

# Adoption of newly FDA-approved Targeted Immunomodulatory Therapies by Dermatologists: a Cross-Sectional Analysis of Medicare Part D claims from 2013-2018

Owen Dean

University of Rochester Medical Center

Francisco Tausk

University of Rochester Medical Center

Partik Singh (✉ [partik\\_singh@urmc.rochester.edu](mailto:partik_singh@urmc.rochester.edu))

University of Rochester Medical Center

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## Short Report

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# Abstract

Although targeted immunomodulatory medications are increasingly utilized for inflammatory skin conditions like plaque psoriasis, little is known of the trends in adoption of newly Federal Drug Administration (FDA)-approved immunomodulators by dermatologists. We performed a retrospective, cross-sectional analysis of Medicare Part D Prescriber datasets to identify dermatologists filing Medicare prescription claims for immunomodulatory drugs FDA-approved for plaque psoriasis between 2013-2018. Differences in dermatologist characteristics were determined between dermatologists prescribing a psoriasis treatment within two years of its FDA approval, “early adopters” and non-prescriber dermatologists over the same time period. Biologics approved for psoriasis from 2013-2018 included certolizumab pegol, secukinumab, brodalumab, ixekizumab, guselkumab, and apremilast. Early adopter dermatologists (n=783) accounted for 5% of all Medicare Part D prescribing dermatologists. Early adopters were more likely to be male, in practice longer, and had a greater number of average annual beneficiaries than dermatologists who did not. Only six (<1%) early adopters practiced in small town or rural areas. We believe these data show that the adoption of novel biologic treatments for psoriasis by dermatologists to Medicare beneficiaries may be associated with clinician experience and practice volume. Additionally, we identified low absolute numbers of dermatologists prescribing biologics overall in non-metropolitan areas, which may represent delayed access to novel psoriasis treatments for many Medicare beneficiaries.

## Introduction

The use of targeted immunomodulator therapies, or biologics, has outpaced the use of traditional therapies for inflammatory skin diseases by dermatologists over the past two decades [1, 2]. Recent analyses have identified greater overall biologic use among established dermatologist private practices, rapid biologic adoption rates among academic and younger dermatologists, and low annual growth of biologic use in rural areas [2, 3]. However, little is known of dermatologist trends in the initial adoption of newly Federal Drug Administration (FDA)-approved biologics. We sought to define the prescriber characteristics of dermatologists who prescribed biologics utilized for psoriasis treatment within two years of their initial FDA-approval, hereby referred to as “early-adopters”, versus those who did not.

## Methods

We performed a retrospective, cross-sectional analysis of the 2013–2018 Medicare Part D Public Use File to identify dermatologist claims for FDA-approved biologics for psoriasis. We recorded aggregate annual biologic claims, drug costs (list prices adjusted to 2018 US dollars[4]), unique prescribers, mean annual claims per clinician, and associated compounded annual growth rates (CAGR). Differences in prescriber characteristics were determined between early adopters and non-adopters with  $\geq 10$  Medicare Part D claims per year using Welch’s independent t-tests and Chi-squared tests for continuous and categorical metrics, respectively. Geographic distributions of early adopters were mapped by zip code in ArcGIS (Esri,

Redlands, California). Spatial autocorrelation was assessed with Global Moran's I, with positive Z-scores representing more spatial clustering and negative Z-scores representing more spatial dispersion.

## Results

Biologics approved for psoriasis from 2013–2018 included one TNF-  $\alpha$  inhibitor

(certolizumab pegol, FDA-approved the end of 2013), three IL-17 inhibitors (secukinumab, 2015, ixekizumab, 2016, & brodalumab, 2017), one IL-23 inhibitor (guselkumab, 2017), and one PDE4 inhibitor (apremilast, 2014). Dermatologists filed 119,113 claims for these six drugs over the study period, accounting for \$466 million dollars in reported drug cost, not including discounts or rebates. No claims were filed for these biologics in 2013. Annual increases in the number of new claims were highest for guselkumab (21 to 1630 prescribers from 2017 to 2018, 781% CAGR) and ixekizumab (105 to 2699, 276%) (Supplemental Table 1).

