

BRIEF COMMUNICATION

Trends in the Cost and Utilization of Omalizumab in the Medicare Population: 2013-2017

Shayan Cheraghlou^{a,1}, Nelson Ugwu^{b,1}, Beverly Yu^b, and Jeffrey M. Cohen^{b,*}^aThe Ronald O. Perelman Department of Dermatology, New York University Grossman School of Medicine, New York, NY, USA;^bDepartment of Dermatology, Yale School of Medicine, New Haven, CT, USA

Background: Omalizumab has been demonstrated to be effective in treating chronic spontaneous urticaria (CSU) and was FDA approved for this indication in 2014. Previous work has shown that access to injectable biologics varies across US counties. In the present study we evaluate geographic and temporal trends in the utilization of omalizumab in the Medicare population by dermatologists, with its use by allergists and pulmonologists as comparators. **Methods:** We analyzed year-over-year trends in omalizumab utilization across geographic regions using the Medicare Provider Utilization and Payment Data: Part D files. **Results:** Utilization of omalizumab by dermatologists increased rapidly after its FDA approval, from 0.08 claims/100,000 enrollees totaling \$209/100,000 enrollees in 2014 to 1.45 claims/100,000 enrollees totaling \$3115/100,000 enrollees in 2017. Nonetheless, prescribing dermatologists were present in only 2.8% (95% Confidence Interval (CI): 2.0%-3.9%) and 0.2% (95% CI: 0.0%-0.5%) of metropolitan and non-metropolitan counties, respectively, in 2017, demonstrating limited availability, especially in non-metropolitan counties. Similarly, prescribers of any specialty were available in 32.9% (95% CI: 30.2%-35.6%) and 3.8% (95% CI: 3.1%-4.8%) of metropolitan and non-metropolitan counties, respectively, in 2017. **Conclusions:** Our data suggest that despite increasing omalizumab utilization, there remains a lack of access across many counties, particularly in non-metropolitan regions. Efforts to expand omalizumab prescriber accessibility in these counties may improve outcomes for patients with CSU.

INTRODUCTION

Omalizumab, a humanized anti-IgE monoclonal antibody, received initial Food and Drug Administration (FDA) approval in 2003 for the treatment of moderate-to-severe persistent asthma. In 2014, the FDA approved its use for patients ≥ 12 years of age with chronic spontaneous urticaria (CSU) who remain symptomatic

despite treatment with H1-antihistamines [1]. CSU is defined as urticaria with or without angioedema for at least 6 weeks.

For CSU patients with sub-optimal response to second-generation H1-antihistamines, omalizumab is well-tolerated and highly effective in treating symptoms and improving quality of life; and currently recommended as a third-line add-on therapy [2]. Despite

*To whom all correspondence should be addressed: Jeffrey M. Cohen, MD, Department of Dermatology, Yale University School of Medicine, 15 York Street, New Haven, CT 06510; Email: jeffrey.m.cohen@yale.edu.

Abbreviations: CSU, chronic spontaneous urticaria; FDA, Food and Drug Administration; CI, Confidence Interval; CMS, Centers for Medicare and Medicaid Services; RUCC, Rural-Urban Continuum Codes; AAGR, average annual growth rate.

Keywords: omalizumab, utilization, Medicare, access

¹These authors contributed equally to this work.

strong evidence supporting its safety and efficacy, data on the utilization of omalizumab in CSU within the US remains scarce. Although prior studies have explored demographics and treatment patterns of CSU with omalizumab, there are none to date that examine omalizumab utilization and spending over time [3]. Furthermore, it is unknown how omalizumab utilization has changed since its FDA approval for CSU. Studies have demonstrated variability in access to other injectable biologics in the US, and it is important to evaluate geographic trends in omalizumab utilization to identify potential disparities and consider interventions to make access more universal [4]. It is additionally important to consider trends in cost for future financial planning regarding Medicare spending on this medication. In order to evaluate these trends in omalizumab utilization and cost, we evaluated data from the Centers for Medicare and Medicaid Services (CMS) Medicare Provider Utilization and Payment Data: Part D.

