|  |  |  |  |
| --- | --- | --- | --- |
| **Table 1.** Demographic and clinical characteristics of 194,326 patients with rheumatoid arthritis or systemic lupus erythematosus (SLE) | | | |
|  | **Total** | **No HCQ** | **HCQ** |
| Sample size, n | 194,236 (100.0) | 163,735 (100.0) | 30,501 (100.0) |
|  |  |  |  |
| **Population** |  |  |  |
| Rheumatoid arthritis | 167,513 (86.2) | 143,848 (87.9) | 23,665 (77.6) |
| SLE | 26,723 (13.8) | 19,887 (12.1) | 6,836 (22.4) |
|  |  |  |  |
| **Demographics** |  |  |  |
| Age, years |  |  |  |
| Median (IQR) | 66 (54-75) | 66 (55-76) | 63 (53-72) |
| 18-39 | 13,683 (7.0) | 11,409 (7.0) | 2,274 (7.5) |
| 40-49 | 19,406 (10.0) | 15,804 (9.7) | 3,602 (11.8) |
| 50-59 | 37,024 (19.1) | 30,408 (18.6) | 6,616 (21.7) |
| 60-69 | 45,617 (23.5) | 37,655 (23.0) | 7,962 (26.1) |
| 70-79 | 49,101 (25.3) | 41,976 (25.6) | 7,125 (23.4) |
| ≥80 | 29,405 (15.1) | 26,483 (16.2) | 2,922 (9.6) |
|  |  |  |  |
| Sex |  |  |  |
| Female | 138,160 (71.1) | 114,866 (70.2) | 23,294 (76.4) |
| Male | 56,076 (28.9) | 48,869 (29.8) | 7,207 (23.6) |
|  |  |  |  |
| Ethnicity |  |  |  |
| White | 132,408 (68.2) | 112,126 (68.5) | 20,282 (66.5) |
| South Asian | 10,478 (5.4) | 8,490 (5.2) | 1,988 (6.5) |
| Black | 2,995 (1.5) | 2,424 (1.5) | 571 (1.9) |
| Mixed | 1,278 (0.7) | 1,003 (0.6) | 275 (0.9) |
| Other | 1,837 (0.9) | 1,504 (0.9) | 333 (1.1) |
| Missing | 45,240 (23.3) | 38,188 (23.3) | 7,052 (23.1) |
|  |  |  |  |
| Index of multiple deprivation |  |  |  |
| 1 (least deprived) | 38,904 (20.0) | 32,892 (20.1) | 6,012 (19.7) |
| 2 | 39,314 (20.2) | 33,251 (20.3) | 6,063 (19.9) |
| 3 | 38,834 (20.0) | 32,715 (20.0) | 6,119 (20.1) |
| 4 | 38,386 (19.8) | 32,326 (19.7) | 6,060 (19.9) |
| 5 (most deprived) | 38,798 (20.0) | 32,551 (19.9) | 6,247 (20.5) |
|  |  |  |  |
| Residence type |  |  |  |
| Rural | 45,364 (23.4) | 38,051 (23.2) | 7,313 (24.0) |
| Urban | 148,872 (76.6) | 125,684 (76.8) | 23,188 (76.0) |
|  |  |  |  |
| Body mass index, kg/m2 |  |  |  |
| <18.5 | 4,452 (2.3) | 3,778 (2.3) | 674 (2.2) |
| 18.5-24.9 | 57,178 (29.4) | 48,218 (29.4) | 8,960 (29.4) |
| 25-29.9 | 61,723 (31.8) | 52,526 (32.1) | 9,197 (30.2) |
| 30-34.9 | 35,166 (18.1) | 29,506 (18.0) | 5,660 (18.6) |
| 35-39.9 | 15,035 (7.7) | 12,396 (7.6) | 2,639 (8.7) |
| ≥40 | 7,688 (4.0) | 6,128 (3.7) | 1,560 (5.1) |
| Missing | 12,994 (6.7) | 11,183 (6.8) | 1,811 (5.9) |
|  |  |  |  |
| Smoking status |  |  |  |
| Never | 74,031 (38.1) | 62,578 (38.2) | 11,453 (37.5) |
| Former | 92,235 (47.5) | 77,578 (47.4) | 14,657 (48.1) |
