Comorbidity Burden Among Patients With Bullous Pemphigoid in the US Medicare Population

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INTRODUCTION

- Bullous Pemphigoid (BP) is an autoimmune skin blistering disorder predominantly affecting the elderly[1] and has high rates of mortality and morbidity.[2]

- BP is associated with several comorbid conditions including diabetes, cardiovascular disease, pneumonia, neurological conditions, etc., with a substantial comorbidity burden.[3,4]

- Previous studies have focused primarily on the commercially insured population, which may not be generalizable to the overall BP population due to the advanced average age of individuals with BP.[5]
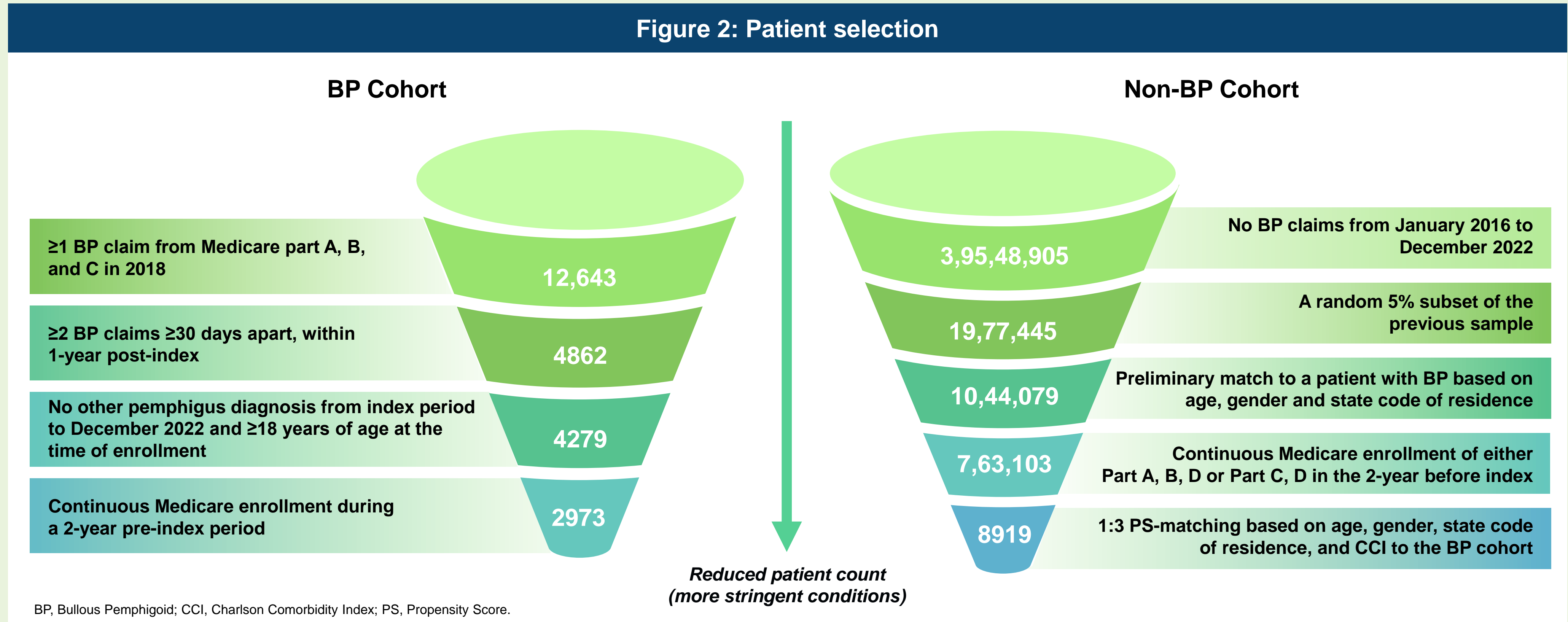
OBJECTIVE

