**Table S4** Prevalence of major comorbidities of patients with and without asthma according to age (A-1,2,3) and sex groups (B-1,2)

(A-1)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Age: 18–44 years | Patients with asthma (N, %) N = 468,401 | | Patients without asthma (N, %) N = 390,300 | | Adjusted OR (95% CI)\* | | |  |
| OR | Lower | Upper | P-value |
| Rhinitis | 414,726 | 88.54 | 188,404 | 48.27 | 1.861 | 1.854 | 1.867 | < .0001 |
| - Chronic Rhinitis | 44,385 | 9.48 | 15,645 | 4.01 | 2.550 | 2.503 | 2.598 | < .0001 |
| - Vasomotor and allergic rhinitis | 412,750 | 88.12 | 185,242 | 47.46 | 11.090 | 10.957 | 11.225 | < .0001 |
| DM | 16,554 | 3.53 | 9,627 | 2.47 | 1.453 | 1.418 | 1.490 | < .0001 |
| - T1DM | 530 | 0.11 | 364 | 0.09 | 1.231 | 1.077 | 1.407 | 0.0022 |
| - T2DM | 16,024 | 3.42 | 9,263 | 2.37 | 1.479 | 1.441 | 1.518 | < .0001 |
| Cardiovascular disease | 33,563 | 7.17 | 18,725 | 4.80 | 1.515 | 1.489 | 1.542 | < .0001 |
| * HTN | 20,220 | 4.32 | 12,001 | 3.07 | 1.424 | 1.393 | 1.456 | < .0001 |
| * AMI | 450 | 0.10 | 245 | 0.06 | 1.552 | 1.329 | 1.814 | < .0001 |
| Cerebrovascular disease | 3,520 | 0.75 | 2,084 | 0.53 | 1.428 | 1.353 | 1.507 | < .0001 |
| * Stroke | 713 | 0.15 | 484 | 0.12 | 1.245 | 1.109 | 1.397 | 0.0002 |
| Dementia | 343 | 0.07 | 230 | 0.06 | 1.260 | 1.067 | 1.490 | 0.0064 |
| - Dementia | 162 | 0.03 | 112 | 0.03 | 1.223 | 0.961 | 1.555 | 0.1020 |
| - Alzheimer’s disease | 12 | - | 5 | - | 2.029 | 0.715 | 5.758 | 0.2256 |
| Parkinson’s disease | 179 | 0.04 | 121 | 0.03 | 1.250 | 0.993 | 1.575 | 0.0635 |
| Psychiatric disorders | 68,789 | 14.69 | 33,129 | 8.49 | 1.755 | 1.733 | 1.777 | < .0001 |
| - Anxiety disorders | 31,991 | 6.83 | 14,520 | 3.72 | 1.928 | 1.889 | 1.967 | < .0001 |
| - Bipolar disorders | 3,507 | 0.75 | 2,005 | 0.51 | 1.482 | 1.403 | 1.566 | < .0001 |
| - Mood disorders | 4,556 | 0.97 | 2,154 | 0.55 | 1.796 | 1.706 | 1.891 | < .0001 |
| - Schizophrenia | 2,448 | 0.52 | 2,025 | 0.52 | 1.022 | 0.963 | 1.084 | 0.4795 |
| - Sleep disorders | 25,654 | 5.48 | 11,416 | 2.92 | 1.953 | 1.910 | 1.998 | < .0001 |
| - Somatoform disorders | 8,366 | 1.79 | 3,754 | 0.96 | 1.900 | 1.828 | 1.975 | < .0001 |
| - Symptoms and signs involving emotional state | 3,971 | 0.85 | 1,406 | 0.36 | 2.399 | 2.258 | 2.550 | < .0001 |
| - Depressive disorders | 18,396 | 3.93 | 9,190 | 2.35 | 1.721 | 1.678 | 1.766 | < .0001 |
| - Obsessive compulsive disorders | 938 | 0.20 | 516 | 0.13 | 1.538 | 1.381 | 1.712 | < .0001 |
| - Stress disorders | 3,716 | 0.79 | 1,913 | 0.49 | 1.647 | 1.559 | 1.741 | < .0001 |
| GERD | 158,324 | 33.80 | 70,580 | 18.08 | 1.896 | 1.881 | 1.911 | < .0001 |
| Osteoporosis | 3,011 | 0.64 | 2,025 | 0.52 | 1.257 | 1.188 | 1.329 | < .0001 |
| - Osteoporosis | 2,973 | 0.63 | 2,008 | 0.51 | 1.253 | 1.184 | 1.326 | < .0001 |
| - Osteoporosis with fracture | 62 | 0.01 | 29 | 0.01 | 1.807 | 1.163 | 2.809 | 0.0083 |
| Rheumatoid arthritis | 7,278 | 1.55 | 3,834 | 0.98 | 1.604 | 1.543 | 1.668 | < .0001 |
| Fatty liver disease | 9,600 | 2.05 | 5,089 | 1.30 | 1.594 | 1.542 | 1.649 | < .0001 |
| Dyslipidemia | 49,841 | 10.64 | 28,335 | 7.26 | 1.487 | 1.466 | 1.508 | < .0001 |
| Endocrine disorder | 40,900 | 8.73 | 62,888 | 16.11 | 1.300 | 1.285 | 1.315 | < .0001 |
| Obesity | 1,233 | 0.26 | 545 | 0.14 | 1.912 | 1.729 | 2.115 | < .0001 |
| Respiratory disease | 448,241 | 95.70 | 259,444 | 66.47 | 1.460 | 1.457 | 1.464 | < .0001 |
| - COPD | 9,916 | 2.12 | 377 | 0.10 | 22.231 | 20.060 | 24.637 | < .0001 |
| - Pneumonia | 55,373 | 11.82 | 6,075 | 1.56 | 7.704 | 7.505 | 7.908 | < .0001 |
| - Influenza | 14,070 | 3.00 | 5,185 | 1.33 | 2.294 | 2.222 | 2.367 | < .0001 |
| Herpes Zoster | 8,331 | 1.78 | 5,051 | 1.29 | 1.394 | 1.347 | 1.443 | < .0001 |
| Food Allergy | 1,149 | 0.25 | 587 | 0.15 | 1.654 | 1.498 | 1.827 | < .0001 |
| Anaphylaxis | 584 | 0.12 | 139 | 0.04 | 3.551 | 2.952 | 4.272 | < .0001 |
| Drug allergy | 1,085 | 0.23 | 368 | 0.09 | 2.492 | 2.214 | 2.805 | < .0001 |

