffolk  | East of England        | 21/1/2021             | CB8 CB9 CO10 IP14 IP24 IP28 |

*recruitment not restricted by postcode district

Table 2 Sensitivity, specificity and thresholds of positivity for anti-SARS-CoV-2 IgG spike protein antibodies (RocheS) and anti-SARS-CoV-2 IgG nucleocapsid antibodies (RocheN)

|                | RocheS | RocheN |
|----------------|--------|--------|
| Threshold of positivity | 0.8U/ml | 1.0 COI |
| Sensitivity     | 95.5% (95% CI 93.2-97.1) | 83.9% (95% CI 74.8-90.7) |
| Specificity     | 100% (95% CI 99.1-100) | 100% (95% CI 99.1-100) |

COI – cut off index
U/ml - units per millilitre

Table 3 Summary of participants aged 0-18 years tested for COVID-19 with RocheS - Anti-SARS-CoV-2 IgG spike protein antibodies and RocheN - Anti-SARS-CoV-2 IgG nucleocapsid antibodies assays

| Age group       | Seroprevalence RocheS | Seroprevalence RocheN | Symptoms RocheS | Symptoms RocheN | Risk factor RocheS | Risk factor RocheN |
|-----------------|-----------------------|-----------------------|-----------------|-----------------|-------------------|-------------------|
| 0-4 years       | 532 (21.5%)           | 529 (21.4%)           | 289 (21.6%)     | 287 (21.5%)     | 516 (21.4%)       | 513 (21.3%)       |
| 5-9 years       | 636 (25.7%)           | 636 (25.7%)           | 344 (25.7%)     | 344 (25.7%)     | 620 (25.7%)       | 620 (25.7%)       |
| 10-14 years     | 721 (29.1%)           | 721 (29.1%)           | 377 (28.2%)     | 377 (28.2%)     | 705 (29.2%)       | 705 (29.3%)       |
| 15-18 years     | 588 (23.7%)           | 589 (23.8%)           | 329 (24.6%)     | 329 (24.6%)     | 571 (23.7%)       | 572 (23.7%)       |
| Sex             |                       |                       |                 |                 |                   |                   |
| Female          | 1230 (49.7%)          | 1230 (49.7%)          | 689 (51.5%)     | 688 (51.5%)     | 1198 (49.7%)      | 1198 (49.7%)      |
| Male            | 1247 (50.3%)          | 1245 (50.3%)          | 650 (48.7%)     | 649 (48.5%)     | 1214 (50.3%)      | 1212 (50.3%)      |
| NHS region      |                       |                       |                 |                 |                   |                   |
| East of England | 171 (6.9%)            | 171 (6.9%)            | 96 (7.2%)       | 96 (7.2%)       | 156 (6.5%)        | 156 (6.5%)        |
| London          | 289 (11.7%)           | 289 (11.7%)           | 181 (13.6%)     | 181 (13.5%)     | 287 (11.9%)       | 287 (11.9%)       |
| Midlands        | 210 (8.5%)            | 211 (8.5%)            | 138 (10.3%)     | 138 (10.3%)     | 207 (8.6%)        | 208 (8.6%)        |
| Time period                                      | North East and Yorkshire | North West | South East | South West |  |
|------------------------------------------------|--------------------------|------------|------------|------------|---|
| Pre-pandemic (01 Oct 2019 - 31 Mar 2020)       | 419 (16.9%)              | 331 (13.4%)| 633 (25.6%)| 424 (17.1%)|  |
| First wave (01 Apr 2020 - 31 May 2020)         | 232 (17.4%)              | 141 (10.5%)| 260 (19.4%)| 291 (21.8%)|  |
| Post first wave (01 Jun 2020 - 31 Aug 2020)    | 232 (17.4%)              | 141 (10.5%)| 260 (19.4%)| 291 (21.8%)|  |
| Post second wave (01 Jan 2021 - 31 Mar 2021)   | 410 (17.0%)              | 326 (13.5%)| 607 (25.2%)| 419 (17.4%)|  |
| Emergence of delta variant (01 Apr 2021 - 30 Jun 2021) | 410 (17.0%)              | 326 (13.5%)| 607 (25.2%)| 419 (17.4%)|  |
| Ethnicity                                      |                          |            |            |            |---|
| White (White and White minorities)              | 1991 (80.4%)             | 1989 (80.4%)| 1073 (80.1%)| 1071 (80.1%)|  |
| Black (African, Caribbean, Other Black background) | 51 (2.1%)                | 51 (2.1%)  | 29 (2.2%)  | 29 (2.2%)  |  |
| Asian (Bangladeshi, Pakistani, Indian, Chinese, Arab, other Asian background and other ethnic group) | 144 (5.8%)               | 144 (5.8%) | 99 (7.4%)  | 99 (7.4%)  |  |
| Multiple ethnic backgrounds Not specified       | 231 (9.3%)               | 231 (9.3%) | 134 (10.0%)| 134 (10.0%)|  |
|                                                | 60 (2.4%)                | 60 (2.4%)  | 4 (0.3%)   | 4 (0.3%)   |  |
| IMD quintile         | Most deprived 1 |         |         |         |         |         |         |         |         |         |         |         |         |         |
|----------------------|-----------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
|                      | 357 (14.4%)     | 357 (14.4%) | 179 (13.4%) | 179 (13.4%) | 352 (14.6%) | 352 (14.6%) |         |         |         |         |         |         |         |         |
|                      | 337 (13.6%)     | 336 (13.6%) | 178 (13.3%) | 177 (13.2%) | 328 (13.6%) | 327 (13.6%) |         |         |         |         |         |         |         |         |
|                      | 461 (18.6%)     | 461 (18.6%) | 247 (18.4%) | 247 (18.5%) | 446 (18.5%) | 446 (18.5%) |         |         |         |         |         |         |         |         |
|                      | 535 (21.7%)     | 534 (21.6%) | 289 (21.6%) | 289 (21.6%) | 518 (21.5%) | 517 (21.5%) |         |         |         |         |         |         |         |         |
|                      | 782 (31.6%)     | 782 (31.6%) | 441 (33.0%) | 440 (32.9%) | 768 (31.8%) | 768 (31.9%) |         |         |         |         |         |         |         |         |
| Least deprived 5     | 5 (0.2%)        | 5 (0.2%)  | 5 (0.4%)  | 5 (0.4%)  |           |           |         |         |         |         |         |         |         |         |
|                      | 374 (15.1%)     | 374 (15.1%) | 188 (14.0%) | 188 (14.1%) | 368 (15.3%) | 368 (15.3%) |         |         |         |         |         |         |         |         |
|                      | 348 (14.0%)     | 347 (14.0%) | 194 (14.5%) | 193 (14.4%) | 342 (14.2%) | 341 (14.1%) |         |         |         |         |         |         |         |         |
|                      | 451 (18.2%)     | 451 (18.2%) | 225 (16.8%) | 225 (16.8%) | 433 (18.0%) | 433 (18.0%) |         |         |         |         |         |         |         |         |
|                      | 540 (22.9%)     | 541 (21.9%) | 305 (22.8%) | 305 (22.8%) | 538 (22.3%) | 537 (22.3%) |         |         |         |         |         |         |         |         |
|                      | 750 (30.3%)     | 750 (30.3%) | 422 (31.5%) | 421 (31.5%) | 731 (30.3%) | 731 (30.3%) |         |         |         |         |         |         |         |         |
| Least deprived 5     | 5 (0.2%)        | 5 (0.2%)  | 5 (0.4%)  | 5 (0.4%)  |           |           |         |         |         |         |         |         |         |         |
|                      | 1984 (80.1%)    | 1982 (80.1%) | 1076 (80.4%) | 1075 (80.4%) | 1933 (80.1%) | 1931 (80.1%) |         |         |         |         |         |         |         |         |
| Urban/rural          | 493 (19.9%)     | 493 (19.9%) | 263 (19.6%) | 262 (19.6%) | 479 (19.9%) | 479 (19.9%) |         |         |         |         |         |         |         |         |
| Most deprived 1      | 628 (25.4%)     | 627 (25.3%) | 421 (31.5%) | 421 (31.5%) | 626 (26.0%) | 625 (25.9%) |         |         |         |         |         |         |         |         |
|                      | 1269 (51.2%)    | 1268 (51.2%) | 804 (60.0%) | 802 (60.0%) | 1262 (52.3%) | 1261 (52.3%) |         |         |         |         |         |         |         |         |
| City/rural           | 580 (23.4%)     | 580 (23.4%) | 114 (8.5%)  | 114 (8.5%)  | 524 (21.7%) | 524 (21.7%) |         |         |         |         |         |         |         |         |
| Total                | 2477            | 2475     | 1339     | 1337     | 2412     | 2410     |         |         |         |         |         |         |         |         |
Table 4 Comparing regional populations (0-18 years) with the STORY sample (0-18 years olds) including vaccinated individuals