| Current | 27,360 (14.1) | 23,035 (14.1) | 4,325 (14.2) |
| Missing | 610 (0.3) | 544 (0.3) | 66 (0.2) |
|  |  |  |  |
| **Clinical conditions** |  |  |  |
| Diabetes |  |  |  |
| No diabetes | 159,503 (82.1) | 133,687 (81.6) | 25,816 (84.6) |
| Diabetes, HbA1c <7.5% | 24,809 (12.8) | 21,330 (13.0) | 3,479 (11.4) |
| Diabetes, HbA1c ≥7.5% | 9,363 (4.8) | 8,262 (5.0) | 1,101 (3.6) |
| Diabetes, missing HbA1c | 561 (0.3) | 456 (0.3) | 105 (0.3) |
|  |  |  |  |
| eGFR, ml/min/1.73m2 |  |  |  |
| ≥60 | 127,177 (65.5) | 104,168 (63.6) | 23,009 (75.4) |
| 30-59 | 23,802 (12.3) | 20,504 (12.5) | 3,298 (10.8) |
| <30 | 1,885 (1.0) | 1,646 (1.0) | 239 (0.8) |
| Missing | 41,372 (21.3) | 37,417 (22.9) | 3,955 (13.0) |
|  |  |  |  |
| Chronic cardiac disease | 30,540 (15.7) | 26,236 (16.0) | 4,304 (14.1) |
| Chronic liver disease | 2,709 (1.4) | 2,220 (1.4) | 489 (1.6) |
| Respiratory disease (excluding asthma) | 26,617 (13.7) | 22,101 (13.5) | 4,516 (14.8) |
| Neurological condition | 12,686 (6.5) | 10,973 (6.7) | 1,713 (5.6) |
| Hypertension | 83,215 (42.8) | 70,951 (43.3) | 12,264 (40.2) |
| Cancer | 19,962 (10.3) | 17,092 (10.4) | 2,870 (9.4) |
| Immunosuppression | 2,964 (1.5) | 2,395 (1.5) | 569 (1.9) |
| Influenza vaccination 2019/20 | 122,005 (62.8) | 100,869 (61.6) | 21,136 (69.3) |
|  |  |  |  |
| **Other medications** |  |  |  |
| Other DMARDs | 71,342 (36.7) | 55,638 (34.0) | 15,704 (51.5) |
| Azithromycin | 948 (0.5) | 751 (0.5) | 197 (0.6) |
| Oral corticosteroids | 33,593 (17.3) | 26,727 (16.3) | 6,866 (22.5) |
| NSAIDs | 33,256 (17.1) | 26,614 (16.3) | 6,642 (21.8) |
| *Abbreviations:* IQR, interquartile range; HbA1c, glycated haemoglobin; eGFR, estimated glomerular filtration rate; DMARD, disease-modifying antirheumatic drug; NSAID, non-steroidal anti-inflammatory drug | | | |

**Figure 1.** Flow diagram (coming soon)





**NEED TO ADD RISK TABLE**

**Figure 4.** QBA around missing biologics data (coming soon)

**SUPPLEMENTAL MATERIAL**



|  |  |  |  |
| --- | --- | --- | --- |
| **Table S1.** Demographic and clinical characteristics of 167,513 patients with rheumatoid arthritis | | | |
|  | **Total** | **No HCQ** | **HCQ** |
| **Demographics** |  |  |  |
| Age, years |  |  |  |
| Median (IQR) | 67 (56-76) | 67 (56-76) | 65 (55-73) |
| 18-39 | 10,065 (6.0) | 8,936 (6.2) | 1,129 (4.8) |
| 40-49 | 15,086 (9.0) | 12,802 (8.9) | 2,284 (9.7) |
| 50-59 | 30,868 (18.4) | 25,984 (18.1) | 4,884 (20.6) |
| 60-69 | 39,962 (23.9) | 33,400 (23.2) | 6,562 (27.7) |
