



Greenspace Morphology and Preterm Birth: A State-Wide Study in Georgia, United States (2000-2016)



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Introduction

- Higher residential greenness has been associated with improved birth outcomes. However, limited knowledge exists regarding the role that greenspace morphology plays.
- Additionally, evidence is lacking as to whether these relationships vary by subpopulation.

Objectives

- We examined the association between preterm birth and residential greenspace morphology, including percentage, shape, connectedness, aggregation, closeness, and fragmentation.

Methods

- We analyzed 2,063,444 singleton live births between 2001 to 2016. 30-meter resolution landcover data for 2001-2016 from National Land Cover Databased were obtained to calculate landscape metrics to measure the percentage, shape, connectedness, aggregation, closeness, and fragmentation of greenspace at the census tract level.
- We used a two-stage logistic regression analysis.
- Stratified analysis was conducted by maternal race, ethnicity, education, urbanicity, neighborhood poverty rate, and percentage of greenness.

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Results

- A robust protective association was found between greenspace percentage and preterm birth overall. This association was more pronounced among Black mothers, predominantly influenced by census tracts located in high-urbanicity counties with greater economic disadvantage.

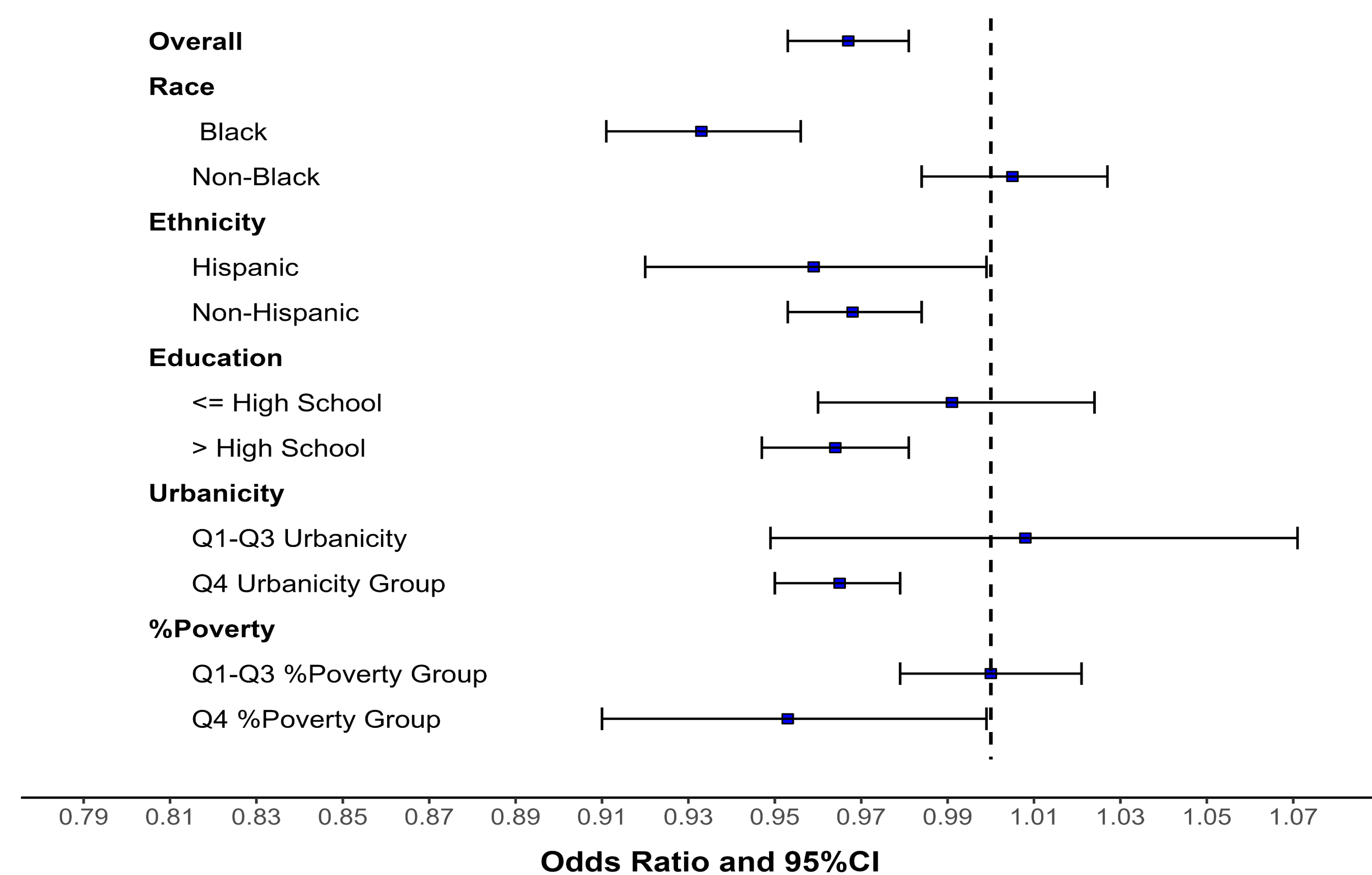


Figure 1. Odds ratios and 95% CI from primary single exposure model and stratification analysis for preterm birth per IQR increase in census tract greenness among Georgia live births.

