Real-world healthcare costs and resource utilization among patients treated with erenumab in the United States: A retrospective claims database study

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Poster presenter: **Judie Gutierrez**

Poster session: P16 (Practice, Pitfalls, and Innovation 3)

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Disclosures

- **Judie Gutierrez** is an employee of Amgen
- **Stewart J. Tepper** – *Consultant, speaker, or scientific advisor*: Aeon, Allergan/Abbvie, Alphasights, Amgen, Axsome Therapeutics, Becker Pharmaceutical Consulting, ClearView Healthcare Partners, CoolTech, CRG, Currax, DRG, Eli Lilly, ExpertConnect, FCB Health, GLG, Guidepoint Global, Health Science Communications, HMP Communications, Impel, InteractiveForums, Krog and Partners, Lundbeck, M3 Global Research, MJH Holdings, Neurolief, Nordic BioTech, Novartis, Palion Medical, Pulmatrix, SAI MedPartners, Satsuma, Spherix Global Insights, Strategy Inc, System Analytic, Synapse Medical Communications, System Analytic, Taylor and Francis, Teva, Theranica, Unity HA, XOC, Zosano; *No personal compensation for research:* Allergan Abbvie, Amgen, Eli Lilly, Lundbeck, Neurolief, Novartis, Satsuma, Zosano; *Other: Salary:* Dartmouth-Hitchcock Medical Center, American Headache Society, Thomas Jefferson University; *CME honoraria:* American Academy of Neurology, American Headache Society, Annenberg Center for Health Sciences, Catamount Medical Education, Diamond Headache Clinic, Forefront Collaborative, Haymarket Medical Education, Medical Education Speakers Network, Medical Learning Institute Peerview, Migraine Association of Ireland, North American Center for CME, The Ohio State University, Physicians' Education Resource, PlatformQ Education, Texas Neurological Society, WebMD/Medscape.
- **Todd J. Schwedt** – *Consultant, speaker, or scientific advisor:* Alder, Allergan, Amgen, Biohaven, Click Therapeutics, Eli Lilly, Equinox, Ipsen, Lundbeck, Novartis, Tonix, Weber and Weber, XoC; *Research grants:* Amgen; *Editorial board:* Cephalalgia, Cephalalgia Reports; *Author royalties:* UpToDate; *Other:* stock options in Aural Analytics and Nocira.
- **Pamela Vo** and **Matias Ferraris** are employees of and own stock in Novartis; **Mrudula Glassberg**, **Ahmad Abdrabboh**, **Parth Joshi** and **Santosh Tiwari** are employees of Novartis; **Jeffrey Thompson** is an employee of Kantar Health.
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Background

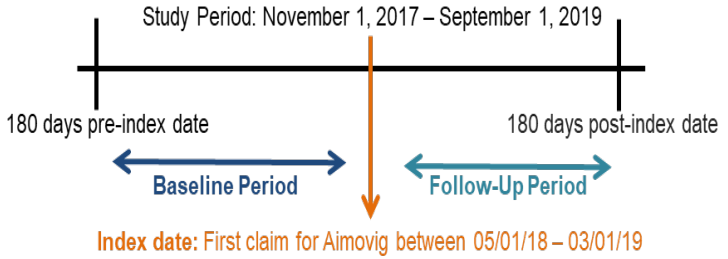
- Migraine is a debilitating neurological disease that affected approximately 39 million people in the year 2020 in the United States (US)[1]
- Erenumab (Aimovig®) is indicated for the preventive treatment of migraine in adults[2]
- While the real-world clinical effectiveness of erenumab in patients with migraine is well documented, its impact on the healthcare costs and utilization in patients with migraine has not been fully investigated[3-7]
- Therefore, the objective of this retrospective study was to evaluate costs and healthcare resource utilization (HRU) among migraine patients treated with erenumab in the US

1. Migraine Research Foundation. Migraine Fact Sheet 2020 (Accessed July 2021); **2.** US Food and Drug Administration. Aimovig™ - Prescribing information. 2018; Available: https://www.accessdata.fda.gov/drugsatfda_docs/label/2018/761077s000lbl.pdf (Accessed July 2021); **3.** Fang J, et al. *Adv Ther*. 2021;38(6):2921–34; **4.** Barbanti et al. *Headache.* 2021;61:363–72. **5.** Kannan S, et al. *Cephalalgia.* 2020;40(13):1511–22; **6.** Scheffler A, et al. *J Headache Pain.* 2020;21:84; **7.** Robblee J, et al. *Headache.* 2020;60:2024–25.

