

Socioeconomic and Demographic Drivers of Ambulatory Surgery Usage

The 2020 HCUP National Ambulatory Surgery Sample in 10 Charts

Scalable, Multi-Platform, Open-access, Reproducible Data Pipeline

7.8 million patients, 2899 hospitals, 35 states, 1 nation

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LLMs Utilized: Claude Sonnet 4 | Opus 4.1; ChatGPT 4o, o4, 5, 5-mini; Deepseek 3.1; Gemini 2.5 Pro; Grok 5



AIM

To explore whether socioeconomics or demographics has more affect on the usage of ambulatory surgery.

METHODS

- Simple descriptive analysis → no statistical tests
- Vs 2020 US Census data → classical statistical tests
- Machine Learning → advanced statistical modeling
- Initially Traditional coding, later w/ use of AI/LLM

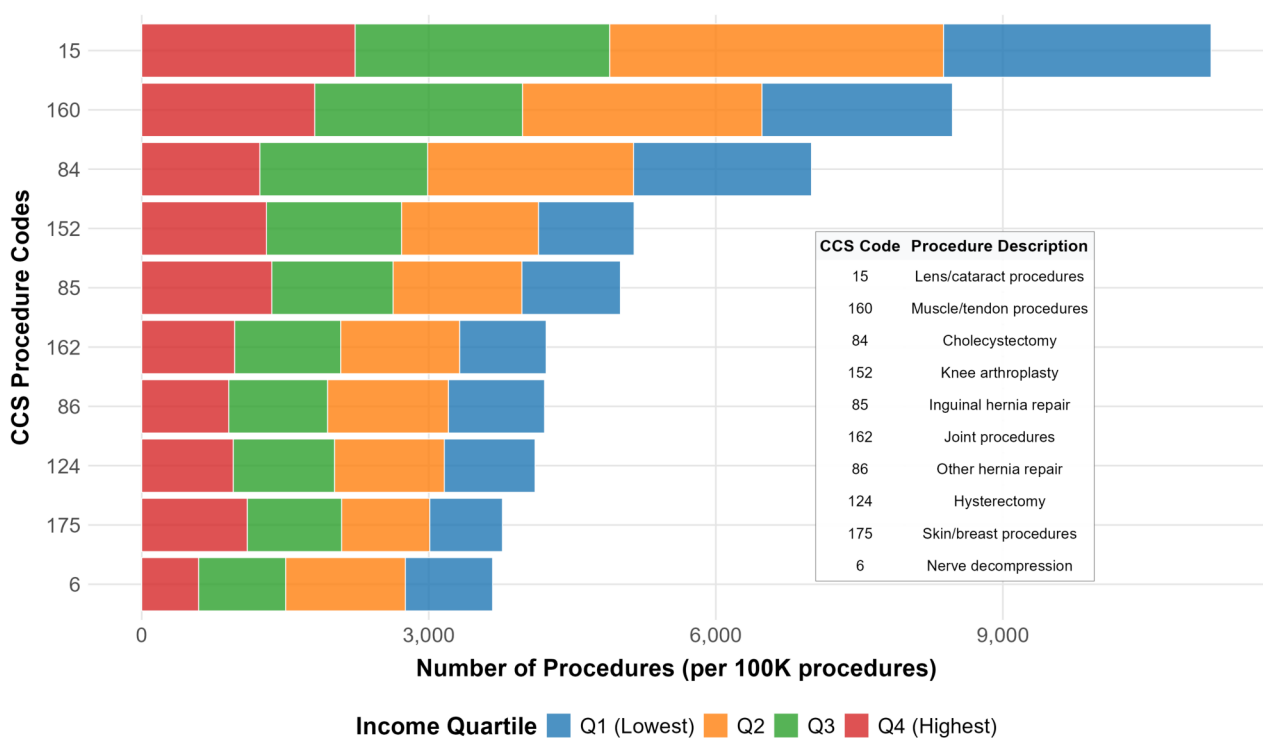
KEY FINDINGS

- Demographic shift over 1 American lifetime makes Age confounding
- Payor is the primary driver of ambulatory surgical access
- Medicare is the dominant payor, furthering Age confounding
- Geographical bias is a weakness of the dataset

