

# Examining Race, Socioeconomic Status, and Clinical Outcomes in Eosinophilic Esophagitis

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## Introduction

- Eosinophilic esophagitis (EoE) is a rare allergy-based chronic inflammatory condition of the esophagus characterized by an abnormal accumulation of eosinophils in the esophagus (Rothenberg).
- Predominantly present in White people, making up between 70 and 90% of cases in some studies (Ocampo et al.).
- Insurance status has been found to play a role in health outcomes for EoE, as patients without insurance tend to be less likely to proceed with follow-up procedures or appointments, experience clinical improvement in symptoms, or achieve histologic remission (Mohamed and Ghazal).
- Research question: How does race and socioeconomic status influence disease severity and clinical outcomes in patients with EoE?
- Objective: By identifying disparities in EoE and outcomes, we aim to contribute to efforts to improve access to care and to develop targeted interventions for underserved populations to improve patient outcomes.

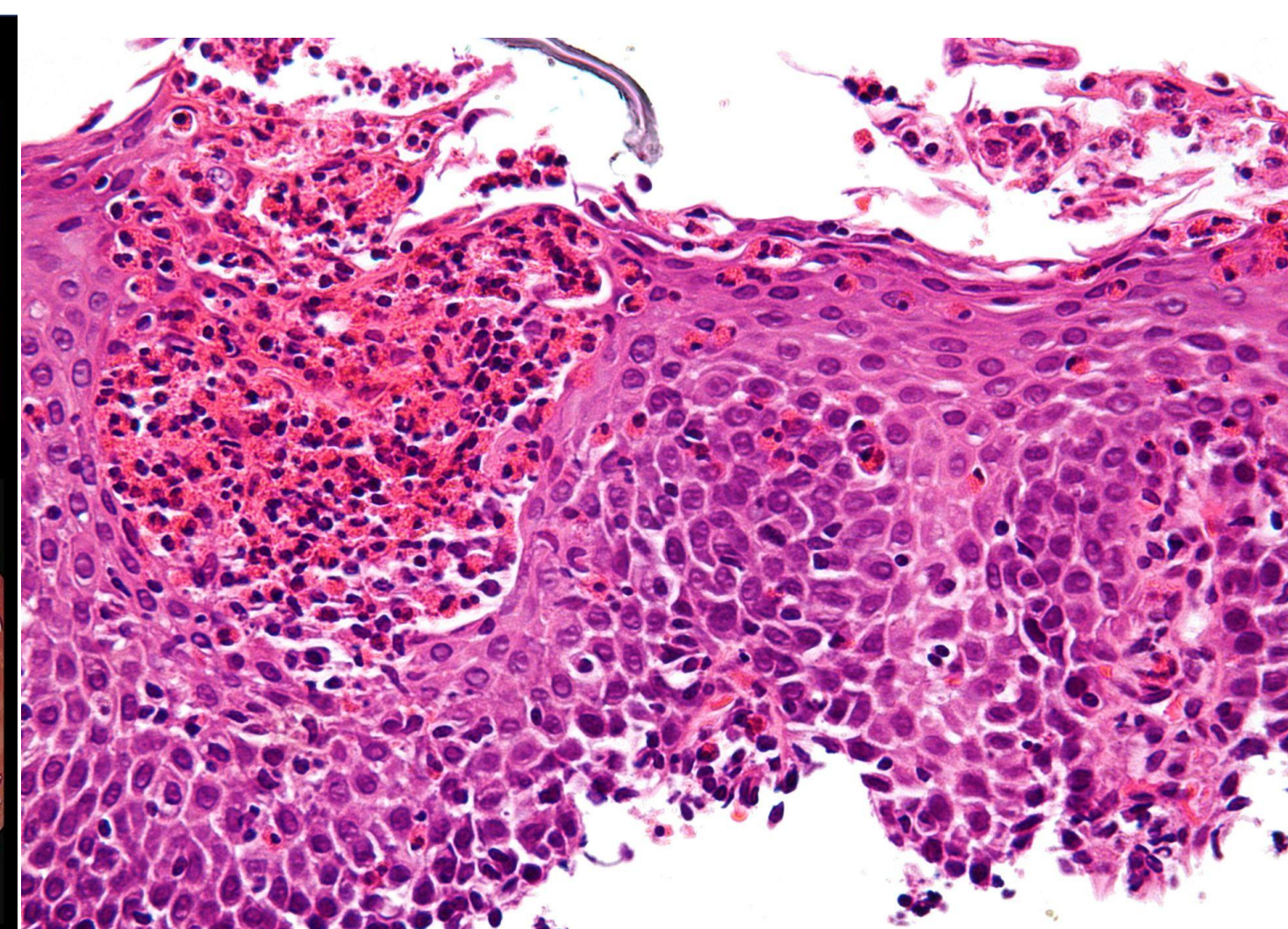
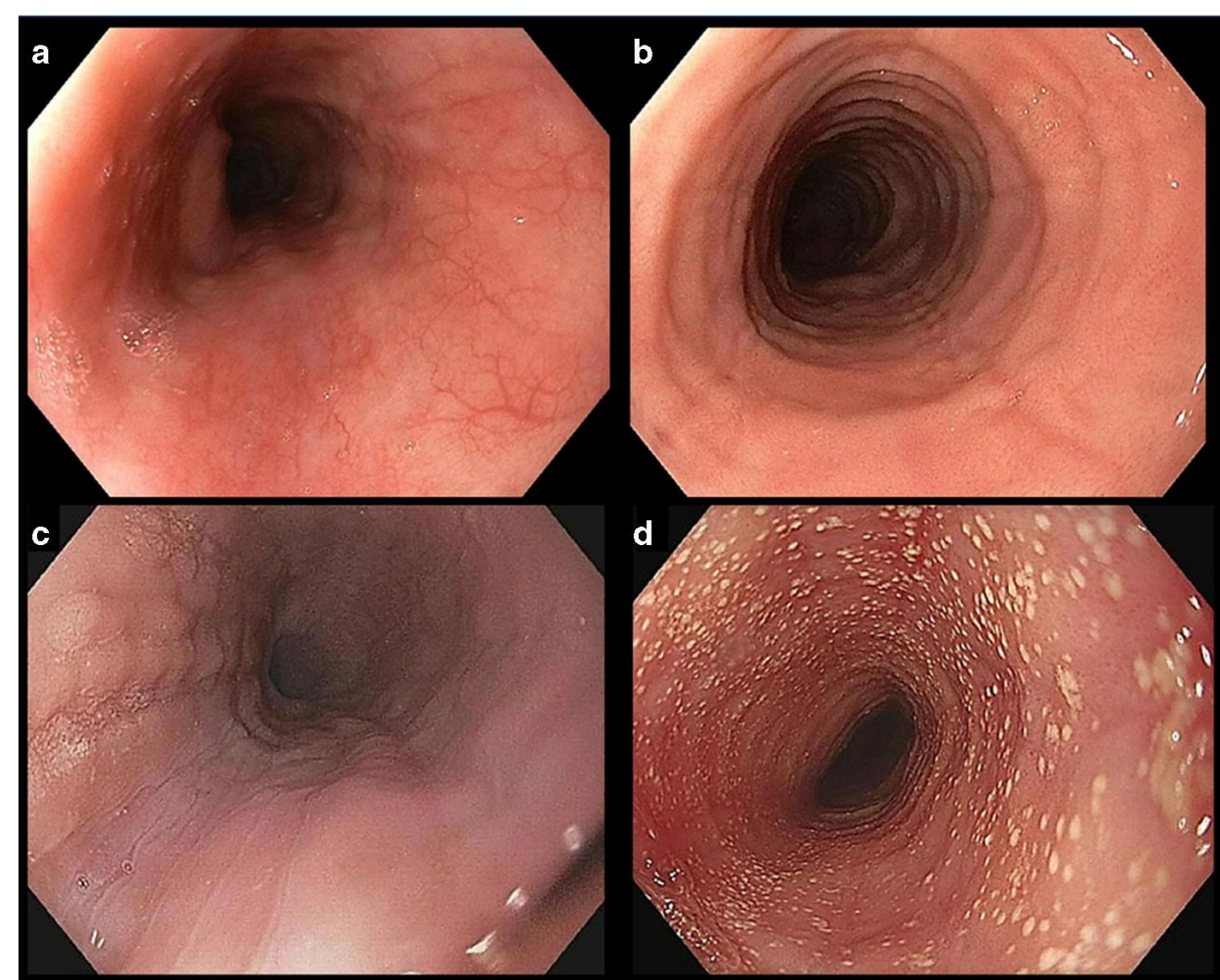