| NHS region | East of England | London | Midlands | North East and Yorkshire | North West | South East | South West |
|------------|-----------------|--------|----------|--------------------------|-----------|------------|------------|
| Region (0-18 years (%)) | STORY sample (0-18 years (%)) | Region (0-18 years (%)) | STORY sample (0-18 years (%)) | Region (0-18 years (%)) | STORY sample (0-18 years (%)) | Region (0-18 years (%)) | STORY sample (0-18 years (%)) | Region (0-18 years (%)) | STORY sample (0-18 years (%)) |
| White* | 1146365.8 (82.4) | 998497.8 (82.4) | 374912.9 (17.0) | 941658.8 (89.5) | 1309834.6 (82.5) | 1045274.7 (80.4) | 1390598.2 | 158.0 |
| Black** | 46559.0 (3.3) | 241941.7 (2.5) | 310612.9 (14.1) | 19364 (1.8) | 55537 (2.2) | 15822 (2) | 86007.6 (6.2) | 158.0 |
| Asian*** | 111665.8 (8.8) | 918432.2 (8.0) | 71616.5 (3.3) | 32584 (3.1) | 510511 (4.0) | 174174.6 (10.6) | 1130597.5 | 210.0 |
| Multiple ethnic backgrounds total | 1390598.2 | 158.0 | 1390598.2 | 158.0 | 1390598.2 | 158.0 | 1390598.2 | 158.0 |

*White including white minorities
**Black (African, Caribbean, Other Black background)
*** Asian (Bangladeshi, Chinese, Indian, Pakistani, Other Asian background)
Table 5 Comparing children aged 0-15 years on IDACI and IMD by region as a measure of socioeconomic deprivation in children IMD and IDACI derived from postcode of participant, FASii and Census 2011 home ownership and house size questions data were collected on the questionnaire.
### Supplemental material

