Supplementary Text 1. Standardized difference calculations

- Standardized differences of continuous variables were calculated as the absolute difference in the means divided by the square root of the average of the squared standard deviations.
- Standardized differences of categorical variables were calculated as \((P_1 - P_2)/\sqrt{p(1-p)}\), where \(P_1 = \) the proportion of participants in the COPD+ cohort, \(P_2 = \) the proportion of participants in COPD− cohort, and \(p = (P_1 + P_2)/2\).
| Diagnosis       | Definition                                                                                                                                 |
|-----------------|------------------------------------------------------------------------------------------------------------------------------------------|
| COPD (modified  | ≥1 claim for an inpatient stay with COPD as a primary diagnosis (ICD-9-CM: 491, 492, 496; ICD-10-CM: J41, J42, J43, J44) |
| from Dalal et al¹) | • ≥1 claim for an outpatient visit with COPD as a primary diagnosis and ≥1 outpatient visit with a diagnosis of COPD (in any position) on a separate date within 12 months  |
|                 | • ≥1 claim with a diagnosis of COPD (in any position) and a filled prescription for a COPD maintenance treatment within 12 months (LAMA, LABA, ICS/LABA, LABA/LAMA, ICS/LABA/LAMA) |
|                 | ≥1 claim for an outpatient visit with COPD as a primary diagnosis and ≥1 outpatient visit with a diagnosis of COPD (in any position) on a separate date within 12 months  |
|                 | • ≥1 claim with a diagnosis of COPD (in any position) and a filled prescription for a COPD maintenance treatment within 12 months (LAMA, LABA, ICS/LABA, LABA/LAMA, ICS/LABA/LAMA) |
| HZ              | ≥1 claim associated with a diagnosis of HZ (ICD-9-CM: 053 excluding 053.1; ICD-10-CM: B02 excluding B02.2)                                         |
| PHN             | ≥1 claim associated with a diagnosis of PHN (ICD-9-CM: 053.1; ICD-10-CM: B02.2) and ≥1 claim for a medication or pain intervention ≥90 days after the PHN or HZ claim |
| HZO             | • ≥1 claim associated with a diagnosis of HZO (ICD-9-CM: 053.21, 053.22, 053.29; ICD-10-CM: B02.31, B02.32, B02.33, B02.34, B02.39)               |
|                 | • ≥1 claim associated with a diagnosis of eye complications within 30 days of an HZ diagnosis (ICD-9-CM: 363.20, 364.3, 369, 370, 379.0, 379.43; ICD-10-CM: H15.0, H15.1, H16, H20.9, H30.93, H54, H57.04) |
| Asthma          | ≥1 claim associated with an asthma diagnosis (ICD-9-CM: 493; ICD-10-CM: J45)                                                                |

COPD, chronic obstructive pulmonary disease; HZ, herpes zoster; HZO, herpes zoster ophthalmicus; ICD-9-CM, International Classification of Diseases, Ninth Revision, Clinical Modification; ICD-10-CM, International Classification of Diseases, Tenth Revision, Clinical Modification; ICS, inhaled corticosteroids; LABA, long-acting beta agonist; LAMA, long-acting muscarinic antagonist; PHN, postherpetic neuralgia.

**Reference**

1. Dalal AA, Liu F, Riedel AA. Cost trends among commercially insured and Medicare Advantage-insured patients with chronic obstructive pulmonary disease: 2006 through 2009. *Int J Chron Obstruct Pulmon Dis*. 2011;6:533–542.
## Supplementary Table 2. Baseline CCI data

| CCI score, ‡ n (%) | COPD+ cohort (n=161,970) | COPD– cohort (n=9,643,522) | Standardized difference† |
|-------------------|-------------------------|----------------------------|--------------------------|
| 0                 | 30,416 (18.6)           | 8,953,790 (92.8)           | 149.5%                   |
| 1                 | 62,277 (38.4)           | 2,444,060 (2.5)            | 89.0%                    |
| 2-4               | 54,140 (33.4)           | 3,872,228 (4.0)            | 75.4%                    |
| ≥5                | 15,407 (9.5)            | 58,044 (0.6)               | 40.7%                    |

### CCI conditions, n (%)

| Condition                                      | COPD+ cohort | COPD– cohort | Standardized difference† |
|------------------------------------------------|--------------|--------------|--------------------------|
| Chronic pulmonary disease§                     | 116,860 (72.1)| 176,176 (1.8) | 145.7%                   |
| Congestive heart failure                       | 33,293 (20.6)| 149,255 (1.5) | 60.6%                    |
| Diabetes without chronic complications         | 29,990 (18.5)| 330,558 (3.4)| 48.3%                    |
| Peripheral vascular disease                    | 26,968 (16.6)| 117,387 (1.2)| 54.1%                    |
| Renal disease                                  | 23,242 (14.3)| 147,683 (1.5)| 47.4%                    |
| Cerebrovascular disease                        | 18,487 (11.4)| 138,683 (1.4)| 40.7%                    |
| Diabetes with chronic complications            | 17,582 (10.9)| 128,350 (1.3)| 39.8%                    |
| Any malignancy¶                                | 15,935 (9.8) | 138,489 (1.4) | 36.4%                    |
| Myocardial infarction                          | 11,756 (7.3) | 72,995 (0.8)  | 33.1%                    |
| Mild liver disease                             | 6,239 (3.9)  | 51,409 (0.5)  | 22.7%                    |
| Rheumatologic disease                          | 6,389 (3.9)  | 49,259 (0.5)  | 23.3%                    |
| Dementia                                       | 5,612 (3.5)  | 55,656 (0.6)  | 20.5%                    |
| Metastatic solid tumor                         | 2,980 (1.8)  | 29,252 (0.3)  | 14.9%                    |
| Peptic ulcer disease                           | 2,522 (1.6)  | 19,414 (0.2)  | 14.5%                    |
| Hemiplegia or paraplegia                       | 1,975 (1.2)  | 23,111 (0.2)  | 11.5%                    |
| Moderate or severe liver disease               | 853 (0.5)    | 72,31 (0.1)   | 8.2%                     |
| AIDS/HIV                                       | 357 (0.2)    | 5,332 (0.1)   | 4.5%                     |

AIDS, acquired immune deficiency syndrome; CCI, Charlson-Quan Comorbidity Index; COPD, chronic obstructive pulmonary disease; HIV, human immunodeficiency virus; n, number of patients.

