ORIGINAL ARTICLE

Real-world burden of comorbidities in US patients with psoriasis

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Background: Understanding background comorbidity rates in psoriasis can provide perspective for adverse events associated with new therapies.

Objective: We sought to assess the extent of comorbidities in psoriasis patients by use of the Truven Health Analytics MarketScan database.

Methods: MarketScan, comprising commercial claims representative of a large US-insured population, had 1.22 million patients with ≥1 claim with a psoriasis diagnosis between January 1, 2008, and December 31, 2014. Patients ≥18 years of age who had ≥2 health claims in any diagnosis field for psoriasis (International Classification of Diseases, 9th Revision, Clinical Modification 696.1) with a psoriasis diagnosis (index) date between July 1, 2008, and June 30, 2014, were included to allow follow-up observation time.

Results: Prevalence and incidence of 24 comorbidities were assessed in 469,097 psoriasis patients; the most common comorbidities were hyperlipidemia (45.64% and 30.83%, respectively), hypertension (42.19% and 24.19%), depression (17.91% and 12.68%), type 2 diabetes mellitus (17.45% and 8.44%), and obesity (14.38% and 11.57%).

Limitations: A limitation of the study was that only a certain insured population was represented.

Conclusions: Comorbidity rates align with those described in the literature and support the concept that psoriasis patients have high rates of cardiometabolic comorbidities. This analysis highlights the potential utility of very large insurance databases for determining comorbidity prevalence in psoriasis, which may aid health care providers in managing psoriasis. (J Am Acad Dermatol http://dx.doi.org/10.1016/j.jaad.2017.03.037.)

Key words: comorbidity; database; disease burden; MarketScan; medical insurance claims; psoriasis.

Psoriasis is a common inflammatory skin disease associated with multiple comorbidities that may affect treatment decision-making, including arthritis, depression, obesity, metabolic syndrome, cardiovascular disease, cerebrovascular disease, and peripheral vascular disease, among others.[1-3] The rates of these comorbidities in patients with psoriasis have not been fully characterized.

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Conflicts of interest: Dr Shah was an employee of Celgene Corporation at the time of study conduct and has access to stocks, stock options, and restricted stock units in Celgene Corporation. Ms Mellars and Dr Changolkar were contractors employed by Celgene Corporation at the time the study was conducted. Dr Feldman has served as a consultant to AbbVie, Amgen, Baxter, Celgene Corporation, Cosmederm, Eli Lilly, Galderma, GSK, Hanall Pharmaceutical, Kikaku, LEO Pharma, Merck, Merz Pharmaceuticals, Mylan, Novartis, Pfizer, Qurient, Stiefel/GSK, Suncare Research, and Xenoport; has served as a speaker for AbbVie, Celgene Corporation, Janssen, LEO Pharma, Mylan, Novartis, Stiefel/GSK, and Taro; received grant support from AbbVie, Amgen, Anacor, Celgene Corporation, Galderma, Janssen, Novartis, Pfizer, Qurient, and Stiefel/GSK; and served on advisory boards for Boehringer Ingelheim, Pfizer, and Xenoport.

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Randomized psoriasis studies have provided limited information on comorbid conditions because trials often have many exclusion criteria that preclude enrollment of patients with significant comorbidities.[4] Randomized populations do not generally represent the spectrum of patients and comorbidities in the real-world population,[4] and post-marketing surveillance data often consist of spontaneously reported adverse events that are plagued by underreporting bias.[5-7] Patient registries address some of these issues, providing more robust information, but some have limited sample sizes and study durations or may be affected by heterogeneity. In addition, many registries were conducted in specific countries and therefore may not be reflective of the US or global population.[8,9]

CAPSULE SUMMARY

- Psoriasis is associated with comorbidities that can affect treatment decisions.
- The MarketScan US insurance claims database revealed that patients with psoriasis have high rates of metabolic syndrome and depression.
- The use of very large insurance claims databases for determination of comorbidity prevalence may aid health care professionals in providing more comprehensive management of psoriasis.

Medical insurance claims databases can be utilized to study large populations of patients and provide an effective means to assess comorbidity rates in real-world patients. This study used a large claims database to gain an understanding of the rate of comorbidities in a broad population-based cohort of adult patients with psoriasis.

