Comparison of Healthcare Resource Utilization and Costs in Patients With and Without Bullous Pemphigoid: A Retrospective Analysis of US Health Insurance Claims Data

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Background

- Bullous pemphigoid (BP) is a rare chronic autoimmune disease mainly affecting the elderly with a global incidence rate of 34.2 per million person-years.1
- o Patients typically present with pruritis or pain, along with tense blisters and skin erosions, with periodic
- High-potency topical steroids are typically first-line therapy for BP, followed by systemic glucocorticoids.
- As BP is largely a disease of the elderly, patients often have a range of comorbidities and also appear to be at an increased risk for mortality as well as viral and bacterial infection.^{3,4} Chronic and high-dose steroid use are also associated with adverse events.5
- Despite this, limited real-world data exist regarding the healthcare resource utilization (HCRU) and costs among patients with BP.

Objective

 To evaluate all-cause and BP-related HCRU and costs among patients with BP, including the incremental burden of disease, compared with a population of patients without BP.

Methods

Study design

- Administrative claims (2015-2019) from the IBM MarketScan US Commercial and Medicare databases were retrospectively assessed.
- Patients with BP (BP cohort) were matched with patients without BP (non-BP cohort), based on demographic and clinical characteristics.
- Patients were followed until either health plan disenrollment or end of study database, whichever was the earliest.

Non-BP cohort

pre-index date and a follow-up period equivalent to

No diagnosis of BP or pemphigus at any point after

Assigned index date of matched BP case.

their matched BP case.

first medical claim date.

Follow-up period

(example patient)

First observed

BP treatment

(BP cohort)

≥6 months continuous health plan enrolment

BP cohort

- ≥18 years on date of first observed BP diagnosis (i.e. index date).
- ≥1 pharmacy claim for BP therapy within ±30 days of the index date.
- No diagnosis of pemphigus at any point.
- ≥6 months continuous health plan enrolment pre-index, no diagnosis of BP during this time.

Outcomes

All-cause HCRU were assessed by service setting:

Hospitalization*



Home visits







Urgent care visits



Telemedicine consultation



Outpatient visits[†]



+ Pharmacy prescriptions

Patients with at least one inpatient hospital admission; †Patients with at least one outpatient hospital visit.

All-cause HCRU costs were reported as *per-patient-per-month* (**PPPM**) and annualized, and adjusted to 2020 US dollars using the medical care component of the US Consumer Price index.6

Statistical methods

- The BP and non-BP cohorts were matched at a ratio of up to 1:5 using direct covariate matching based on demographic and clinical characteristics (year of birth, sex, geographic region, baseline Charlson Comorbidity Index [CCI] score, months of follow-up).
- The CCI is a weighted assessment tool used to predict long-term mortality in patients with multiple comorbidities. Each comorbidity is assigned a score from 1 to 6, with higher scores indicating a stronger association with mortality or higher resource use.⁷
- Descriptive analyses of patient demographics, clinical characteristics, HCRU and associated costs were reported.
- Multivariable regression analyses were conducted to estimate adjusted all-cause costs among patients in the BP and matched non-BP cohorts.
- All analyses were conducted using SAS Studio (Cary, NC, USA).

Results

Database

continuous

health plan

enrolment

Patient demographics and clinical characteristics at the index date

, 108 BP cohort patients







4,621 Non-BP cohort patients

similar in both cohorts

higher in the BP cohort

Table 1. Patient demographics and clinical characteristics

Characteristic	BP cohort (N=1,108)	Non-BP cohort (N=4,621)	
Mean (SD) age at index, years	73.6 (14.9)	71.1 (14.7)	
Female, %	53.4	54.3	
Mean (SD) CCI score at baseline	3.3 (2.7)	2.8 (2.4)	
Mean (SD) CCI score in the follow-up period	5.0 (4.9)	3.7 (3.0)	
Payer type, % Commercial Medicare	32.0 70.9	38.3 61.7	

BP, bullous pemphigoid; CCI, Charlson Comorbidity Index; SD, standard deviation.

PPPM all-cause HCRU

- The prevalence of hospitalization for BP patients was substantially greater in the follow-up period compared to the baseline period (44% vs 15%). The lengths of stay per hospitalization were similar (6.0 vs 6.4 days).
- The non-BP cohort had similar HCRU in the baseline and follow-up periods (Table 2).

