**SUPPLEMENTARY MATERIAL FOR:**

**Haematological abnormalities in new onset rheumatoid arthritis and risk of common infections: a population-based study**

**Authors:** Elena Nikiphorou, Simon de Lusignan, Christian Mallen, Kaivan Khavandi, Jacqueline Roberts, Christopher Buckley, James Galloway, Karim Raza

**Appendix Table 1. Baseline characteristics among individuals with and without anaemia**

|  | **No anaemia (n=5525)** | **Anaemia (n=1066)** | **p** |
| --- | --- | --- | --- |
| Age (years) | 57.7 (15.3) | 63.9 (15.6) | <0.001 |
| Men | 1586 (28.7) | 556 (52.2) | <0.001 |
| Ethnicity |  |  | <0.001 |
| White | 4143 (92.4) | 740 (87.9) |  |
| Asian | 190 (4.2) | 65 (7.7) |  |
| Black | 102 (2.3) | 26 (3.1) |  |
| Mixed | 19 (0.4) | 7 (0.8) |  |
| Other | 32 (0.7) | 4 (0.5) |  |
| Smoking status |  |  | <0.001 |
| Never smoked | 1559 (30.1) | 294 (29.7) |  |
| Active smoker | 1181 (22.8) | 167 (16.9) |  |
| Ex-smoker | 2440 (47.1) | 528 (53.4) |  |
| BMI (kg/m2) | 27.8 (5.9) | 27.2 (6.3) | 0.010 |
| Comorbidities |  |  |  |
| Atrial Fibrillation | 176 (3.2) | 61 (5.7) | <0.001 |
| Hypertension | 1622 (29.4) | 441 (41.4) | <0.001 |
| Myocardial Infarction | 143 (2.6) | 59 (5.5) | <0.001 |
| Stroke | 172 (3.1) | 82 (7.7) | <0.001 |
| Heart Failure | 71 (1.3) | 37 (3.5) | <0.001 |
| CKD stages III-V | 441 (8.0) | 177 (16.6) | <0.001 |
| Diabetes | 548 (9.9) | 187 (17.5) | <0.001 |
| COPD | 387 (7.0) | 79 (7.4) | 0.683 |
| Asthma | 939 (17.0) | 179 (16.8) | 0.906 |
| Malignancy | 294 (5.3) | 75 (7.0) | 0.031 |
| Metastatic cancer | 45 (0.8) | 17 (1.6) | 0.025 |
| Depression | 1621 (29.3) | 234 (22.0) | <0.001 |
| Haematological/lab values |  |  |  |
| Haemoglobin (g/L) | 13.6 (1.2) | 11.6 (1.4) | <0.001 |
| Neutrophil count (109/L) | 4.6 (2.7) | 5.0 (2.5) | <0.001 |
| Lymphocyte count (109/L) | 2.0 (0.9) | 1.7 (0.8) | <0.001 |
| Medications |  |  |  |
| NSAIDs | 1648 (29.8) | 314 (29.5) | 0.836 |
| Glucocorticoids | 1568 (28.4) | 433 (40.6) | <0.001 |
| Methotrexate | 795 (14.4) | 197 (18.5) | 0.001 |
| Other csDMARDs | 1003 (18.2) | 260 (24.4) | <0.001 |
| bDMARDs | 17 (0.3) | 2 (0.2) | 0.721 |

BMI = body mass index, AF = atrial fibrillation, MI = myocardial infarction, CCF = congestive cardiac failure, CKD = chronic kidney disease, COPD = chronic obstructive pulmonary disease, NSAIDs = non-steroidal anti-inflammatory drugs, csDMARDs = conventional synthetic disease-modifying antirheumatic drugs, bDMARDs = biological disease-modifying antirheumatic drugs.