METHODS

Data source

We used the Truven Health Analytics MarketScan database (Truven Health Analytics, Ann Arbor, Michigan) to review all claims from patients enrolled between January 1, 2008, and December 31, 2014, including early view claims through July 31, 2015. The MarketScan database contains administrative claims in the United States for commercially insured working-age adults and their dependents as well as individuals with Medicare supplemental insurance paid for by employers. The database encompasses full continuum of care across settings and longitudinal tracking at the patient level. More than half the individuals are tracked for at least 3 years.

Employer-provided data allow for tracking across health plans and, overall, contain administrative claims and eligibility records for approximately 230 million patient-lives since 1995.[10] Enrollment records contain demographic information, including age, sex, and geographic region. Medical claims files include inpatient, outpatient, facility, and service claims records. The database is compliant with the Health Insurance Portability and Accountability Act and contains synthetic identifiers to protect the privacy of individual patients and data contributors.

Study population

Adult patients (≥18 years of age) who were diagnosed with psoriasis (≥2 claims associated with the International Classification of Diseases, 9th Revision, Clinical Modification [ICD-9-CM] code 696.1, the most commonly used diagnosis code for psoriasis)[11] with the first diagnosis claim between July 1, 2008, and June 30, 2014, were selected from the database. The first diagnosis claim was set as the index date. Patients meeting inclusion criteria are referred to as the psoriasis population. In addition, patients with psoriasis who met a minimum continuous health plan enrollment from 6 months before through 6 months after the index date were selected and are referred to as the continuously enrolled population. Patients were studied until loss of insurance eligibility or the end of the study period.

Study outcomes

The outcomes chosen for this analysis reflect a broad spectrum of comorbid conditions. The ICD-9-CM codes chosen for the outcomes were based on medical judgment or had been used in the literature previously. The ICD-9-CM codes for psoriasis,[11] acute myocardial infarction (MI),[12] stroke,[13] and depression[14] have been validated, and the ICD-9-CM codes for infections had been used previously.[15] Acute MI was determined by use of the primary diagnosis code for inpatient diagnoses. Stroke and infections were determined on the basis of any inpatient diagnosis. Other outcomes were determined on the basis of at least 1 diagnosis in any claim; the complete list of codes and diagnosis claims considered are listed in Supplemental Table I (available at http://www.jaad.org).[12-17]

Statistical analysis

Continuous variables for comorbidities were summarized by use of means and standard deviations, and the discrete data were summarized by use of counts and percentages. Estimates for both prevalence (percent) and incidence (percent and

Abbreviations used:

CI: confidence interval
ICD-9-CM: International Classification of Diseases, 9th Revision, Clinical Modification
MI: myocardial infarction
THIN: The Health Improvement Network

incidence rate per 100 patient-years) of comorbidities were determined. The prevalence of comorbidities was calculated by use of the proportion of occurrences for the specific comorbidity during the study period divided by the total population. The incidence of comorbidities was calculated by use of the proportion of new (after the index date) occurrences of the specific comorbidity divided by the population at risk for developing the comorbidity after the index date (ie, patients who had a claim for the comorbidity before the index date are excluded). The incidence rate of comorbidities per 100 patient-years is based on the number of patient-years up to the first event.

Table I. Demographic characteristics of the patients with psoriasis

Characteristics	Psoriasis population n = 469,097	Continuously enrolled population n = 292,999
Male, n (%)	225,206 (48.0)	138,277 (47.2)
Age, years		
Mean	49.6	50.4
Median	51	51
Age range, years, n (%)		
≥18-40	133,589 (28.5)	76,891 (26.2)
41-65	276,463 (58.9)	175,702 (60.0)
>65	59,045 (12.6)	40,406 (13.8)
Psoriasis diagnosis by year, n (%)		
2008	41,342 (8.8)	33,983 (11.6)
2009	93,731 (20.0)	58,956 (20.1)
2010	80,654 (17.2)	49,711 (17.0)
2011	83,496 (17.8)	50,768 (17.3)
2012	72,265 (15.4)	45,200 (15.43)
2013	61,849 (13.2)	37,422 (12.77)
2014	35,760 (7.6)	16,959 (5.79)

RESULTS

Patients

The prevalence of psoriasis in the United States was estimated at 3.2% in 2010, accounting for 7.2 million adults 20 years of age or older.[18] In the MarketScan database, 1.22 million patients had at least 1 claim and a diagnosis of psoriasis between January 1, 2008, and December 31, 2014.