- To evaluate the comorbidity burden among patients aged 65 years and older with BP and Medicare insurance, and to compare this burden to that observed in a matched cohort without BP.
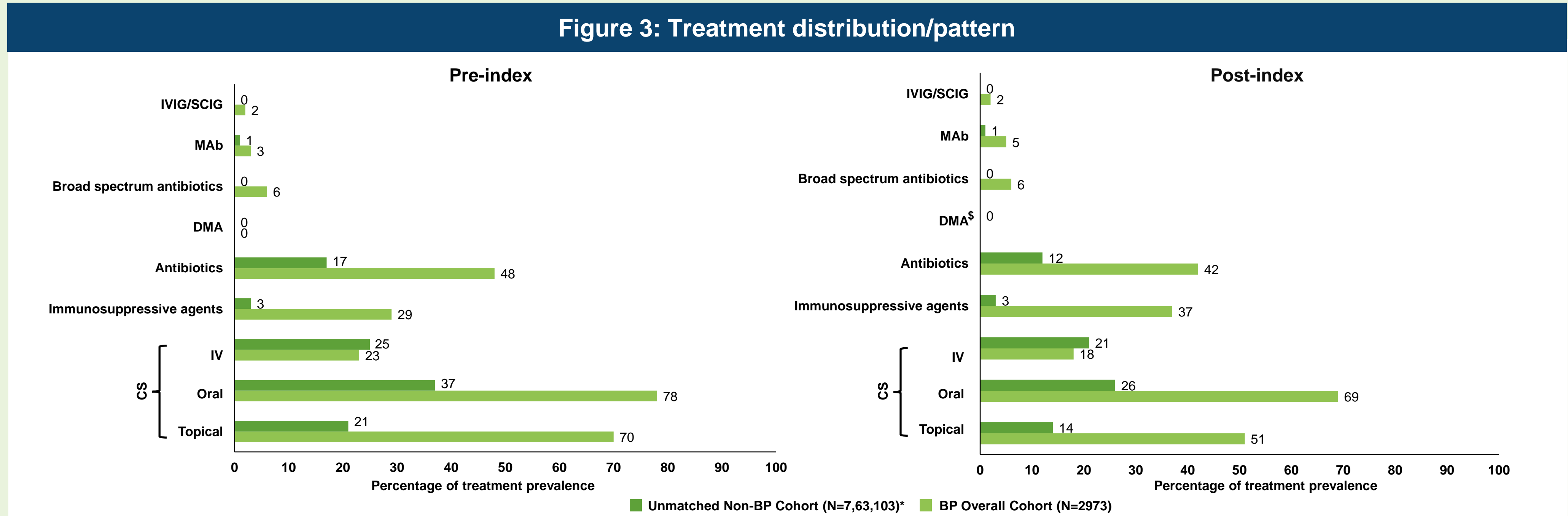
METHODS

- A retrospective cohort study utilized Medicare claims data between January 2016–December 2022 (**Figure 1**).

Figure 1: Study design

Key patient selection criteria

- For BP Cohort
  - Patients ≥ 65 years with Medicare insurance, having ≥2 BP claims ≥30 days apart within 1-year post-index.
  - Patients with continuous Medicare enrollment in the 2-year pre-index period.
- For Non-BP Cohort
  - No BP claims during the study period and ≥1 claim in 2018, preliminary match to a patient with BP based on age, gender, and state code of residence.
  - Patients with continuous Medicare enrollment in the 2-years pre-index.
  - 1:3 PS-matching based on age, gender, state code of residence, and CCI to the BP cohort.

Study outcomes

- Comparison of comorbidities of pre- and post-index data between patients with BP and matched non-BP controls.

Study variables

- Treatment distribution/pattern before PS-matching
- Demographic characteristics
- Comorbidity burden

Statistical analysis

- Descriptive statistics was used: continuous data were reported using mean, and SD while categorical data were summarized using percentages.

BP, Bullous Pemphigoid; CCI, Charlson Comorbidity Index; SD, Standard Deviation.

SUMMARY

- Higher rates of several neurological, cardiac, psychological, and weight-related conditions were observed in elderly patients with BP during the post-index period.

- A 3% to 11% increase in the prevalence of comorbidities was observed between cohorts in the post-index period, emphasizing the comorbidity burden associated with BP.

- Higher use of corticosteroids in the pre-index period suggests its potential risk. Hence, there is a need for targeted therapy in the management of BP.