#### East of England

| Quintile | IMD | Number (%) of families that own their own home in each IMD quintile | Average number of rooms in home in each IMD quintile | Average Number of bedrooms in home in each IMD quintile | Mean FASiii score in each IMD quintile | IDACI | Number (%) of families that own their own home in each IDACI quintile | Average number of rooms in home in each IDACI quintile | Average Number of bedrooms in home in each IDACI quintile | Mean FASiii score in each IDACI quintile |
|-----------|-----|------------------------------------------------------------------|----------------------------------------------------|-----------------------------------------------------|--------------------------------------|-------|------------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------|--------------------------------------|
| Overall   |     | 303                                                              | 280                                                | 409                                                  | 453                                  | 663   | 50·8                                                             | 69·4                                                | 77·9                                                  | 81·7                                  |
|           |     | 5·6                                                              | 6·1                                                | 6·6                                                  | 7·0                                   | 7·3   | 2·9                                                              | 3·2                                                 | 3·5                                                  | 3·6                                  |
|           |     | 6·5                                                              | 7·7                                                | 8·7                                                  | 8·9                                   | 9·5   | 6·6                                                              | 7·7                                                 | 8·6                                                  | 8·9                                  |
| East of England | IMD | 16                                                               | 22                                                 | 44                                                   | 40                                    | 25    | 50·8                                                             | 69·4                                                | 77·9                                                  | 81·7                                  |
|           |     | 30·8                                                             | 59·1                                               | 65·8                                                  | 86·1                                   | 100·0 | 5·6                                                              | 6·1                                                 | 6·6                                                  | 6·8                                  |
|           |     | 5·8                                                              | 6·6                                                | 6·8                                                  | 7·4                                   | 7·8   | 2·9                                                              | 3·5                                                 | 3·3                                                  | 3·9                                  |
|           |     | 6·4                                                              | 7·6                                                | 7·8                                                  | 9·3                                   | 9·7   | 6·6                                                              | 7·2                                                 | 9·2                                                  | 8·5                                  |
| London    | IMD | 9                                                                | 41                                                 | 61                                                   | 48                                    | 79    | 22·2                                                             | 36·6                                                | 73·8                                                  | 83·3                                  |
|           |     | 22·2                                                             | 36·6                                               | 73·8                                                  | 83·3                                   | 84·6   | 4·8                                                              | 5·1                                                 | 5·9                                                  | 6·7                                  |
|           |     | 2·3                                                              | 2·9                                                | 3·2                                                  | 3·5                                   | 3·8   | 5·8                                                              | 7·5                                                 | 8·5                                                  | 9·3                                  |
|           |     | 5·8                                                              | 7·5                                                | 8·5                                                  | 9·3                                   | 9·7   | 18                                                               | 55                                                  | 35                                                   | 61                                   |
|           |     | 18                                                               | 55                                                 | 35                                                   | 61                                    | 69    | 27·8                                                             | 50·9                                                | 74·3                                                  | 80·3                                  |
|           |     | 27·8                                                             | 50·9                                               | 74·3                                                  | 80·3                                   | 88·2   | 4·6                                                              | 5·3                                                 | 6·1                                                  | 6·4                                  |
|           |     | 4·6                                                              | 5·3                                                | 6·1                                                  | 6·4                                   | 7·0    | 2·5                                                              | 2·9                                                 | 3·3                                                  | 3·6                                  |
|           |     | 2·5                                                              | 2·9                                                | 3·3                                                  | 3·6                                   | 3·9    | 5·8                                                              | 7·5                                                 | 8·3                                                  | 9·2                                  |
| Midlands  | IMD | 17                                                               | 30                                                 | 34                                                   | 30                                    | 44    | 58·8                                                             | 67·9                                                | 84·8                                                  | 86·7                                  |
|           |     | 58·8                                                             | 67·9                                               | 84·8                                                  | 86·7                                   | 95·3   | 6·8                                                              | 6·3                                                 | 6·4                                                  | 7·1                                  |
|           |     | 6·8                                                              | 6·3                                                | 6·4                                                  | 7·1                                   | 7·8    | 3·6                                                              | 3·4                                                 | 3·5                                                  | 3·7                                  |
|           |     | 3·6                                                              | 3·4                                                | 3·5                                                  | 3·7                                   | 4·0    | 7·5                                                              | 8·3                                                 | 8·8                                                  | 9·1                                  |
|           |     | 7·5                                                              | 8·3                                                | 8·8                                                  | 9·1                                   | 9·8    | 23                                                               | 32                                                  | 31                                                   | 35                                   |
|           |     | 23                                                               | 32                                                 | 31                                                   | 35                                    | 34    | 52·2                                                             | 75·9                                                | 83·9                                                  | 91·2                                  |
|           |     | 52·2                                                             | 75·9                                               | 83·9                                                  | 91·2                                   | 97·1   | 6·6                                                              | 6·4                                                 | 6·3                                                  | 7·3                                  |
|           |     | 6·6                                                              | 6·4                                                | 6·3                                                  | 7·3                                   | 7·9    | 3·4                                                              | 3·5                                                 | 3·4                                                  | 3·9                                  |
|           |     | 3·4                                                              | 3·5                                                | 3·4                                                  | 3·9                                   | 4·0    | 7·7                                                              | 8·5                                                 | 8·7                                                  | 9·5                                  |
| North East and Yorkshire | IMD | 88                                                               | 59                                                 | 61                                                   | 57                                    | 89    | 58·8                                                             | 82·5                                                | 81·7                                                  | 91·1                                  |
|           |     | 58·8                                                             | 82·5                                               | 81·7                                                  | 91·1                                   | 88·6   | 5·5                                                              | 6·3                                                 | 6·8                                                  | 7·1                                  |
|           |     | 5·5                                                              | 6·3                                                | 6·8                                                  | 7·1                                   | 7·4    | 7·7                                                              | 8·5                                                 | 8·7                                                  | 9·5                                  |
|                      | Average Number of bedrooms in home in each IMD quintile | Mean FASiii score in each IMD quintile | IDACI | Number (% of families that own their own home in each IDACI quintile | Average number of rooms in home in each IDACI quintile | Average Number of bedrooms in home in each IDACI quintile | Mean FASiii score in each IDACI quintile |
|----------------------|--------------------------------------------------------|----------------------------------------|-------|-------------------------------------------------------------------|-----------------------------------------------|--------------------------------------------------------|----------------------------------------|
| **North West**       | 2.9 3.2 3.6 3.6 3.7                                    | 6.8 7.2 8.7 9.3 9.0                    | 83    | 60.0 73.2 83.3 87.5 92.3                                        | 5.6 6.3 6.8 6.7 7.4                          | 3.0 3.2 3.5 3.5 3.7                                  | 6.7 7.3 8.6 8.8 9.1                      |
| **IDACI**            |                                                        |                                        |       |                                                                   |                                               |                                                        |                                        |
|                      | 83 57 68 41 105                                       |                                        |       |                                                                   |                                               |                                                        |                                        |
| **South East**       | 2.7 3.1 3.3 3.5 3.9                                    | 6.3 7.6 8.4 9.4 9.4                    | 116   | 52.2 74.1 87.5 70.0 91.9                                        | 5.7 6.0 7.3 6.4 8.1                          | 3.0 3.2 3.7 3.7 4.3                                  | 6.5 8.0 8.3 8.5 9.3                      |
| **IDACI**            |                                                        |                                        |       |                                                                   |                                               |                                                        |                                        |
|                      | 116 27 50 41 63                                       |                                        |       |                                                                   |                                               |                                                        |                                        |
| **South West**       | 2.8 3.4 3.5 3.5 3.8                                   | 6.1 7.5 8.5 8.2 9.5                    | 19    | 23.5 65.7 72.6 77.7 82.5                                        | 5.3 6.1 6.5 7.0 7.5                          | 2.5 3.2 3.5 3.6 3.8                                  | 5.5 8.0 8.7 9.2 9.6                      |
| **IDACI**            |                                                        |                                        |       |                                                                   |                                               |                                                        |                                        |
|                      | 19 68 104 152 206                                     |                                        |       |                                                                   |                                               |                                                        |                                        |
| **Number (%) of families that own their own home in each** | **Average number of rooms in home in each** | **Average Number of bedrooms in home in each** | **Mean FASiii score in each** | **Number (% of families that own their own home in each** | **Average number of rooms in home in each** | **Average Number of bedrooms in home in each** | **Mean FASiii score in each** |
| **IMD**              | quintile                                             | quintile                               | quintile | quintile                                                         | quintile                                     | quintile                                        | quintile                                 |
|                      |                                                      |                                        |       |                                                                   |                                               |                                                        |                                        |
| **South West**       | 54.8 75.8 83.6 76.1 91.3                              | 5.1 5.8 6.9 6.4 7.3                    | 2.8   | 3.4 3.5 3.5 3.5 3.8                                              | 6.1 7.5 8.5 8.2 9.5                          | 3.2 43 63 106 124                                | 5.2 6.5 6.4 6.7 7.2                      |
| **IDACI**            |                                                        |                                        |       |                                                                   |                                               |                                                        |                                        |
|                      | 54.8 75.8 83.6 76.1 91.3                              | 5.1 5.8 6.9 6.4 7.3                    | 2.8   | 3.4 3.5 3.5 3.5 3.8                                              | 6.1 7.5 8.5 8.2 9.5                          | 3.2 43 63 106 124                                | 5.2 6.5 6.4 6.7 7.2                      |
| **Number (%) of families that own their own home in each** | **Average number of rooms in home in each** | **Average Number of bedrooms in home in each** | **Mean FASiii score in each** | **Number (% of families that own their own home in each** | **Average number of rooms in home in each** | **Average Number of bedrooms in home in each** | **Mean FASiii score in each** |
| **IMD**              | quintile                                             | quintile                               | quintile | quintile                                                         | quintile                                     | quintile                                        | quintile                                 |
|                      |                                                      |                                        |       |                                                                   |                                               |                                                        |                                        |
| **South West**       | 52.6 74.1 87.5 70.0 91.9                              | 5.7 6.0 7.3 6.4 8.1                    | 3.0   | 3.2 3.7 3.7 4.3 4.3                                              | 6.5 8.0 8.3 8.5 9.3                          | 6.5 8.0 8.3 8.5 9.3                                | 6.5 8.0 8.3 8.5 9.3                      |
| **IDACI**            |                                                        |                                        |       |                                                                   |                                               |                                                        |                                        |
|                      | 52.6 74.1 87.5 70.0 91.9                              | 5.7 6.0 7.3 6.4 8.1                    | 3.0   | 3.2 3.7 3.7 4.3 4.3                                              | 6.5 8.0 8.3 8.5 9.3                          | 6.5 8.0 8.3 8.5 9.3                                | 6.5 8.0 8.3 8.5 9.3                      |
Figure 1 A comparison of results by the RocheN - Anti-SARS-CoV-2 IgG nucleocapsid antibodies assay and RocheS - Anti-SARS-CoV-2 IgG spike protein antibodies assay by age