A total of 469,097 adult patients (≥18 years of age) had at least 2 health claims in any diagnosis field for psoriasis (ICD-9-CM code 696.1) and an index date (first psoriasis diagnosis date) between July 1, 2008, and June 30, 2014. These patients represent 6.5% of the estimated 7.2 million adults with psoriasis in 2010. The 292,999 patients who met the continuous enrollment criteria represent 4.1% of US adults with psoriasis in 2010.[18]

In the psoriasis population, 48% of patients were male and the median age was 51 years, which was similar to the continuously enrolled population. The number of patients diagnosed each year in the 2 populations was also similar, with the exception of years 2008 and 2014, which had fewer patients because the index date for the populations was selected to allow for the potential of 6 months of data before and after the index date (Table I). The total follow-up was 789,581 patient-years, which represents approximately 1.68 years per patient. In the psoriasis population, the majority of patients were prescribed at least 1 therapy, and the most common therapies were either steroids (except for topical steroids) or topical steroids. Approximately 14% of patients were prescribed a biologic agent (Table II).

Prevalence and incidence of comorbidities in patients with psoriasis

The prevalence and incidence rates of the selected comorbidities were similar for the psoriasis population and the continuously enrolled population, except for type 2 diabetes mellitus, hyperlipidemia, hypertension, and depression (Supplemental Table II and Supplemental Table III; available at http://www.jaad.org). The prevalence and incidence of other comorbid conditions were also generally similar.

DISCUSSION

Comorbidities are common among real-world patients with psoriasis. Some of the comorbidities that were present in ≥5% of patients in this analysis include malignancies, serious infections, depression (including major depression), cerebrovascular disease, type 2 diabetes mellitus, hyperlipidemia, hypertension, peripheral vascular disease, ischemic heart disease, osteoporosis, obesity, and cardiac dysrhythmia. These conditions can complicate treatment of patients with psoriasis.

The prevalence of metabolic syndrome increased in the United States from 32.9% in 2003-2004 to 34.7% in 2011-2012.[19] In this analysis of adult patients with

Table II. Therapeutic usage among patients with psoriasis by drug class

Drug classification	Psoriasis population n = 469,097 n (%)
Any therapy*	353,859 (75.4)
Biologic agents	66,300 (14.1)
DMARDs	53,931 (11.5)
Steroids (excluding topicals)	219,788 (47.0)
Topical steroids	258,840 (55.2)
Topicals (excluding topical steroids)	2460 (0.5)

Treatments were used on or after the index date (first psoriasis diagnosis).
DMARDs, Disease-modifying anti-rheumatic drugs.
*Number of patients who received ≥1 of the therapies. Patients who received >1 therapy are included for each therapy class received.

psoriasis, the most prevalent comorbidities in the continuously enrolled population were hyperlipidemia (48.6%), hypertension (44.7%), depression (18.7%), type 2 diabetes mellitus (18.3%), and obesity (15.0%). These comorbidities, except for depression, contribute to metabolic syndrome, a disorder that leads to an increased rate of heart disease and stroke. Our findings are consistent with a previous 12-month study that found similar prevalence rates of hyperlipidemia (33.3%), hypertension (32.8%), and type 2 diabetes mellitus (15.8%) in a cohort of patients with moderate to severe psoriasis.[20] Another study that used data from 2 different claims databases also found high rates of hyperlipidemia (31.2% and 31.6%), hypertension (35.5% and 29.3%), and type 2 diabetes mellitus (13.3% and 10.2%).[16] In a study that used patient data from a United Kingdom–based study in The Health Improvement Network (THIN), increased risks of diabetes and diabetes with systemic complications were reported among patients with psoriasis, with pooled odds ratios of 1.22 (95% confidence interval [CI], 1.11-1.35) and 1.34 (95% CI, 1.11-1.62), respectively, compared with matched control patients ($P \leq .006$).[21]

The prevalence of obesity may be difficult to assess in health claims databases. Physicians may not include obesity as a diagnosis because it is often not the reason patients sought medical services or a claim for payment of services. In the 2003-2006 National Health and Nutrition Examination Survey, the prevalence of abdominal obesity was 62.9% in adult patients with psoriasis and 47.9% in patients without psoriasis.[22]