\* adjusted for sex

OR: odds ratio, CI: confidence interval, URI: upper respiratory infection, HTN: hypertension, GERD: gastroesophageal reflux disease, DM: diabetes mellitus, T1DM: type 1 diabetes mellitus, T2DM: type 2 diabetes mellitus, AMI: acute myocardial infarction, COPD: chronic obstructive pulmonary disease

(A-2)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Age: 45–64 years | Patients with asthma (N, %) N = 585,880 | | Patients without asthma (N, %) N = 546,956 | | Adjusted OR (95% CI)\* | | |  |
| OR | Lower | Upper | P-value |
| Rhinitis | 487,047 | 83.13 | 232,182 | 42.45 | 1.990 | 1.983 | 1.996 | < .0001 |
| - Chronic Rhinitis | 48,918 | 8.35 | 18,728 | 3.42 | 2.618 | 2.573 | 2.663 | < .0001 |
| - Vasomotor and allergic rhinitis | 483,711 | 82.56 | 227,697 | 41.63 | 8.094 | 8.020 | 8.169 | < .0001 |
| DM | 105,301 | 17.97 | 82,294 | 15.05 | 1.214 | 1.204 | 1.224 | < .0001 |
| - T1DM | 2,075 | 0.35 | 1,567 | 0.29 | 1.257 | 1.177 | 1.342 | 0.0022 |
| - T2DM | 103,226 | 17.62 | 80,727 | 14.76 | 1.260 | 1.248 | 1.273 | < .0001 |
| Cardiovascular disease | 220,631 | 37.66 | 175,111 | 32.02 | 1.195 | 1.189 | 1.201 | < .0001 |
| * HTN | 184,667 | 31.52 | 151,548 | 27.71 | 1.156 | 1.149 | 1.162 | < .0001 |
| * AMI | 3,377 | 0.58 | 2,250 | 0.41 | 1.424 | 1.350 | 1.501 | < .0001 |
| Cerebrovascular disease | 30,938 | 5.28 | 24,176 | 4.42 | 1.214 | 1.194 | 1.234 | < .0001 |
| * Stroke | 10,533 | 1.80 | 8,999 | 1.65 | 1.110 | 1.080 | 1.142 | < .0001 |
| Dementia | 4,604 | 0.79 | 3,960 | 0.72 | 1.103 | 1.057 | 1.150 | < .0001 |
| - Dementia | 3,326 | 0.57 | 2,895 | 0.53 | 1.090 | 1.037 | 1.145 | 0.0007 |
| - Alzheimer’s disease | 334 | 0.06 | 286 | 0.05 | 1.108 | 0.946 | 1.297 | 0.2129 |
| Parkinson’s disease | 1,296 | 0.22 | 1,166 | 0.21 | 1.054 | 0.974 | 1.141 | 0.1964 |
| Psychiatric disorders | 166,789 | 28.47 | 98,843 | 18.07 | 1.600 | 1.589 | 1.612 | < .0001 |
| - Anxiety disorders | 82,567 | 14.09 | 44,803 | 8.19 | 1.876 | 1.853 | 1.899 | < .0001 |
| - Bipolar disorders | 5,045 | 0.86 | 3,507 | 0.64 | 1.368 | 1.310 | 1.428 | < .0001 |
| - Mood disorders | 12,120 | 2.07 | 6,455 | 1.18 | 1.798 | 1.744 | 1.854 | < .0001 |
| - Schizophrenia | 3,918 | 0.67 | 4,585 | 0.84 | 0.809 | 0.775 | 0.845 | < .0001 |
| - Sleep disorders | 72,630 | 12.40 | 38,868 | 7.11 | 1.886 | 1.862 | 1.911 | < .0001 |
| - Somatoform disorders | 22,046 | 3.76 | 11,884 | 2.17 | 1.790 | 1.750 | 1.831 | < .0001 |
| - Symptoms and signs involving emotional state | 9,099 | 1.55 | 4,274 | 0.78 | 2.036 | 1.963 | 2.112 | < .0001 |
| - Depressive disorders | 48,820 | 8.33 | 27,459 | 5.02 | 1.751 | 1.725 | 1.778 | < .0001 |
| - Obsessive compulsive disorders | 698 | 0.12 | 470 | 0.09 | 1.409 | 1.253 | 1.584 | < .0001 |
| - Stress disorders | 6,048 | 1.03 | 3,691 | 0.67 | 1.560 | 1.497 | 1.626 | < .0001 |
| GERD | 270,371 | 46.15 | 154,629 | 28.27 | 1.658 | 1.650 | 1.667 | < .0001 |
| Osteoporosis | 51,800 | 8.84 | 37,881 | 6.93 | 1.297 | 1.281 | 1.314 | < .0001 |
| - Osteoporosis | 50,609 | 8.64 | 37,138 | 6.79 | 1.321 | 1.303 | 1.340 | < .0001 |
| - Osteoporosis with fracture | 2,286 | 0.39 | 1,350 | 0.25 | 1.609 | 1.504 | 1.721 | < .0001 |
| Rheumatoid arthritis | 25,356 | 4.33 | 15,383 | 2.81 | 1.563 | 1.533 | 1.594 | < .0001 |
| Fatty liver disease | 27,402 | 4.68 | 19,247 | 3.52 | 1.350 | 1.326 | 1.375 | < .0001 |
| Dyslipidemia | 215,691 | 36.81 | 165,727 | 30.30 | 1.234 | 1.228 | 1.241 | < .0001 |
| Endocrine disorder | 232,019 | 39.60 | 181,754 | 33.23 | 1.211 | 1.205 | 1.217 | < .0001 |
| Obesity | 1,007 | 0.17 | 570 | 0.10 | 1.674 | 1.511 | 1.855 | < .0001 |
| Respiratory disease | 556,650 | 95.01 | 349,961 | 63.98 | 1.509 | 1.506 | 1.512 | < .0001 |
| - COPD | 49,100 | 8.38 | 2,408 | 0.44 | 19.339 | 18.567 | 20.143 | < .0001 |
| - Pneumonia | 84,547 | 14.43 | 11,322 | 2.07 | 7.082 | 6.947 | 7.220 | < .0001 |
| - Influenza | 15,225 | 2.60 | 5,339 | 0.98 | 2.705 | 2.622 | 2.790 | < .0001 |
| Herpes Zoster | 21,094 | 3.60 | 14,670 | 2.68 | 1.364 | 1.336 | 1.392 | < .0001 |
| Food Allergy | 1,698 | 0.29 | 906 | 0.17 | 1.778 | 1.640 | 1.927 | < .0001 |
| Anaphylaxis | 857 | 0.15 | 326 | 0.06 | 2.493 | 2.195 | 2.832 | < .0001 |
| Drug allergy | 1,739 | 0.30 | 760 | 0.14 | 2.170 | 1.993 | 2.363 | < .0001 |

