Lower Socioeconomic Status is Associated with Increased Bevacizumab Use Among Patients Initiating Anti-Vascular Endothelial Growth Factor Therapy for Diabetic Macular Edema

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Disclosures

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Background and Objectives

- Bevacizumab is an anti-VEGF agent widely used off-label for treating DME[1,2]
  - Data from head-to-head clinical trials (e.g. Protocol T) have suggested reduced efficacy of bevacizumab compared with other anti-VEGF agents in patients with moderate-to-severe loss in VA[3,4]
  - However, bevacizumab is typically less costly compared with other anti-VEGF agents[5]
- Socioeconomic factors (e.g. race, ethnicity, income, insurance coverage, geographic region, and educational attainment status) are predictors of vision care in the US[6]

To explore the association between indicators of socioeconomic status and initiation of bevacizumab vs other anti-VEGF agents as the first anti-VEGF treatment for DME

DME, diabetic macular edema; VA, visual acuity; VEGF, vascular endothelial growth factor.

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2. Lally DR et al. *Surv Ophthalmol*. 2016;61:759–768. 3. Wells JA et al. *N Engl J Med*. 2015;372:1193–1203. 4. Vader MJC et al. *Ophthalmol Retina*. 2020;8:777–788.
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Study Design

Retrospective cohort study of patients with DME first initiating anti-VEGF agents

Patients in the Komodo Health Claims database receiving anti-VEGF therapy[a] between January 2018 and June 2023
(N=2,078,648)

Eligibility criteria

Inclusion

- **Treatment-naive patients** with DME at the index date[b]
- ***Continuous enrollment*** *in a health plan for 12 months prior to the index date*[b,c]
- Age ≥18 years
- If aged ≥65 years, not enrolled in Medicaid

Exclusion

- Eyes with nAMD or RVO
- Patients enrolled in Medicare FFS

Eligible patients
(N=135,910)

Bevacizumab initiators
(n=109,882)

Other anti-VEGF initiators
(n=26,028)

Outcomes assessed

- **Association between SES variables and use of bevacizumab versus other anti-VEGF agents**

[a]Anti-VEGF and CPT code for injection on the same day and anti-VEGF injections in closed claims.
[b]Index date=first observed used of anti-VEGF.
[c]Baseline period=12 months prior to the index date.
CPT, Current Procedural Terminology; FFS, fee-for-service; nAMD, neovascular age-related macular degeneration; RVO, retinal vein occlusion; SES, socioeconomic status.

Methods

- SES indicators evaluated in the study included:
  - Race/ethnicity
  - Insurance type (commercial, Medicare Advantage, or Medicaid)
  - SES score, calculated by aggregating Census data on geographic-level factors (income, education, and occupation) based on the patient's 3-digit ZIP code[a]
- The association between SES variables and the initiation of bevacizumab versus any other anti-VEGF as the first anti-VEGF agent for DME was estimated via logistic regression adjusted for age, sex, and index year
  - OR (95% CI) for bevacizumab use versus other anti-VEGF agents were reported

[a]Income (average household income and home value), education (% high school and college graduates), and occupation (i.e., % of employed persons in management, business, science, and arts) based on 3-digit ZIP code Census data; SES score computed by adapting the method described by Diez Roux AV et al. *New Engl J Med.* 2001;345:99–106. 2021

5-year Census estimates were used to calculate the 3-digit ZIP code level SES score. The score was divided into percentiles (lowest 10% to top 90%) and quartiles to compare across levels of SES.