The incidence of acute MI in the continuously enrolled population was 0.9%. In several articles in the published literature, the incidence of acute MI ranged from 0.7% to 1.6%.[16,20,23] In an observational study that used medical and pharmacy administrative claims data from the United Health Group between May 1, 2000, and September 30, 2008, Abuabara et al[23] found rates of acute MI in 0.7% (30/4220) of patients with psoriasis who were receiving phototherapy; the incidence rate was 0.381 per 100 patient-years. In patients who received systemic therapy, the incidence of acute MI was 0.9% (187/20,094), with an incidence rate of 0.468 per 100 patient-years.[23] In another study that used the OptumHealth Reporting and Insights claims, the acute MI prevalence was 0.7% in patients with psoriasis and 0.5% in patients without psoriasis.[20] A study that used ICD-9-CM codes from any health claim (as opposed to our use of only inpatient codes for MI) found higher MI rates for patients with psoriasis (1.6%) than for patients without psoriasis (1.3%).[16] In a meta-analysis of observational studies, Armstrong et al[24] concluded that there was an increased risk of MI among patients with mild or severe psoriasis. The United Kingdom–based THIN study also reported an increased risk of MI among patients with psoriasis, with a pooled odds ratio of 1.34 versus control patients (95% CI, 1.07-1.69; $P = .03$).[21]

In a meta-analysis of 98 studies, Dowlatshahi et al[25] reported that the prevalence of depression in patients with psoriasis varies between 6% and 62%, depending on the study design, population, and outcome definition. In studies in which the depression outcome was based on ICD-9-CM codes, the pooled rate was 12%, with a 95% CI limit between 8% and 18%.[25] In our analysis, the prevalence rate was at the higher end, at approximately 18%. One of the studies included in the meta-analysis by Kimball et al[26] reported a depression prevalence of 9.2%; this study used a more selective set of depression codes than that used in our analysis, and the study period was only 6 months. Our analysis used the most sensitive selection of ICD-9-CM codes outlined by Fiest et al.[14]

In our analysis, malignancy outcomes were based on a patient having at least 1 diagnosis code. A previous analysis found that 4.1% of patients with psoriasis had malignancies (excluding nonmelanoma skin cancer) in which the outcome definition was based on either 1 inpatient diagnosis or 2 outpatient diagnoses occurring at least 30 days but no more than 365 days apart.[27] The incidence of nonmelanoma skin cancer was 5.4% and the incidence of lymphoma was 0.4%.[27] In comparison, the incidence of nonmelanoma skin cancer and lymphoma was 2.8% and 0.2% in the general population, respectively.[27] In a smaller population of patients with moderate to severe psoriasis, 3.0%

had nonmelanoma skin cancer,[20] which aligns with the incidence of malignancies observed in our analysis. In contrast, the United Kingdom–based THIN study reported no statistical increase in the risk of cancer or metastatic tumors in patients with psoriasis, with a pooled odds ratio of 0.85 (95% CI, 0.71-1.02) and of 0.81 (95% CI, 0.32-2.08), respectively.[21] However, the authors noted that the THIN study may have been underpowered for the detection associations for which the overall prevalence in the study patients were low, because there were only 142 and 5 patients, respectively, with cancer or metastatic tumors in the psoriatic population studied.

In a recent meta-analysis of 7 studies, Ungprasert et al[28] reported the increased risk of chronic obstructive pulmonary disease among patients with psoriasis, with a pooled odds ratio versus control of 1.45 (95% CI, 1.21-1.73). Although a direct comparison cannot be made because of the different methodologies in reporting, these results support our findings of increased prevalence and incidence rates for chronic obstructive pulmonary disease in patients with psoriasis.

The published literature on serious infection rates in patients with psoriasis is limited. The incidence of infection requiring hospitalization was 5.6% in the hospital and pharmacy databases covering Dutch residents from 1997-2008,[29] similar to what we observed.

Although claims databases have a large population of patients representing a real-world population, study limitations must be considered. Our selected populations may not be reflective of the age distribution of the psoriasis population because the MarketScan database contains only claims from the commercially insured population and health care claims of individuals with Medicare supplemental insurance paid for by employers. The claims information could be subject to misclassifications; however, our use of inpatient diagnoses for selected comorbidities and the requirement of 2 outpatient diagnoses of psoriasis help to mitigate this limitation. Some of the differences in the prevalence rates in our study compared with research conducted by others probably are a result of differences in the study design, including selection of ICD-9-CM codes, study period, and fields used for diagnoses. Our study did not assess the severity of psoriasis or the associated comorbidities, except for a few selected comorbidities in which inpatient hospitalization criteria were used (eg, acute MI, infection, stroke). The lack of a control population in the MarketScan database is also a limitation of this study.