Table 6 SARS-CoV-2 seroprevalence (RocheS - Anti-SARS-CoV-2 IgG spike protein antibodies and RocheN - Anti-SARS-CoV-2 IgG nucleocapsid antibodies) by age group and time period October 2019 to June 2021 in England, adjusted for age, region and ethnicity

| Period                        | RocheS                | RocheN                |
|-------------------------------|-----------------------|-----------------------|
|                               | N         | Crude rate | Adjusted rate | N         | Crude rate | Adjusted rate |
| Pre-pandemic (Oct 19 - Mar 20)| 125       | 0.0%       | 0.0%          | 125       | 0.0%       | 0.0%          |
| First wave (Apr 20 - May 20) | 335       | 3.9%       | 2.2% (0.9%-3.4%)| 335       | 3.6%       | 1.8% (0.8%-2.8%)|
| Post first wave (Jun 20 - Aug 20) | 516     | 3.9%       | 3.2% (3.2%-7.2%)| 515       | 3.7%       | 5.1% (3.1%-7.2%)|
| Schools reopening and second wave (Sep 20 - Dec 20) | 464     | 6.9%       | 7.1% (5.5%-8.6%)| 464       | 6.0%       | 7.3% (5.5%-9.1%)|
| Post second wave (Jan 21 - Mar 21) | 771     | 17.5%      | 17.6% (14.4%-20.9%)| 770       | 15.2%      | 16.2% (12.9%-19.4%)|
| Emergence of delta variant (Apr 21 - Jun 21) | 266     | 19.9%      | 19.9% (16.1%-23.7%)| 266       | 17.7%      | 16.8% (13.1%-20.6%)|
### Table 7: SARS-CoV-2 seroprevalence (RocheS - Anti-SARS-CoV-2 IgG spike protein antibodies and RocheN - Anti-SARS-CoV-2 IgG nucleocapsid antibodies) by age group and time period October 2019 to June 2021 in England, adjusted for NHS region and ethnicity

|          | RocheS |    | RocheN |    |
|----------|--------|----|--------|----|
|          | N   | Crude | Adjusted | N   | Crude | Adjusted |
| **0–4 years** |     |      |          |     |      |          |
| Pre-pandemic (Oct 19 - Mar 20) | 25  | 0.0% | 0.0% | 25  | 0.0% | 0.0% |
| First wave (Apr 20 - May 20) | 62  | 1.6% | 0.7% (0.0%-2.1%) | 62  | 1.6% | 0.7% (0.0%-2.1%) |
| Post first wave (Jun 20 - Aug 20) | 64  | 4.7% | 4.7% (0.0%-10.2%) | 63  | 4.8% | 4.7% (0.0%-10.3%) |
| Schools reopening and second wave (Sep 20 - Dec 20) | 77  | 5.2% | 5.3% (2.2%-8.4%) | 76  | 6.6% | 6.2% (2.7%-9.8%) |
| Post second wave (Jan 21 - Mar 21) | 200 | 13.5% | 13.0% (6.7%-19.3%) | 199 | 10.1% | 11.7% (5.5%-18.0%) |
| Emergence of delta variant (Apr 21 - Jun 21) | 104 | 16.3% | 13.9% (4.5%-23.2%) | 104 | 13.5% | 12.2% (3.1%-21.4%) |
| **5–9 years** |     |      |          |     |      |          |
| Pre-pandemic (Oct 19 - Mar 20) | 31  | 0.0% | 0.0% | 31  | 0.0% | 0.0% |
| First wave (Apr 20 - May 20) | 83  | 3.6% | 2.5% (0.0%-5.0%) | 83  | 3.6% | 2.5% (0.0%-5.0%) |
| Post first wave (Jun 20 - Aug 20) | 144 | 4.9% | 9.5% (8.2%-10.9%) | 144 | 3.5% | 8.9% (7.9%-10.0%) |
| Schools reopening and second wave (Sep 20 - Dec 20) | 119 | 3.4% | 3.6% (0.0%-7.3%) | 119 | 3.4% | 3.6% (0.0%-7.3%) |
| Post second wave (Jan 21 - Mar 21) | 187 | 15.0% | 17.8% (11.5%-24.1%) | 187 | 15.0% | 17.8% (11.5%-24.1%) |
| Emergence of delta variant (Apr 21 - Jun 21) | 72  | 22.2% | 18.9% (15.5%-22.3%) | 72  | 20.8% | 18.5% (15.2%-21.9%) |
| **10–14 years** |     |      |          |     |      |          |
| Pre-pandemic (Oct 19 - Mar 20) | 41  | 0.0% | 0.0% | 41  | 0.0% | 0.0% |
| First wave (Apr 20 - May 20) | 108 | 3.7% | 3.2% (0.0%-6.5%) | 108 | 2.8% | 1.7% (0.0%-3.5%) |
| Post first wave (Jun 20 - Aug 20) | 174 | 2.3% | 0.9% (0.0%-1.8%) | 174 | 2.3% | 0.9% (0.0%-1.8%) |
| Schools reopening and second wave (Sep 20 - Dec 20) | 152 | 5.3% | 2.5% (0.6%-4.4%) | 152 | 5.3% | 2.5% (0.6%-4.4%) |
| Post second wave (Jan 21 - Mar 21) | 195 | 21.5% | 20.6% (13.6%-27.6%) | 195 | 17.9% | 18.1% (11.3%-24.9%) |
| Emergence of delta variant (Apr 21 - Jun 21) | 51  | 15.7% | 17.6% (9.7%-25.5%) | 51  | 13.7% | 16.0% (8.9%-24.3%) |
| **15–18 years** |     |      |          |     |      |          |
| Pre-pandemic (Oct 19 - Mar 20) | 28  | 0.0% | 0.0% | 28  | 0.0% | 0.0% |
| First wave (Apr 20 - May 20) | 82  | 6.1% | 2.5% (0.5%-4.5%) | 82  | 6.1% | 2.5% (0.5%-4.5%) |
| Post first wave (Jun 20 - Aug 20) | 134 | 4.5% | 4.6% (0.5%-8.7%) | 134 | 5.2% | 5.1% (1.0%-9.3%) |
| Schools reopening and second wave (Sep 20 - Dec 20) | 116 | 13.8% | 23.2% (17.4%-29.0%) | 117 | 9.4% | 20.7% (15.3%-26.0%) |
| Post second wave (Jan 21 - Mar 21) | 189 | 20.1% | 19.5% (13.8%-25.1%) | 189 | 18.0% | 17.0% (11.5%-22.4%) |
| Emergence of delta variant (Apr 21 - Jun 21) | 39  | 30.8% | 32.7% (23.6%-41.8%) | 39  | 28.2% | 21.2% (12.1%-30.4%) |
Table 8 SARS-CoV-2 seroprevalence (RocheS - Anti-SARS-CoV-2 IgG spike protein antibodies and RocheN - Anti-SARS-CoV-2 IgG nucleocapsid antibodies) by region and time period October 2019 to June 2021 in England, adjusted for age and ethnicity.

