**Table S5** Top 20 comorbidities of patients with asthma according to asthma severity and control state

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Severity (N,%)** | **Hospitalization rate (N,%)** | **Control status in severe asthma (N,%)** |
| Non-severe asthma (N = 1,595,847) | Severe asthma (N = 46,919) | Never (N = 1,609,936) | 1–2 (N = 32,084)  | ≥ 3 (N = 746) | Uncontrolled (N = 14,686) | Controlled (N = 32,233) |
| 1 | Bronchitis |  1,321,549  |  82.99  | Bronchitis | 34,526 | 73.58 | Vasomotor and allergic rhinitis |  1,314044 | 81.62 | Bronchitis |  26,030  |  81.13  | Bronchitis |  597  |  80.03  | Vasomotor and allergic rhinitis |  11,654  | 79.35 | Bronchitis |  23,065 |  64.85 |
| 2 | Vasomotor and allergic rhinitis | 1,304,123 | 81.89 | URI | 30,411 | 64.81 | Bronchitis |  1,329,448  |  82.58  | Vasomotor and allergic rhinitis |  19,382  | 60.41 | Pneumonia  |  587  |  78.69  | Bronchitis |  11,461  | 78.04 | Vasomotor and allergic rhinitis |  18,206  |  56.48  |
| 3 | URI |  1,267,096  |  79.57  | Vasomotor and allergic rhinitis | 29,860 | 63.64 | URI |  1,275,442  |  79.22  | URI |  21,636  |  67.44  | COPD |  576  |  77.21  | URI |  9,657  | 65.76 | URI |  20,754  |  58.35  |
| 4 | GERD | 705,407 | 44.30 | HTN | 19,422 | 41.39 | GERD |  705,522  |  43.82  | Pneumonia |  19,016  |  59.27  | Vasomotor and allergic rhinitis |  560  |  75.07  | GERD |  7,561  | 51.48 | HTN |  12,612  |  39.12  |
| 5 | HTN | 566,661 | 35.58 | GERD | 18,693 | 39.84 | HTN |  567,971  |  35.28  | GERD |  18,080  |  56.35  | GERD |  498  |  66.76  | COPD |  7,314 | 49.80 | GERD |  11,132  | 34.54 |
| 6 | Dyslipidemia | 538,636 | 33.82 | COPD | 17,870 | 38.09 | Dyslipidemia |  540,225  |  33.56  | HTN |  17,635  |  54.97  | HTN |  477  |  63.94  | HTN |  6,828  | 46.47 | Dyslipidemia  |  10,117  |  31.39  |
| 7 | Contact Dermatitis |  481,516  |  30.24  | Dyslipidemia | 15,732 | 33.53 | Contact Dermatitis |  485,078  |  30.13  | COPD |  16,159  |  50.36  | URI |  429  |  57.51  | Dyslipidemia | 5,615 | 38.23 | COPD |  10,556  |  32.75  |
| 8 | Conjunctivitis |  451,379  |  28.34  | Conjunctivitis | 12,690 | 27.05 | Conjunctivitis |  455,884  |  28.32  | Dyslipidemia |  13,015  |  40.56  | Chronic Bronchitis |  367  |  49.20  | Pneumonia |  5,210  | 35.47 | Conjunctivitis |  8,587  |  26.64  |
| 9 | Gastric ulcer |  406,218  |  25.51  | Contact Dermatitis | 12,593 | 26.84 | Gastric ulcer |  407,253  |  25.30  | Functional intestinal disorders |  11,228  |  35.00  | Functional intestinal disorders  |  332  |  44.50  | Chronic Bronchitis |  4,599  | 31.32 | Contact Dermatitis |  8,356  |  25.92  |
| 10 | Functional intestinal disorders |  366,101  |  22.99  | DM | 10,388 | 22.14 | Functional intestinal disorders |  365,957  |  22.73  | Chronic Bronchitis |  11,200  |  34.91  | Dyslipidemia |  328  |  43.97  | Contact Dermatitis |  4,237  | 28.85 | DM |  7,331  |  22.74  |