METHODS

Data originated from the Medicare Provider Utilization and Payment Data: Part D Prescriber Public Use Files from 2013-2017, made publicly available by CMS, with address data linked using the Physician and Other Supplier Dataset. Data from physicians and advanced practitioners (nurse practitioners and physician assistants) were included in the study. Data regarding prescriber county was obtained by matching zip codes provided in claims files to their corresponding counties using the US Department of Housing and Urban Development's ZIP-COUNTY crosswalk file. Prescribers who could not be matched are described in Appendix A: Supplemental Table 1. Counties were assigned Rural-Urban Continuum Codes (RUCC) based on size, extent of urbanization, and proximity to a metropolitan (metro) area previously defined by the National Center for Health Statistics Urban-Rural Classification Scheme for Counties [5]. Counties were divided into metro and non-metro according to RUCC levels 1-3 and 4-9, respectively. Counties and claims from the 50 US states were included in the analysis. Total claims, days supply, and cost were adjusted to a per-enrollee basis according to drug plan enrollment in January 1 of the reported year. All data analysis was performed using STATA version 13 (StataCorp. 2013. Stata Statistical Software: Release 13. College Station, TX: StataCorp LP.).

RESULTS

Total omalizumab claims, drug supply days, and cost by provider specialty are outlined in Table 1. Since 2013, total claims and cost associated with prescriptions for omalizumab have increased rapidly across provider spe-

cialties. The relative increase in utilization has been most pronounced among dermatologists, who, between 2014 and 2017, had an average annual growth rate (AAGR) of over 180% for total claims and 160% for total drug cost. However, omalizumab continues to be primarily prescribed by pulmonologists and allergists. While pulmonologists were the most common prescribers of the drug in 2013, their AAGR in claims (23.2%) were lower than that of allergists (43.2%) during the study period, such that, in 2017, allergists accounted for 77.3% more prescriptions than pulmonologists. Between 2013 and 2017, the total claims for omalizumab more than tripled from 7,884 to 25,321, with total costs increasing from approximately \$21M to over \$85M during this time.

Alongside this increased utilization of omalizumab, there has been an increase in both the number of prescribers of the drug and in the counties in which these providers practice (Table 2). In 2017, omalizumab prescribers were available in 32.9% (95% Confidence Interval (CI): 30.2%-35.6%) of metro counties, versus 18.3% (95% CI: 16.2%-20.7%) of counties in 2013. Availability of omalizumab prescribers also varied by provider specialty, with dermatology prescribers practicing in only 2.8% (95% CI: 2.0%-3.9%) of metro counties in 2017. Additionally, while the AAGR in counties with prescribing providers has been higher in non-metro counties during the study period, there remains considerably fewer omalizumab prescribers in these regions. As of 2017, there were three (0.2% (95% CI: 0.0%-0.5%)) non-metro counties with a dermatologist prescribing omalizumab and 75 (3.8% (95% CI: 0.0%-0.5%)) with any provider prescribing the drug.

DISCUSSION

In the present study, we demonstrate that, despite an increase in the number of dermatologists prescribing omalizumab, there remain many areas, particularly in non-metro areas, without a prescribing dermatologist. This lack of access may be exacerbated by the fact that CSU management with omalizumab requires repeated treatments, which may not be feasible for patients that live far from a potential provider. Given that only 50% of patients with CSU respond to antihistamine therapy, this lack of access may represent a barrier to needed care [6].

Additionally, while there has been increasing use of omalizumab among dermatologists, the majority of prescriptions continue to originate from pulmonologists and allergists as almost two-thirds of the 26 million US children and adults with asthma suffer from persistent asthma, whereas chronic urticaria impacts approximately 0.23% of US adults [7-9]. Notably, it is likely that a number of allergists are prescribing omalizumab for CSU, perhaps leading to the higher AAGR in prescriptions

Table 1. Trends in Omalizumab Claims and Cost per 100,000 Enrollees by Prescriber Specialty from 2013-2017

Year	Dermatologists			Pulmonologists			Allergists			Other Physicians			Advanced Practitioners		
	Claims	Days Supply	Cost	Claims	Days Supply	Cost	Claims	Days Supply	Cost	Claims	Days Supply	Cost	Claims	Days Supply	Cost
2013	0.00	0	0	9.49	274.1	\$25977	9.13	274.3	\$23010	3.17	92.0	\$8333	1.49	41.7	\$4033
2014	0.08	2.2	\$209	10.48	304.5	\$31401	10.74	330.8	\$30600	4.08	115.9	\$11618	1.74	49.8	\$5056
2015	0.26	7.3	\$483	10.72	316.5	\$36108	14.71	448.7	\$43914	4.03	116.0	\$11631	2.64	76.2	\$8420
2016	0.77	21.5	\$1518	12.38	355.1	\$43816	19.77	587.8	\$58774	5.18	147.1	\$16860	2.78	79.2	\$9416
2017	1.45	40.8	\$3115	17.14	491.2	\$66706	30.38	884.9	\$93660	6.49	185.7	\$22748	4.58	128.4	\$15938
AAGR	169.8%*	172.0%*	150.2%*	16.7%	16.4%	27.4%	35.7%	34.5%	42.4%	20.3%	19.8%	29.9%	34.6%	34.6%	43.2%

**Note: all data calculated per 100k enrollees. *Note: AAGR calculated from 2014-2017. AAGR – average annual growth rate

among allergists compared to pulmonologists during the study period. Furthermore, the differences in adoption between providers in metro compared to non-metro areas suggests unmet treatment need for both patients with persistent asthma and those with chronic urticaria in non-metro counties.

