

2. Bate A, Lindquist M, Edwards IR, et al. A Bayesian neural network method for adverse drug reaction signal generation. *Eur J Clin Pharmacol*. 1998;54(4):315-321.
3. Xu R, Wang Q. Large-scale combining signals from both biomedical literature and the FDA Adverse Event Reporting System (FAERS) to improve post-marketing drug safety signal detection. *BMC Bioinformatics*. 2014;15(1):17.
4. European Medicines Agency (EMA). Guideline on good pharmacovigilance practices (GVP) - Module IX - Signal management (Rev 1). Accessed April 26, 2021. Available at: https://www.ema.europa.eu/en/documents/scientific-guideline/guideline-good-pharmacovigilance-practices-gvp-module-ix-signal-management-rev-1_en.pdf
5. Bate A, Evans SJW. Quantitative signal detection using spontaneous ADR reporting. *Pharmacoepidemiol Drug Saf*. 2009;18(6):427-436.

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Cross-sectional study reveals reduced odds of allergies in people with hidradenitis suppurativa



To the Editor: Hidradenitis suppurativa is a complex inflammatory skin disorder of the pilosebaceous unit consisting of follicular occlusion, rupture, and inflammation. There is substantial overlap between the immune cells and cytokines present in hidradenitis suppurativa lesions and those involved in allergic disease, with some hidradenitis suppurativa patients exhibiting high serum immunoglobulin E titers and itching at lesions (Table I).¹⁻⁴ Therefore, we investigated the relationship between hidradenitis suppurativa and allergy.

We used the MarketScan Commercial Claims database (Truven Health Analytics, Ann Arbor, MI) to perform a cross-sectional study of health claims

submitted by approximately 100 payers and representing greater than 150 million individuals in the United States. Institutional review board approval was obtained. For study inclusion, individuals were aged 12 years or older on enrollment between January 1, 2013, and December 31, 2017, with continuous enrollment thereafter. The hidradenitis suppurativa group included individuals with greater than or equal to 1 hidradenitis suppurativa claim. Control individuals without hidradenitis suppurativa, pilonidal cyst, acne conglobata, or dissecting scalp cellulitis were randomly selected at a 10:1 ratio after sex and age matching. Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated and considered significant if $P < .05$. Logistic regression was used to adjust for confounding variables: age, sex, and use of antibiotic, anti-inflammatory, and biologic drugs.

In total, 294,360 patients were included: 26,760 hidradenitis suppurativa patients and 267,600 controls. Hidradenitis suppurativa patients had decreased odds of allergic contact dermatitis versus the control group (OR 0.61 [95% CI 0.58-0.64]; adjusted OR 0.51 [95% CI 0.48-0.53]) (Table II). Furthermore, the hidradenitis suppurativa group had significantly decreased odds for developing unspecified contact dermatitis or other eczema (OR 0.62 [95% CI 0.59-0.65]) and contact dermatitis caused by nonfood plants (OR 0.25 [95% CI 0.21-0.30]) (Table II). Having hidradenitis suppurativa was also associated with an overall decreased OR of allergic conjunctivitis (OR 0.37 [95% CI 0.34-0.39]; adjusted OR 0.33 [95% CI 0.31-0.35]) and subtypes including acute atopic conjunctivitis (OR 0.39 [95% CI 0.30-0.51]), vernal

Table I. Immune cell and cytokine responses involved in hidradenitis suppurativa and allergies

Hidradenitis suppurativa	Allergy
Cell types	
Dendritic cells, eosinophils, macrophages, mast cells, neutrophils, plasma cells (B cells), T cells	Basophils, eosinophils, mast cells, neutrophils, plasma cells (B cells), T cells
Cytokines	
High production	High association
IL-1 β , -6, -8, -10, -12, -17; IFN- γ ; TI-IFN; TNF- α	IL-4, -5, -9, -13, -25, -33; TSLP
Low production	Supporting cytokines
IL-4, -5, -13	IL-1 β , -6, -17; TNF- α
Antibody response	
IgG, IgE? [*]	IgE, IgG

Macrophages, DCs, neutrophils: IL-1 β , -6, -8, -10, -12, -17, -25, -33; IFN- γ ; TI-IFN; TNF- α . T cells: Th1 = IFN- γ ; Th2 = IL-4, -5, -13, -25; Th9 = IL-9; Th17 = IL-17; Tregs = IL-10. B cells: IL-1 β , -6, -10; IFN- γ ; TI-IFN; TNF- α ; antibodies. Mast cells, eosinophils, basophils: IL-4, -5, -9, -13, -17, -25. Keratinocytes, fibroblasts: IL-1 β , -6, -8, -33; TI-IFN; TNF- α ; TSLP.

DC, Dendritic cell; IFN, interferon; IgE, Immunoglobulin E; IgG, immunoglobulin G; IL, interleukin; Th, T helper; TNF, tumor necrosis factor.