| 11 | DM | 305,278 | 19.17 | Chronic Bronchitis | 11,588 | 24.70 | DM |  305,282  |  18.96  | DM |  10,066  |  31.37  | DM |  318  |  42.63  | Conjunctivitis |  4,103  | 27.94 | Functional intestinal disorders |  7,047  | 21.86 |
| 12 | Urticaria |  289,077  |  18.15  | Pneumonia | 10,552 | 22.49 | Urticaria |  290,439  |  18.04  | Gastric ulcer |  9,947  |  31.00  | Sleep disorders |  262  |  35.12  | Functional intestinal disorders |  4,039  | 27.50 | Chronic bronchitis |  6,989  |  21.68  |
| 13 | Irritable bowel syndrome |  280,650  |  17.62  | Functional intestinal disorders | 11,086 | 23.63 | Irritable bowel syndrome |  282,041  |  17.52  | Contact Dermatitis |  9,273  |  28.90  | Gastric ulcer |  254  |  34.05  | Gastric ulcer |  4,003  | 27.25 | Gastric ulcer |  6,921  |  21.47  |
| 14 | Chronic Bronchitis |  274,247  |  17.22  | Gastric ulcer | 10,924 | 23.28 | Chronic Bronchitis |  274,592  |  17.06  | Conjunctivitis |  8,526  |  26.57  | Anxiety disorders |  226  |  30.29  | DM |  3,057  | 20.82 | Pneumonia |  5,342  |  16.57  |
| 15 | Arthritis |  271,300  |  17.04  | BPH | 7,993 | 17.04 | Arthritis |  272,027  |  16.90  | Sleep disorders |  7,900  |  24.62  | Contact Dermatitis |  215  |  28.82  | Urticaria |  2,985  | 20.33 | BPH |  5,329  | 16.53 |
| 16 | Keratitis |  266,912  |  16.76  | Keratitis | 7,630 | 16.26 | Keratitis |  269,703  |  16.75  | Anxiety disorders |  7,641  |  23.82  | Angina pectoris |  196  |  26.27  | Sleep disorders |  2,665  | 19.51 | Keratitis  |  5,002  |  15.52  |
| 17 | Pneumonia | 259,962 | 16.32 | Arthritis | 7,623 | 16.25 | Chronic sinusitis |  262,758  |  16.32  | Arthritis |  6,966  |  21.71  | BPH |  184  |  24.66  | Arthritis |  2,714  | 19.44 | Arthritis |  4,909  |  15.23  |
| 18 | Chronic sinusitis |  260,906  |  16.38  | Sleep disorder | 6,857 | 14.61 | Pneumonia |  250,911  |  15.59  | Osteoporosis |  6,293  |  19.61  | Conjunctivitis |  182  |  24.40  | Anxiety disorders |  2,807 | 18.14 | Cataract |  4,951  |  13.92  |
| 19 | Anxiety disorder | 239,700 | 15.05 | Anxiety disorder | 6,851 | 14.60 | Anxiety disorder |  238,684  |  14.83  | Urticaria |  6,055  |  18.87  | Heart failure |  176  |  23.59  | BPH |  2,664  | 18.13 | Irritable bowel syndrome |  4,302  |  13.34  |
| 20 | Sleep disorder | 207,631 | 13.04 | Urticaria | 7,353 | 15.67 | Sleep disorder |  206,326  |  12.82  | Irritable bowel syndrome |  5,892  | 18.36 | Depressive disorder |  173  |  23.19  | Irritable bowel syndrome |  2,619  | 17.83 | Sleep disorders |  4,192 |  13.01 |

\* n, %

URI: Upper respiratory infection, HTN: hypertension, GERD: Gastroesophageal reflux disease, DM: diabetes mellitus, BPH: benign prostatic hyperplasia