Given the data source, our analysis was limited to the Medicare population and we were unable to evaluate omalizumab prescription trends for younger patients with commercial insurance or Medicare Advantage plans. It may be the case that low Medicare reimbursement for omalizumab may have driven practices to not offer the medication for Medicare beneficiaries. Our study population is also likely not the primary demographic of omalizumab users, as patients over 65 represent approximately a quarter of those with CSU and about 12% of those with asthma [10,11]. Hence, it would be of interest to study the use of the drug for younger patients with commercial insurance. Additionally, our analysis was limited to provider-level data and we are unable to determine if patients from non-metro regions were travelling to metro regions to receive prescriptions or assess patient-level risk factors such as socioeconomic status. Lastly, several off-label uses for omalizumab have been described, such as allergic rhinitis, viral keratoconjunctivitis, and atopic dermatitis, thus it is not possible to determine the exact indication for prescriptions of the medication.

In conclusion, the present study reveals that despite increasing utilization of omalizumab, there remains a notable lack of access to the medication in non-metro regions. Efforts to expand omalizumab prescriber accessibility may improve outcomes for patients with moderate-to-severe asthma as well as those with CSU refractory to second-generation H1-antihistamines in non-metro regions.

Author Note: The authors have no conflicts of interest or financial disclosures, and all authors had access to the data and a role in writing the manuscript.

REFERENCES

- Maurer M, Weller K, Bindslev-Jensen C, Giménez-Arnau A, Bousquet PJ, Bousquet J, et al. Unmet clinical needs in chronic spontaneous urticaria. A GA²LEN task force report. *Allergy*. 2011 Mar;66(3):317–30.
- Zuberbier T, Aberer W, Asero R, Abdul Latiff AH, Baker D, Ballmer-Weber B, et al.; Endorsed by the following societies: AAAAI, AAD, AAIITO, ACAAI, AEDV, APAAACI, ASBAI, ASCIA, BAD, BSACI, CDA, CMICA, CSACI, DDG, DDS, DGAKE, DSA, DST, EAACI, EIAS, EDF, EMBRN, ESCD, GA²LEN, IAACI, IADVL, JDA, NVvA, MSAI, ÖGDV, PSA, RAACI, SBD, SFD, SGAI, SGDv, SIAAIC, SIdEMaST, SPDV, TSD, UNBB, UNEV and WAO. The EAACI/GA²LEN/EDF/WAO guideline for the definition, classification, diagnosis and management of

Table 2. Total Number of Counties with Omalizumab Prescribers and Number of Prescribers per 100,000 Enrollees in Metropolitan and Non-metropolitan Counties from 2013-2017