We identified 783 early adopters, accounting for 5% of all dermatologists with > 10 Medicare claims from 2013–2018. Early adopter dermatologists were significantly more likely to be male, in practice longer, and had a greater number of average annual beneficiaries than dermatologists who did not ( $P < 0.0001$  for all) (Table 1). The top three most commonly adopted medications by prescribed volume included apremilast (421 clinicians), secukinumab (343), and ixekizumab (167). Early adopters most often practiced in the South (38% of prescribers). Only six (< 1%) early adopters practiced in small town or rural areas.

Table 1

Characteristics of Dermatologist Early Adopters of Biologic Treatments for Psoriasis, Medicare PUF 2013–2018

Clinician Characteristics	Early Adopters (n = 783)	Non Early Adopters (n = 13,648)	<i>P</i>
Years in practice, median (IQR <sup>†</sup> )	24 (16–25)	18 (8–28)	< 0.0001
Clinician gender, F/M (% female)	242/541 (31%)	6633/7010 (49%)	< 0.0001
Average annual number of Medicare Beneficiaries per provider (SD <sup>‡</sup> )	442 (296)	224 (186)	< 0.0001
Average age of Medicare Beneficiaries (SD)	72.4 (2.3)	72.7 (2.9)	0.002
Average annual total no. of Medicare Part D Claims (SD)	1295 (1038)	554 (554)	< 0.0001
Average proportion of Annual Medicare Claims with Low-income Subsidy (SD)	26.5% (18.1%)	24.0% (19.1%)	0.00016
Region, n %			0.0002
Midwest	177 (23%)	2607 (19%)	
Northeast	147 (19%)	3145 (23%)	
South	296 (38%)	4573 (34%)	
West	149 (19%)	3146 (23%)	
Practice Rural-Urban Commuting Code, %			0.002
Metropolitan	720 (92%)	12945 (95%)	
Micropolitan	54 (7%)	562 (4%)	
Small Town	4 (1%)	84 (1%)	
Rural Areas	2 (0%)	13 (0%)	
Not coded	0 (0%)	14 (0%)	
†IQR, Interquartile Range			
‡SD, Standard Deviation			

Access to certolizumab and brodalumab in the Medicare Part D population was limited to select United States zip codes (Fig. 1A & D). Cumulatively, early adopter provider Part D Medicare claims for newly approved biologics were spatially clustered (Global Moran's I Z-score = 3.33,  $P = 0.0009$ ), and qualitatively noted to be primarily in major urban centers.

## Discussion

Understanding how physicians adopt new standard of care treatments is of particular interest to patients and the health care systems that support them. Emerging biologic treatments are frequently changing the standard of care for psoriasis, but access to these treatments depends in part on individual dermatologists' prescribing patterns. Our findings suggest that dermatologist adoption of novel biologics for psoriasis may be associated with clinician experience, practice volume, and geographic practice region in the Medicare population. Additionally, we identified low absolute numbers of dermatologists prescribing biologics overall in non-metropolitan areas, which may represent delayed access to novel psoriasis treatments for many Medicare beneficiaries.

Strengths of our study include ample sample size and a nationally representative Medicare sample. Limitations include lack of known external validity for non-dermatologists, commercial payers, and Medicare advantage plans. Data on clinical indications and discounts/rebates were also not available. Further study of the potential mediators of disparities in access to novel medications, including regional insurance coverage, targeted pharmaceutical advertising and rural provider continuing education is necessary to better understand regional nonuniformity in psoriasis treatment in the United States.

