Comparative Effectiveness of Asthma Monoclonal Antibody Therapy in Adults: An EHR-based, Propensity-Score-Matched Retrospective Cohort Study

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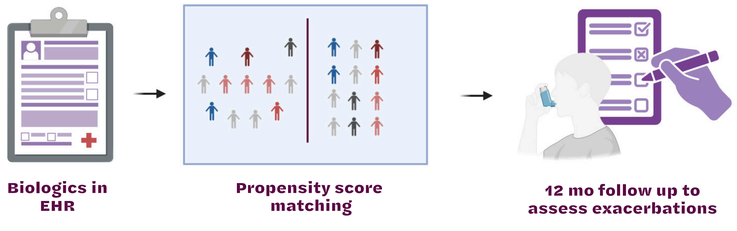
Introduction

- The landscape of moderate-to-severe asthma treatment continues to evolve as monoclonal antibody therapies or biologics emerge. [1]
- Biologics demonstrably improve asthma control by targeting key inflammatory pathways.
- Real-world comparative effectiveness of monoclonal antibody therapies **can inform treatment selection** and provide clinicians **evidence-based recommendations** for when patients are eligible for multiple biologics. [2]

Methods

- Electronic Health Record (EHR)-based retrospective cohort from Penn Medicine encounters for adults with a primary asthma ICD-10 diagnosis between January 1, 2017, and February 29, 2024.
- Encounters were limited to patients that were ever prescribed **Omalizumab**, **Mepolizumab**, **Benralizumab**, **Dupilumab**, or **Tezepelumab**.
- We computed **propensity scores** using logistic regression (models adjusted for sex, race, smoking, baseline treatment, allergic comorbidities, and Elixhauser comorbidity score).
- Negative binomial regression models with a 2:1 nearest neighbor matching were fit. We estimated the total number of **asthma-related exacerbations during 12 months of follow-up**.



In **propensity score matched** analyses, Omalizumab and Mepolizumab were associated with *fewer* exacerbations than Dupilumab. Tezepelumab outperformed Omalizumab.

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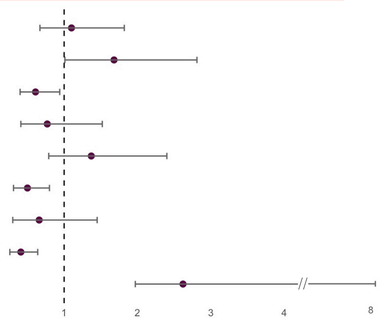
Table 1: Pairwise Comparisons of Biologics for Asthma and their Adjusted Incidence Rate Ratios (IRRs). Incidence rate ratios (IRRs) and 95% CI show the comparative effectiveness of the two biologics

Comparison		IRR (95% CI)
Benralizumab vs	Mepolizumab	1.10 (0.67, 1.82)
	Omalizumab	**1.68 (1.01, 2.81)**
	Dupilumab	**0.61 (0.40, 0.94)**
	Tezepelumab	0.77 (0.41, 1.52)
Mepolizumab vs	Omalizumab	1.37 (0.79, 2.40)
	Dupilumab	**0.50 (0.31, 0.80)**
	Tezepelumab	0.66 (0.30, 1.45)
Omalizumab vs.	Dupilumab	**0.41 (0.26, 0.64)**
	Tezepelumab	**2.62 (1.97, 8.11)**



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Results

- We included **1,149 patients** (median **age 54 years, 67.8% female**).
- **Dupilumab (32.6%) was the most prescribed biologic**, followed by Omalizumab (28.4%), Mepolizumab (17.3%), Benralizumab (16.5%), and Tezepelumab (5.1%).
- **Mepolizumab and Benralizumab** were associated with **significantly fewer exacerbations than Dupilumab** (IRR = 0.50; 95% CI: 0.31, 0.80), and (IRR = 0.61; 95% CI: 0.40, 0.94).
- Benralizumab yielded more exacerbations than Omalizumab (IRR = 1.68; 95% CI: 1.01, 2.81).

Discussion

- In propensity-score-matched analysis, we observed differences in asthma exacerbation rates depending on which biologic was prescribed.
- **Omalizumab and Mepolizumab were associated with fewer exacerbations** when compared to Dupilumab and Tezepelumab outperformed Omalizumab.
- We found **clinically relevant differences** in effectiveness of prescribed biologics among adults.
- In future steps, prospective comparative effectiveness trials are needed to guide optimal treatment for adults with moderate-to-severe asthma.

References

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2. Couillard S, Jackson DJ, Pavord ID, Wechsler ME. Chest. 2024:S0012-3692(24)05139-0. doi:10.1016/j.chest.2024.08.045

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