Year	Metropolitan Counties											
	Total Counties with Prescribing Providers (Total: n=1,162) [95% Confidence Interval of proportion]											
	All Providers	Dermatologists	Pulmonologists	Allergists	Other Physicians	Advanced Practitioners	All Providers	Derma- tologists	Pulmo- nologists	Allergists	Other Physicians	Advanced Pract
2013	213 (16.2%-20.7%)	0 (-)	122 (8.9%-12.4%)	109 (7.8%-11.2%)	35 (2.2%-4.2%)	17 (0.9-2.3%)	1,166	0.000	0.515	0.466	0.133	0.050
2014	250 (19.2%-24.0%)	2 (0.0%-0.7%)	128 (9.3%-12.9%)	134 (9.8%-13.5%)	61 (4.1%-6.7%)	18 (1.0%-2.4%)	1,310	0.005	0.517	0.530	0.199	0.055
2015	272 (21.1%-25.9%)	5 (0.2%-1.0%)	129 (9.4%-13.0%)	164 (12.2%-16.2%)	62 (4.2%-6.8%)	22 (1.2%-2.9%)	1,517	0.013	0.521	0.712	0.189	0.088
2016	310 (24.2%-29.3%)	15 (0.8%-2.1%)	135 (9.9%-13.6%)	200 (15.1%-19.5%)	79 (5.5%-8.4%)	30 (1.8%-3.7%)	1,788	0.045	0.539	0.859	0.248	0.097
2017	382 (30.2%-35.6%)	32 (2.0%-3.9%)	172 (12.9%-17.0%)	253 (19.5%-24.2%)	91 (6.4%-9.5%)	46 (3.0%-5.2%)	2,428	0.083	0.711	1.219	0.268	0.147
AAGR	15.8%	154.5%*	9.4%	23.4%	29.6%	29.5%	20.4%	163.5%	9.1%	27.7%	21.0%	32.9%
Non-Metropolitan Counties												
Year	Total Counties with Prescribing Providers (Total: n=1,957)											
	All Providers	Dermatologists	Pulmonologists	Allergists	Other Physicians	Advanced Practitioners	All Providers	Derma- tologists	Pulmo- nologists	Allergists	Other Physicians	Advanced Pract
2013	30 (1.1%-2.2%)	0 (-)	9 (0.2%-0.9%)	12 (0.4%-1.1%)	13 (0.4%-1.1%)	2 (0.0%-0.4%)	0.109	0.000	0.027	0.038	0.038	0.006
2014	36 (1.3%-2.5%)	0 (-)	15 (0.5%-1.3%)	11 (0.3%-1.0%)	15 (0.5%-1.3%)	2 (0.0%-0.4%)	0.126	0.000	0.044	0.035	0.041	0.005
2015	43 (1.6%-3.0%)	1 (0.0%-0.4%)	15 (0.5%-1.3%)	17 (0.5%-1.4%)	14 (0.4%-1.2%)	0 (-)	0.129	0.003	0.044	0.047	0.036	0.000
2016	60 (2.4%-3.9%)	3 (0.0%-0.5%)	21 (0.7%-1.6%)	19 (0.6%-1.5%)	21 (0.7%-1.6%)	3 (0.0%-0.5%)	0.181	0.007	0.062	0.052	0.052	0.007
2017	75 (3.1%-4.8%)	3 (0.0%-0.5%)	34 (1.2%-2.4%)	25 (0.9%-1.9%)	21 (0.7%-1.6%)	9 (0.2%-0.9%)	0.247	0.007	0.097	0.066	0.055	0.021
AAGR	26.0%	N/A	42.1%	22.4%	14.7%	N/A	23.7%	N/A	40.1%	16.0%	11.5%	N/A

*Note: AAGR calculated from 2014-2017

- urticaria. *Allergy*. 2018 Jul;73(7):1393–414.
3. Eghrari-Sabet J, Sher E, Kavati A, Pilon D, Zhdanava M, Balp MM, et al. Real-world use of omalizumab in patients with chronic idiopathic/spontaneous urticaria in the United States. *Allergy Asthma Proc*. 2018 May;39(3):191–200.
 4. Feng H, Cohen JM, Neimann AL. Access to injectable biologic medications by medicare beneficiaries: geographic distribution of US dermatologist prescribers. *J Dermatolog Treat*. 2019 May;30(3):237–9.
 5. Ingram DD, Franco SJ. 2013 NCHS urban-rural classification scheme for counties. *Vital Health Stat 2*. 2014 Apr;(166):1–73.
 6. Kaplan AP. Treatment of chronic spontaneous urticaria. *Allergy Asthma Immunol Res*. 2012 Nov;4(6):326–31.
 7. Centers for Disease Control and Prevention. Most Recent National Asthma Data 2020 [cited 2020 July 21]. Available from: https://www.cdc.gov/asthma/most_recent_national_asthma_data.htm
 8. Zahran HS, Bailey CM, Qin X, Moorman JE. Assessing asthma severity among children and adults with current asthma. *J Asthma*. 2014;51(6):610-7. <https://doi.org/10.3109/02770903.2014.892966>.
 9. Wertenteil S, Strunk A, Garg A. Prevalence estimates for chronic urticaria in the United States: A sex- and age-adjusted population analysis. *J Am Acad Dermatol*. 2019 Jul;81(1):152–6.
 10. Lapi F, Cassano N, Pegoraro V, Cataldo N, Heiman F, Cricelli I, et al. Epidemiology of chronic spontaneous urticaria: results from a nationwide, population-based study in Italy. *Br J Dermatol*. 2016 May;174(5):996–1004.
 11. Moorman JE, Akinbami LJ, Bailey CM, Zahran HS, King ME, Johnson CA, et al. National surveillance of asthma: United States, 2001-2010. *Vital Health Stat 3*. 2012 Nov;(35):1–58.

Appendix A

Supplemental Table 1. Omalizumab Prescribers with Unmatched Addresses						
Year	All Providers	Dermatologists	Pulmonologists	Allergists	Other Physicians	Advanced Practitioners
2013	18	0	1	2	4	11
2014	25	0	1	4	9	11
2015	32	0	0	4	11	17
2016	31	0	2	10	6	13
2017	40	2	1	8	9	20