\* adjusted for sex

OR: odds ratio, CI: confidence interval, URI: upper respiratory infection, HTN: hypertension, GERD: gastroesophageal reflux disease, DM: diabetes mellitus, T1DM: type 1 diabetes mellitus, T2DM: type 2 diabetes mellitus, AMI: acute myocardial infarction, COPD: chronic obstructive pulmonary disease.

(A-3)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Age: ≥ 65 years | Patients with asthma (N, %) N = 588,485 | | Patients without asthma (N, %) N = 536,766 | | Adjusted OR (95% CI)\* | | |  |
| OR | Lower | Upper | P-value |
| Rhinitis | 441,090 | 74.95 | 208,362 | 38.82 | 1.957 | 1.950 | 1.964 | < .0001 |
| - Chronic Rhinitis | 34,863 | 5.92 | 14,793 | 2.76 | 2.256 | 2.213 | 2.301 | < .0001 |
| - Vasomotor and allergic rhinitis | 437,522 | 74.35 | 204,310 | 38.06 | 5.315 | 5.271 | 5.359 | < .0001 |
| DM | 193,811 | 32.93 | 162,004 | 30.18 | 1.106 | 1.100 | 1.112 | < .0001 |
| - T1DM | 4,046 | 0.69 | 3,944 | 0.73 | 0.948 | 0.907 | 0.991 | 0.0177 |
| - T2DM | 189,765 | 32.25 | 158,060 | 29.45 | 1.166 | 1.156 | 1.175 | < .0001 |
| Cardiovascular disease | 423,119 | 71.90 | 357,518 | 66.61 | 1.094 | 1.092 | 1.097 | < .0001 |
| * HTN | 381,196 | 64.78 | 327,938 | 61.10 | 1.075 | 1.072 | 1.078 | < .0001 |
| * AMI | 10,047 | 1.71 | 6,661 | 1.24 | 1.395 | 1.352 | 1.438 | < .0001 |
| Cerebrovascular disease | 103,644 | 17.61 | 91,377 | 17.02 | 1.049 | 1.040 | 1.057 | < .0001 |
| * Stroke | 50,187 | 8.53 | 47,999 | 8.94 | 0.967 | 0.955 | 0.978 | < .0001 |
| Dementia | 58,328 | 9.91 | 64,684 | 12.05 | 0.834 | 0.825 | 0.843 | < .0001 |
| - Dementia | 51,341 | 8.72 | 58,026 | 10.81 | 0.818 | 0.809 | 0.827 | 0.0007 |
| - Alzheimer’s disease | 5,599 | 0.95 | 5,860 | 1.09 | 0.883 | 0.852 | 0.916 | < .0001 |
| Parkinson’s disease | 9,475 | 1.61 | 10,345 | 1.93 | 0.847 | 0.824 | 0.871 | < .0001 |
| Psychiatric disorders | 253,311 | 43.04 | 167,183 | 31.15 | 1.401 | 1.394 | 1.408 | < .0001 |
| - Anxiety disorders | 131,993 | 22.43 | 78,652 | 14.65 | 1.719 | 1.703 | 1.736 | < .0001 |
| - Bipolar disorders | 9,932 | 1.69 | 9,085 | 1.69 | 1.011 | 0.982 | 1.040 | 0.4596 |
| - Mood disorders | 19,398 | 3.30 | 11,064 | 2.06 | 1.643 | 1.605 | 1.682 | < .0001 |