| 70-79 | 44,359 (26.5) | 38,167 (26.5) | 6,192 (26.2) |
| ≥80 | 27,173 (16.2) | 24,559 (17.1) | 2,614 (11.0) |
|  |  |  |  |
| Sex |  |  |  |
| Female | 116,161 (69.3) | 99,023 (68.8) | 17,138 (72.4) |
| Male | 51,352 (30.7) | 44,825 (31.2) | 6,527 (27.6) |
|  |  |  |  |
| Ethnicity |  |  |  |
| White | 115,609 (69.0) | 99,526 (69.2) | 16,083 (68.0) |
| South Asian | 8,492 (5.1) | 7,070 (4.9) | 1,422 (6.0) |
| Black | 1,984 (1.2) | 1,690 (1.2) | 294 (1.2) |
| Mixed | 878 (0.5) | 721 (0.5) | 157 (0.7) |
| Other | 1,354 (0.8) | 1,166 (0.8) | 188 (0.8) |
| Missing | 39,196 (23.4) | 33,675 (23.4) | 5,521 (23.3) |
|  |  |  |  |
| Index of multiple deprivation |  |  |  |
| 1 (least deprived) | 33,385 (19.9) | 28,736 (20.0) | 4,649 (19.6) |
| 2 | 33,811 (20.2) | 29,107 (20.2) | 4,704 (19.9) |
| 3 | 33,597 (20.1) | 28,776 (20.0) | 4,821 (20.4) |
| 4 | 33,230 (19.8) | 28,545 (19.8) | 4,685 (19.8) |
| 5 (most deprived) | 33,490 (20.0) | 28,684 (19.9) | 4,806 (20.3) |
|  |  |  |  |
| Residence type |  |  |  |
| Rural | 39,321 (23.5) | 33,604 (23.4) | 5,717 (24.2) |
| Urban | 128,192 (76.5) | 110,244 (76.6) | 17,948 (75.8) |
|  |  |  |  |
| Body mass index, kg/m2 |  |  |  |
| <18.5 | 3,796 (2.3) | 3,286 (2.3) | 510 (2.2) |
| 18.5-24.9 | 48,371 (28.9) | 41,607 (28.9) | 6,764 (28.6) |
| 25-29.9 | 54,025 (32.3) | 46,679 (32.5) | 7,346 (31.0) |
| 30-34.9 | 30,951 (18.5) | 26,485 (18.4) | 4,466 (18.9) |
| 35-39.9 | 13,199 (7.9) | 11,125 (7.7) | 2,074 (8.8) |
| ≥40 | 6,739 (4.0) | 5,495 (3.8) | 1,244 (5.3) |
| Missing | 10,432 (6.2) | 9,171 (6.4) | 1,261 (5.3) |
|  |  |  |  |
| Smoking status |  |  |  |
| Never | 62,932 (37.6) | 54,527 (37.9) | 8,405 (35.5) |
| Former | 81,125 (48.4) | 69,225 (48.1) | 11,900 (50.3) |
| Current | 22,977 (13.7) | 19,657 (13.7) | 3,320 (14.0) |
| Missing | 479 (0.3) | 439 (0.3) | 40 (0.2) |
|  |  |  |  |
| **Clinical conditions** |  |  |  |
| Diabetes |  |  |  |
| No diabetes | 136,398 (81.4) | 116,645 (81.1) | 19,753 (83.5) |
| Diabetes, HbA1c <7.5% | 22,134 (13.2) | 19,236 (13.4) | 2,898 (12.2) |
| Diabetes, HbA1c ≥7.5% | 8,497 (5.1) | 7,561 (5.3) | 936 (4.0) |
| Diabetes, missing HbA1c | 484 (0.3) | 406 (0.3) | 78 (0.3) |
|  |  |  |  |
| eGFR, ml/min/1.73m2 |  |  |  |
| ≥60 | 112,440 (67.1) | 94,038 (65.4) | 18,402 (77.8) |
| 30-59 | 21,384 (12.8) | 18,629 (13.0) | 2,755 (11.6) |
| <30 | 1,583 (0.9) | 1,409 (1.0) | 174 (0.7) |
| Missing | 32,106 (19.2) | 29,772 (20.7) | 2,334 (9.9) |
|  |  |  |  |
| Chronic cardiac disease | 27,186 (16.2) | 23,655 (16.4) | 3,531 (14.9) |