| Region | RocheS | RocheN |
|--------|--------|--------|
|        | N      | Crude  | Adjusted | N      | Crude  | Adjusted |
|        |        |        |          |        |        |          |
| **Pre-pandemic (Oct 19 - Mar 20)** |        |        |          |        |        |          |
| East of England | 21 | 0·0% | 0·0% | 21 | 0·0% | 0·0% |
| London | 10 | 0·0% | 0·0% | 10 | 0·0% | 0·0% |
| Midlands | 0 | 0·0% | 0·0% | 0 | 0·0% | 0·0% |
| North East & Yorkshire | 2 | 0·0% | 0·0% | 2 | 0·0% | 0·0% |
| North West | 0 | 0·0% | 0·0% | 0 | 0·0% | 0·0% |
| South East | 92 | 0·0% | 0·0% | 92 | 0·0% | 0·0% |
| South West | 0 | 0·0% | 0·0% | 0 | 0·0% | 0·0% |
| **First wave (Apr 20 - May 20)** |        |        |          |        |        |          |
| East of England | 16 | 6·3% | 3·3% (0·0%-9·3%) | 16 | 6·3% | 0·0% |
| London | 55 | 12·7% | 10·2% (3·0%-17·3%) | 55 | 12·7% | 10·2% (3·0%-17·3%) |
| Midlands | 27 | 0·0% | 0·0% | 27 | 0·0% | 0·0% |
| North East & Yorkshire | 64 | 3·1% | 3·8% (0·0%-8·4%) | 64 | 3·1% | 3·8% (0·0%-8·4%) |
| North West | 0 | 0·0% | 0·0% | 0 | 0·0% | 0·0% |
| South East | 134 | 2·2% | 1·5% (0·0%-3·1%) | 133 | 2·3% | 1·5% (0·0%-3·1%) |
| South West | 39 | 0·0% | 0·0% | 39 | 0·0% | 0·0% |
| **Post first wave (Jun 20-Aug 20)** |        |        |          |        |        |          |
| East of England | 9 | 0·0% | 0·0% | 9 | 0·0% | 0·0% |
| London | 14 | 21·4% | 33·9% (18·7%-49·1%) | 14 | 21·4% | 33·9% (18·7%-49·1%) |
| Midlands | 46 | 2·2% | 0·9% (0·0%-2·7%) | 46 | 2·2% | 0·9% (0·0%-2·7%) |
| North East & Yorkshire | 73 | 0·0% | 0·0% | 73 | 0·0% | 0·0% |
| North West | 127 | 6·3% | 5·8% (1·9%-9·7%) | 125 | 6·4% | 5·9% (2·0%-9·8%) |
| South East | 97 | 0·0% | 0·0% | 94 | 0·0% | 0·0% |
| South West | 39 | 0·0% | 0·0% | 39 | 0·0% | 0·0% |
| **Schools reopening and second wave (Sep 20-Dec 20)** |        |        |          |        |        |          |
| East of England | 11 | 0·0% | 0·0% | 11 | 0·0% | 0·0% |
| London | 12 | 16·7% | 8·4% (2·0%-14·7%) | 12 | 16·7% | 8·4% (2·0%-14·7%) |
| Midlands | 77 | 6·5% | 2·6% (0·1%-5·0%) | 75 | 5·3% | 5·2% (0·1%-10·3%) |
| North East & Yorkshire | 62 | 11·3% | 11·6% (5·7%-17·4%) | 61 | 9·8% | 10·5% (5·0%-16·0%) |
| North West | 61 | 11·5% | 15·1% (9·5%-20·7%) | 61 | 11·5% | 15·4% (9·3%-21·4%) |
| South East | 127 | 3·9% | 3·8% (0·7%-6·9%) | 122 | 4·1% | 3·0% (0·2%-5·8%) |
| South West | 114 | 5·3% | 5·1% (0·0%-10·2%) | 114 | 5·3% | 4·6% (0·0%-9·6%) |
| **Post second wave (Jan 21-Mar 21)** |        |        |          |        |        |          |
| East of England | 88 | 9·1% | 13·2% (8·9%-17·5%) | 76 | 10·5% | 11·2% (7·7%-14·8%) |
| London | 115 | 26·1% | 24·1% (15·1%-33·1%) | 115 | 26·1% | 22·8% (13·9%-31·8%) |
| Midlands | 49 | 14·3% | 15·5% (5·4%-25·6%) | 48 | 14·6% | 15·5% (5·4%-25·6%) |
| North East & Yorkshire | 193 | 16·1% | 14·8% (9·9%-19·7%) | 187 | 16·6% | 12·4% (7·7%-17·0%) |
| North West | 116 | 28·4% | 26·8% (18·0%-35·7%) | 115 | 27·8% | 24·0% (15·4%-32·6%) |
| South East | 120 | 10·8% | 11·5% (5·3%-17·8%) | 109 | 11·0% | 11·6% (5·3%-17·9%) |
| South West | 90 | 14·4% | 18·5% (10·8%-26·2%) | 89 | 14·6% | 16·4% (9·1%-23·7%) |

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| Region               | Cases | Smith (%) | Range (%) | Cases | Smith (%) | Range (%) |
|----------------------|-------|-----------|-----------|-------|-----------|-----------|
| London               | 83    | 24.1%     | 25.8% (13.8%-37.8%) | 83    | 24.1%     | 20.6% (9.7%-31.5%) |
| Midlands             | 11    | 18.2%     | 11.3% (0.7%-21.9%)  | 11    | 18.2%     | 11.3% (0.7%-21.9%)  |
| North East & Yorkshire| 25    | 24.0%     | 23.7% (20.3%-27.0%)| 25    | 24.0%     | 7.8% (4.8%-10.9%)   |
| North West           | 27    | 40.7%     | 51.9% (33.4%-70.5%) | 26    | 42.3%     | 51.9% (33.4%-70.5%) |
| South East           | 63    | 11.1%     | 6.0% (0.1%-11.9%)  | 57    | 10.5%     | 5.6% (0.0%-11.5%)   |
| South West           | 31    | 16.1%     | 26.6% (22.0%-31.2%)| 31    | 16.1%     | 28.9% (23.3%-34.6%) |
Figure 2 Summary of symptoms reported by seropositive participants on RocheN Anti-SARS-CoV nucleocapsid antibodies assay by age group. Error bars show 95% confidence intervals.
Figure 3a Univariate analysis of symptoms by age band (RocheS - Anti-SARS-CoV-2 IgG spike protein antibodies)

| Symptom (0-9 years) | OR [95% CI] | p-value | Number | Symptom (10-18 years) | OR [95% CI] | p-value | Number |
|---------------------|-------------|---------|--------|-----------------------|-------------|---------|--------|
| Fever               | 1.00 (0.89, 1.12) | 0.94 | 631 | Fever                 | 1.00 (0.89, 1.12) | 0.94 | 631 |
| Cough               | 1.00 (0.89, 1.12) | 0.94 | 631 | Cough                 | 1.00 (0.89, 1.12) | 0.94 | 631 |
| SCF                 | 1.00 (0.89, 1.12) | 0.94 | 631 | SCF                   | 1.00 (0.89, 1.12) | 0.94 | 631 |
| Fatigue             | 1.00 (0.89, 1.12) | 0.94 | 631 | Fatigue               | 1.00 (0.89, 1.12) | 0.94 | 631 |
| Myalgia             | 1.00 (0.89, 1.12) | 0.94 | 631 | Myalgia               | 1.00 (0.89, 1.12) | 0.94 | 631 |
| Abdominal pain      | 1.00 (0.89, 1.12) | 0.94 | 631 | Abdominal pain        | 1.00 (0.89, 1.12) | 0.94 | 631 |
| Diarrhoea           | 1.00 (0.89, 1.12) | 0.94 | 631 | Diarrhoea             | 1.00 (0.89, 1.12) | 0.94 | 631 |
| No reported symptoms| 1.00 (0.89, 1.12) | 0.94 | 631 | No reported symptoms  | 1.00 (0.89, 1.12) | 0.94 | 631 |
| Overall, N = 78.9%  | 0.97 (0.75, 1.27) | 0.62 | 631 | Overall, N = 78.9%    | 0.97 (0.75, 1.27) | 0.62 | 631 |