Limitations

The study focused on a geriatric population and data from Medicare claims, may limit the generalizability of the findings to younger populations with BP or individuals covered with private medical insurance.

RESULTS

Patient selection

- A total of 2973 patients with BP and 8919 non-BP matched controls were identified (**Figure 2**).

Figure 2: Patient selection

BP Cohort

- ≥1 BP claim from Medicare part A, B, and C in 2018 — 12,643
- ≥2 BP claims ≥30 days apart, within 1-year post-index — 4862
- No other pemphigus diagnosis from index period to December 2022 and ≥18 years of age at the time of enrollment — 4279
- Continuous Medicare enrollment during a 2-year pre-index period — 2973

Reduced patient count (more stringent conditions)

Non-BP Cohort

- No BP claims from January 2016 to December 2022 — 3,95,48,905
- A random 5% subset of the previous sample — 19,77,445
- Preliminary match to a patient with BP based on age, gender and state code of residence — 10,44,079
- Continuous Medicare enrollment of either Part A, B, D or Part C, D in the 2-year before index — 7,63,103
- 1:3 PS-matching based on age, gender, state code of residence, and CCI to the BP cohort — 8919

BP, Bullous Pemphigoid; CCI, Charlson Comorbidity Index; PS, Propensity Score.

Treatment distribution/pattern

- The use of topical (70.0% vs 21.0%) and oral corticosteroids (78.0% vs 37.0%) was higher in the BP cohort than in the unmatched non-BP cohort, pre-index.

- The use of topical (51.0% vs 14.0%) and oral corticosteroids (69.0% vs 29.0%) decreased from pre- to post-index (**Figure 3**).

Figure 3: Treatment distribution/pattern

*The data represent the treatment distribution of BP overall and the unmatched non-BP cohort. Pre-index period is the treatment distribution over time during the lookback period (2-years, day -730 to -1). Post-index period is the treatment distribution over time during the 1-year post-index (Day 0 to 364). Unmatched non-BP includes no BP claim from January 2016 to December 2022 and ≥1 BP claim from Medicare part A, B, and C in 2018. [The prevalence of DMA was redacted in post-index period. BP, Bullous Pemphigoid; CS, Corticosteroids; DMA, Disease-Modifying Agents; IV, Intravenous; IVIG, Intravenous Immunoglobulin; MAb, Monoclonal Antibody; SCIG, Subcutaneous Immunoglobulin.
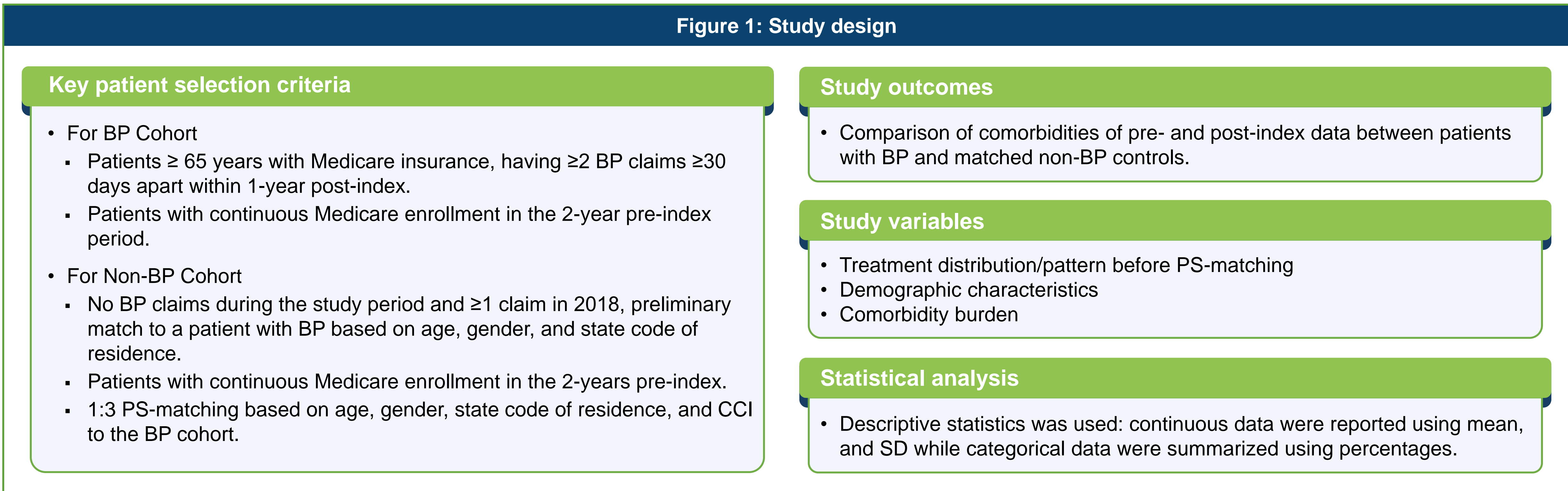
Propensity score matching