| Chronic liver disease | 2,104 (1.3) | 1,782 (1.2) | 322 (1.4) |
| Respiratory disease (excluding asthma) | 23,864 (14.2) | 20,027 (13.9) | 3,837 (16.2) |
| Neurological condition | 10,866 (6.5) | 9,617 (6.7) | 1,249 (5.3) |
| Hypertension | 73,688 (44.0) | 63,800 (44.4) | 9,888 (41.8) |
| Cancer | 17,542 (10.5) | 15,190 (10.6) | 2,352 (9.9) |
| Immunosuppression | 2,195 (1.3) | 1,847 (1.3) | 348 (1.5) |
| Influenza vaccination 2019/20 | 108,614 (64.8) | 91,472 (63.6) | 17,142 (72.4) |
|  |  |  |  |
| **Other medications** |  |  |  |
| Other DMARDs | 68,315 (40.8) | 54,262 (37.7) | 14,053 (59.4) |
| Azithromycin | 850 (0.5) | 691 (0.5) | 159 (0.7) |
| Oral corticosteroids | 28,781 (17.2) | 23,905 (16.6) | 4,876 (20.6) |
| NSAIDs | 30,516 (18.2) | 24,974 (17.4) | 5,542 (23.4) |
| *Abbreviations:* IQR, interquartile range; HbA1c, glycated haemoglobin; eGFR, estimated glomerular filtration rate; DMARD, disease-modifying antirheumatic drug; NSAID, non-steroidal anti-inflammatory drug | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Table S2.** Demographic and clinical characteristics of 26,723 patients with systemic lupus erythematosus (SLE) | | | |
|  | **Total** | **No HCQ** | **HCQ** |
| **Demographics** |  |  |  |
| Age, years |  |  |  |
| Median (IQR) | 58 (47-70) | 60 (48-71) | 55 (44-66) |
| 18-39 | 3,618 (13.5) | 2,473 (12.4) | 1,145 (16.7) |
| 40-49 | 4,320 (16.2) | 3,002 (15.1) | 1,318 (19.3) |
| 50-59 | 6,156 (23.0) | 4,424 (22.2) | 1,732 (25.3) |
| 60-69 | 5,655 (21.2) | 4,255 (21.4) | 1,400 (20.5) |
| 70-79 | 4,742 (17.7) | 3,809 (19.2) | 933 (13.6) |
| ≥80 | 2,232 (8.4) | 1,924 (9.7) | 308 (4.5) |
|  |  |  |  |
| Sex |  |  |  |
| Female | 21,999 (82.3) | 15,843 (79.7) | 6,156 (90.1) |
| Male | 4,724 (17.7) | 4,044 (20.3) | 680 (9.9) |
|  |  |  |  |
| Ethnicity |  |  |  |
| White | 16,799 (62.9) | 12,600 (63.4) | 4,199 (61.4) |
| South Asian | 1,986 (7.4) | 1,420 (7.1) | 566 (8.3) |
| Black | 1,011 (3.8) | 734 (3.7) | 277 (4.1) |
| Mixed | 400 (1.5) | 282 (1.4) | 118 (1.7) |
| Other | 483 (1.8) | 338 (1.7) | 145 (2.1) |
| Missing | 6,044 (22.6) | 4,513 (22.7) | 1,531 (22.4) |
|  |  |  |  |
| Index of multiple deprivation |  |  |  |
| 1 (least deprived) | 5,519 (20.7) | 4,156 (20.9) | 1,363 (19.9) |
| 2 | 5,503 (20.6) | 4,144 (20.8) | 1,359 (19.9) |
| 3 | 5,237 (19.6) | 3,939 (19.8) | 1,298 (19.0) |
| 4 | 5,156 (19.3) | 3,781 (19.0) | 1,375 (20.1) |
| 5 (most deprived) | 5,308 (19.9) | 3,867 (19.4) | 1,441 (21.1) |
|  |  |  |  |
| Residence type |  |  |  |
| Rural | 6,043 (22.6) | 4,447 (22.4) | 1,596 (23.3) |