| - Schizophrenia | 3,489 | 0.59 | 4,125 | 0.77 | 0.781 | 0.746 | 0.817 | < .0001 |
| - Sleep disorders | 116,204 | 19.75 | 69,588 | 12.96 | 1.684 | 1.667 | 1.702 | < .0001 |
| - Somatoform disorders | 32,956 | 5.60 | 18,586 | 3.46 | 1.679 | 1.648 | 1.710 | < .0001 |
| - Symptoms and signs involving emotional state | 13,379 | 2.27 | 6,459 | 1.20 | 1.937 | 1.880 | 1.996 | < .0001 |
| - Depressive disorders | 87,406 | 14.85 | 56,477 | 10.52 | 1.510 | 1.493 | 1.527 | < .0001 |
| - Obsessive compulsive disorders | 711 | 0.12 | 507 | 0.09 | 1.297 | 1.157 | 1.454 | < .0001 |
| - Stress disorders | 6,291 | 1.07 | 3,727 | 0.69 | 1.567 | 1.504 | 1.632 | < .0001 |
| GERD | 295,405 | 50.20 | 171,352 | 31.92 | 1.594 | 1.587 | 1.601 | < .0001 |
| Osteoporosis | 147,035 | 24.99 | 107,406 | 20.01 | 1.266 | 1.257 | 1.275 | < .0001 |
| - Osteoporosis | 139,132 | 23.64 | 101,862 | 18.98 | 1.349 | 1.336 | 1.361 | < .0001 |
| - Osteoporosis with fracture | 16,669 | 2.83 | 10,714 | 2.00 | 1.452 | 1.417 | 1.488 | < .0001 |
| Rheumatoid arthritis | 32,045 | 5.45 | 19,410 | 3.62 | 1.526 | 1.500 | 1.553 | < .0001 |
| Fatty liver disease | 22,969 | 3.90 | 16,525 | 3.08 | 1.285 | 1.260 | 1.311 | < .0001 |
| Dyslipidemia | 288,836 | 49.08 | 232,407 | 43.30 | 1.149 | 1.145 | 1.154 | < .0001 |
| Endocrine disorder | 331,111 | 56.26 | 268,881 | 50.09 | 1.139 | 1.135 | 1.143 | < .0001 |
| Obesity | 133 | 0.02 | 286 | 0.05 | 1.988 | 1.619 | 2.442 | < .0001 |
| Respiratory disease | 553,856 | 94.12 | 358,259 | 66.74 | 1.429 | 1.427 | 1.432 | < .0001 |
| - COPD | 136,193 | 23.14 | 10,744 | 2.00 | 11.720 | 11.496 | 11.948 | < .0001 |
| - Pneumonia | 130,594 | 22.19 | 25,568 | 4.76 | 4.722 | 4.662 | 4.784 | < .0001 |
| - Influenza | 16,022 | 2.72 | 5,158 | 0.96 | 2.872 | 2.784 | 2.963 | < .0001 |
| Herpes Zoster | 25,920 | 4.40 | 16,894 | 3.15 | 1.419 | 1.392 | 1.446 | < .0001 |
| Food Allergy | 2,082 | 0.35 | 1,102 | 0.21 | 1.747 | 1.624 | 1.879 | < .0001 |
| Anaphylaxis | 642 | 0.11 | 267 | 0.05 | 2.223 | 1.928 | 2.564 | < .0001 |
| Drug allergy | 1,743 | 0.30 | 930 | 0.17 | 1.733 | 1.600 | 1.876 | < .0001 |