- After the propensity score match, the mean age, gender, state of residency, and Charlson Comorbidity Index (CCI) were found to be similar between the BP and matched non-BP cohorts.

- The standardized mean difference was <0.1 for all variables included (**Table 1**).

Table 1: Propensity Score Match for BP and non-BP cohorts

PS Match Covariates	BP Cohort (N=2973)	Unmatched Non-BP Cohort (N=7,63,103)
Age, yrs		
Mean (SD)	79.7 (9.5)	76.0 (7.4)
Gender, n (%)		
Male	1,279 (43.0)	282,040 (37.0)
Female	1,694 (57.0)	481,063 (63.0)
State of Residency		
CCI, Mean (SD)	3.3 (2.8)	2.7 (2.7)

BP, Bullous Pemphigoid; CCI, Charlson Comorbidity Index; PS, Propensity Score; SD, Standard Deviation; yrs, Years.

Demographic characteristics

- The study consisted of a geriatric population (mean age, ~80.0 years), with most participants in the BP (84.1%), and matched non-BP cohorts (85.8%) being white.

- A higher proportion of females than males (57.0% in BP and 56.9% in non-BP) were observed in both cohorts (**Table 2**).

Table 2: Demographics and baseline characteristics

Characteristics	BP Cohort (N=2973)	Matched Non-BP Cohort (N=8989)
Age at Index, yrs		
Mean (SD)	79.7 (9.5)	79.7 (9.3)
Gender, n (%)		
Male	1279 (43.0)	3841 (43.1)
Female	1694 (57.0)	5078 (56.9)
Race, n (%)		
White	2501 (84.1)	7651 (85.8)
Black	262 (8.8)	660 (7.4)
Asian	89 (3.0)	151 (1.7)
North American Native	9 (0.3)	46 (0.5)
Hispanic	34 (1.1)	197 (2.2)
Other	61 (2.1)	136 (1.5)
Unknown	17 (0.6)	78 (0.9)
US Region		
Northeast	804 (27.0)	2442 (27.4)
Midwest	912 (30.7)	2793 (31.3)
South	724 (24.4)	2130 (23.9)
West	533 (17.9)	1552 (17.4)
CCI, Mean (SD)	3.3 (2.8)	3.3 (2.9)
CCI Category, n (%)		
0	441 (14.8)	1336 (15.0)
1-2	940 (31.6)	2843 (31.9)
3-4	707 (23.8)	2099 (23.5)
≥5	885 (29.8)	2641 (29.6)

BP, Bullous Pemphigoid; CCI, Charlson Comorbidity Index; SD, Standard Deviation; US, United States; yrs, Years.

Comorbidity burden pre- and post-index

- Patients with BP experienced higher rates of cardiac disease (42.3% vs 34.5%), dementia (24.4% vs 13.5%), depression (28.3% vs 20.7%), pneumonia (21.6% vs 14.9%), and obesity (26.7% vs 19.3%), compared with non-BP controls, 1-year post-index.

- The prevalence rate of pneumonia and cardiac diseases were comparable between the BP and non-BP cohorts during the pre-index period; however, their rates were higher among BP compared with non-BP patients post-index (6.7% and 7.8%, respectively) (**Table 3**).

