A Claims Analysis to Characterize the Economic Burden of Generalized Pustular Psoriasis Among Patients in the United States

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Aim: This study compared all-cause HCRU and all-cause costs among patients with GPP and comorbid GPP + PsO versus patients with plaque PsO in the US

Background

- Generalized pustular psoriasis (GPP) is a chronic, heterogeneous, inflammatory skin condition that is clinically and genetically distinct from plaque psoriasis (PsO), often requiring a higher level of care.[1]
- GPP is characterized by recurring flares accompanied by pain, fever, malaise, chills, leukocytosis, asthenia, myalgia, and arthralgia.[1,2]
- GPP flares are more severe than the symptoms of plaque PsO and often necessitate emergency treatment.[1-3]
- Compared to plaque PsO, the diagnosis and management of GPP incur higher healthcare resource use (HCRU) and economic burden due to emergency department (ED) visits during acute flares, outpatient visits to prevent future flares, manage existing skin lesions,[3] and complications such as sepsis, renal, hepatic, and/or cardiorespiratory failure that may result in hospitalization.[4]
- There are limited data to describe the HCRU and costs incurred by patients with GPP in the United States (US).

Methods

- A retrospective, non-interventional, cohort study utilizing US claims data was conducted to investigate the all-cause HCRU and all-cause cost outcomes associated with GPP. The study design is presented in Figure 1a.
- The study cohorts were specified using Inovalon® Insights real-world claims data (1/1/2016 to 12/31/2019) (Figure 1b).
- Cohorts were defined using ICD-10 codes, with GPP corresponding to L40.1 and plaque PsO corresponding to L40.0.
- All-cause costs were contributed by all-cause HCRU visits to emergency room (ER), intensive care unit (ICU), inpatient, outpatient/office, lab, and other visits.
- Propensity score matching, a statistical matching technique, was employed with 1:1 matching cohort ratios using the nearest neighbor algorithm. This approach was utilized to estimate the effect of all-cause HCRU and all-cause costs, while accounting for covariates such as index year, age, sex, payer type, region, and Charlson Comorbidity Index (CCI) (Table 1). Adjusted median values for all-cause HCRU and all-cause costs were calculated using bivariate analysis (Mann Whitney U test).
- The study was compliant with the Health Insurance Portability and Accountability Act of 1996 regulations and received institutional review board ethics approval.

Figure 1. Study design and cohorts

Figure 1a. Study Design

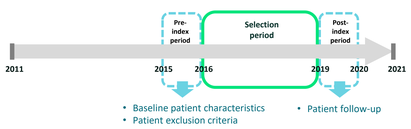
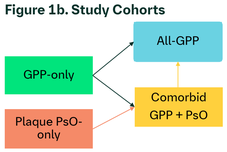


Figure 1b. Study Cohorts

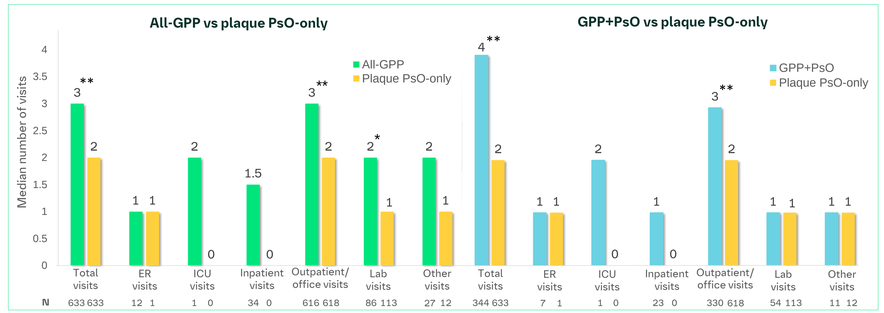


Results

Table 1. Propensity score matched cohort demographics

	All-GPP n=633		Plaque PsO-only n=633			GPP+PsO n=344		Plaque PsO-only n=633		
Variables	n	%	n	%	*p-value*	n	%	n	%	*p-value*
Sex										
Female	439	69.40%	436	68.90%	*0.903*	234	68.00%	436	68.90%	*0.839*
Male	194	30.60%	197	31.10%		110	32.00%	197	31.10%	
Age Category										
18 to <25	14	2.20%	14	2.20%	*1.000*	8	2.30%	14	2.20%	*0.995*
25 to <35	62	9.80%	62	9.80%		37	10.80%	62	9.80%	
35 to <45	100	15.80%	101	16.00%		53	15.40%	101	16.00%	
45 to <55	154	24.30%	155	24.50%		85	24.70%	155	24.50%	
55 to <65	214	33.80%	212	33.50%		111	32.30%	212	33.50%	
65 and older	89	14.10%	89	14.10%		50	14.50%	89	14.10%	
Payer										
Commercial	411	64.90%	410	64.80%	*0.998*	225	65.40%	410	64.80%	*0.783*
Medicaid	166	26.20%	167	26.40%		93	27.00%	167	26.40%	
Medicare Advantage	56	8.80%	56	8.80%		26	7.60%	56	8.80%	
Region										
Midwest	196	31.00%	195	30.80%	*1.000*	105	30.50%	195	30.80%	*0.524*
Northeast	118	18.60%	119	18.80%		75	21.80%	119	18.80%	
South	207	32.70%	208	32.90%		114	33.10%	208	32.90%	
West	112	17.70%	111	17.50%		50	14.50%	111	17.50%	
Index Year										
2016	239	37.80%	239	37.80%	*0.997*	132	38.40%	239	37.80%	*0.614*
2017	124	19.60%	122	19.30%		74	21.50%	122	19.30%	
2018	99	15.60%	98	15.50%		56	16.30%	98	15.50%	
2019	171	27.00%	174	27.50%		82	23.80%	174	27.50%	
CCI										
Mean (SD)	0.89	1.3	0.87	1.24	*0.757*	0.9	1.28	0.87	1.24	*0.701*