Figure 1. a. normal esophagus b. rings c. fissures d. exudates. Source: Biedermann, L., Straumann, A., Greuter, T. et al. Eosinophilic esophagitis—established facts and new horizons. *Sermin Immunopathol* 433, 319-335 (2021). <https://doi.org/10.1007/s00281-021-00855-y>.

Figure 2. Micrograph of esophageal tissue showing eosinophilic esophagitis. Hematoxylin and Eosin stain. Source: Copyright © 2011 Michael Bonert, MD, FRCP (https://commons.wikimedia.org/wiki/User:Nephron/https://experts.mcmaster.ca/display/bonertm).

## Methods

- A cross-sectional analysis was conducted using EoE hospitalizations from 2016 to 2023 from the National Inpatient Sample (NIS). The major outcome was disease severity, and the major predictive variable was race and income. Covariates accounted for age, gender, elective admission, insurance, and complications.
- A predictive logistic regression analysis on race and income on EoE severity and hospital outcomes was conducted. Descriptive analyses were additionally performed, and the relationship between covariates was examined through the Rao-Scott chi-square test. All statistical analyses were performed using Statistical Analysis System OnDemand (SAS ODA). The significance level was set at  $p < 0.05$ .

## Results

Figure 3: Forest Plot of Logistic Regression Analysis

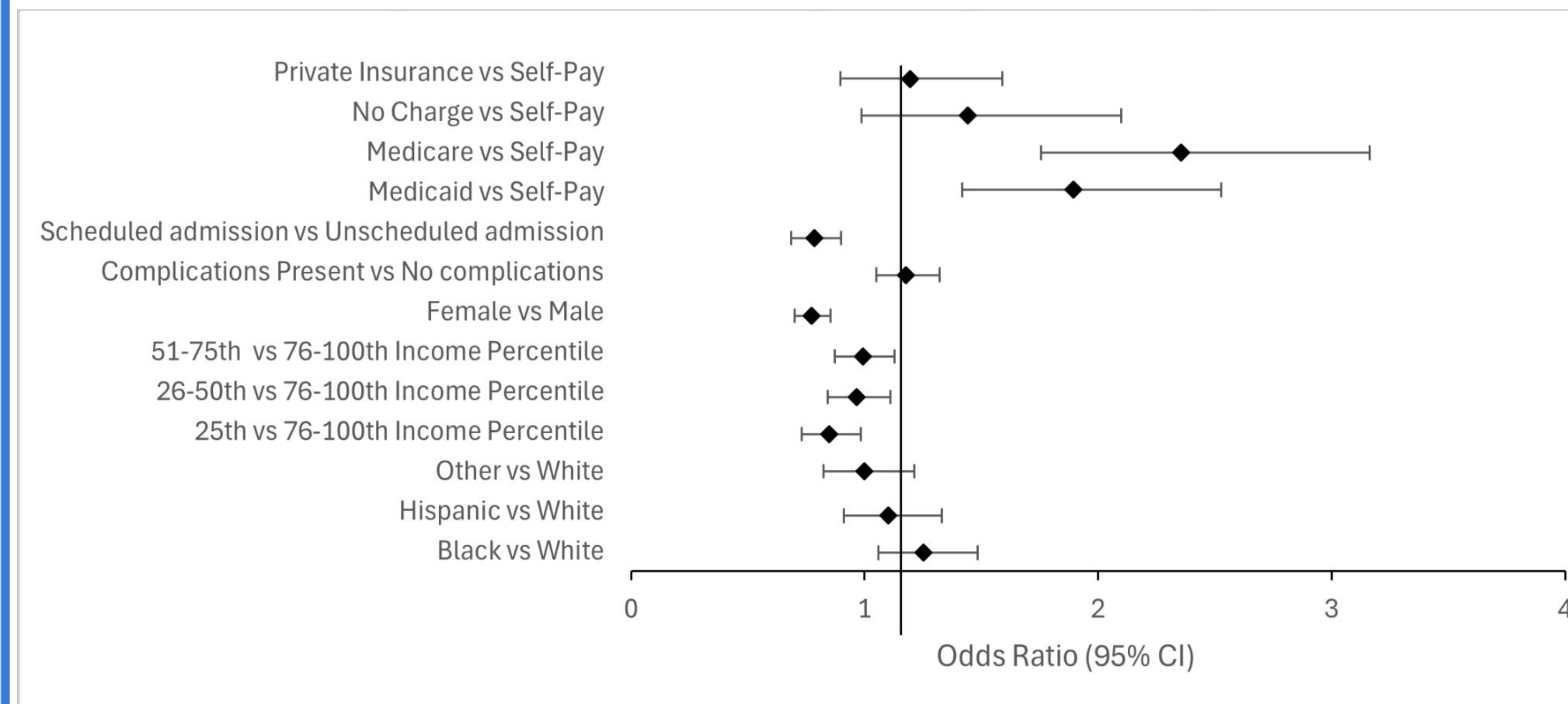


Figure 3. Forest plot displaying adjusted odds ratios and 95% confidence intervals for EoE severity classification across demographic, socioeconomic, clinical, and insurance-related predictors. Significant ( $p < 0.05$ ) associations were observed for sex, complications, admission type, and insurance status.