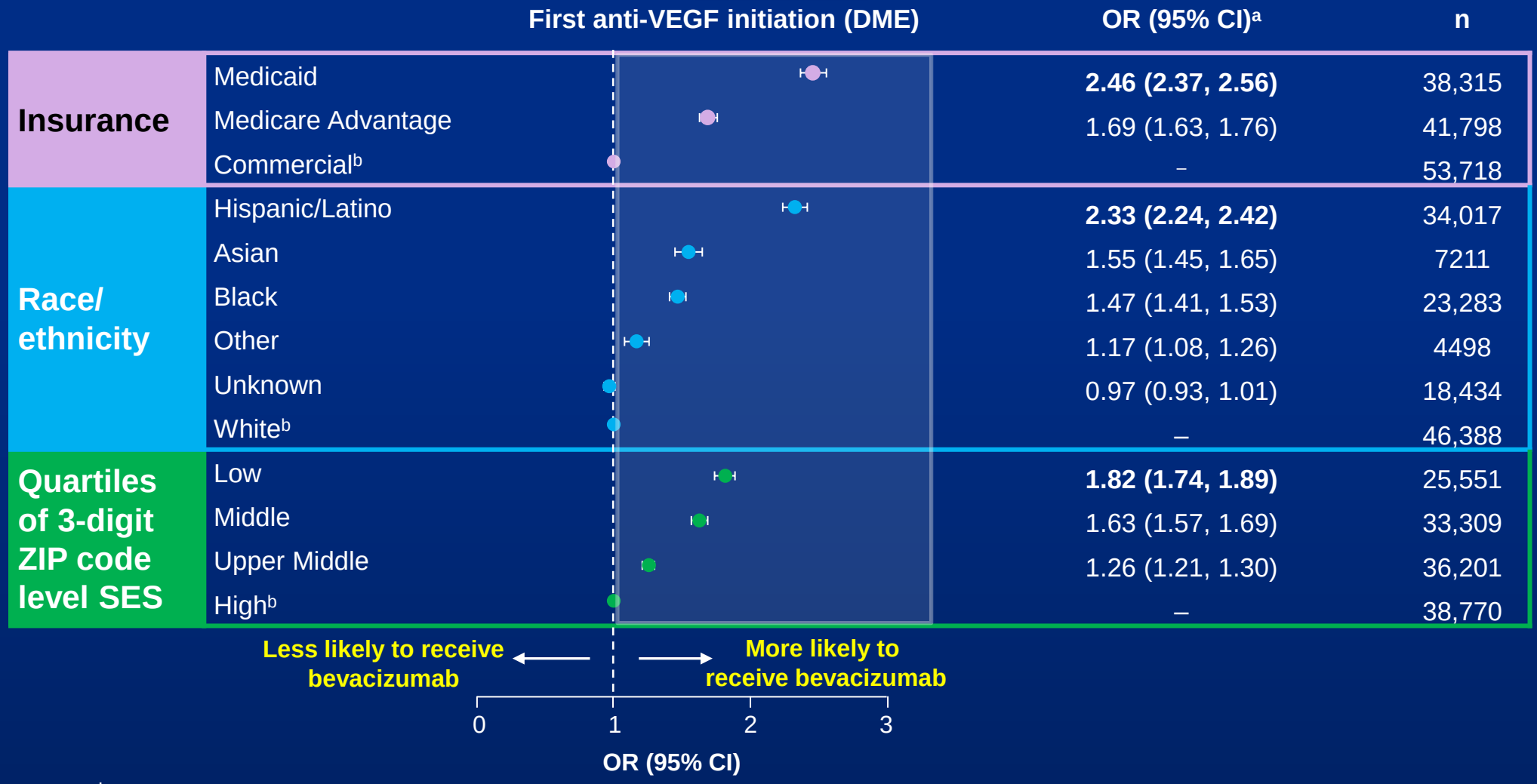
CI, confidence interval; OR, odds ratio.

Baseline Characteristics Among Patients with DME First Initiating Anti-VEGF Agents

	Bevacizumab initiators (n=109,882)	Other anti-VEGF initiators (n=26,028)	Overall (N=135,910)
Age, mean (SD), years	58.6 (11.8)	59.2 (11.5)	58.7 (11.7)
Sex, male (%)[a]	52.6	54.6	53.0
Race/ethnicity (%)			
Hispanic or Latino	27.6	15.7	25.3
White	32.7	43.2	34.7
Black	17.8	15.9	17.5
Asian or Pacific Islander	5.5	4.8	5.4
Other	3.3	3.7	3.4
Unknown	13.1	16.9	13.8
Insurance type (%)[a]			
Commercial	37.1	52.8	40.1
Medicaid	30.9	17.4	28.3
Medicare Advantage	32.0	29.8	31.6
Quartiles of 3-digit ZIP code level SES (%)[a]			
High SES	27.5	36.3	29.2
Upper-middle SES	26.7	28.2	27.0
Middle SES	25.8	20.9	24.9
Low SES	20.0	14.6	19.0

[a]Patients with unknown values were not included in the denominator when calculating the distribution, which was <2% of the overall N for sex, 0.2% for insurance type, and 0.04% for SES.
SD, standard deviation.