Methods

Study design

- This was a retrospective, non-interventional analysis of medical and pharmacy claims data retrieved from the Komodo Health database



Data source

- **Komodo Health (administrative claims database)**: The database includes de-identified claims (>65 billion clinical, pharmacy and lab encounters) for more than 320 million patients in the US (between 2012-2020)*. It contains prescription and/or medical claims of over 120 million individuals collected from 150+ private insurers in the US, including Medicaid managed-care and Medicare Advantage plans

Study eligibility criteria

- Adults (≥18 years of age) with ≥3 consecutive monthly claims for erenumab between November 1, 2017 and September 1, 2019 and having continuous medical & pharmacy benefit eligibility from 180 days pre-index of erenumab treatment through 180 days post-index were included. The index date was defined as the date of first erenumab claim
- Patients with any claim for another CGRP-targeted medication (fremanezumab or galcanezumab) during entire study period, were **excluded**

*These encounters have census level representation across patient populations, including hospital networks, physician networks, healthcare claim processing companies (ie, claims clearing houses), pharmacies, & health insurers. CGRP, calcitonin gene-related peptide.

Methods

Study Measures

- Migraine-related* and all-cause healthcare costs were reported in the following categories:
  - Medical costs
  - Prescription costs
  - Total costs (medical + prescription)
- Mean monthly healthcare costs were compared over varied follow-up periods to assess the impact of the erenumab treatment
  - Short-term (180 days post-index)
  - Mid-term (91-270 days post-index)
  - Longer-term (maximum available follow-up time)
- All expenditures were expressed in 2019 US dollars
- HRU (both all-cause and migraine-related) outcomes were compared over 180 days pre- vs. 180 days post-index periods:
  - Hospitalizations
  - Emergency room visits
  - Outpatient visits**
  - Office visits
  - Neurologist visits
- Demographic characteristics measured on the index date included age, sex, insurance type, and geographic location
- Clinical characteristics were measured during the pre-index period and included adjusted Elixhauser Comorbidity Score (excluding depression),[1] and selected comorbid conditions (anxiety, depression, and insomnia)

* All preventive and acute migraine medications and all medical claims with a primary diagnosis of migraine based on the International Classification of Diagnosis: ICD-9 346.xx / ICD-10 G43.xx);
**Outpatient visits include the following places-of-service: Walk-in retail health clinic, off campus-outpatient hospital, urgent care facility, on campus-outpatient hospital, independent clinic, public health clinic, and rural health clinic.
1. Quan H et al. *Med Care [Internet]*. 2005;43(11):1130–9. HRU, healthcare resource utilization.

Results

Participant's Characteristics

- Overall, 1,839 migraine patients with ≥3 consecutive erenumab claims were included in the study

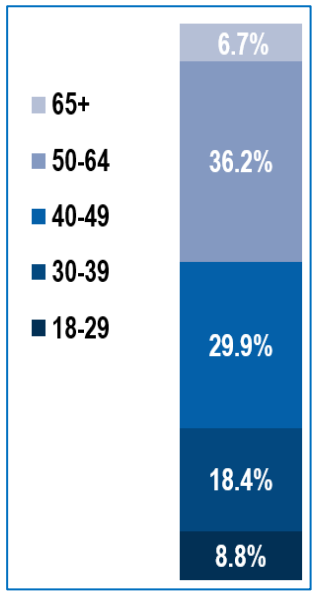
Mean (SD) age

46.9 (12.8 years)