\* adjusted for gender

OR: odds ratio, CI: confidence interval, URI: upper respiratory infection, HTN: hypertension, GERD: gastroesophageal reflux disease, DM: diabetes mellitus, T1DM: type 1 diabetes mellitus, T2DM: type 2 diabetes mellitus, AMI: acute myocardial infarction, COPD: chronic obstructive pulmonary disease

(B-1)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Male | Patients with asthma (N, %) N = 637,934 | | Patients without asthma (N, %) N = 552,106 | | Adjusted OR (95% CI)\* | | |  |
| OR | Lower | Upper | P-value |
| Rhinitis | 510,981 | 83.03 | 213,292 | 39.52 | 2.101 | 2.094 | 2.109 | < 0.0001 |
| - Chronic Rhinitis | 48,453 | 7.87 | 16,744 | 3.10 | 2.670 | 2.622 | 2.718 | < 0.0001 |
| - Vasomotor and allergic rhinitis | 507,432 | 82.46 | 209,124 | 38.74 | 7.433 | 7.369 | 7.496 | < 0.0001 |
| DM | 134,496 | 21.86 | 111,170 | 20.60 | 1.061 | 1.054 | 1.069 | < 0.0001 |
| - T1DM | 3,075 | 0.50 | 2,584 | 0.48 | 1.044 | 0.991 | 1.100 | 0.1090 |
| - T2DM | 131,421 | 21.36 | 108,586 | 20.12 | 1.078 | 1.069 | 1.088 | < .0001 |
| Cardiovascular disease | 274,797 | 44.65 | 224,800 | 41.65 | 1.072 | 1.068 | 1.077 | < .0001 |
| * HTN | 238,313 | 38.73 | 202,135 | 37.45 | 1.034 | 1.029 | 1.039 | < .0001 |
| * AMI | 7,905 | 1.28 | 5,315 | 0.98 | 1.305 | 1.260 | 1.350 | < .0001 |
| Cerebrovascular disease | 57,944 | 9.42 | 49,157 | 9.11 | 1.034 | 1.022 | 1.046 | < .0001 |
| * Stroke | 28,089 | 4.56 | 26,380 | 4.89 | 0.934 | 0.919 | 0.949 | < .0001 |
| Dementia | 22,154 | 3.60 | 22,395 | 4.15 | 0.863 | 0.847 | 0.880 | < .0001 |
| - Dementia | 18,720 | 3.04 | 19,368 | 3.59 | 0.848 | 0.831 | 0.865 | < 0.0001 |
| - Alzheimer’s disease | 2,065 | 0.34 | 2,038 | 0.38 | 0.889 | 0.836 | 0.945 | 0.0002 |
| Parkinson’s disease | 4,464 | 0.73 | 4,318 | 0.80 | 0.907 | 0.870 | 0.945 | 0.0009 |
| Psychiatric disorders | 166,509 | 27.06 | 94,145 | 17.44 | 1.551 | 1.540 | 1.562 | < 0.0001 |
| - Anxiety disorders | 80,406 | 13.07 | 40,941 | 7.58 | 1.831 | 1.809 | 1.854 | < 0.0001 |
| - Bipolar disorders | 7,381 | 1.20 | 5,274 | 0.98 | 1.230 | 1.187 | 1.275 | < 0.0001 |