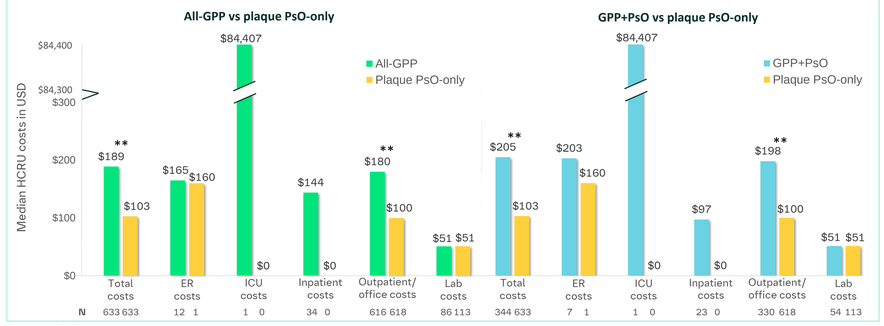
Figure 2. All-GPP and GPP+PsO had higher all-cause HCRU visits than plaque PsO cohort



** p-value <0.001; *p-value=0.028 (Mann Whitney U test)
1:1 matching ratio; with nearest neighbor algorithm; matched on age groups, sex, payer type, region, index year, and CCI
Other visits include telehealth, school, home, assisted living facilities, skilled nursing facilities, and other using CMS place of service information

- *All-GPP* and *GPP+PsO* cohorts had significantly higher all-cause HCRU total visits and outpatient/office visits compared with the *Plaque PsO-only* cohort
- Inpatient and ICU-related visits were reported exclusively in the matched GPP cohorts
- Similar results were observed with the *GPP-only* versus *Plaque PsO-only* cohort

Figure 3. All-GPP and GPP+PsO showed higher all-cause HCRU costs than plaque PsO cohort



** p-value <0.001 (Mann Whitney U test)
Costs presented in USD; data labels are rounded to the nearest whole value.
1:1 matching ratio; with nearest neighbor algorithm; matched on age groups, sex, payer type, region, index year, and CCI

- *All-GPP* and *GPP+PsO* cohorts had significantly higher all-cause HCRU total costs, outpatient/office costs, and lab costs compared with the *plaque PsO-only* cohort
- Although the ER-related costs are comparable, about 12 patients incurred ER costs in *All-GPP* cohort compared to one patient in the *plaque PsO-only* cohort
- While no patient in the propensity score matched *plaque PsO-only* cohort was hospitalized, about 5% of the GPP patients incurred inpatient costs
- The highest costs were noticed in the ICU, with about 84K USD corresponding to the GPP cohort
- Similar results were observed with the *GPP-only* versus *Plaque PsO-only* cohort

Limitations

- Claims analyses are subject to the inherent limitations such as the potential for missing data and errors or inconsistencies in the coding of diagnoses, procedures, or other variables.
- By the nature of its design, this analysis focused on insured patients in the US, and may not be generalizable to patients in the rest of the world or the uninsured.
- The claims data only capture a subset of flares, specifically those resulting in hospitalization and differentiation of patients based on disease severity was not possible.
- Analysis was restricted to admission diagnoses, lacking discharge diagnoses for a comprehensive overview.

Conclusion

- The GPP cohorts in this analysis experienced higher all-cause HCRU (total and outpatient visits) compared with the *plaque PsO-only* cohort. This is in line with the literature on HCRU in GPP and plaque PsO.[5-9]
- The GPP cohorts reported higher total costs, outpatient/office costs, and lab costs compared with the *plaque PsO-only* cohort.
- Although hospitalization is a key contributor to HCRU, outpatient visits are also an important part of GPP management. Patients often experience ongoing chronic skin lesions between flares and utilize outpatient visits to manage existing chronic skin lesions and prevent future flares by utilizing different healthcare resources as well as lab work to follow up on patients under different treatments.[3]
- Previous studies suggest that the economic burden experienced by patients with GPP may be partially due to the complications and comorbidities associated with GPP.[7,8]
- Ultimately, the lack of effective treatments for GPP may be a driving force behind high HCRU rates and associated costs. More effective management of GPP could have a positive impact on both GPP and comorbid conditions, thereby reducing the overall economic burden.[5]

Key Finding

This US based claims study demonstrated that patients in the GPP and comorbid cohorts experienced higher all-cause HCRU and associated costs compared with the plaque *PsO* cohort

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Abbreviations

CCI, Charlson Comorbidity Index; **CMS**, Centers for Medicare & Medicaid Services; **ER**, emergency room; **GPP**, generalized pustular psoriasis; **HCRU**, healthcare resource utilization; **ICD**, International Classification of Diseases; **ICU**, intensive care unit; **PsO**, plaque psoriasis; **SD**, standard deviation; **US**, United States

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