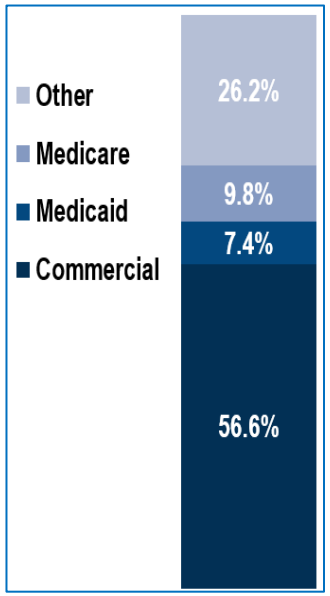
Sex

85.9% **14.1%**

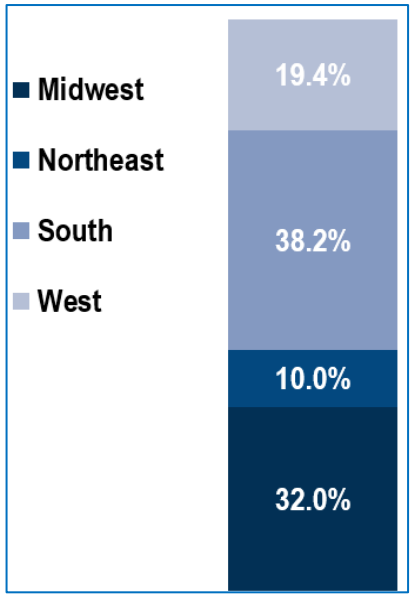
Age group (%)



Insurance type (%)



Geographic region (%)



True monotherapy
950 (51.7%) of the 1,839 patients were on migraine monotherapy

***True Monotherapy**: Patients with no other preventive migraine medications pre-index (90-days pre-index for Botox, no days supply for other oral preventive medications 15-days pre-index) through entire post-index period*

Migraine diagnosis
1572 (85.5%) of the 1,839 patients had a confirmed migraine diagnosis

***Any migraine diagnosis**: Patients with any diagnosis for migraine during the 180-day pre-index period through the 180-day post-index period*

Comorbidities	
Anxiety	36.5%
Depression	31.5%
Insomnia	13.5%

Mean (SD) Elixhauser Comorbidity Score: 1.9 (2.2)

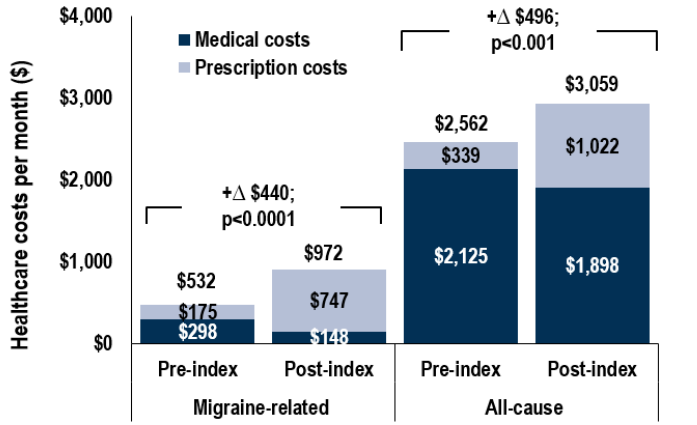
SD, standard deviation.

Results

- Following erenumab initiation, a reduction in mean monthly migraine-related (p<0.0001) and all-cause medical costs (p=0.07) during the 180-day post-index period was observed, which was associated with significant increase in migraine-related (p<0.0001) and all-cause prescription costs (p<0.0001)
- **With increase in follow-up time, up to 98% of the increased migraine-related and >100% of the all-cause prescription costs were offset by the reduced medical costs**

Short-term impact: Average monthly cost (180 days pre-index vs. 180 days post-index healthcare costs)

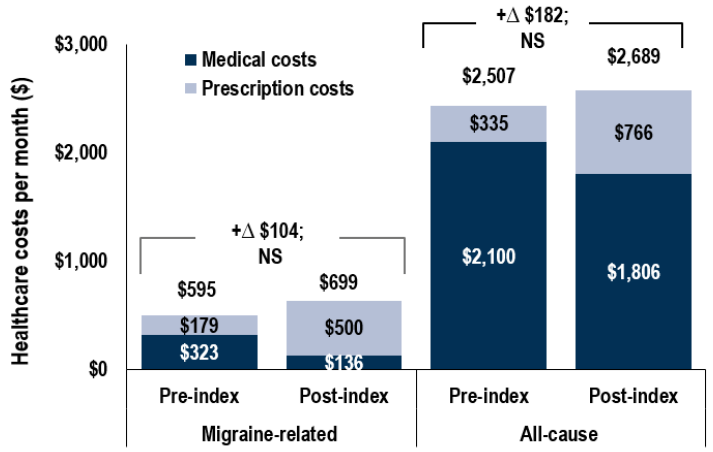
A statistically significant increase in migraine-related and all-cause costs during 180 days post-index period due to increased prescription costs