Table 2. PPPM all-cause HCRU

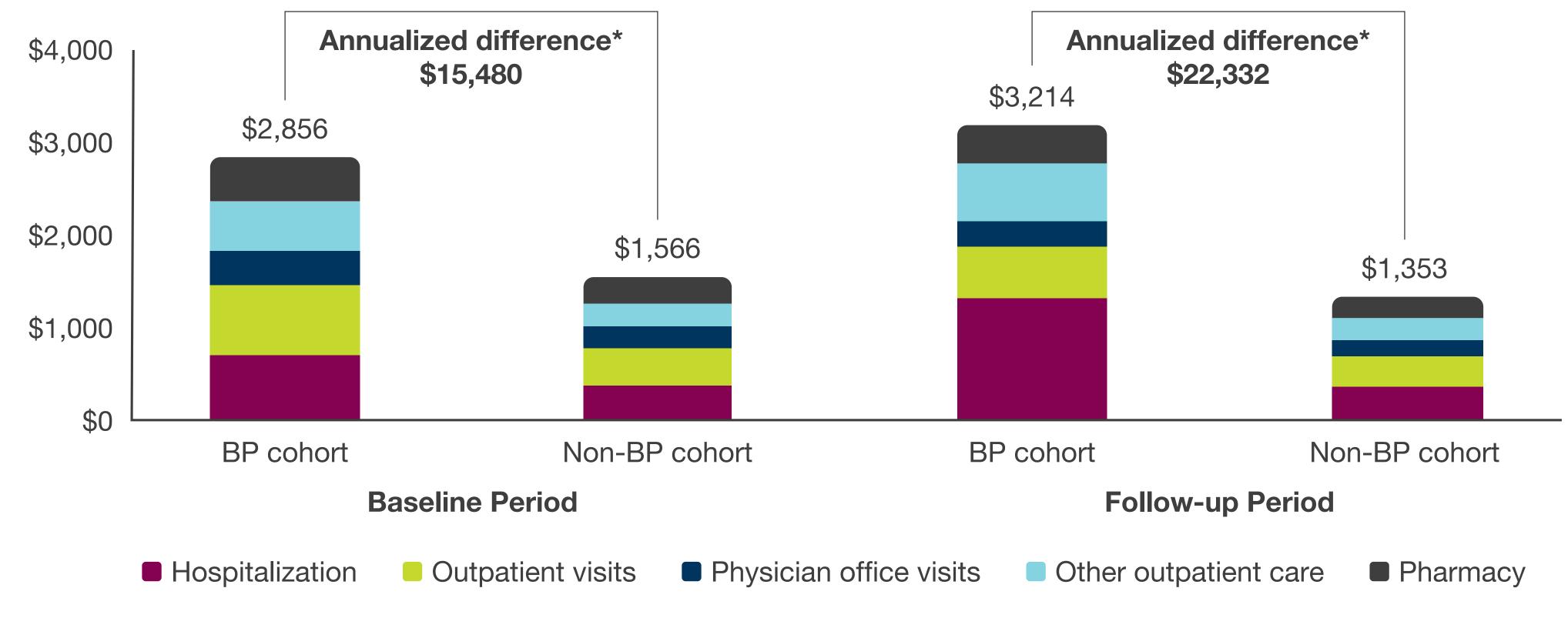
	Baseline period		Follow-up period			
Mean HCRU PPPM	BP cohort	Non-BP cohort	BP cohort	Non-BP cohort		
Hospitalization	0.18	0.10	0.77	0.25		
Ambulatory surgical center claims	0.06	0.07	0.05	0.05		
ED claims	0.24	0.11	0.23	0.12		
Urgent care claims	0.02	0.01	0.02	0.02		
Outpatient claims	2.58	1.56	3.03	1.57		
Physician office claims	3.31	2.50	3.68	2.32		
Home claims	0.47	0.24	0.84	0.24		
Other outpatient care claims	2.02	1.01	3.15	1.02		
P hullous pemphigoid: FD, emergency department: HCRII, healthcare resource utilization: PPPM, per-patient-per-month						

BP, bullous pemphigoid; ED, emergency department; HCRU, healthcare resource utilization; PPPM, per-patient-per-month

PPPM all-cause total healthcare costs

- In the baseline period, regardless of cohort, outpatient visits were the main HCRU cost component, followed by hospitalization (Figure 2).
- PPPM all-cause total healthcare costs in the BP cohort were almost double those in the non-BP cohort (\$2,856 vs \$1,566); annualized difference was \$15,480.
- In the follow-up period, hospitalization was the main cost component for both BP and non-BP patients, followed by outpatient visits (Figure 2).
- PPPM all-cause total healthcare costs increased 13% between baseline and follow-up for the BP cohort, mainly driven by increased hospitalization costs, but decreased 14% for the Non-BP cohort.
- PPPM all-cause total healthcare costs in the follow-up period were almost 2.5 times greater for the BP cohort versus the non-BP cohort (Figure 2).
- The difference, when annualized, amounted to a \$22,332 per year higher cost for BP patients compared with matched non-BP patients.