A substantial proportion of patients with psoriasis have comorbid conditions that should be considered when formulating a treatment and management plan. One finding that requires further confirmation and consideration is the use of steroid therapy (excluding topicals) by 47% of the patients in the psoriasis population (Supplemental Table III), because it is unclear from MarketScan whether this usage was purely for psoriasis or whether it was also for psoriatic arthritis or other inflammatory disorders. The choice of treatment may have intended or unintended effects on some of the common comorbidities. This study did not address which comorbidities or adverse experiences may be associated with specific therapies. Patients who have >1 condition may have a higher chance of having adverse experiences, and additional research is needed to evaluate the potential contribution of the various therapies to the rate of comorbidities in patients with psoriasis.

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Supplemental Table I. ICD-9-CM codes for outcomes

Outcome	ICD-9-CM codes	Claims	Diagnosis
Acute MI[12]	410.xx	Inpatient claims	Discharge diagnosis
Atherosclerosis[16]	440.xx	All claims	Any diagnosis
Cardiac dysrhythmias	427.0x, 427.1x, 427.2x, 427.31, 427.32, 427.41, 427.42, 427.5x, 427.81, 427.89, and 427.9x	All claims	Any diagnosis
Cerebrovascular diseases[16]	430.xx, 431.xx, 432.xx, 433.xx, 434.xx, 435.xx, 436.xx, 437.xx, and 438.xx	All claims	Any diagnosis
Chronic obstructive pulmonary disease	491.xx, 492.xx, 493.xx, 496.xx	All claims	Any diagnosis
Chronic renal insufficiency[17]	582.xx, 583.xx, 585.xx, 586.xx, and 587.xx	All claims	Any diagnosis
Congestive heart failure[16]	428.xx	All claims	Any diagnosis
Crohn's disease	555.9x	All claims	Any diagnosis
Depression[14]	296.2x, 296.3x, 300.4, 309.0, 309.1, 309.28, 311, 296.82, and 296.90	All claims	All diagnoses
Hematologic malignancies	200.xx, 201.xx, 202.xx, 203.xx, 204.xx, 205.xx, 206.xx, 207.xx, 208.xx, and 238.6	All claims	Any diagnosis field
Hyperlipidemia[16]	272.0x, 272.1x, 272.2x, 272.3x, and 272.4x	All claims	Any diagnosis
Hypertension[16]	401.x	All claims	Any diagnosis
Infections[15]	254.1, 255.8, 323, 324, 357, 380.1, 382, 382.9, 383, 384, 384.1, 421, 422, 424.9, 447.2, 457.2, 460, 461, 462, 463, 464, 465, 466, 472, 473, 474, 475, 476, 480, 481, 482, 483, 484, 485, 486, 487.1, 487.8, 490, 491.2, 510, 511.1, 513, 519.1, 519.2, 522.5, 522.7, 523.3, 528.3, 528.5, 529, 540, 541, 542, 550, 551, 566, 567, 569.5, 572, 572.1, 574, 574.1, 574.3, 574.4, 575, 575.1, 576.1, 590, 595, 597, 597.8, 599, 603.1, 604, 607.1, 607.2, 614, 615, 615.9, 616, 680, 681, 682, 684, 685, 686, 711, 711.9, 728, 729.4, 730, 785.4, 788.7, 790.7, 790.8, 996.6, 998.5, and 999.3	Inpatient claims	Any diagnosis field
Ischemic heart disease[16]	410.xx, 411.xx, 412.xx, 413.xx, and 414.xx	All claims	Any diagnosis
Ischemic stroke	433.01, 433.11, 433.21, 433.31, 433.81, 433.91, 434.01, 434.11, 434.91, and 436.xx	Inpatient claims	Any diagnosis
Lymphoma	200.xx, 201.xx, 202.xx (excludes 202.5x and 202.6x)	All claims	Any diagnosis
Major depression	296.2 and 296.3	All claims	Any diagnosis field
Nonalcoholic liver disease	571.8x	All claims	Any diagnosis
Nonmelanoma skin cancers, excluding melanoma	173.xx (excludes all patients with melanoma), 172.xx	All claims	Any diagnosis field
Obesity	278.0, 278.00, 278.01, 278.02, and 278.03	All claims	Any diagnosis
Osteoporosis	733.0x, 733.00, 733.01, 733.02, 733.03, 733.09, 733.1x, 733.10, 733.11, 733.12, 733.13, 733.14, 733.15, 733.16, and 733.19	All claims	Any diagnosis
Peripheral vascular disease[16]	440.xx, 441.xx, 443.xx, 447.1, 557.1, 557.9, and V43.4	All claims	Any diagnosis
Solid tumors	140.xx, 141.xx, 142.xx, 143.xx, 144.xx, 145.xx, 146.xx, 147.xx, 148.xx, 149.xx, 150.xx, 151.xx, 152.xx, 153.xx, 154.xx, 155.xx, 156.xx, 157.xx, 158.xx, 159.xx, 160.xx, 161.xx, 162.xx, 163.xx, 164.xx, 165.xx, 170.xx, 171.xx, 172.xx, 174.xx, 175.xx, 176.xx, 179.xx, 180.xx, 181.xx, 182.xx, 183.xx, 184.xx, 185.xx, 186.xx, 187.xx, 188.xx, 189.xx, 190.xx, 191.xx, 192.xx, 193.xx, 194.xx, 195.xx, 196.xx, 197.xx, 198.xx, 199.xx, 209.0x, 209.1x, 209.2x, and 209.3x	All claims	Any diagnosis field