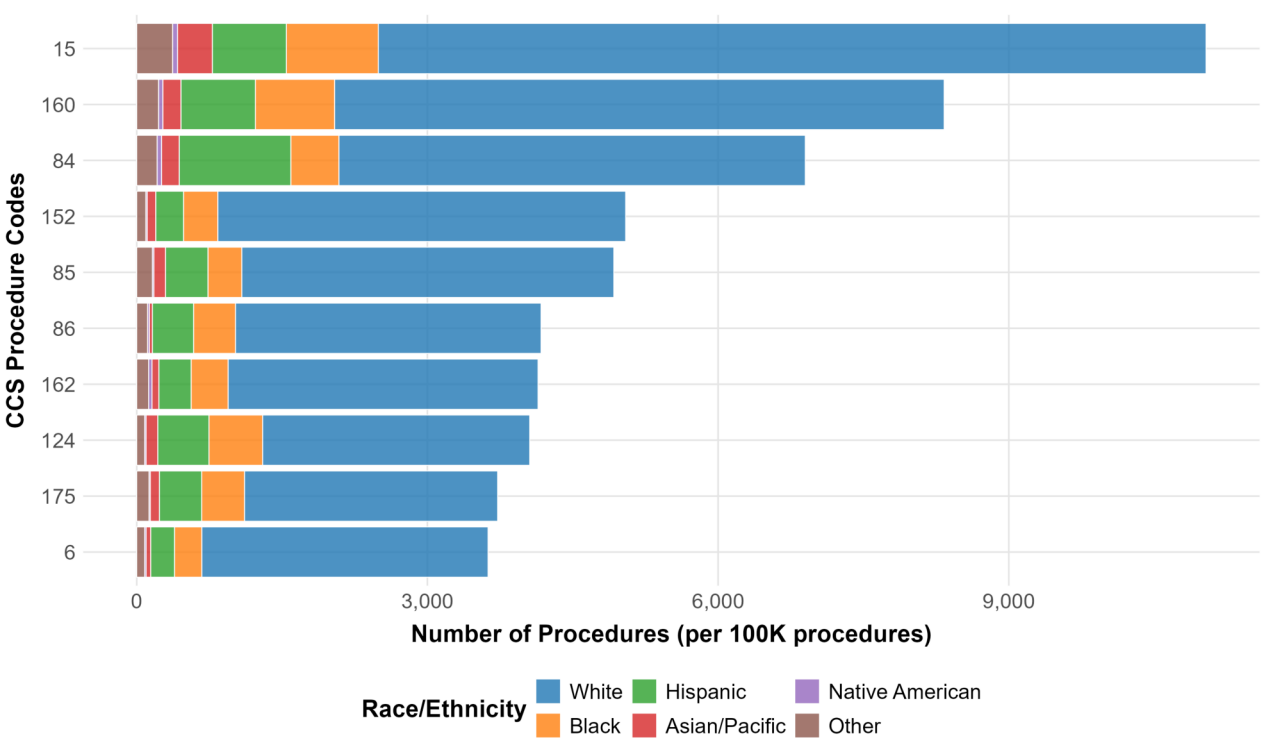
CONCLUSION

- HCUP NASS data shows minimal socioeconomics imbalance
- Demographics generally reflect US population trends