^{*}One preliminary study.

Table II. Allergy odds ratio calculations for individuals with hidradenitis suppurativa versus those without it

Diagnosis	ICD-9, ICD-10 codes	HS group (n = 26,760), no. (%)	Control group (n = 267,600), no. (%)	Unadjusted odds ratio (95% CI)	P value	Adjusted odds ratio (95% CI)*
Allergic contact dermatitis	L23	333 (1.24)	5351 (2)	0.61 (0.58–0.64)	<.0001	0.51 (0.48–0.53)
Contact dermatitis and other eczema, unspecified cause	692, L25.9	2175 (8.13)	32,939 (12.31)	0.62 (0.59–0.65)	<.0001	
Allergic contact dermatitis—plant, not food	692.6, L23.7	146 (0.55)	5591 (2.09)	0.25 (0.21–0.30)	<.0001	
All allergic conjunctivitis	H10.45	145 (0.54)	3001 (1.12)	0.37 (0.34–0.39)	<.0001	0.33 (0.31–0.35)
Acute atopic conjunctivitis	372.05	59 (0.22)	1477 (0.55)	0.39 (0.30–0.51)	<.0001	
Vernal conjunctivitis	372.13	8 (0.03)	179 (0.07)	0.44 (0.22–0.89)	.03	
Other chronic allergic conjunctivitis	372.14	234 (0.87)	5944 (2.22)	0.38 (0.34–0.44)	<.0001	
All allergic rhinitis	477	1980 (7.4)	44,393 (16.59)	0.50 (0.48–0.52)	<.0001	0.40 (0.38–0.41)
Vasomotor and allergic rhinitis	J30	2213 (8.27)	39,576 (14.79)	0.51 (0.49–0.53)	<.0001	
Allergic rhinitis from pollen	J30.1	724 (2.71)	12,225 (4.57)	0.57 (0.53–0.62)	<.0001	
Allergic rhinitis from nonpollen seasonal	J30.2	463 (1.73)	8529 (3.19)	0.52 (0.48–0.58)	<.0001	
Allergic rhinitis from food	477.1, J30.5	26 (0.1)	681 (0.25)	0.46 (0.34–0.62)	<.0001	
Allergic rhinitis from cat/dog	477.2, J30.81	260 (0.97)	4022 (1.5)	0.63 (0.56–0.72)	<.0001	
Personal history of allergy to medicinal agents	V14, Z88	634 (2.37)	7479 (2.79)	0.83 (0.76–0.90)	<.0001	0.78 (0.72–0.85)

CI, Confidence interval; HS, hidradenitis suppurativa; ICD-9, *International Classification of Diseases, Ninth Revision*; ICD-10, *International Statistical Classification of Diseases and Related Health Problems, 10th Revision*.

*Adjusted for age, sex, antibiotic use, anti-inflammatory use, and biologic use.

conjunctivitis (OR 0.44 [95% CI 0.22–0.89]), and other chronic allergic conjunctivitis (OR 0.38 [95% CI 0.34–0.44]). Finally, hidradenitis suppurativa patients had decreased odds of allergic rhinitis (OR 0.50 [95% CI 0.48–0.52]; adjusted OR 0.40 [95% CI 0.38–0.41]), including allergic rhinitis associated with pollen, nonpollen seasonal allergies, and food and cat or dog allergy (Table II). Adjustment for antibiotic, anti-inflammatory, and biologic medications reduced the OR further for all categories. In all, hidradenitis suppurativa patients had reduced odds of developing various allergies. These findings may be limited by differences in health care use between the 2 cohorts, potentially causing differences in diagnosis. Limitations also include potential misclassification and biases within the claims database and exclusion of uninsured individuals.

We may observe reduced allergies in hidradenitis suppurativa patients because of high levels of interferon or interleukin 12 expression in

hidradenitis suppurativa patients, which blunt T helper cell type 2–driven allergic responses (Table I).^{2,4} Classically associated immune cells such as mast cells and eosinophils, and mediators interleukin 4 and immunoglobulin E, likely contribute to hidradenitis suppurativa inflammation independent of allergic triggers. Mechanisms underlying hidradenitis suppurativa–associated itch are unknown but may be potentiated by interleukin 1 family cytokines or tumor necrosis factor α –mediated hypersensitivity to itch stimuli⁵ rather than allergen-associated histamine release. Despite the complex immune profile in hidradenitis suppurativa, this study highlights the presence of immune polarization in hidradenitis suppurativa patients, which protects against allergic immunomediated pathophysiology in these patients.