**Appendix Table 2. Baseline characteristics among individuals with and without neutropenia**

|  | **No neutropenia (n=6553)** | **Neutropenia (n=38)** | **p** |
| --- | --- | --- | --- |
| Age (years) | 58.66 (15.56) | 59.84 (13.22) | 0.642 |
| Men | 2126 (32.4) | 16 (42.1) | 0.274 |
| Ethnicity |  |  | <0.001 |
| White | 4866 (91.9) | 17 (54.8) |  |
| Asian | 252 (4.8) | 3 (9.7) |  |
| Black | 117 (2.2) | 11 (35.5) |  |
| Mixed | 26 (0.5) | 0 (0.0) |  |
| Other | 36 (0.7) | 0 (0.0) |  |
| Smoking status |  |  | 0.521 |
| Never smoked | 1841 (30.0) | 12 (38.7) |  |
| Active smoker | 1343 (21.9) | 5 (16.1) |  |
| Ex-smoker | 2954 (48.1) | 14 (45.2) |  |
| BMI (kg/m2) | 27.67 (5.98) | 26.71 (4.83) | 0.349 |
| Comorbidities |  |  |  |
| Atrial Fibrillation | 236 (3.6) | 1 (2.6) | 1.000 |
| Hypertension | 2048 (31.3) | 15 (39.5) | 0.361 |
| Myocardial Infarction | 202 (3.1) | 0 (0.0) | 0.530 |
| Stroke | 251 (3.8) | 3 (7.9) | 0.381 |
| Heart Failure | 108 (1.6) | 0 (0.0) | 0.875 |
| CKD stages III-V | 614 (9.4) | 4 (10.5) | 1.000 |
| Diabetes | 732 (11.2) | 3 (7.9) | 0.703 |
| COPD | 465 (7.1) | 1 (2.6) | 0.451 |
| Asthma | 1114 (17.0) | 4 (10.5) | 0.399 |
| Malignancy | 367 (5.6) | 2 (5.3) | 1.000 |
| Metastatic cancer | 62 (0.9) | 0 (0.0) | 1.000 |
| Depression | 1848 (28.2) | 7 (18.4) | 0.248 |
| Haematological/lab values |  |  |  |
| Haemoglobin (g/L) | 13.24 (1.47) | 12.69 (1.80) | 0.020 |
| Neutrophil count (109/L) | 4.68 (2.61) | 1.25 (0.35) | <0.001 |
| Lymphocyte count (109/L) | 1.96 (0.91) | 1.57 (0.56) | 0.008 |
| Medications |  |  |  |
| NSAIDs | 1952 (29.8) | 10 (26.3) | 0.773 |
| Glucocorticoids | 1994 (30.4) | 7 (18.4) | 0.153 |
| Methotrexate | 987 (15.1) | 5 (13.2) | 0.921 |
| Other csDMARDs | 1257 (19.2) | 6 (15.8) | 0.747 |
| bDMARDs | 19 (0.3) | 0 (0.0) | 1.000 |

BMI = body mass index, AF = atrial fibrillation, MI = myocardial infarction, CCF = congestive cardiac failure, CKD = chronic kidney disease, COPD = chronic obstructive pulmonary disease, NSAIDs = non-steroidal anti-inflammatory drugs, csDMARDs = conventional synthetic disease-modifying antirheumatic drugs, bDMARDs = biological disease-modifying antirheumatic drugs.

**Appendix Table 3. Baseline characteristics among individuals with and without lymphopenia**

|  | **No lymphopenia (n=6494)** | **Lymphopenia (n=97)** | **p** |
| --- | --- | --- | --- |
| Age (years) | 58.59 (15.53) | 64.01 (15.25) | 0.001 |
| Men | 2110 (32.5) | 32 (33.0) | 1.000 |
| Ethnicity |  |  | 0.438 |
| White | 4809 (91.6) | 74 (97.4) |  |
| Asian | 253 (4.8) | 2 (2.6) |  |
| Black | 128 (2.4) | 0 (0.0) |  |
| Mixed | 26 (0.5) | 0 (0.0) |  |
| Other | 36 (0.7) | 0 (0.0) |  |
| Smoking status |  |  | 0.320 |
| Never smoked | 1821 (29.9) | 32 (36.8) |  |
| Active smoker | 1333 (21.9) | 15 (17.2) |  |
| Ex-smoker | 2928 (48.1) | 40 (46.0) |  |
| BMI (kg/m2) | 27.69 (5.96) | 26.05 (6.44) | 0.008 |
| Comorbidities |  |  |  |
| Atrial Fibrillation | 232 (3.6) | 5 (5.2) | 0.578 |
| Hypertension | 2030 (31.3) | 33 (34.0) | 0.637 |
| Myocardial Infarction | 197 (3.0) | 5 (5.2) | 0.365 |
| Stroke | 249 (3.8) | 5 (5.2) | 0.686 |
| Heart Failure | 107 (1.6) | 1 (1.0) | 0.943 |
| CKD stages III-V | 606 (9.3) | 12 (12.4) | 0.399 |
| Diabetes | 721 (11.1) | 14 (14.4) | 0.383 |
| COPD | 455 (7.0) | 11 (11.3) | 0.146 |
| Asthma | 1104 (17.0) | 14 (14.4) | 0.594 |
| Malignancy | 366 (5.6) | 3 (3.1) | 0.390 |
| Metastatic cancer | 60 (0.9) | 2 (2.1) | 0.534 |
| Depression | 1834 (28.2) | 21 (21.6) | 0.187 |
| Haematological/lab values |  |  |  |
| Haemoglobin (g/L) | 13.26 (1.46) | 12.18 (1.68) | <0.001 |
| Neutrophil count (109/L) | 4.66 (2.62) | 4.47 (2.66) | 0.483 |
| Lymphocyte count (109/L) | 1.98 (0.90) | 0.60 (0.15) | <0.001 |
| Medications |  |  |  |
| NSAIDs | 1941 (29.9) | 21 (21.6) | 0.099 |
| Glucocorticoids | 1943 (29.9) | 58 (59.8) | <0.001 |
| Methotrexate | 970 (14.9) | 22 (22.7) | 0.048 |
| Other csDMARDs | 1221 (18.8) | 42 (43.3) | <0.001 |
| bDMARDs | 18 (0.3) | 1 (1.0) | 0.674 |