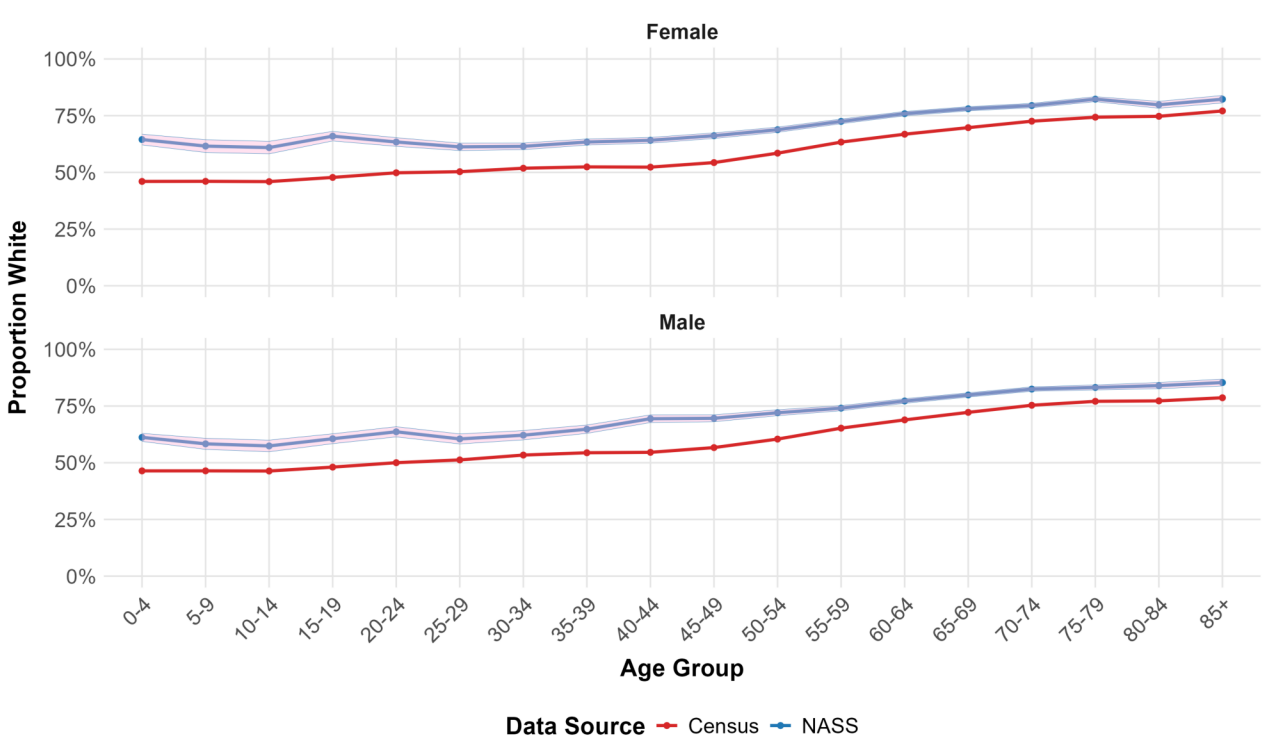
Most Common Ambulatory Surgeries by Socioeconomics
Segmented by Income Quartile of Patient ZIP Code



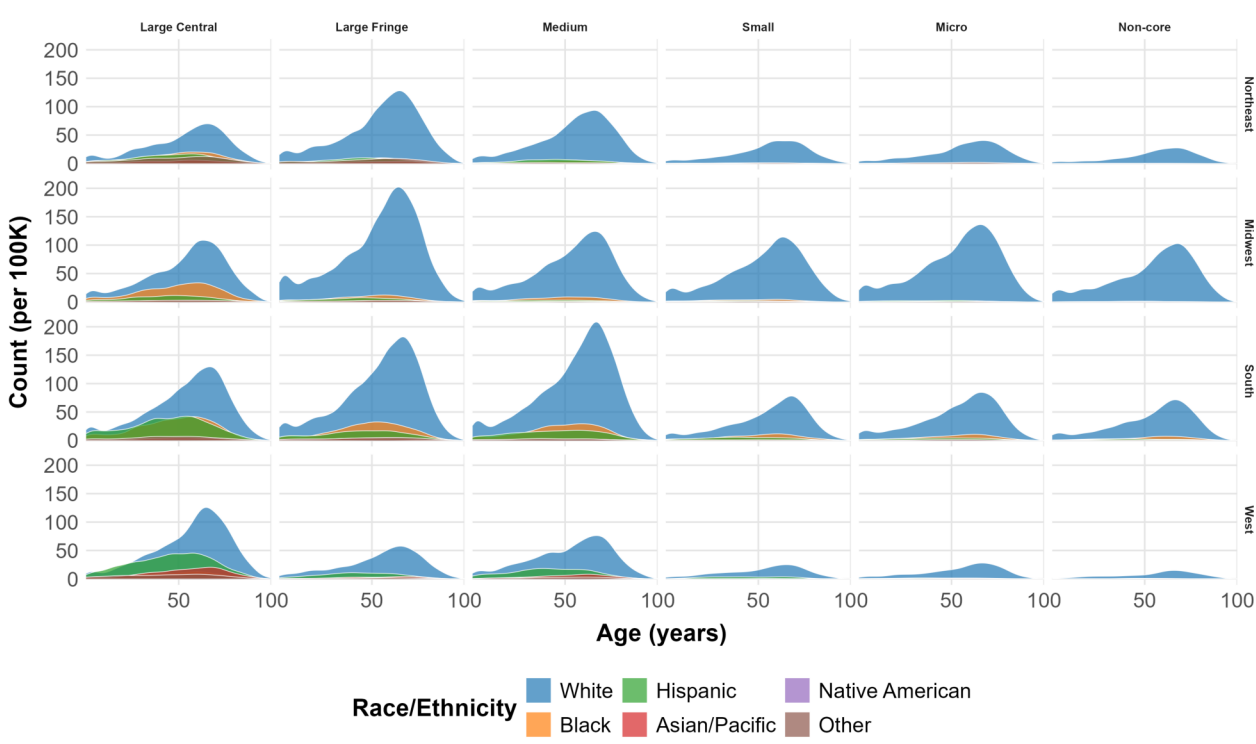
Most Common Ambulatory Surgeries by Demographic
Distribution by Patient Race/Ethnicity