Insurance Type, Race/Ethnicity, and Community SES are Associated with Bevacizumab as the First Anti-VEGF for DME

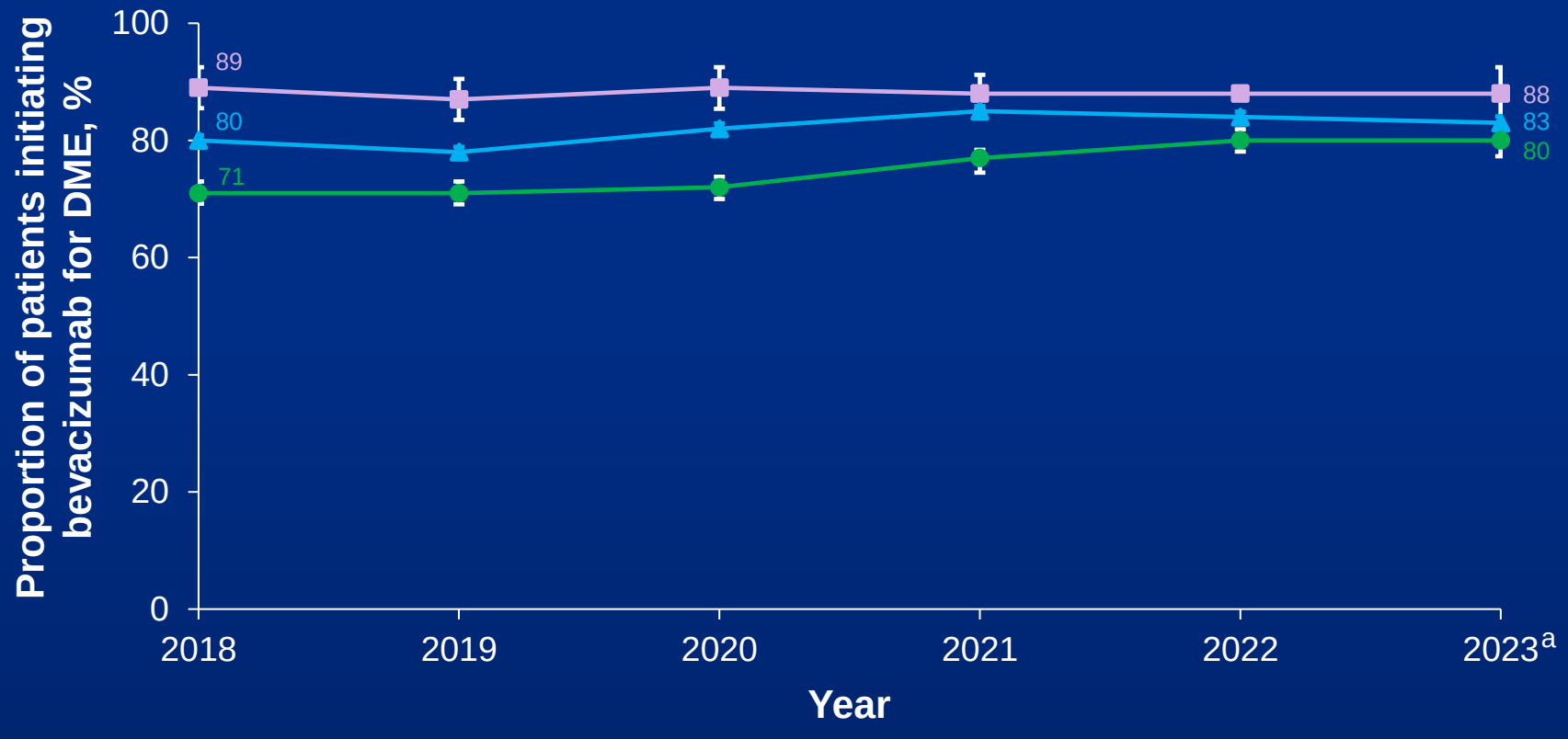


[a]OR adjusted for age, sex, and year.