Reduction of $149 in migraine-related medical costs (p<0.0001) and $228 in all-cause medical costs (p=0.073). Increase of $573 in migraine-related prescription costs (p<0.0001) and $684 in all-cause prescription costs (p<0.0001)

Mid-term impact: Average monthly cost (180 days pre-index vs. 91-270 days post-index)

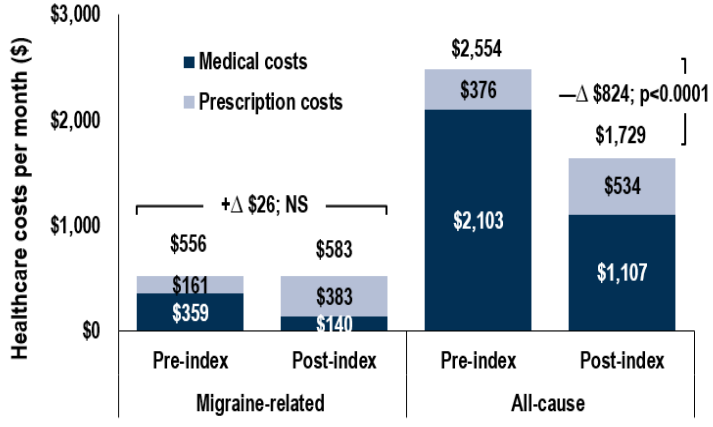
A non-significant increase in migraine-related & all-cause costs was observed



Reduction of $187 in migraine-related medical costs (p<0.0001) & $295 in all-cause medical costs (p=0.116). Increase of $321 in migraine-related prescription costs (p<0.0001) & $431 in all-cause prescription costs (p<0.0001)

Longer-term impact: Average monthly cost (180 days pre- vs. maximum follow-up post-index)

A slight increase (non-significant) in total migraine-related costs and a statistically significant decrease in all-cause costs was observed



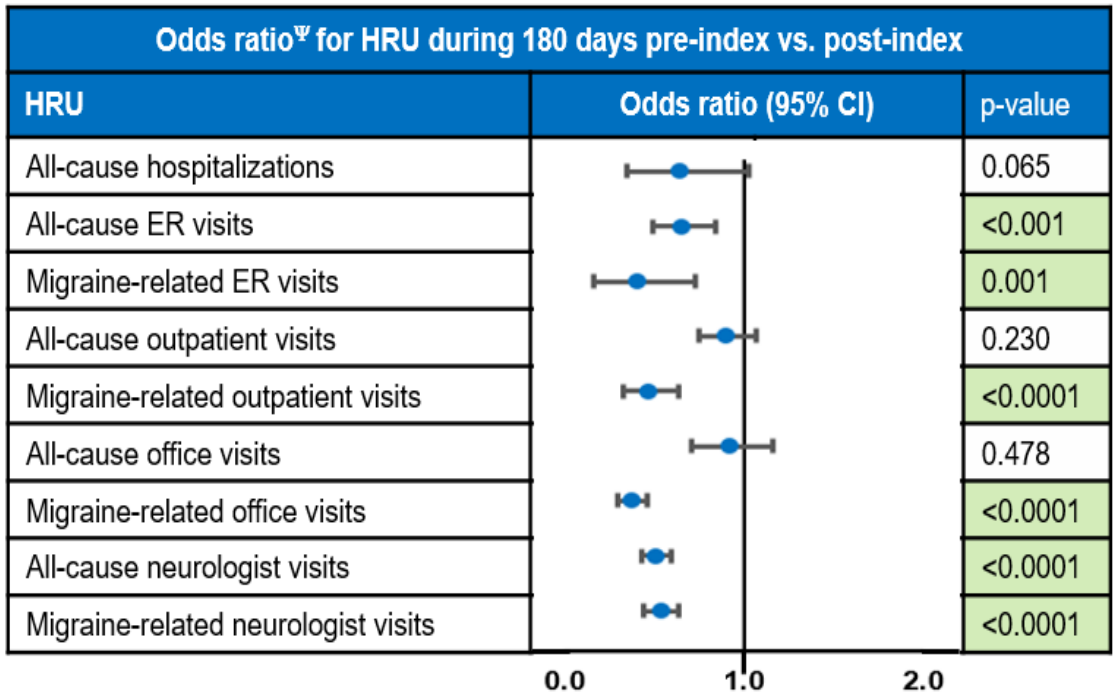
Reduction of $218 in migraine-related mean monthly medical costs (p<0.0001) and $996 in all-cause medical costs (p<0.0001). Increase of $222 in migraine-related prescription costs (p<0.0001) and $158 in all-cause prescription costs (p<0.0001)