Table 3: Prevalence of comorbidities pre- and post-index periods

Comorbidity, n (%)	Prevalence of Comorbidities during 1-year pre-index (Day −365 to −1)			Prevalence of Comorbidities during 1-year post index (Day 0 to 364)		
	BP Overall Cohort (N=2973)	Matched Non-BP Cohort (N=8919)	Difference (%)	BP Overall Cohort (N=2973)	Matched Non-BP Cohort (N=8919)	Difference (%)
Dementia	408 (13.7)	800 (9.0)	4.8	725 (24.4)	1204 (13.5)	10.9
Cardiac disease	751 (25.3)	2142 (24.0)	1.2	1257 (42.3)	3079 (34.5)	7.8
Depression	493 (16.6)	1248 (14.0)	2.6	842 (28.3)	1846 (20.7)	7.6
Obesity	508 (17.1)	1179 (13.2)	3.9	794 (26.7)	1720 (19.3)	7.4
Pneumonia	244 (8.2)	726 (8.1)	0.1	641 (21.6)	1325 (14.9)	6.7
Sleep disorders	648 (21.8)	1952 (21.9)	−0.1	1097 (36.9)	2916 (32.7)	4.2
Asthma	257 (8.6)	679 (7.6)	1.0	428 (14.4)	924 (10.4)	4.0
Chronic kidney disease	731 (24.6)	2257 (25.3)	−0.7	1113 (37.4)	2988 (33.5)	3.9
End-stage renal disease	76 (2.6)	280 (3.1)	−0.6	129 (4.3)	356 (4.0)	0.3
Renal impairment	524 (17.6)	1573 (17.6)	0.0	835 (28.1)	2205 (24.7)	3.4
Hypertension	2153 (72.4)	6377 (71.5)	0.9	2581 (86.8)	7407 (83.0)	3.8
Anxiety	420 (14.1)	1224 (13.7)	0.4	697 (23.4)	1790 (20.1)	3.4
Osteoarthritis	737 (24.8)	2302 (25.8)	−1.0	1220 (41.0)	3384 (37.9)	3.1
Osteoporosis	302 (10.2)	909 (10.2)	0.0	534 (18.0)	1332 (14.9)	3.0
Type 2 diabetes	1014 (34.1)	3037 (34.1)	0.1	1256 (42.2)	3516 (39.4)	2.8
Peptic ulcer disease	59 (2.0)	157 (1.8)	0.2	168 (5.7)	284 (3.2)	2.5
Parkinson's disease	101 (3.4)	191 (2.1)	1.3	156 (5.2)	253 (2.8)	2.4
Glaucoma	157 (5.3)	396 (4.4)	0.8	263 (8.8)	602 (6.7)	2.1
Chronic pulmonary disease#	556 (18.7)	1820 (20.4)	−1.7	878 (29.5)	2488 (27.9)	1.6
Sleep apnoea	305 (10.3)	938 (10.5)	−0.3	486 (16.3)	1327 (14.9)	1.5
Osteoporotic fracture	41 (1.4)	94 (1.1)	0.3	100 (3.4)	187 (2.1)	1.3
Type 1 diabetes	50 (1.7)	105 (1.2)	0.5	81 (2.7)	160 (1.8)	0.9
Weight gain	25 (0.8)	37 (0.4)	0.4	46 (1.5)	70 (0.8)	0.8
Rheumatoid arthritis	101 (3.4)	327 (3.7)	−0.3	156 (5.2)	418 (4.7)	0.6
Dyslipidaemia	1579 (53.1)	5097 (57.1)	−4.0	2090 (70.3)	6240 (70.0)	0.3
High cholesterol	431 (14.5)	1461 (16.4)	−1.9	688 (23.1)	2114 (23.7)	−0.6
Other congestive heart failure§	165 (5.5)	576 (6.5)	−0.9	294 (9.9)	865 (9.7)	0.2
Other ischemic heart disease§	807 (27.1)	2664 (29.9)	−2.7	1193 (40.1)	3558 (39.9)	0.2
Cataracts	168 (5.7)	519 (5.8)	−0.2	274 (9.2)	854 (9.6)	−0.4
Cancer*	328 (11.0)	1484 (16.6)	−5.6	483 (16.2)	1890 (21.2)	−4.9

§excluding asthma, #not covered under cardiac diseases,*excluding skin cancer. BP, Bullous Pemphigoid.

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