| - Mood disorders | 11,810 | 1.92 | 5,868 | 1.09 | 1.780 | 1.725 | 1.837 | < 0.0001 |
| - Schizophrenia | 4,384 | 0.71 | 3,921 | 0.73 | 0.981 | 0.939 | 1.024 | 0.3773 |
| - Sleep disorders | 75,929 | 12.34 | 39,255 | 7.27 | 1.795 | 1.772 | 1.818 | < 0.0001 |
| - Somatoform disorders | 19,343 | 3.14 | 9,621 | 1.78 | 1.788 | 1.745 | 1.833 | < 0.0001 |
| - Symptoms and signs involving emotional state | 8,821 | 1.43 | 3,533 | 0.65 | 2.207 | 2.122 | 2.296 | < 0.0001 |
| - Depressive disorders | 50,984 | 8.28 | 28,550 | 5.29 | 1.618 | 1.594 | 1.642 | < 0.0001 |
| - Obsessive compulsive disorders | 1,014 | 0.16 | 550 | 0.10 | 1.577 | 1.422 | 1.751 | < .0001 |
| - Stress disorders | 5,003 | 0.81 | 2,663 | 0.49 | 1.653 | 1.577 | 1.733 | < .0001 |
| GERD | 267,357 | 43.44 | 139,047 | 25.76 | 1.687 | 1.678 | 1.696 | < .0001 |
| Osteoporosis | 25,420 | 4.13 | 14,470 | 2.68 | 1.795 | 1.524 | 2.121 | < .0001 |
| - Osteoporosis | 23,948 | 3.89 | 13,736 | 2.54 | 1.551 | 1.518 | 1.584 | < .0001 |
| - Osteoporosis with fracture | 2,458 | 0.40 | 1,173 | 0.22 | 1.841 | 1.718 | 1.974 | < .0001 |
| Rheumatoid arthritis | 18,182 | 2.95 | 9,798 | 1.82 | 1.628 | 1.589 | 1.668 | < .0001 |
| Fatty liver disease | 26,206 | 4.26 | 18,226 | 3.38 | 1.261 | 1.238 | 1.285 | < .0001 |
| Dyslipidemia | 210,104 | 34.14 | 161,054 | 29.84 | 1.144 | 1.138 | 1.150 | < .0001 |
| Endocrine disorder | 196,888 | 31.99 | 153,227 | 28.39 | 1.127 | 1.121 | 1.133 | < .0001 |
| Obesity | 390 | 0.06 | 173 | 0.03 | 1.977 | 1.653 | 2.365 | < .0001 |
| Respiratory disease | 604,476 | 98.23 | 338,713 | 62.75 | 1.565 | 1.562 | 1.569 | < .0001 |
| - COPD | 120,090 | 19.51 | 7,728 | 1.43 | 13.630 | 13.324 | 13.943 | < .0001 |
| - Pneumonia | 108,072 | 17.56 | 17,225 | 3.19 | 5.503 | 5.418 | 5.590 | < .0001 |
| - Influenza | 14,704 | 2.39 | 4,760 | 0.88 | 2.710 | 2.623 | 2.799 | < .0001 |
| Herpes Zoster | 18,443 | 3.00 | 11,582 | 2.15 | 1.397 | 1.365 | 1.429 | < .0001 |
| Food Allergy | 1,836 | 0.30 | 920 | 0.17 | 1.750 | 1.617 | 1.895 | < .0001 |
| Anaphylaxis | 877 | 0.14 | 332 | 0.06 | 2.317 | 2.042 | 2.629 | < .0001 |
| Drug allergy | 1,635 | 0.27 | 709 | 0.13 | 2.023 | 1.852 | 2.209 | < .0001 |