| Urban | 20,680 (77.4) | 15,440 (77.6) | 5,240 (76.7) |
|  |  |  |  |
| Body mass index, kg/m2 |  |  |  |
| <18.5 | 656 (2.5) | 492 (2.5) | 164 (2.4) |
| 18.5-24.9 | 8,807 (33.0) | 6,611 (33.2) | 2,196 (32.1) |
| 25-29.9 | 7,698 (28.8) | 5,847 (29.4) | 1,851 (27.1) |
| 30-34.9 | 4,215 (15.8) | 3,021 (15.2) | 1,194 (17.5) |
| 35-39.9 | 1,836 (6.9) | 1,271 (6.4) | 565 (8.3) |
| ≥40 | 949 (3.6) | 633 (3.2) | 316 (4.6) |
| Missing | 2,562 (9.6) | 2,012 (10.1) | 550 (8.0) |
|  |  |  |  |
| Smoking status |  |  |  |
| Never | 11,099 (41.5) | 8,051 (40.5) | 3,048 (44.6) |
| Former | 11,110 (41.6) | 8,353 (42.0) | 2,757 (40.3) |
| Current | 4,383 (16.4) | 3,378 (17.0) | 1,005 (14.7) |
| Missing | 131 (0.5) | 105 (0.5) | 26 (0.4) |
|  |  |  |  |
| **Clinical conditions** |  |  |  |
| Diabetes |  |  |  |
| No diabetes | 23,105 (86.5) | 17,042 (85.7) | 6,063 (88.7) |
| Diabetes, HbA1c <7.5% | 2,675 (10.0) | 2,094 (10.5) | 581 (8.5) |
| Diabetes, HbA1c ≥7.5% | 866 (3.2) | 701 (3.5) | 165 (2.4) |
| Diabetes, missing HbA1c | 77 (0.3) | 50 (0.3) | 27 (0.4) |
|  |  |  |  |
| eGFR, ml/min/1.73m2 |  |  |  |
| ≥60 | 14,737 (55.1) | 10,130 (50.9) | 4,607 (67.4) |
| 30-59 | 2,418 (9.0) | 1,875 (9.4) | 543 (7.9) |
| <30 | 302 (1.1) | 237 (1.2) | 65 (1.0) |
| Missing | 9,266 (34.7) | 7,645 (38.4) | 1,621 (23.7) |
|  |  |  |  |
| Chronic cardiac disease | 3,354 (12.6) | 2,581 (13.0) | 773 (11.3) |
| Chronic liver disease | 605 (2.3) | 438 (2.2) | 167 (2.4) |
| Respiratory disease (excluding asthma) | 2,753 (10.3) | 2,074 (10.4) | 679 (9.9) |
| Neurological condition | 1,820 (6.8) | 1,356 (6.8) | 464 (6.8) |
| Hypertension | 9,527 (35.7) | 7,151 (36.0) | 2,376 (34.8) |
| Cancer | 2,420 (9.1) | 1,902 (9.6) | 518 (7.6) |
| Immunosuppression | 769 (2.9) | 548 (2.8) | 221 (3.2) |
| Influenza vaccination 2019/20 | 13,391 (50.1) | 9,397 (47.3) | 3,994 (58.4) |
|  |  |  |  |
| **Other medications** |  |  |  |
| Other DMARDs | 3,027 (11.3) | 1,376 (6.9) | 1,651 (24.2) |
| Azithromycin | 98 (0.4) | 60 (0.3) | 38 (0.6) |
| Oral corticosteroids | 4,812 (18.0) | 2,822 (14.2) | 1,990 (29.1) |
| NSAIDs | 2,740 (10.3) | 1,640 (8.2) | 1,100 (16.1) |
| *Abbreviations:* IQR, interquartile range; HbA1c, glycated haemoglobin; eGFR, estimated glomerular filtration rate; DMARD, disease-modifying antirheumatic drug; NSAID, non-steroidal anti-inflammatory drug | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Table S3.** Interactions with HCQ use on the risk of COVID-19 mortality | | | | |
|  |  | **DAG-Informed Adjustment** | | |