Figure 3b Univariate analysis of symptoms by age band (RocheN - Anti-SARS-CoV-2 IgG nucleocapsid antibodies)

| Symptom (0-9 years) | OR [95% CI] | p-value | Number | Symptom (10-18 years) | OR [95% CI] | p-value | Number |
|---------------------|-------------|---------|--------|-----------------------|-------------|---------|--------|
| Fever               | 1.00 (0.89, 1.12) | 0.94 | 631 | Fever                 | 1.00 (0.89, 1.12) | 0.94 | 631 |
| Cough               | 1.00 (0.89, 1.12) | 0.94 | 631 | Cough                 | 1.00 (0.89, 1.12) | 0.94 | 631 |
| SCF                 | 1.00 (0.89, 1.12) | 0.94 | 631 | SCF                   | 1.00 (0.89, 1.12) | 0.94 | 631 |
| Fatigue             | 1.00 (0.89, 1.12) | 0.94 | 631 | Fatigue               | 1.00 (0.89, 1.12) | 0.94 | 631 |
| Myalgia             | 1.00 (0.89, 1.12) | 0.94 | 631 | Myalgia               | 1.00 (0.89, 1.12) | 0.94 | 631 |
| Abdominal pain      | 1.00 (0.89, 1.12) | 0.94 | 631 | Abdominal pain        | 1.00 (0.89, 1.12) | 0.94 | 631 |
| Diarrhoea           | 1.00 (0.89, 1.12) | 0.94 | 631 | Diarrhoea             | 1.00 (0.89, 1.12) | 0.94 | 631 |
| No reported symptoms| 1.00 (0.89, 1.12) | 0.94 | 631 | No reported symptoms  | 1.00 (0.89, 1.12) | 0.94 | 631 |
| Overall, N = 78.9%  | 0.97 (0.75, 1.27) | 0.62 | 631 | Overall, N = 78.9%    | 0.97 (0.75, 1.27) | 0.62 | 631 |

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### Table 9a Logistic regression models to determine symptoms associated with positivity the RocheS - Anti-SARS-CoV-2 IgG spike protein antibodies assay results. Symptoms with the highest p-value were sequentially excluded and model Akaike Information Criterion (AIC) values were compared until a model with the lowest AIC value had been reached. Separate models created for 0-9 years and 10-18 years.

|                           | RocheS | OR (95% CI) | p-value |
|---------------------------|--------|-------------|---------|
| **Age group: 0-9 years (N=663 observations)** |         |             |         |
| Male                      |        | 1.0 (0.6-1.7) | 0.89    |
| Fever                     |        | 1.7 (1.0-2.9) | 0.05    |
| Gastrointestinal symptoms |        | 0.6 (0.3-1.1) | 0.09    |
| **Age group: 10-18 years (N=873 observations)** |         |             |         |
| Male                      |        | 0.9 (0.6-1.3) | 0.57    |
| Fever                     |        | 1.6 (1.0-2.7) | 0.05    |
| Loss of taste and smell   |        | 9.2 (5.1-16.3) | <0.001  |

OR: odds ratio

### Table 9b Logistic regression models to determine symptoms associated with positivity the RocheN - Anti-SARS-CoV-2 IgG nucleocapsid antibodies assay results. Symptoms with the highest p-value were sequentially excluded and model Akaike Information Criterion (AIC) values were compared until a model with the lowest AIC value had been reached. Separate models created for 0-9 years and 10-18 years.

|                           | RocheN | OR (95% CI) | p-value |
|---------------------------|--------|-------------|---------|
| **Age group: 0-9 years (N=631 observations)** |         |             |         |
| Male                      |        | 1.1 (0.6-1.8) | 0.80    |
| Fever                     |        | 2.1 (1.2-3.6) | 0.009   |
| Gastrointestinal symptoms |        | 0.5 (0.3-1.1) | 0.09    |
| **Age group: 10-18 years (N=873 observations)** |         |             |         |
| Male                      |        | 0.9 (0.6-1.4) | 0.65    |
| Cough                     |        | 1.6 (1.0-2.6) | 0.07    |
| Loss of taste or smell    |        | 8.0 (4.5-14.4) | <0.001  |

OR: odds ratio
Table 10: A univariate and multivariable logistic regression models to establish risk of SARS-CoV-2 seropositivity on Roche Elecsys Anti-SARS-CoV-2 serological assays for the detection of anti-SARS-CoV-2 IgG nucleocapsid antibodies (RocheN) in children aged 0-18 years.

| Number of participants in model | Univariate | IMD* deprivation quintiles | Multivariable | IMD and incl· HCW†‡ |
|-------------------------------|------------|-----------------------------|---------------|----------------------|
|                               | Odds ratio (95%CI) | LR test (p value) | Odds ratio (95%CI) | LR test (p value) | Odds ratio (95%CI) | LR test (p value) | Odds ratio (95%CI) | LR test (p value) |
| Age group                     |             |                |               |                     |                    |                      |                      |                     |
| 0-4 years                     | 1·0 (0·7-1·6) | 0·1            | 0·8 (0·5-1·3) | 0·02                 | 0·8 (0·1-1·3) | 0·02                   | 0·8 (0·5-1·3) | 0·07               |
| 5-9 years                     | 1·1 (0·7-1·6) | 1·1 (0·7-1·7) | 1·1 (0·7-1·7) | 1·1 (0·7-1·6)        |                     |                      |                    |                     |
| 10-14 years                   | 1·1 (1·1-2·2) | 1·6 (1·1-2·4) | 1·6 (1·1-2·4) | 1·5 (1·0-2·2)        |                     |                      |                    |                     |
| 15-18 years                   | 0·9 (0·7-1·2) | 0·7            | 1·0 (0·7-1·3) | 0·9                  | 1·0 (0·7-1·3) | 0·9                    | 1·0 (0·7-1·3) | 0·9                |
| Sex                           |             |                |               |                     |                    |                      |                    |                     |
| Female                        | 1 (ref)     | 1 (ref)        | 1 (ref)       | 1 (ref)              |                     |                      |                    |                     |
| Male                          | 0·9 (0·7-1·2) | 0·7            | 1·0 (0·7-1·3) | 0·9                  | 1·0 (0·7-1·3) | 0·9                    | 1·0 (0·7-1·3) | 0·9                |
| NHS region                    |             |                |               |                     |                    |                      |                    |                     |
| East of England               | 1·1 (0·5-2·6) | <0·001         | 0·8 (0·3-2·0) | <0·001               | 0·8 (0·3-2·0) | 0·001                   | 0·9 (0·3-2·2) | 0·001              |
| London                        | 2·7 (1·6-4·7) | 2·6 (1·5-4·4) | 2·7 (1·5-4·8) |                     |                    |                      |                    |                     |
| Midlands                      | 1·3 (0·6-2·6) | 1·2 (0·6-2·5) | 1·2 (0·6-2·6) |                     |                    |                      |                    |                     |
| Yorkshire                     | 1·5 (0·9-2·7) | 1·5 (0·8-2·6) | 1·5 (0·8-2·7) |                     |                    |                      |                    |                     |
| North West                    | 2·7 (1·5-4·9) | 2·6 (1·5-4·6) | 2·7 (1·4-4·9) |                     |                    |                      |                    |                     |
| South East                    | 1 (ref)     | 1 (ref)        | 1 (ref)       | 1 (ref)              |                     |                      |                    |                     |
| South West                    | 1·5 (0·8-2·7) | 1·5 (0·8-2·7) | 1·5 (0·8-2·7) |                     |                    |                      |                    |                     |
| Time period                   |             |                |               |                     |                    |                      |                    |                     |
| Pre-pandemic (01 Oct 2019 - 31 Mar 2020) | <0·001         | <0·001         | <0·001         | <0·001               |                     |                      |                    |                     |
| First wave (01 Apr 2020 - 31 May 2020) | 0·2 (0·1-0·4) | 0·2 (0·1-0·5) | 0·2 (0·1-0·5) |                     |                    |                      |                    |                     |
| First wave (01 Jun 2020 - 31 Aug 2020) | 0·2 (0·1-0·4) | <0·001         | 0·2 (0·1-0·3) | 0·2 (0·1-0·3)        | 0·2 (0·1-0·3)        |                     |                    |                     |
| Second wave (01 Sep 2020 - 31 Dec 2020) | 0·4 (0·2-0·6) | <0·001         | 0·4 (0·3-0·6) | 0·4 (0·2-0·6)        | 0·4 (0·3-0·6)        |                     |                    |                     |
| Second wave (01 Jan 2021 - 31 Mar 2021) | 1 (ref)     | 1 (ref)        | 1 (ref)       | 1 (ref)              |                     |                      |                    |                     |
| Emergence of delta variant (01 Apr 2021 - 30 Jun 2021) | 1·2 (0·8-1·7) | 1·0 (0·7-1·6) | 1·0 (0·7-1·6) | 1·0 (0·7-1·6)        |                     |                      |                    |                     |
| Ethnicity                     |             |                |               |                     |                    |                      |                    |                     |
| White                         | 1 (ref)     | 1 (ref)        | 1 (ref)       | 1 (ref)              |                     |                      |                    |                     |
| Minority ethnic group††       | 2·5 (1·9-3·5) | <0·001         | 1·5 (1·0-2·1) | 0·04                 | 1·5 (1·0-2·1) | 0·04                   | 1·4 (1·0-2·1) | 0·06               |