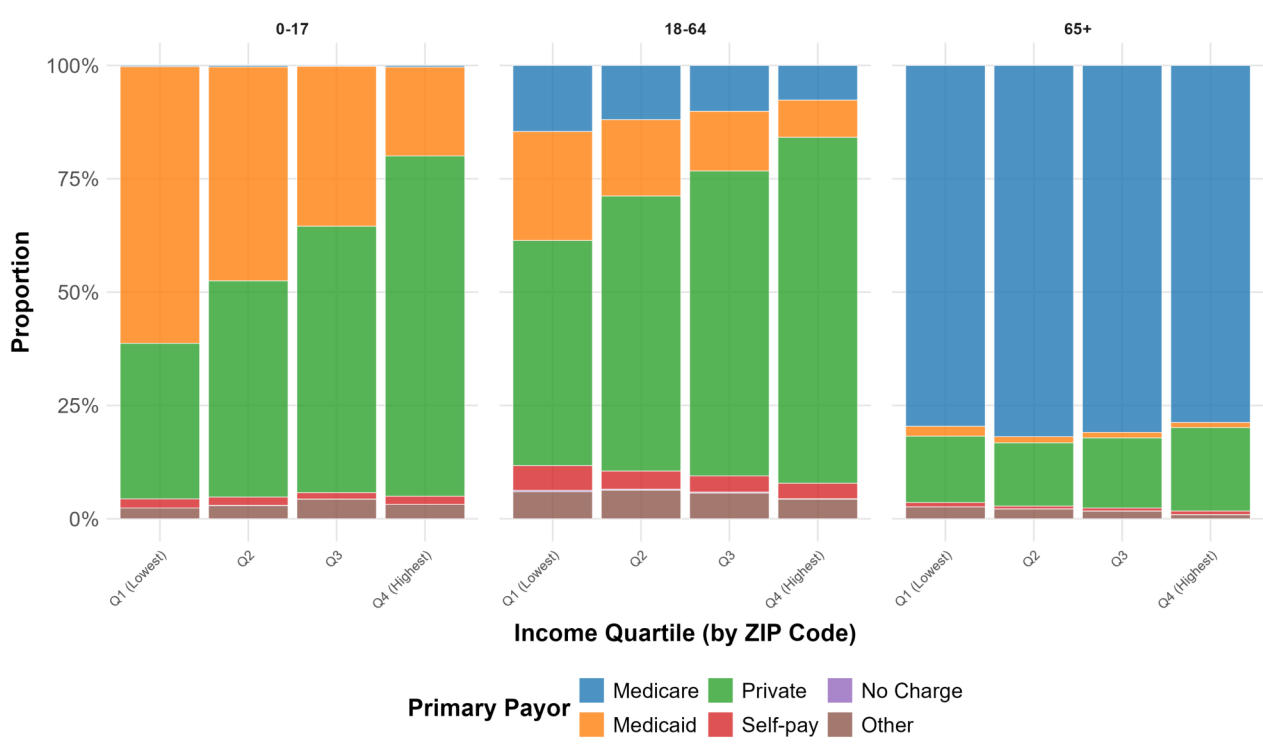
Race Proportion by Age Groups vs Census
Census comparisons across age groups and gender (w/ CI)