Continued

Supplemental Table I. Cont'd

Outcome	ICD-9-CM codes	Claims	Diagnosis
Stroke (any)[13]	430.xx, 431.xx, 433.01, 433.11, 433.21, 433.31, 433.81, 433.91, 434.01, 434.11, 431.91, and 436.xx	Inpatient claims	Any diagnosis
Suicide/suicidal ideation	E950, E951, E952, E953, E954, E955, E956, E957, E958, and V6284	All claims	Any diagnosis field
Type 2 diabetes mellitus[16]	250.x0 and 250.x2	All claims	Any diagnosis
Uveitis	364.3, 364.00, 364.02, 364.04, and 364.10	All claims	Any diagnosis

ICD-9-CM, International Classification of Diseases, 9th Revision, Clinical Modification; *MI*, myocardial infarction.

Supplemental Table II. Prevalence of comorbidities observed among patients with psoriasis

	Psoriasis population n = 469,097	Continuously enrolled population* n = 292,999
Comorbidity	**n (%)**	**n (%)**
Hyperlipidemia†	214,077 (45.6)	142,486 (48.6)
Hypertension†	197,920 (42.2)	130,889 (44.7)
Depression	84,020 (17.9)	54,745 (18.7)
Type 2 diabetes mellitus†	81,876 (17.5)	53,758 (18.4)
Obesity†	67,473 (14.4)	44,056 (15.0)
Ischemic heart disease†	51,358 (11.0)	35,334 (12.1)
Cardiac dysrhythmias	46,698 (10.0)	32,368 (11.1)
Chronic obstructive pulmonary disease	34,686 (7.4)	23,719 (8.1)
Peripheral vascular disease	34,503 (7.4)	24,286 (8.3)
Cerebrovascular disease†	34,218 (7.3)	24,132 (8.2)
Solid tumors	33,098 (7.1)	22,776 (7.8)
Infections‡	31,101 (6.6)	21,563 (7.4)
Osteoporosis	27,444 (5.9)	19,169 (6.5)
Major depression	26,668 (5.7)	17,573 (6.0)
Nonmelanoma skin cancers	24,403 (5.2)	17,169 (5.9)
Chronic renal insufficiency	20,286 (4.3)	14,034 (4.8)
Nonalcoholic liver disease	19,218 (4.1)	12,293 (4.2)
Atherosclerosis†	17,842 (3.8)	12,675 (4.3)
Congestive heart failure	17,668 (3.8)	12,489 (4.3)
Hematologic malignancies	5898 (1.3)	4037 (1.4)
Crohn's disease	4349 (0.9)	2862 (1.0)
Lymphoma	4032 (0.9)	2751 (0.9)
Acute MI§‖	4024 (0.9)	2860 (1.0)
Uveitis	3228 (0.7)	2157 (0.7)
Stroke (any)‖	2558 (0.6)	1841 (0.6)
Suicide and suicidal ideation	1965 (0.4)	1269 (0.4)
Ischemic stroke‖	1939 (0.4)	1400 (0.5)

"Prevalence" is the proportion of occurrences for the specific comorbidity during the study period divided by the total population. All claims and any diagnosis field are included unless otherwise specified.