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| IDACI deprivation quintile | Most deprived 1 | 2·8 (1·8-4·2) | 1·5 (0·9-2·4) | 0·02 | 1·7 (1·0-2·9) | 0·009 |
|---------------------------|-----------------|----------------|----------------|------|----------------|------|
|                           | 2               | 1·4 (0·9-2·3)  | 0·7 (0·4-1·2)  | 0·7  | 0·7 (0·4-1·2)  | 0·02 |
|                           | 3               | 1·5 (1·0-2·3)  | 0·9 (0·6-1·5)  | 1·0  | 0·6 (1·7)      | 0·009 |
|                           | 4               | 1·7 (1·1-2·5)  | 1·4 (0·9-2·2)  | 1·5  | 0·9-2·4        |      |
| Least deprived 5          | 1 (ref)         | 1 (ref)        | 1 (ref)        |      |                |      |

| Urban/rural               |                 |                |                |      |                |      |
|---------------------------|-----------------|----------------|----------------|------|----------------|------|
| Rural                     | 2·0 (1·3-2·9)   | <0·001         | 1·2 (0·7-1·8)  | 0·04 |
|                           | 1·0 (0·6-1·6)   |                | 0·6 (0·4-1·0)  |      |
|                           | 0·8 (0·5-1·3)   |                | 0·6 (0·4-1·0)  |      |
|                           | 1·9 (0·7-1·5)   |                | 1·0 (0·6-1·5)  |      |
| Least deprived 5          | 1 (ref)         |                | 1 (ref)        |      |                |      |

| HCW †                     |                 |                |                |      |                |      |
|---------------------------|-----------------|----------------|----------------|------|----------------|------|
| No                        | 2·0 (1·0-0·4)   | <0·001         | 0·4 (0·2-0·8)  | 0·002| 0·4 (0·2-0·7)  | <0·001|
|                           | 1·5 (1·1-2·0)   |                | 0·5 (0·2-0·9)  | 0·009|                |      |
| Yes                       | 1 (ref)         |                | 1 (ref)        |      |                |      |

*IMD Index of Multiple Deprivation
**IDACI Income Deprivation Affecting Children Index (IDACI) measures the proportion of all children aged 0 to 15 living in income deprived families
†fewer results available for this analysis due to incomplete data in HCW (healthcare worker) field (see Table 2)
††Minority ethnic group includes all minority groups apart from white minorities.
‡Likelihood ratio for each risk factor calculated with overall p value displayed
Appendix 1 Questionnaire used in What’s the STORY? (Serum Testing Of Representative Youngsters)

Participant Number: | | | | | |

Most of the questions below are taken from the UK census. They are included here to check how well the participants taking part in this study match those of the general population in your area. These data will be stored securely by your site and analysed anonymously in accordance with General Data Protection Regulation (GDPR).

Today’s date: _ _ / _ __ _ / _ _ _ _

Q1. What is your child’s date of birth? (month and year only)
Q2. What was their birth gender? male female
Q3. Which country was your child born in?
Q4. How many years has your child lived in the UK?
Q5. Which country were you (the Parent/Guardian) born in?
Q6. How many years have you (the Parent/Guardian) lived in the UK?
Q7. In which country/countries did your child (the participant) receive their vaccinations?
   UK Other
Q8. Does your child attend a childcare setting? (This question is for under 5 year olds only)
   Yes no
   If Yes which setting? Nursery Childminder Nanny Other Please specify

If the answer is yes to Q8, please indicate how many hours a week?

| 1-4 hours | 4-8 hours | 8-12 hours |
|-----------|----------|-----------|
| 12-20 hours | 21-30 hours | 30+ hours |

The following questions is for school aged children

Q9. Is your child enrolled in full time education?
   Yes No
Q10. If yes to Q9, which setting are they being educated in?
    Primary school
    Middle school
    Secondary school
    College
    Homeschooling
    Other please specify
Q11. If in full time education please provide the name of the institution or N/A (if N/A please move to question 14)
Q12. If enrolled at an institution, is it open? Yes no (if no please move to question 14)
Q13. If your child’s institution is open are they attending? Yes no N/A
Q14. Who is your child’s GP?
Q15. Name and address of surgery
Q16. Has your child had any symptoms such as those listed below since February 2020?
    Fever
    Dry Cough
    Shortness of breath
    Fatigue
    Myalgia (muscle aches)
    Nasal congestion
    Loss of sense of taste
    Loss of sense of smell
    Runny nose
    Sneezing
Sore throat
Abdominal pain or cramps (not including menstrual cramps)
Diarrhoea
Vomiting
Other Please specify___________
None of the above
Q17. If yes to any of the symptoms in question 16, when was the start of their most recent episode of symptoms? DD/MM/2020 N/A
Q18. Has your child ever been tested for COVID-19? (throat and/or nose swab specifically for COVID-19) Yes No
Q19. Has the result of your child’s throat and/or nose swab for COVID-19 been positive? Yes No N/A
Q20. What was the date of the test? DD/MM/YYYY N/A
Q21. Has your child ever been tested for COVID-19 antibodies (blood test/saliva test)? Yes No
Q22. If yes to Q21, has the result of your child’s antibody testing been positive? Yes No N/A
Q23. What was the date of the antibody test? DD/MM/YYYY N/A

The following questions refer to any household contacts. A household contact is defined as a person who stays overnight in the same residence the participant.