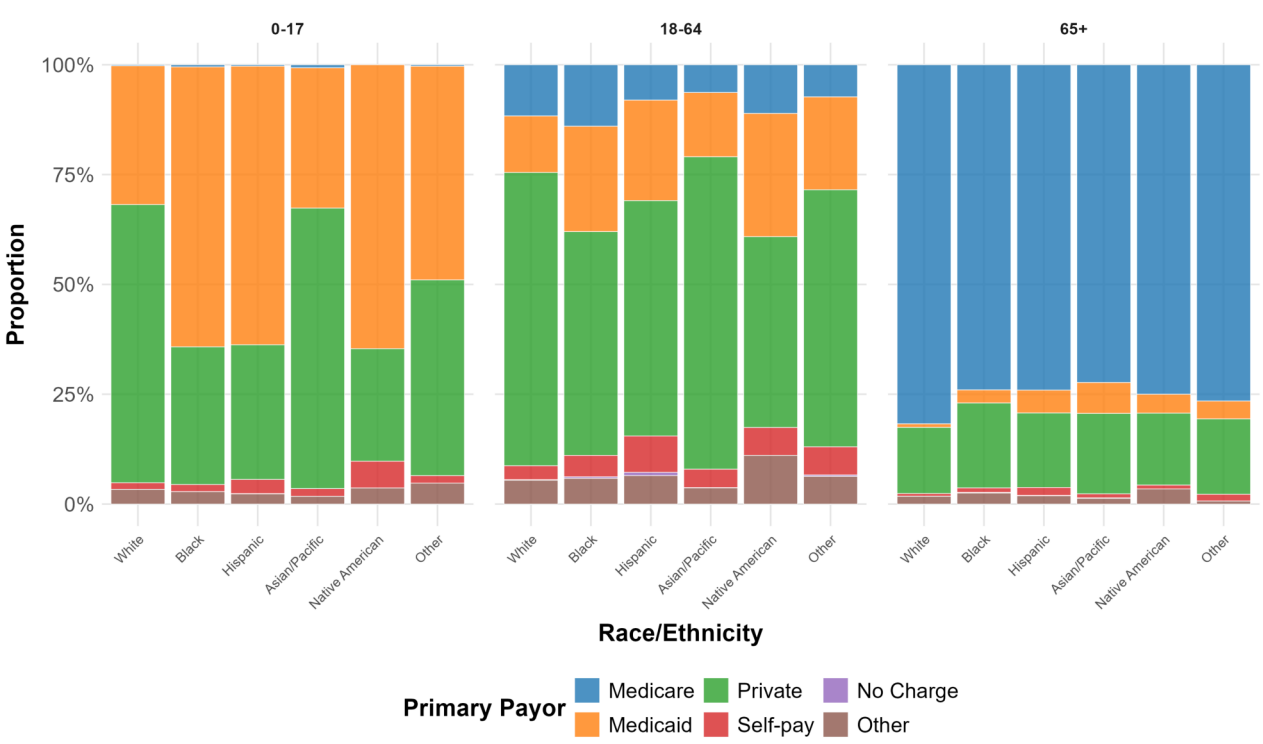
Patient Age Distribution in NASS 2020 by Demographic and Geography
By Urban-Rural Classification and US Region, Segmented by Race