Figure 4: Group Differences in Severity

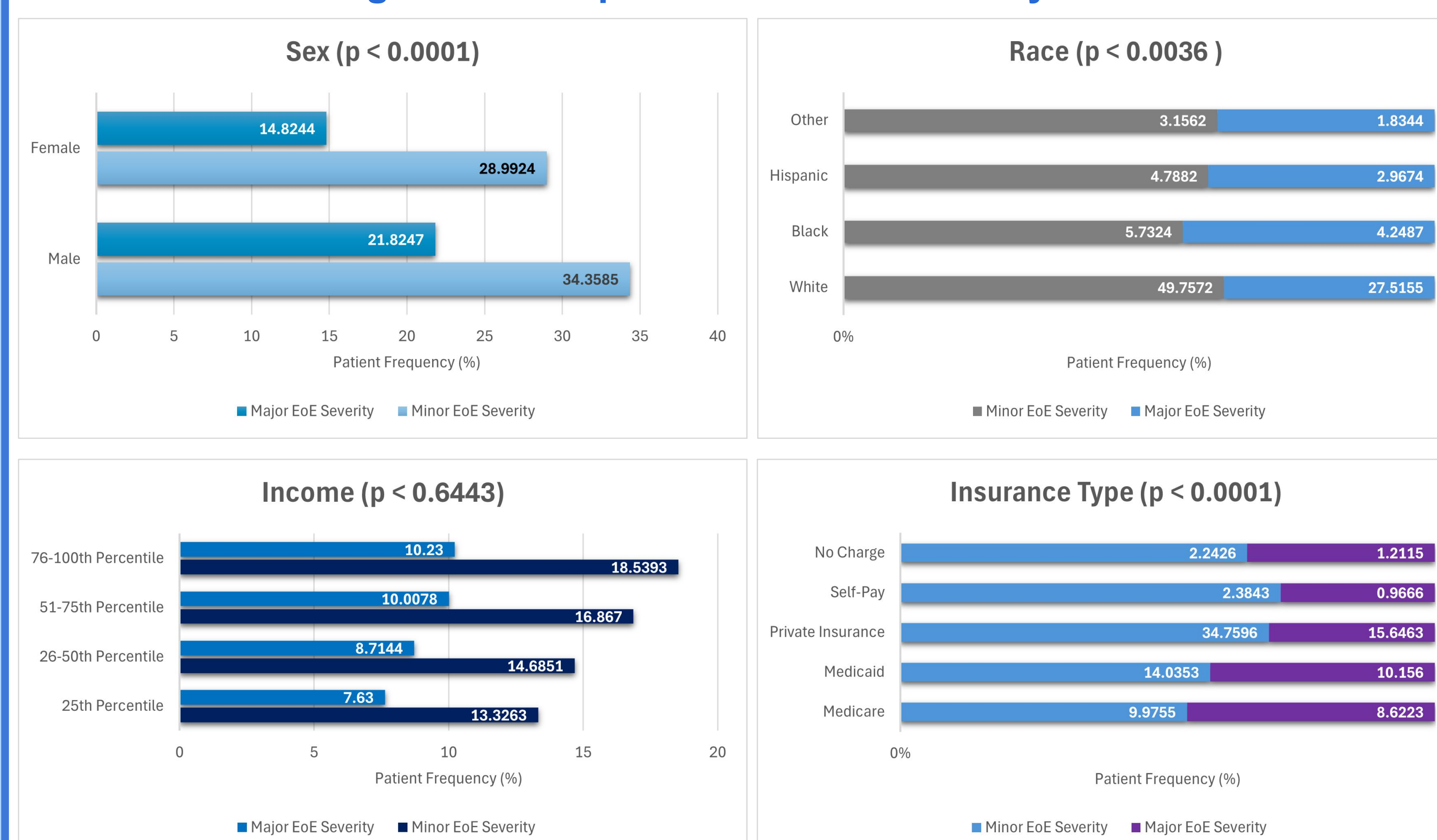


Figure 4. Severity classification in EoE by race, income quartile, and sex. Bar graphs show the distribution of severity levels across race, income, insurance type, and sex, highlighting disparities in clinical presentation.

- Race:** Severity differed significantly across racial groups, with White patients comprising the largest share of both minor/moderate and major/extreme severity classifications. Black patients had a noticeably higher proportion of patients with major to extreme severity than white patients.  $X^2(3)=13.55$ ,  $p=0.0036$ .
- Household Income:** Severity distribution was similar across income quartiles, with no significant association,  $X^2(3)=1.67$ ,  $p=0.64$ .
- Insurance Type:** Severity differed significantly across insurance categories,  $X^2(4)=132.42$ ,  $p<0.001$ , with Medicaid and Medicare patients showing higher proportions of major to extreme severity.

## Discussion

- Disease severity in EoE was more strongly linked to insurance type, admission type, sex, and the presence of complications than to income level, and the racial differences observed largely reflected the underlying sample distribution rather than directional disparities.
- These findings only partially supported the hypothesis that non-White patients or those with lower socioeconomic status would present with more severe disease, as income showed no association, while insurance status demonstrated a clear relationship with severity.
- Factors related to care access and clinical presentation may play a larger role in severity than income alone, which is consistent with existing literature, as insurance status and access to care can impact the quality of care received and follow-up appointments.
- Limitations include that the dataset may not fully capture important social determinants of health, such as education, social environment, or access to specialty care, which could influence disease severity.
- Future work should examine diagnostic delays, insurance-related barriers, and broader social determinants of health to better understand how race and socioeconomic context shape EoE outcomes. With further research, we can develop a more equity-based approach to make healthcare more accessible and affordable to improve outcomes for all patients with EoE and ensure high-quality care.

## Acknowledgements

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## References