\* adjusted for age groups (18–44, 45–64, or ≥ 65)

OR: odds ratio, CI: confidence interval, URI: upper respiratory infection, HTN: hypertension, GERD: gastroesophageal reflux disease, DM: diabetes mellitus, T1DM: type 1 diabetes mellitus, T2DM: type 2 diabetes mellitus, AMI: acute myocardial infarction, COPD: chronic obstructive pulmonary disease

(B-2)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Female | Patients with asthma (N, %) N = 1,004,832 | | Patients without asthma (N, %) N = 921,916 | | Adjusted OR (95% CI)\* | | |  |
| OR | Lower | Upper | P-value |
| Rhinitis | 831,882 | 85.98 | 415,656 | 46.12 | 1.864 | 1.860 | 1.869 | < .0001 |
| - Chronic Rhinitis | 79,713 | 8.24 | 32,422 | 3.60 | 2.406 | 2.375 | 2.438 | < .0001 |
| - Vasomotor and allergic rhinitis | 826,551 | 85.43 | 408,125 | 45.28 | 7.086 | 7.036 | 7.135 | < .0001 |
| DM | 181,170 | 18.73 | 142,755 | 15.84 | 1.182 | 1.175 | 1.190 | < .0001 |
| - T1DM | 3,576 | 0.37 | 3,291 | 0.37 | 1.012 | 0.965 | 1.061 | 0.6199 |
| - T2DM | 177,594 | 18.36 | 139,464 | 15.47 | 1.228 | 1.219 | 1.238 | < .0001 |
| Cardiovascular disease | 402,516 | 41.60 | 326,554 | 36.23 | 1.148 | 1.144 | 1.152 | < .0001 |
| * HTN | 347,770 | 35.94 | 289,352 | 32.10 | 1.120 | 1.115 | 1.124 | < .0001 |
| * AMI | 5,969 | 0.62 | 3,841 | 0.43 | 1.448 | 1.390 | 1.507 | < .0001 |
| Cerebrovascular disease | 80,158 | 8.28 | 68,480 | 7.60 | 1.090 | 1.080 | 1.101 | < .0001 |
| * Stroke | 33,344 | 3.45 | 31,102 | 3.45 | 1.001 | 0.986 | 1.017 | 0.4349 |
| Dementia | 41,121 | 4.25 | 46,479 | 5.16 | 0.824 | 0.814 | 0.835 | < .0001 |
| - Dementia | 36,109 | 3.73 | 41,665 | 4.62 | 0.807 | 0.796 | 0.819 | < .0001 |
| - Alzheimer’s disease | 3,880 | 0.40 | 4,113 | 0.46 | 0.879 | 0.841 | 0.918 | < .0001 |
| Parkinson’s disease | 6,486 | 0.67 | 7,314 | 0.81 | 0.826 | 0.799 | 0.854 | < .0001 |
| Psychiatric disorders | 322,380 | 33.32 | 205,010 | 22.75 | 1.465 | 1.458 | 1.472 | < .0001 |
| - Anxiety disorders | 166,145 | 17.17 | 97,034 | 10.77 | 1.718 | 1.704 | 1.733 | < .0001 |
| - Bipolar disorders | 11,103 | 1.15 | 9,323 | 1.03 | 1.111 | 1.080 | 1.142 | < .0001 |
| - Mood disorders | 24,264 | 2.51 | 13,805 | 1.53 | 1.654 | 1.619 | 1.689 | < .0001 |
| - Schizophrenia | 5,471 | 0.57 | 6,814 | 0.76 | 0.747 | 0.720 | 0.774 | < .0001 |
| - Sleep disorders | 138,559 | 14.32 | 80,617 | 8.94 | 1.702 | 1.686 | 1.717 | < .0001 |