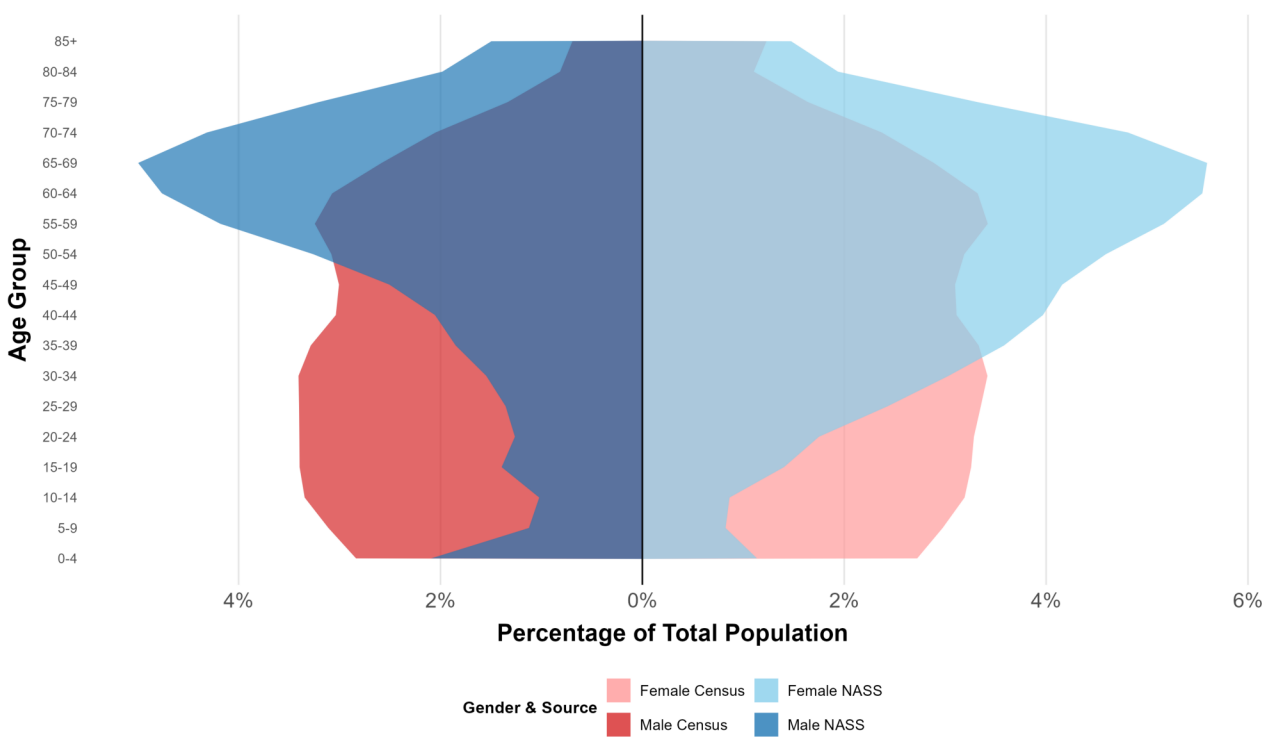
Primary Payor Distribution by Socioeconomics
Insurance by Age Group and Income Quartile