MI, Myocardial infarction.

*Continuous enrollment minimum of 12 months: 6 months before and 6 months after the index date.

†Medical conditions that can be associated with an increased risk of major adverse cardiac events.

‡Includes only serious medical conditions (ie, those with an inpatient diagnosis).

§Acute myocardial infarction was based on the inpatient primary discharge diagnosis claims (ie, the primary discharge diagnosis).

‖Cases that probably represent a major adverse cardiac event.

Supplemental Table III. Incidence of comorbidities observed among patients with psoriasis

	Psoriasis population n = 469,097		Continuously enrolled population* n = 292,999	
Comorbidity	**n (%)**	**Rate/100 patient-years**	**n (%)**	**Rate/100 patient-years**
Hyperlipidemia†	100,924 (30.8)	21.70	52,632 (28.9)	18.81
Hypertension†	80,527 (24.2)	16.39	40,291 (21.3)	13.49
Depression	53,363 (12.7)	7.78	31,435 (12.3)	7.36
Obesity†	50,801 (11.6)	7.02	30,970 (11.5)	6.81
Type 2 diabetes mellitus†	34,926 (8.4)	5.18	19,331 (7.7)	4.59
Cardiac dysrhythmias	32,947 (7.4)	4.47	21,407 (7.8)	4.65
Ischemic heart disease†	29,199 (6.7)	4.06	17,442 (6.5)	3.90
Infections‡	26,898 (5.9)	3.55	17,977 (6.4)	3.80
Cerebrovascular disease†	25,878 (5.7)	3.45	17,016 (6.1)	3.64
Peripheral vascular disease	25,672 (5.7)	3.42	16,962 (6.1)	3.62
Chronic obstructive pulmonary disease	22,346 (5.0)	3.00	13,999 (5.1)	3.01
Osteoporosis	19,910 (4.4)	2.65	12,814 (4.6)	2.74
Solid tumors	18,935 (4.2)	2.53	11,625 (4.2)	2.49
Nonmelanoma skin cancer	17,856 (3.9)	2.35	11,876 (4.2)	2.51
Major depression	17,117 (3.8)	2.26	10,481 (3.7)	2.21
Nonalcoholic liver disease	16,822 (3.7)	2.18	10,325 (3.6)	2.13
Chronic renal insufficiency	14,431 (3.1)	1.87	9469 (3.3)	1.95
Atherosclerosis†	14,390 (3.1)	1.87	9762 (3.4)	2.02
Congestive heart failure	12,795 (2.8)	1.66	8603 (3.0)	1.78
Acute MI§‖	3887 (0.8)	0.49	2745 (0.9)	0.56
Hematological malignancies	3544 (0.8)	0.45	2255 (0.8)	0.46
Uveitis	2475 (0.5)	0.32	1572 (0.5)	0.32
Stroke (any)‖	2457 (0.5)	0.31	1756 (0.6)	0.36
Lymphoma	2368 (0.5)	0.30	1489 (0.5)	0.30
Crohn's disease	2076 (0.5)	0.26	1183 (0.4)	0.24
Ischemic stroke‖	1866 (0.4)	0.24	1338 (0.5)	0.27
Suicide and suicidal ideation	1766 (0.4)	0.22	1120 (0.4)	0.23

"Incidence" is the proportion of new occurrences of the specific comorbidity (n) divided by the population at risk for developing the comorbidity after the index date (m); patients who had a pre-existing claim for a specific comorbidity before the index date were excluded. The population size (m) for each specific comorbidity is not provided.

All claims and any diagnosis field are included unless otherwise specified.

MI, Myocardial infarction.

*Continuous enrollment minimum of 12 months: 6 months before and 6 months after the index date.

†Medical conditions that can be associated with an increased risk of major adverse cardiac events.

‡Includes only serious medical conditions (ie, those with an inpatient diagnosis).

§Acute myocardial infarction was based on the inpatient primary discharge diagnosis claim (ie, the primary discharge diagnosis).

‖Cases that probably represent a major adverse cardiac event.