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REFERENCES

1. Vossen ARJV, Schoenmakers A, van Straalen KR, Prens EP, van der Zee HH. Assessing pruritus in hidradenitis suppurativa: a cross-sectional study. *Am J Clin Dermatol*. 2017;18:687-695.
2. Barnes PJ. Pathophysiology of allergic inflammation. *Immunol Rev*. 2011;242:31-50.
3. Pascual JC, García-Martínez FJ, Martorell A, González I, Hispan P. Increased total serum IgE levels in moderate-to-severe hidradenitis suppurativa. *Br J Dermatol*. 2016;175:1101-1102.
4. Frew JW, Hawkes JE, Krueger JG. A systematic review and critical evaluation of inflammatory cytokine associations in hidradenitis suppurativa. *F1000Res*. 2018;7:1930.
5. Miao X, Huang Y, Liu TT, et al. TNF- α /TNFR1 signaling is required for the full expression of acute and chronic itch in mice via peripheral and central mechanisms. *Neurosci Bull*. 2018;34:42-53.

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Examining the landscape of skin of color dermatoses: A cross-sectional study at an urban tertiary care center



To the Editor: With our nation's growing diversity, there is increased focus on how dermatologic conditions present among various racial and ethnic populations.^{1,2} Census estimations project skin of color to compose nearly 50% of the US population by 2050.³ Few studies, however, have examined the occurrence of cutaneous diseases across racial and ethnic groups.⁴ Our study characterizes the racial and ethnic distribution of common dermatologic conditions observed at a US tertiary care center.

EPIC was used to collect anonymous, aggregate-level data on patients aged 18 years or older who were treated at the Johns Hopkins Hospital System from January 1, 2013, to June 1, 2020. Dermatoses were categorically divided into inflammatory, follicular, pigmentary, alopecia, neoplastic, infectious, and scarring in origin (Table I, Supplementary

Table I. Odds ratio comparison between race, ethnicity, and sex, categorized by disease type

Disease	Black/white, OR (95% CI)	Asian/white, OR (95% CI)	Asian/black, OR (95% CI)	Hispanic/non-Hispanic, OR (95% CI)	Female/male patients, OR (95% CI)
Disorder of skin	1.37 (1.37–1.38)*	1.54 (1.52–1.56)*	3.49 (3.45–3.53)*	0.72 (0.71–0.73)*	1.18 (1.17–1.18)*
Inflammatory					
Atopic dermatitis	2.71 (2.63–2.78)*	2.8 (2.66–2.94)*	2.95 (2.81–3.1)*	0.73 (0.69–0.77)*	1.1 (1.07–1.13)*
Prurigo nodularis	2.72 (2.65–2.8)*	2.75 (2.62–2.88)*	2.88 (2.74–3.02)*	0.71 (0.67–0.75)*	1.09 (1.07–1.12)*
Pityriasis rosea	4.88 (4.53–5.26)*	1.33 (1.07–1.65) [†]	0.77 (0.63–0.96) [†]	0.65 (0.55–0.75)*	1.3 (1.21–1.4)*
Psoriasis	0.44 (0.42–0.46)*	0.97 (0.9–1.03)	6.26 (5.78–6.77)*	0.46 (0.43–0.5)*	1.1 (1.07–1.13)*
Lichen planus	1.51 (1.38–1.65)*	1.7 (1.43–2.01)*	3.2 (2.68–3.82)*	0.38 (0.31–0.48)*	2.08 (1.92–2.26)*
Pruritus	2.35 (2.3–2.4)*	2.25 (2.16–2.35)*	2.75 (2.63–2.86)*	0.92 (0.89–0.95)*	1.82 (1.78–1.86)*
SD	1.65 (1.6–1.7)*	1.93 (1.83–2.03)*	3.33 (3.15–3.52)*	0.72 (0.68–0.76)*	1.07 (1.04–1.1)*
Acneiform follicular					
Acne vulgaris	1.85 (1.81–1.88)*	2.08 (2–2.15)*	3.22 (3.11–3.34)*	0.69 (0.66–0.71)*	1.91 (1.88–1.95)*
HS	5.52 (5.16–5.9)*	1.54 (1.28–1.85)*	0.79 (0.66–0.95) [†]	0.59 (0.51–0.67)*	2.94 (2.74–3.16)*
Rosacea	0.16 (0.15–0.17)*	0.46 (0.42–0.52)*	8.18 (7.19–9.3)*	0.48 (0.44–0.52)*	1.83 (1.77–1.9)*
Folliculitis decalvans	7.74 (5.48–10.94)*	—	—	0.32 (0.13–0.78) [†]	0.2 (0.14–0.29)*
Perioral dermatitis	1.03 (0.93–1.13)	1.68 (1.43–1.98)*	4.65 (3.89–5.54)*	0.94 (0.81–1.09)	2.74 (2.5–3.01)*
Acne keloid	2.59 (2.34–2.88)*	4.27 (3.66–4.98)*	4.67 (3.99–5.46)*	0.63 (0.51–0.77)*	0.86 (0.78–0.94)*
Folliculitis	2.74 (2.67–2.82)*	1.19 (1.11–1.28)*	1.24 (1.16–1.33)*	0.6 (0.57–0.64)*	1 (0.98–1.03)