|  | **No. events** | **HR** | **95% CI** | **p-value** |
| **Age** |  |  |  |  |
| 18-59 years |  |  |  |  |
| No HCQ | 18 (0.0) | 1 | (ref) | 0.83 |
| HCQ | 6 (0.0) | 1.50 | (0.59-3.80) |  |
| 60-69 years |  |  |  |  |
| No HCQ | 40 (0.1) | 1 | (ref) |  |
| HCQ | 9 (0.1) | 1.06 | (0.51-2.18) |  |
| 70-79 years |  |  |  |  |
| No HCQ | 146 (0.3) | 1 | (ref) |  |
| HCQ | 24 (0.3) | 0.94 | (0.61-1.45) |  |
| ≥80 years |  |  |  |  |
| No HCQ | 266 (1.0) | 1 | (ref) |  |
| HCQ | 29 (1.0) | 0.93 | (0.64-1.37) |  |
|  |  |  |  |  |
| **Other DMARDs** |  |  |  |  |
| No |  |  |  |  |
| No HCQ | 307 (0.3) | 1 | (ref) | 0.22 |
| HCQ | 40 (0.3) | 1.13 | (0.81-1.57) |  |
| Yes |  |  |  |  |
| No HCQ | 163 (0.3) | 1 | (ref) |  |
| HCQ | 28 (0.2) | 0.82 | (0.55-1.22) |  |
|  |  |  |  |  |
| **Oral corticosteroids** | |  |  |  |
| No |  |  |  |  |
| No HCQ | 290 (0.2) | 1 | (ref) | 0.91 |
| HCQ | 37 (0.2) | 0.99 | (0.70-1.40) |  |
| Yes |  |  |  |  |
| No HCQ | 180 (0.7) | 1 | (ref) |  |
| HCQ | 31 (0.5) | 0.97 | (0.66-1.42) |  |
|  |  |  |  |  |
| **NSAIDs** |  |  |  |  |
| No |  |  |  |  |
| No HCQ | 436 (0.3) | 1 | (ref) | 0.14 |
| HCQ | 60 (0.3) | 0.97 | (0.73-1.27) |  |
| Yes |  |  |  |  |
| No HCQ | 34 (0.1) | 1 | (ref) |  |
| HCQ | 8 (0.1) | 1.18 | (0.55-2.56) |  |
| *Abbreviations:* HCQ, hydroxychloroquine; COVID-19, coronavirus disease 2019; DAG, directed acyclic graph; CI, confidence interval; DMARD, disease-modifying antirheumatic drug; STP, Sustainability and Transformation Partnership (a National Health Service administrative region) | | | | |
| Notes: DAG-Informed models adjusted for age, sex, other immunosuppressives (other DMARDs, oral corticosteroids) and stratified by population (i.e., RA or SLE) and STP of the patient’s general practice to allow for geographical differences in baseline hazards. | | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Table S4.** Sensitivity analyses of the association between HCQ use and the risk of COVID-19 mortality | | | |
|  |  | **DAG-Informed Adjustment** | |
|  | **No. events** | **HR** | **95% CI** |
| **Ethnicity adjustments** | |  |  |
| Exclude individuals with missing ethnicity | | |  |
| No HCQ | 352 (0.3) | 1 | (ref) |
| HCQ | 47 (0.2) | 0.93 | (0.69-1.27) |
| Additional adjustment for ethnicity | | |  |
| No HCQ | 352 (0.3) | 1 | (ref) |
| HCQ | 47 (0.2) | 0.93 | (0.68-1.27) |
|  |  |  |  |
| **Shorten exposure ascertainment to 3 months** | | | |
| No HCQ | 470 (0.3) | 1 | (ref) |
| HCQ | 68 (0.2) | 1.02 | (0.78-1.31) |
|  |  |  |  |