Figure 2. PPPM all-cause total healthcare costs

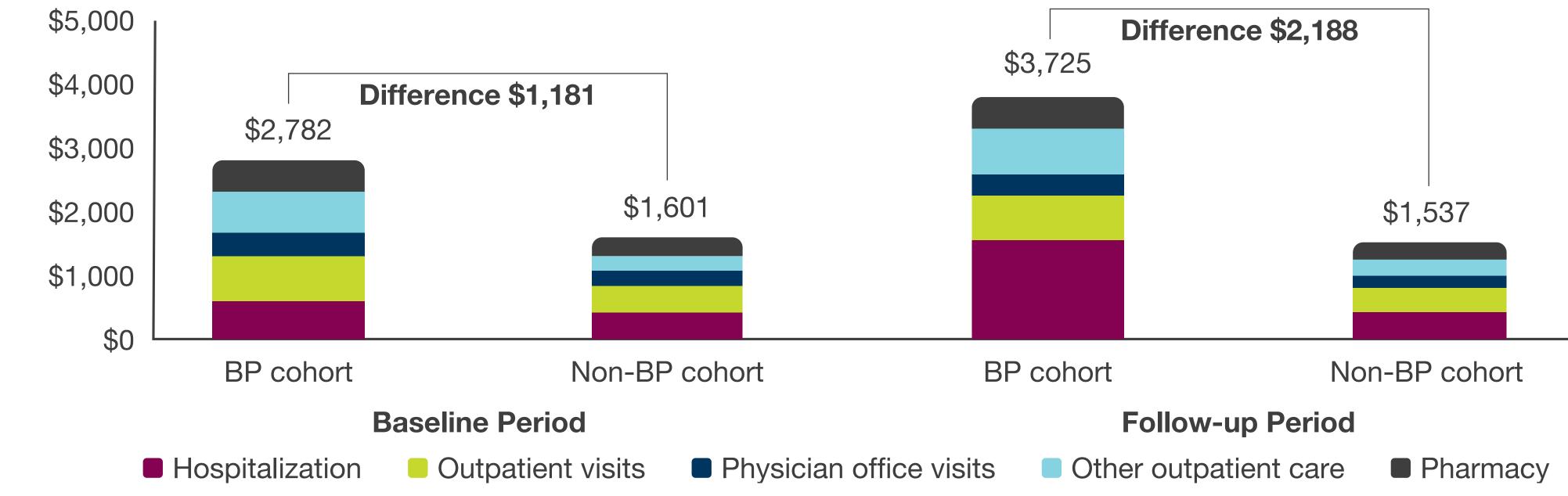


ther outpatient care includes ambulatory surgical center visits, emergency department visits, urgent care visits, home visits, telemedicine consultations, and other outpatient and ancilliary care. BP, bullous pemphigoid; PPPM, per-patient-per-month

Adjusted PPPM all-cause total healthcare costs

• PPPM costs in the baseline and follow-up periods were slightly higher for both cohorts after adjusting for baseline age, gender, payer type, region, year of index date and CCI score, but the magnitude of differences between cohorts were similar to unadjusted values (Figure 3).