[b]Reference category.

Note: Approximately 2% of patients with missing values for covariates were excluded from the analysis.

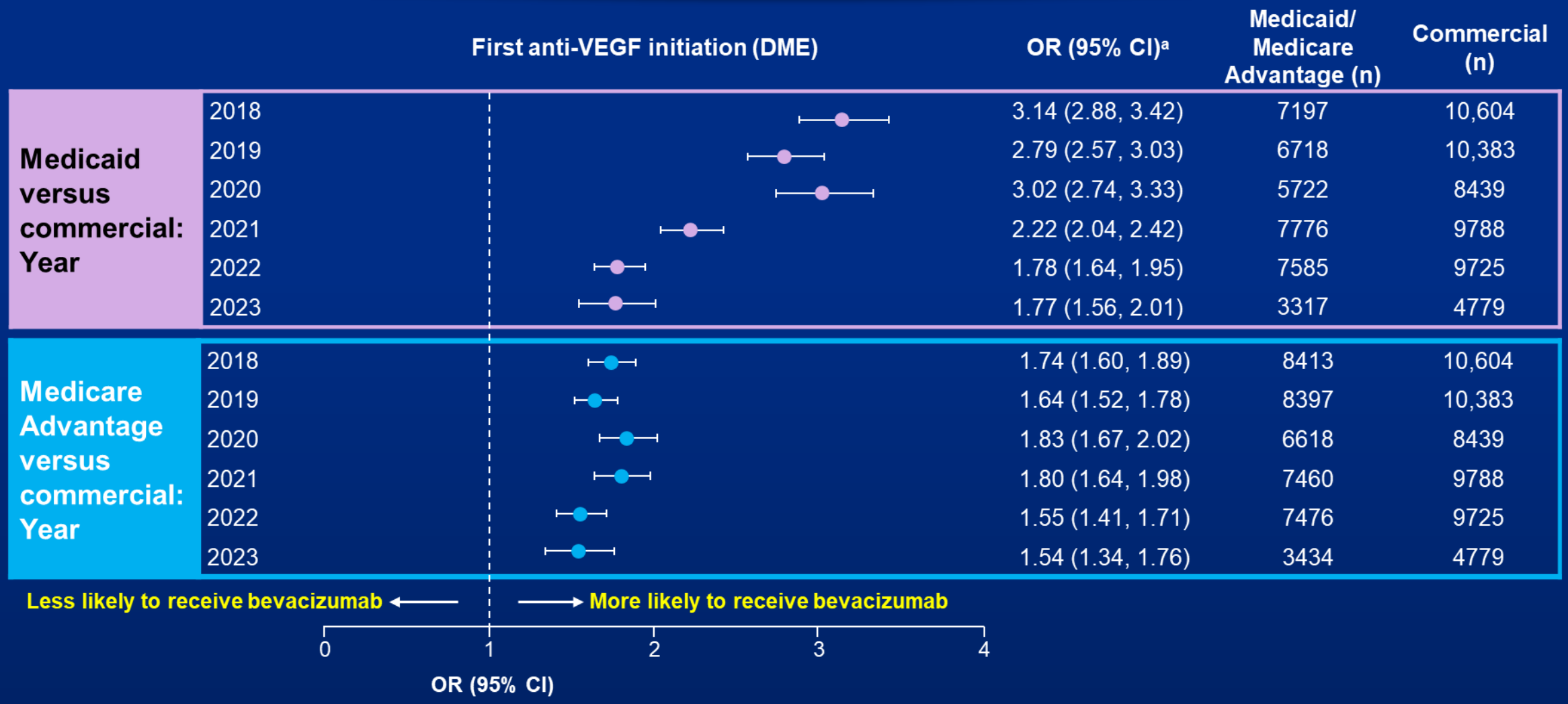
Proportion of Patients Initiating Bevacizumab for DME by Insurance Type Across Years



	2018	2019	2020	2021	2022	2023[a]
Medicaid, n	7221	6733	5737	7802	7604	3322
Medicare Advantage, n	8708	8645	6829	7581	7631	3492
Commercial, n	10,743	10,522	8544	9922	9826	4840

[a]Only includes data until June.