† Standardized differences of 20%, 50%, and 80% suggest small, medium, and large differences, respectively.¹

‡ Computed according to the methods outlined in Quan et al.²

§ Chronic pulmonary disease included COPD, pulmonary heart disease, bronchitis, asthma, bronchiectasis, pneumoconiosis, etc. As the index date was the later of the first observed COPD diagnosis or 6 months after the start of continuous enrollment, not all patients in the COPD+ cohort had this in their baseline period.

¶ Including leukemia and lymphoma, but not malignant neoplasms of the skin.

### References

1. Cohen J. Statistical power analysis for the behavioral sciences. 2nd ed. Mahwah (NJ): Lawrence Erlbaum Associates; 1988.
2. Quan H, Li B, Couris CM, et al. Updating and validating the Charlson comorbidity index and score for risk adjustment in hospital discharge abstracts using data from 6 countries. *Am J Epidemiol.* 2011;173(6):676–682.
Supplementary Table 3. Baseline demographic and clinical characteristics of patients with incident HZ

| Characteristic                              | COPD+/HZ+ cohort (n=6430) | COPD−/HZ+ cohort (n=69524) | Standardized difference† |
|---------------------------------------------|----------------------------|-----------------------------|--------------------------|
| Age at incident HZ (y), mean±SD             | 73.0±9.6                   | 65.9±12.5                   | 63.8%                    |
| 40-49 y, n (%)                              | 109 (1.7)                  | 8974 (12.9)                 | 43.1%                    |
| 50-59 y, n (%)                              | 628 (9.8)                  | 16167 (23.3)                | 36.3%                    |
| 60-69 y, n (%)                              | 1419 (22.1)                | 16120 (23.2)                | 2.7%                     |
| 70-79 y, n (%)                              | 2611 (40.6)                | 17268 (24.8)                | 33.6%                    |
| ≥80 y, n (%)                                | 1663 (25.9)                | 10995 (15.8)                | 24.7%                    |
| Male, n (%)                                 | 2539 (39.5)                | 26188 (37.7)                | 3.7%                     |
| Race/ethnicity, n (%)                       |                            |                             |                          |
| White                                       | 4271 (66.4)                | 44409 (63.9)                | 5.3%                     |
| Black                                       | 523 (8.1)                  | 4582 (6.6)                  | 5.9%                     |
| Hispanic                                    | 430 (6.7)                  | 6245 (9.0)                  | 8.5%                     |
| Asian                                       | 144 (2.2)                  | 2311 (3.3)                  | 6.6%                     |
| Unknown                                     | 1062 (16.5)                | 11977 (17.2)                | 1.9%                     |
| Geographic region, n (%)                   |                            |                             |                          |
| South                                       | 2589 (40.3)                | 26885 (38.7)                | 3.3%                     |
| West                                        | 1617 (25.1)                | 16847 (24.2)                | 2.1%                     |
| Midwest                                     | 1420 (22.1)                | 17350 (25.0)                | 6.8%                     |
| Northeast                                   | 781 (12.1)                 | 8226 (11.8)                 | 1.0%                     |
| Unknown                                     | 23 (0.4)                   | 216 (0.3)                   | 0.8%                     |
| Insurance type, n (%)                       |                            |                             |                          |
| Medicare Advantage                          | 5592 (87.0)                | 37525 (54.0)                | 72.3%                    |
| Commercial                                  | 838 (13.0)                 | 31999 (46.0)                | –                        |
| Asthma, n (%)                               | 1190 (18.5)                | 2809 (4.0)                  | 45.7%                    |
| CCI score,‡ mean±SD                         | 2.2±2.0                    | 0.7±1.4                     | 89.5%                    |
| Use of oral corticosteroids, n (%)          | 2811 (43.7)                | 14764 (21.2)                | 48.0%                    |
| Short-term use§                             | 2337 (83.1)                | 13465 (91.2)                | 24.1%                    |
| Long-term use¶                              | 474 (16.9)                 | 1299 (8.8)                  | –                        |
| Use of inhaled corticosteroids, n (%)       | 2124 (33.0)                | 1445 (2.1)                  | 81.4%                    |
| Use of immunosuppressants, n (%)            | 80 (1.2)                   | 574 (0.8)                   | 4.1%                     |

CCI, Charlson-Quan Comorbidity Index; COPD, chronic obstructive pulmonary disease; HZ, herpes zoster; n, number of patients; SD, standard deviation; y, years.

†Standardized differences of 20%, 50%, and 80% suggest small, medium, and large differences, respectively.‡
| Dummy description | Example |
|--------------------|---------|
| Reference          | 1. Cohen J. Statistical power analysis for the behavioral sciences. 2nd ed. Mahwah (NJ): Lawrence Erlbaum Associates; 1988. 
2. Quan H, Li B, Couris CM, et al. Updating and validating the Charlson comorbidity index and score for risk adjustment in hospital discharge abstracts using data from 6 countries. *Am J Epidemiol*. 2011;173(6):676–682. |