## Declarations

**Funding sources:** None

**Competing Interests:** None declared.

**IRB Approval Status:** Exempt

**Previous presentation:** Some data herein was presented at the American Academy of Dermatology Annual Meeting 2022.

## References

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# Figures

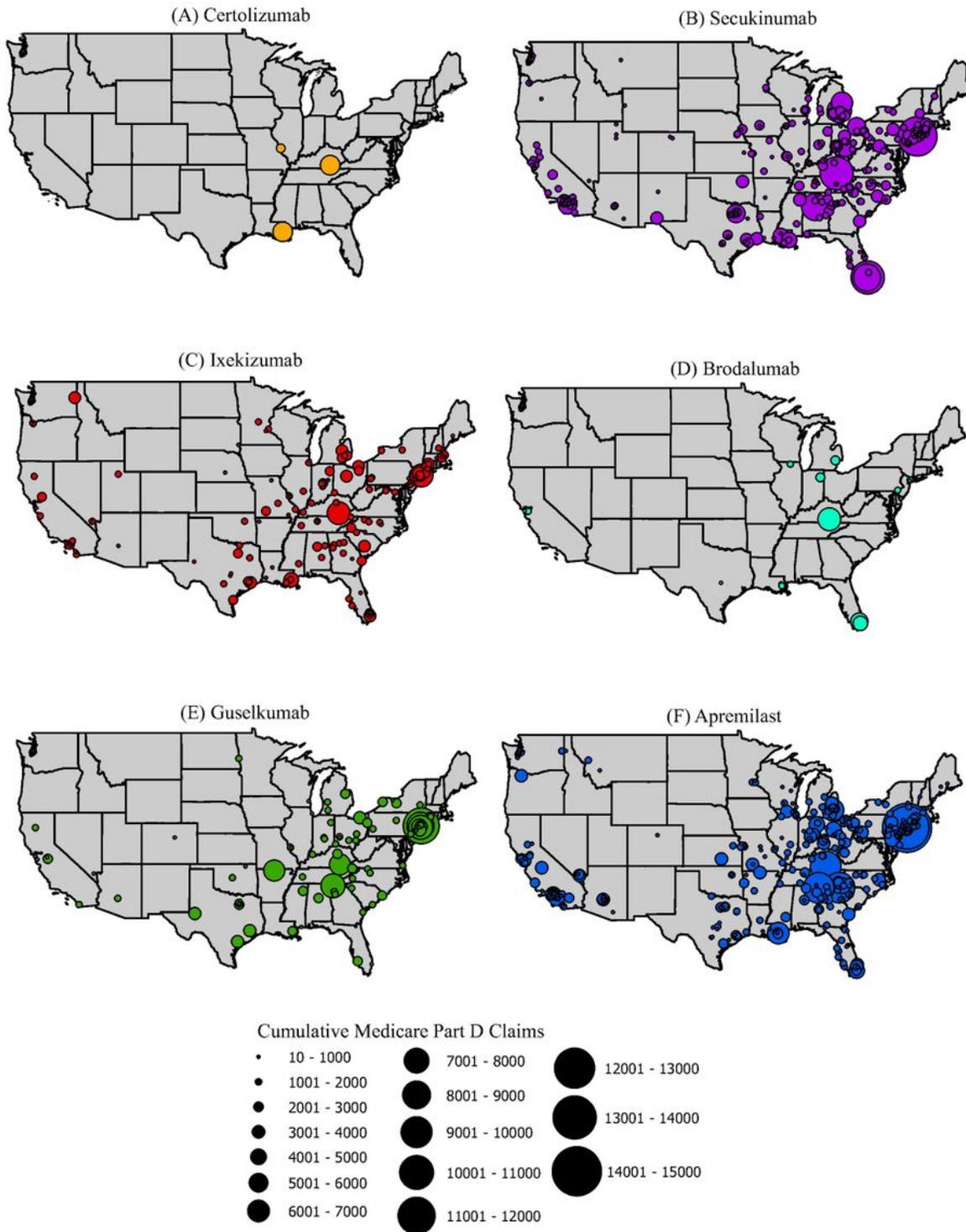


Figure 1

Geographic distribution of dermatologist early-adopter Medicare Part D Claims for recently FDA-approved biologics for psoriasis in the contiguous United States (n=783). Dermatologist early-adopters were defined as those with at least 10 Medicare Part D claims of (A) Certolizumab pegol, (B) Secukinumab, (C)

Ixekizumab, (D) Brodalumab, (E) Guselkumab, and/or (F) Apremilast within two years of their respective FDA-approval for psoriasis. Early adopter location was estimated using the zip code provided in the Medicare Part D public use files 2013-2018. Map scale 1:65,000,000.

## Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- [SupplementalTable1.docx](#)