Odds of Bevacizumab as the First Anti-VEGF for DME by Insurance Type Across Years



[a]Adjusted for age and sex.

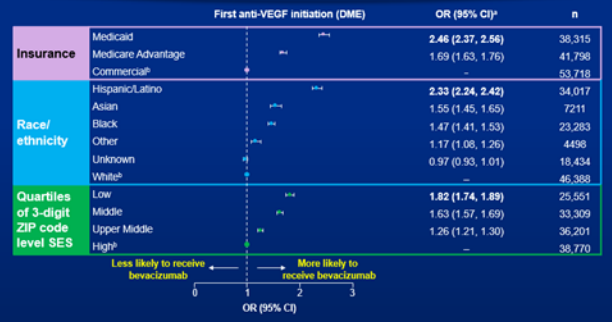
Note: Approximately 2% of patients with missing values for covariates were excluded from the analysis.

Limitations

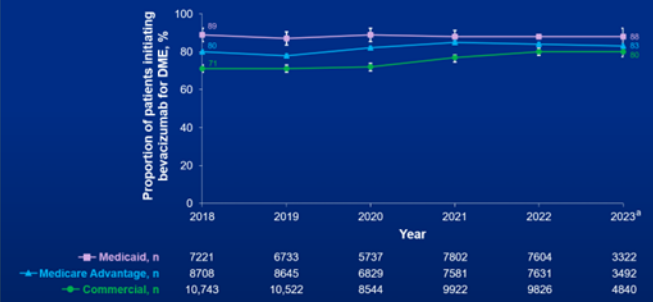
- Although we observed discrepancies in anti-VEGF treatment patterns based on SES, we were not able to determine the cause of these observations in this analysis
- The SES score used in this analysis was measured at the 3-digit ZIP code level and may not reflect the patient's actual individual-level SES
- The Komodo Health claims database did not include Medicare FFS data; therefore, the observed findings for patients covered by Medicare Advantage from this study cannot be generalized to a Medicare FFS population
  - This findings of this analysis can also not be generalized to other healthcare systems

Conclusions

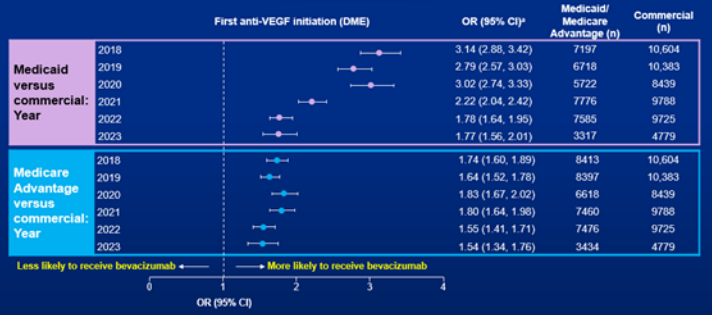
Insurance Type, Race/Ethnicity, and Community SES are Associated with Bevacizumab as the First Anti-VEGF for DME



Proportion of Patients Initiating Bevacizumab for DME by Insurance Type Across Years



Odds of Bevacizumab as the First Anti-VEGF for DME by Insurance Type Across Years



- First-line use of bevacizumab versus other anti-VEGF agents for DME was associated with all indicators of lower socioeconomic status (race/ethnicity, insurance type, and census-derived SES score) assessed in this study
  - The association between insurance type and use of bevacizumab remained despite increasing use of bevacizumab over time in patients on commercial plans
- These findings suggest disparities in access to FDA-approved anti-VEGF agents for DME treatment
- Further research is needed to elucidate drivers of health inequity and the potential impact on outcomes for disadvantaged populations in the US