Figure 3. Adjusted PPPM all-cause total healthcare costs

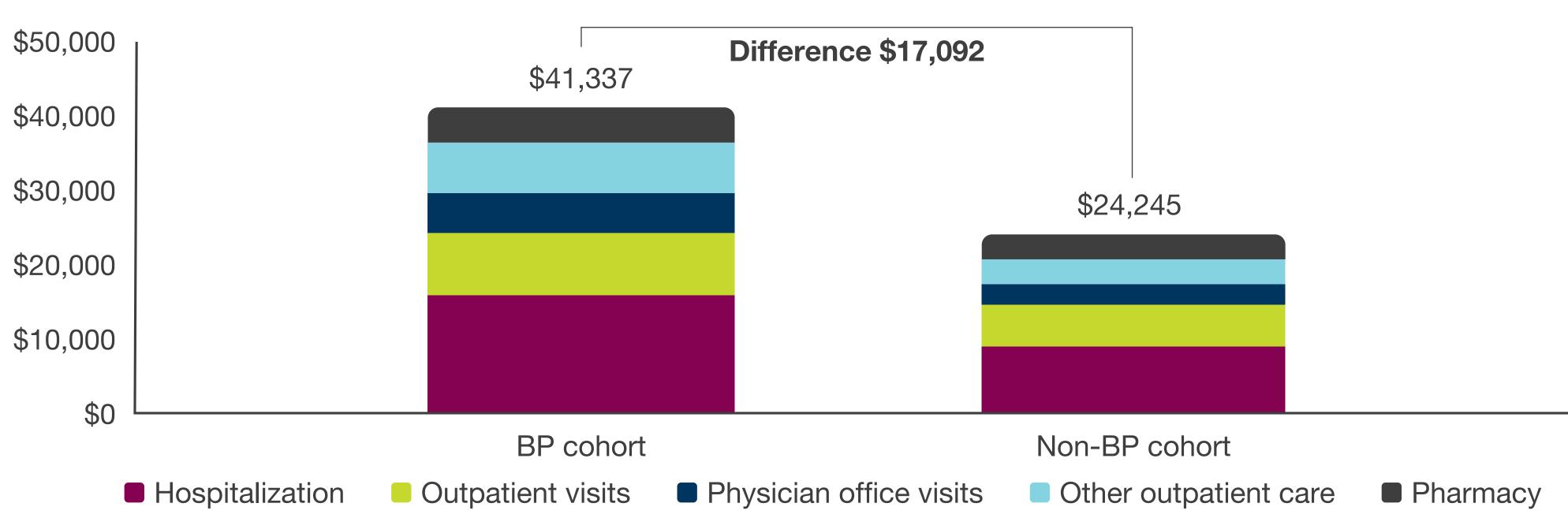


utpatient care includes ambulatory surgical center visits, emergency department visits, urgent care visits, home visits, and other outpatient or ambulatory care, BP, bullous pemphigoid; CCI, Charlson Comorbidity Index; PPPM, per-patient-per-month.

Subgroup analysis

 Among the subset of patients who had 12-months of baseline and follow-up data, the difference between BP (n=448) and non-BP patients (n=1,946) was not as pronounced (\$17,092) as annualized PPPM calculations (**Figure 4**).

Figure 4. All-cause total healthcare costs in the 12-month follow-up period



Other outpatient care includes ambulatory surgical center visits, emergency department visits, urgent care visits, home visits, and other outpatient and ancilliary care.

Limitations

- Diagnoses were based on billing codes which are subject to inaccuracies, such that some patients may not have genuinely had BP. However, the requirement of two diagnoses of BP at least 30 days apart, plus receipt of a BP-related medication, should have substantially limited patients without BP being included in the study sample.
- Claims data do not include clinical measurements that may affect the management of BP, such as functional status, mucous membrane involvement, and lifestyle factors.
- The MarketScan data are based on employment-related insurance claims, so some information may be missing from before and after employment for non-retired patients.
- As BP is a relapsing remitting disease, the date of disease onset may not be accurate.
- No information on reason for health plan disenrollment (e.g. death) is available in the database.

Conclusions

- BP patients had higher CCI post-diagnosis and substantially higher PPPM HCRU than matched non-BP patients, resulting in higher mean total PPPM medical encounter costs.
- The largest component of cost (42%) for BP patients in the follow-up period was hospitalization, with 44% of patients having ≥1 hospitalization, with an average length of stay of 6.4 days.
- A greater difference was seen between BP and non-BP patients with annualized data from PPPM calculations (\$22,332) than with 12-month follow-up data (\$17,092), suggesting that patients may have higher HCRU at diagnosis or potentially higher end of life costs, which lowered later in the year.
- This analysis represents the first real-world estimates of HCRU and costs among patients with BP. Our results indicate that more effective and targeted treatments are needed for BP without the potential adverse events associated with oral or systemic glucocorticoids.

Figure 1. Study schema

(example patient) continuous health plan

enrolment

Baseline period

1. Persson MSM, et al. Br J Dermatol 2022;186(3):414-425; 2. Wertenteil S, et al. J Am Acad Dermatol 2019;80(3):655-659; 3. Lee S, et al. Arch Dermatol Res 2021;313(5):327-332; 4. Langan SM, et al. BMJ 2008;337:a180; 5. Liu D, et al. All Asth Clin Immun 2013;9(30); 6. U.S. Bureau of Labor Statistics. Consumer Price Index; https://www.bls.gov/cpi/; 7. Charlson ME, et al. *J Chronic Dis* 1987;40(5):373-383.

Study selection window

Index date

BP cohort

irst observed BP diagnosis

Non-BP cohort

ssigned the index date o

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