| - Somatoform disorders | 44,025 | 4.55 | 24,603 | 2.73 | 1.699 | 1.672 | 1.726 | < .0001 |
| - Symptoms and signs involving emotional state | 17,628 | 1.82 | 8,606 | 0.95 | 1.925 | 1.876 | 1.976 | < .0001 |
| - Depressive disorders | 103,638 | 10.71 | 64,576 | 7.16 | 1.554 | 1.539 | 1.571 | < .0001 |
| - Obsessive compulsive disorders | 1,333 | 0.14 | 943 | 0.10 | 1.317 | 1.212 | 1.432 | < .0001 |
| - Stress disorders | 11,052 | 1.14 | 6,668 | 0.74 | 1.550 | 1.504 | 1.598 | < .0001 |
| GERD | 456,743 | 47.21 | 257,514 | 28.57 | 1.652 | 1.646 | 1.659 | < .0001 |
| Osteoporosis | 176,426 | 18.23 | 132,842 | 14.74 | 1.237 | 1.229 | 1.245 | < .0001 |
| - Osteoporosis | 168,766 | 17.44 | 127,272 | 14.12 | 1.285 | 1.275 | 1.295 | < .0001 |
| - Osteoporosis with fracture | 16,559 | 1.71 | 10,920 | 1.21 | 1.420 | 1.386 | 1.455 | < .0001 |
| Rheumatoid arthritis | 46,497 | 4.81 | 28,829 | 3.20 | 1.503 | 1.481 | 1.524 | < .0001 |
| Fatty liver disease | 33,765 | 3.49 | 22,635 | 2.51 | 1.390 | 1.367 | 1.413 | < .0001 |
| Dyslipidemia | 344,264 | 35.58 | 265,415 | 29.45 | 1.208 | 1.203 | 1.213 | < .0001 |
| Endocrine disorder | 429,130 | 44.35 | 338,308 | 37.54 | 1.182 | 1.178 | 1.186 | < .0001 |
| Obesity | 2,135 | 0.22 | 1,075 | 0.12 | 1.850 | 1.719 | 1.991 | < .0001 |
| Respiratory disease | 954,271 | 98.63 | 628,951 | 69.78 | 1.413 | 1.411 | 1.415 | < .0001 |
| - COPD | 75,119 | 7.76 | 5,801 | 0.64 | 12.063 | 11.747 | 12.388 | < .0001 |
| - Pneumonia | 162,442 | 16.79 | 25,740 | 2.86 | 5.879 | 5.804 | 5.955 | < .0001 |
| - Influenza | 30,613 | 3.16 | 10,922 | 1.21 | 2.611 | 2.555 | 2.668 | < 0.0001 |
| Herpes Zoster | 36,902 | 3.81 | 25,033 | 2.78 | 1.373 | 1.352 | 1.395 | < 0.0001 |
| Food Allergy | 3,093 | 0.32 | 1,675 | 0.19 | 1.720 | 1.621 | 1.825 | < 0.0001 |
| Anaphylaxis | 1,206 | 0.12 | 400 | 0.04 | 2.809 | 2.508 | 3.145 | < 0.0001 |
| Drug allergy | 2,932 | 0.30 | 1,349 | 0.15 | 2.025 | 1.898 | 2.159 | < 0.0001 |

\* adjusted for age groups (18–44, 45–64, and ≥ 65)

OR: odds ratio, CI: confidence interval, URI: upper respiratory infection, HTN: hypertension, GERD: gastroesophageal reflux disease, DM: diabetes mellitus, T1DM: type 1 diabetes mellitus, T2DM: type 2 diabetes mellitus, AMI: acute myocardial infarction, COPD: chronic obstructive pulmonary disease