BMI = body mass index, AF = atrial fibrillation, MI = myocardial infarction, CCF = congestive cardiac failure, CKD = chronic kidney disease, COPD = chronic obstructive pulmonary disease, NSAIDs = non-steroidal anti-inflammatory drugs, csDMARDs = conventional synthetic disease-modifying antirheumatic drugs, bDMARDs = biological disease-modifying antirheumatic drugs.

**Appendix Table 4. Infection events by infection type in individuals with RA**

| **Infection type** | **Infection event, number (%)** |
| --- | --- |
| Upper respiratory Tract Infection | 1294 (36.9) |
| Influenza-like illness | 103 (2.9) |
| Bronchitis | 190 (5.4) |
| Pneumonia | 89 (2.5) |
| Skin or Soft tissue infection | 892 (25.4) |
| Zoster infection | 237 (6.8) |
| Herpes infection | 47 (1.3) |
| Genital infection | 125 (3.6) |
| Urinary Tract Infection | 529 (15.1) |
| Total Infections | 3506 |

**Appendix Table 5. Clinical characteristics and vaccination status among individuals at diagnosis of RA and age- and sex-matched controls**

|  | **RA (n=3699)** | **No RA (n=3699)** | **p** |
| --- | --- | --- | --- |
| Age (years) | 61.96 (15.7) | 61.96 (15.7) | 1.00 |
| Male | 1169 (31.6) | 1169 (31.6) | 1.00 |
| Ethnicity |  |  | 0.014 |
| White | 2748 (92.2) | 2515 (93.7) |  |
| Asian | 134 (4.5) | 86 (3.2) |  |
| Black | 60 (2.0) | 66 (2.5) |  |
| Mixed | 18 (0.6) | 9 (0.3) |  |
| Other | 19 (0.6) | 9 (0.3) |  |
| Smoking status |  |  | <0.001 |
| Active smoker | 758 (20.7) | 659 (18.0) |  |
| Ex-smoker | 1826 (49.9) | 1736 (47.5) |  |
| Non-smoker | 1077 (29.4) | 1256 (34.4) |  |
| BMI (kg/m2) | 27.63 (6.09) | 27.26 (5.33) | 0.007 |
| COPD | 214 (5.8) | 161 (4.4) | 0.006 |
| Asthma | 583 (15.8) | 518 (14.0) | 0.037 |
| Diabetes | 470 (12.7) | 355 (9.6) | <0.001 |
| CKD stages III-V | 633 (17.1) | 473 (12.8) | <0.001 |
| Seropositive | 903 (24.4) | 86 (2.3) | <0.001 |
| Duration of RA (years) | 3.86 (2.35) | NA | NA |
| NSAIDS | 1540 (41.6) | 1802 (48.7) | <0.001 |
| Methotrexate | 32 (0.9) | 3 (0.1) | <0.001 |
| csDMARD | 253 (6.8) | 18 (0.5) | <0.001 |
| bDMARD\* | 0 (0.0) | 0 (0.0) | NA |
| Glucocorticoids | 116 (3.1) | 40 (1.1) | <0.001 |
| Previous Influenza vaccination | 2351 (63.6) | 1779 (48.1) | <0.001 |
| Previous Pneumococcal vaccination | 606 (16.4) | 460 (12.4) | <0.001 |

BMI = body mass index, CCF = congestive cardiac failure, CKD = chronic kidney disease, COPD = chronic obstructive pulmonary disease, NSAIDs = non-steroidal anti-inflammatory drugs, csDMARDs = conventional synthetic disease-modifying antirheumatic drugs, bDMARDs = biological disease-modifying antirheumatic drugs.