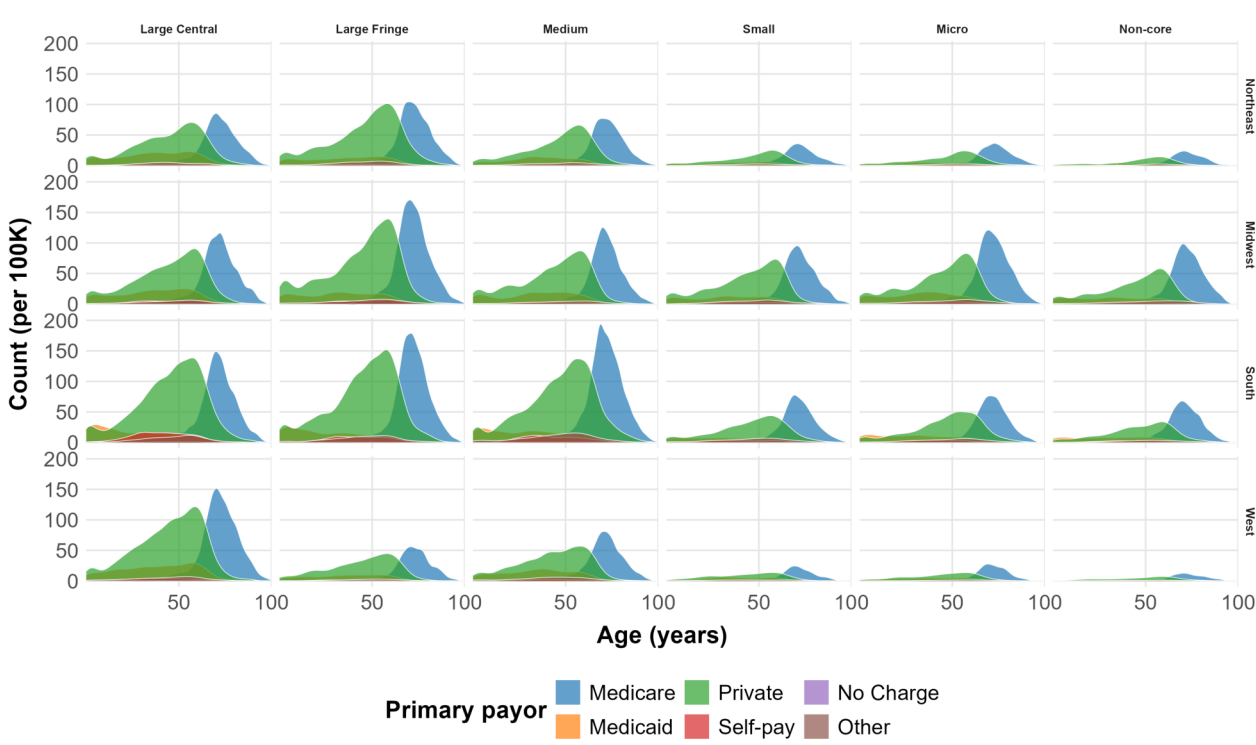
Primary Payor Distribution by Demographic
Insurance Coverage Patterns by Age Group and Race/Ethnicity



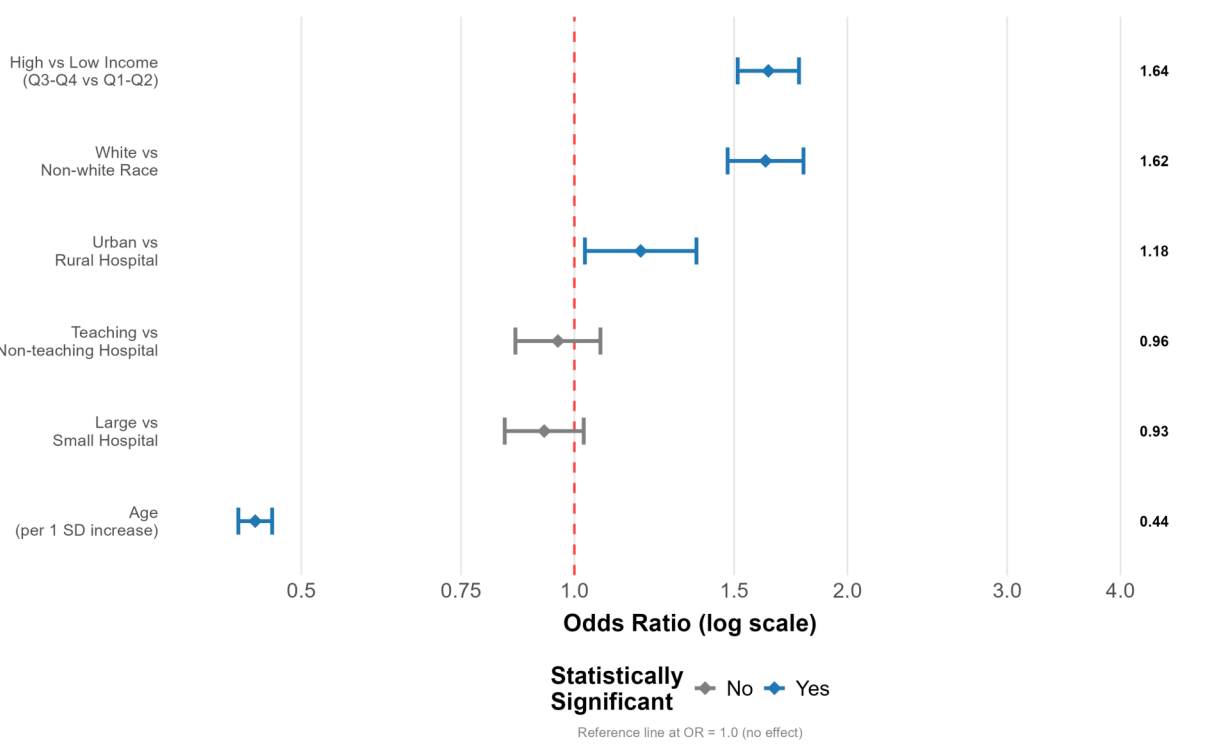
Demographic Proportions: NASS vs Census
Percentage of total population by 5-year age groups