The individual sum of medical and prescription costs slightly vary from the total costs reported (values above each column). This is because the results are based on separate regression analyses for each cost-type (total, medical, and prescription costs), where the impact of the same group of covariates may differ; *Mean maximum follow-up period: 8.9 months. NS, non-significant; Δ, change in costs following erenumab treatment.

Results

- Regression analysis for HRU endpoints after adjusting for covariates showed a statistically significant reduction in all-cause & migraine-related outpatient visits, office visits, and neurologist visits (p<0.05). Similarly, odds of having all-cause & migraine-related ER visits, migraine-related outpatient* & office visits, and all-cause & migraine-related neurologist visits during 180-day post-index period were significantly reduced

HRU (mean visits), N=1,839		Pre-Index Mean (SEM)†	Post-Index Mean (SEM)†	Difference	p-value
Hospitalizations	All-cause	0.10 (45.07)	0.07 (33.65)	-0.03	0.265**
	Migraine-related	NR	NR	NR	NR**
ER	All-cause	0.34 (0.02)	0.27 (0.03)	-0.08	0.027**
	Migraine-related	0.06 (38.18)	0.04 (23.77)	-0.02	0.134**
Outpatient*	All-cause	1.43 (0.06)	1.32 (0.05)	-0.11	<0.05
	Migraine-related	0.22 (0.02)	0.14 (0.01)	-0.09	<0.0001
Office	All-cause	8.26 (0.21)	7.37 (0.18)	-0.89	<0.0001
	Migraine-related	1.48 (0.06)	1.05 (0.06)	-0.43	<0.0001
Neurologists	All-cause	0.99 (0.04)	0.71 (0.03)	-0.28	<0.0001
	Migraine-related	0.68 (0.03)	0.50 (0.02)	-0.19	<0.0001



*Outpatient visits include the following places of service: Walk-in retail health clinic, off campus-outpatient hospital, urgent care facility, on campus-outpatient hospital, independent clinic, public health clinic, and rural health clinic; ** Precaution in interpretation is needed due to low counts; NR: Not reportable due to small observation counts resulting in non-valid statistical testing and/or regression not converging; † Mean (SEM) data represent average number of visits per patient during the 180-day period; □ Odds ratio <1 represents reduction in odds of having hospitalization or other HRU visits during 180-day post-index period (post-initiation of erenumab). CI, confidence interval; ER, emergency room; HRU, healthcare resource utilization; SEM, standard error of mean.

Limitations

- The inclusion criteria of 180-day continuous eligibility pre/post treatment initiation may have led to the inclusion of patients who had continuous enrollment across two calendar years and thus might represent a more stable sub-population of migraine patients. Therefore, the results may not be generalizable across the entire migraine population
- The follow-up time of 180-days and the data-delay restrictions associated with medical/pharmacy claims adjudication may provide limited time for the sample population to measure true differences in treatment effects on patient outcomes, including HRU and cost, therefore results may be underestimated
- For the cost estimates, although the data extrapolated represents the most up-to-date information, costs may be underestimated due to external factors such as inflation. However, this should not affect the relative comparison between the groups
- Finally, there may have been missing erenumab prescriptions dispensed via a free prescription program or dispensed prior to 180-day pre-index period that might have led to misclassification of index date and impact the pre-index outcomes

HRU, healthcare resource utilization.

Conclusions

- In summary, initiation of a new treatment in any disease (including migraine) is expected to increase healthcare costs largely due to an increase in prescription costs (ie, entrance cost of new therapy). For a chronic condition like migraine, the cost versus health benefits should be evaluated over a long period to perceive the true benefits of a therapy
- The data from this study suggests that entrance cost for erenumab, primarily driven by prescription costs, gets mitigated by reduced medical cost over a long-term follow-up
- The results indicate better disease management among adult patients with migraine, which should be an important consideration for both patients and payors considering the findings that indicate an offset between migraine-related prescription and medical costs