Q25. Has anyone in your child's household(s) had a new loss of taste or smell since February 2020? Yes No
Q26. If yes to question 26, how many people in your child’s household been affected? …………….
Q27. If yes to question 26 when was the start of their symptoms? DD/MM/2020
Q28. If yes to question 26, how old are they?
Q29. Has anyone in your child’s household had any symptoms listed below since February 2020?
Fever
Dry cough
Shortness of breath
Muscle aches
Feeling tired
Loss of appetite
Abdominal pain or cramps (not including menstrual cramps)
Diarrhoea
Vomiting
Other Please specify___________
None of the above
Q30. If yes to question 28, how many people in your child’s household been affected? …………….
Q31. If yes to any symptoms in question 28, when was the start of their most recent episode of symptoms? DD/MM/ YYYY If yes to any symptoms in question 28, how old are they?
Q32. If yes to any symptoms in question 28 have they ever been tested for COVID-19? (throat and/or nose swab specifically for COVID-19) Yes No
Q33. If yes to any symptoms in question 28 have they ever been diagnosed with laboratory confirmed throat and/or nose swab for COVID-19? Yes No
Q34. If yes to question 33, when was their positive test? DD/MM/ YYYY Has the individual in question ever been tested for COVID-19 antibodies (blood test/saliva test)? Yes No N/A
Q35. If yes to Q35, has the result of the individual’s antibody testing been positive? Yes No N/A
Q36. What was the date of the antibody test? DD/MM/ YYYY N/A
Q37. Has anyone in the household without symptoms been tested for COVID-19? (throat and/or nose swab specifically for COVID-19) Yes No
Q38. If yes to Q38 was it positive? Yes No
Q40. What was the date of the test? DD/MM/YYYY N/A
Q41. Has anyone in the household without symptoms been tested for COVID-19 antibodies (blood test/saliva test)? Yes No N/A
Q42. If yes to Q40 was it positive? Yes No
Q43. What was the date of the antibody test? DD/MM/YYYY N/A
Q44. Which of the following best describes your child? (the participant)

White
- English/Welsh/Scottish/Northern Irish/ British
- Irish
- Gypsy or Irish Traveller
- Other White background please specify ………………..

Mixed/multiple ethnic groups
- White and Black Caribbean
- White and Black African
- White and Asian
- Any other mixed/multiple ethnic background please specify

Asian/Asian British
- Indian
- Pakistani
- Bangladeshi
- Chinese
- Any other Asian background please specify

Black/African/Caribbean/Black British
- African
- Caribbean
- Any other Black/ African/ Caribbean background please specify

Other ethnic group
- Arab
- Any other ethnic group please specify

What is your child's (the participant) religion? (This question is optional)
- No religion
- Christian (including Church of England, Catholic, Protestant and all other Christian denominations)
- Buddhist
- Hindu
- Jewish
- Muslim
- Sikh
- Other please specify
- Prefer not to say

Please complete questions 46 -59 for the main household in which your child lives?

Q45. How many adults (16+ years old)?
Q46. How many children (under the age of 16)?
Q47. How would you describe the main household?
    A whole house or bungalow that is:
    Detached
    Semidetached
    Terraced (including end-terrace)
    A flat, maisonette or apartment that is:
    In a purpose built block of flats or tenement
    Part of a converted or shared house (including bedsits)
    In a commercial building (for example, in an office building, hotel, or over a shop)
    A mobile or temporary structure
    A caravan or other mobile or temporary structure
Q48. Is this household’s accommodation self-contained?
This means that all the rooms, including the kitchen, bathroom and toilet, are behind a door that only this household can use:
    Yes, all the rooms are behind a door that only this household can use
    No
Q49. How many rooms are available for use only by this household?
    Do NOT count
    Bathrooms
    Toilets
    Halls or landing
    Rooms that can only be used for storage such as cupboards
    Count all other rooms e.g.
    Kitchens
    Living rooms
    Utility rooms
    Bedrooms
    Studies
    Conservatories
    If two rooms have been converted into one, count them as one room
    Number of rooms ..........................................

How many of these rooms are bedrooms? Include all rooms built or converted for use as bedrooms even if they are not currently used as bedrooms

    Number of rooms ............................................................... 

Q50. Which of the following best describes your child’s household’s current accommodation?
    Own you own home outright
    Own your home with a mortgage
    Renting from the council
    Renting from a housing association
    Renting from a private landlord
    In shared accommodation with a housing association
    Living with relatives
    In housing tied to your job
    Lodging within another household
    Other  Please specify
Q51. Your employment – Parent or Guardian to answer (please select only one as your main form of employment)
    Working full time
Working part time
Unemployed
Retired
In full time or further education
Claiming Job Seekers Allowance
Incapacity Benefit
Other
Q52. Does anyone in the household work in either social care or health care?
Yes
No

Thinking about your child’s immediate family (parents and siblings in the same household) please can you tell us the following?

Q53. Does your family own a car, van or truck (include company cars or vans available for private use)?
None
One
Two
Three
Four or more

Q54. Does your child have their own bedroom to themselves?
No
Yes

Q55. How many computers does your family own? (including laptops and tablets, not including games consoles and smartphones)
None
One
Two
More than two

Q56. How many bathrooms (room with a bath/shower or both) are in your home?
None
One
Two
More than two

Q57. Does your family have a dishwasher at home?
No
Yes

Q58. How many times did you travel out of the UK for a holiday/vacation last year either alone or with friends/family (in the 12 months preceding lockdown for COVID-19)?
Not at all
Once
Twice
More than Twice

Table 10 STORY research team

| Name          | Research Group          |
|---------------|-------------------------|
| K. Bell       | Newcastle NHS Trust     |
| C. Kennedy    | Newcastle NHS Trust     |
| A. Bell       | Newcastle NHS Trust     |
| C. L. Coates  | Newcastle NHS Trust     |
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| A. Davies     | Newcastle NHS Trust     |
| Name                | Institution                                           |
|---------------------|-------------------------------------------------------|
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| S. Thomson-Hill     | Bristol Vaccine Centre (BVC)                          |
| K. Jahans-Baynton   | Bristol Vaccine Centre (BVC)                          |
| Z.B. Jordan         | Bristol Vaccine Centre (BVC)                          |
| D. Ellis            | Leeds Teaching Hospitals NHS Trust                    |
| R. Lidstone-Scott   | Leeds Teaching Hospitals NHS Trust                    |
| E. Storr            | Plymouth NHS trust                                    |
| A. Carney           | Plymouth NHS trust                                    |
| S. Sharman          | Plymouth NHS trust                                    |
| N.J. Oldfield       | University of Nottingham Health Service              |
| S. Royal            | University of Nottingham Health Service              |
| S. Belton           | University of Nottingham Health Service              |
| D. Hammersley       | University of Nottingham Health Service              |
| J. Wilson           | Royal Manchester Children’s Hospital                 |
| N. Philips          | Royal Manchester Children’s Hospital                 |
| F. Jennings         | Royal Manchester Children’s Hospital                 |
| I. Mayor            | Royal Manchester Children’s Hospital                 |
| K. Wilkins          | Royal Manchester Children’s Hospital                 |
| S. Williams         | Royal Manchester Children’s Hospital                 |
| S. Akter            | Royal Manchester Children’s Hospital                 |
| E. Ashworth         | Royal Manchester Children’s Hospital                 |
| H. Dalgleish        | Royal Manchester Children’s Hospital                 |
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