| **Population adjustment** | |  |  |
| Change from stratifying to indicator variable | | | |
| No HCQ | 470 (0.3) | 1 | (ref) |
| HCQ | 68 (0.2) | 0.93 | (0.68-1.27) |
|  |  |  |  |
| **Model populations separately** | |  |  |
| Rheumatoid arthritis (RA) | |  |  |
| No HCQ | 442 (0.3) | 1 | (ref) |
| HCQ | 59 (0.2) | 0.98 | (0.74-1.29) |
| Systemic lupus erythematosus (SLE) | | |  |
| No HCQ | 28 (0.1) | 1 | (ref) |
| HCQ | 9 (0.1) | 1.39 | (0.55-3.56) |
| *Abbreviations:* HCQ, hydroxychloroquine; COVID-19, coronavirus disease 2019; DAG, directed acyclic graph; CI, confidence interval; DMARD, disease-modifying antirheumatic drug; STP, Sustainability and Transformation Partnership (a National Health Service administrative region) | | | |
| Notes: DAG-Informed models adjusted for age, sex, other immunosuppressives (other DMARDs, oral corticosteroids) and stratified by population (i.e., RA or SLE) and STP of the patient’s general practice to allow for geographical differences in baseline hazards. | | | |

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| **Table S5.** Comparison of estimates between stratified Cox proportional hazards models (stcox) and flexible parametric models (stpm2) | | | | | |
|  | **Stratified Cox (stcox)** | |  | **Flexible parametric (stpm2)** | |
|  | **HR** | **95% CI** |  | **HR** | **95% CI** |
| **COVID-19 mortality** |  |  |  |  |  |
| HCQ, yes vs. no | 1.02 | (0.78-1.31) |  | 1.02 | (0.79-1.32) |
| Sex, male vs. female | 1.46 | (1.22-1.74) |  | 1.44 | (1.21-1.71) |
| Age, spline 1 | 1.05 | (0.98-1.13) |  | 1.05 | (0.98-1.13) |
| Age, spline 2 | 1.07 | (0.97-1.19) |  | 1.08 | (0.97-1.19) |
| Age, spline 3 | 0.75 | (0.51-1.11) |  | 0.75 | (0.50-1.11) |
| Other DMARD, yes vs. no | 0.93 | (0.77-1.11) |  | 0.90 | (0.75-1.08) |
| OCS | 2.50 | (2.10-2.97) |  | 2.48 | (2.09-2.95) |
|  |  |  |  |  |  |
| **Non COVID-19 mortality** |  |  |  |  |  |
| HCQ, yes vs. no | 1.03 | (0.89-1.20) |  | 1.04 | (0.90-1.20) |
| Sex, male vs. female | 1.28 | (1.16-1.41) |  | 1.28 | (1.16-1.41) |
| Age, spline 1 | 1.06 | (1.02-1.10) |  | 1.06 | (1.02-1.10) |
| Age, spline 2 | 1.03 | (0.98-1.09) |  | 1.03 | (0.98-1.09) |
| Age, spline 3 | 0.95 | (0.78-1.16) |  | 0.95 | (0.78-1.16) |
| Other DMARD, yes vs. no | 0.65 | (0.59-0.73) |  | 0.66 | (0.59-0.73) |
| OCS | 2.01 | (1.82-2.22) |  | 2.01 | (1.82-2.22) |
| Note: Cox models were stratified on STP and RA/SLE population. Flexible parametric models were stratified on STP and included a binary indicator for RA/SLE population as a fixed effect. | | | | | |