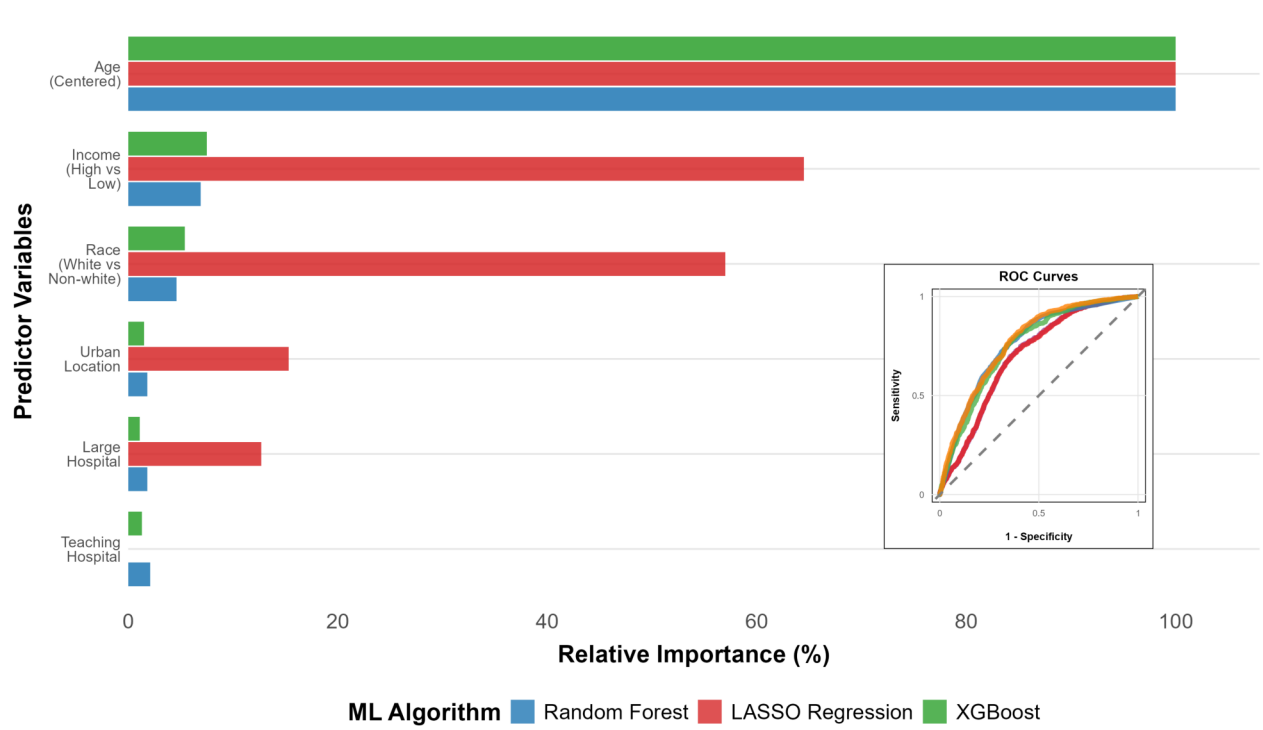
Patient Age Distribution in NASS 2020 by payor and Geography
By Urban-Rural Classification and US Region, Segmented by payor



Predictors of Private Insurance
Multi-level Model Odds Ratios with 95% CI



Machine Learning Variable Importance
for Predicting Private Insurance Access; ROC Overlay



Run this analysis
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Google Colab Link