- After we categorized greenspace percentage into low, medium, and high levels, a clear joint effect of percent greenness and greenspace morphology on the risk of preterm birth emerged.

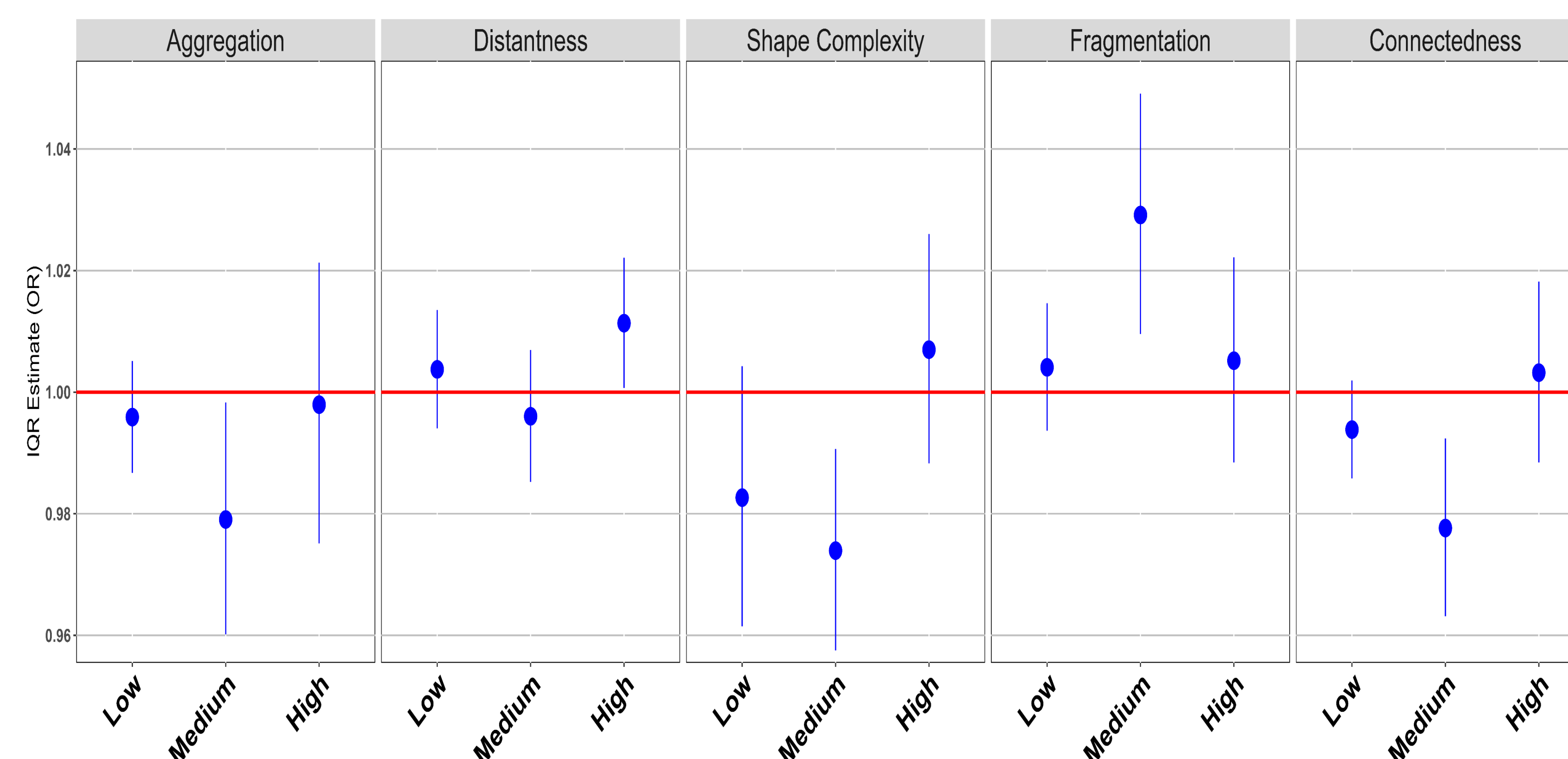


Figure 3. Joint effects of percent greenness and greenspace morphology on the risk of preterm birth in Georgia.

- Consistent protective associations were observed for higher level of percentage, aggregation, shape complexity, connectedness, and lower values of distantness as well as fragmentation of greenspace morphology concerning preterm birth.

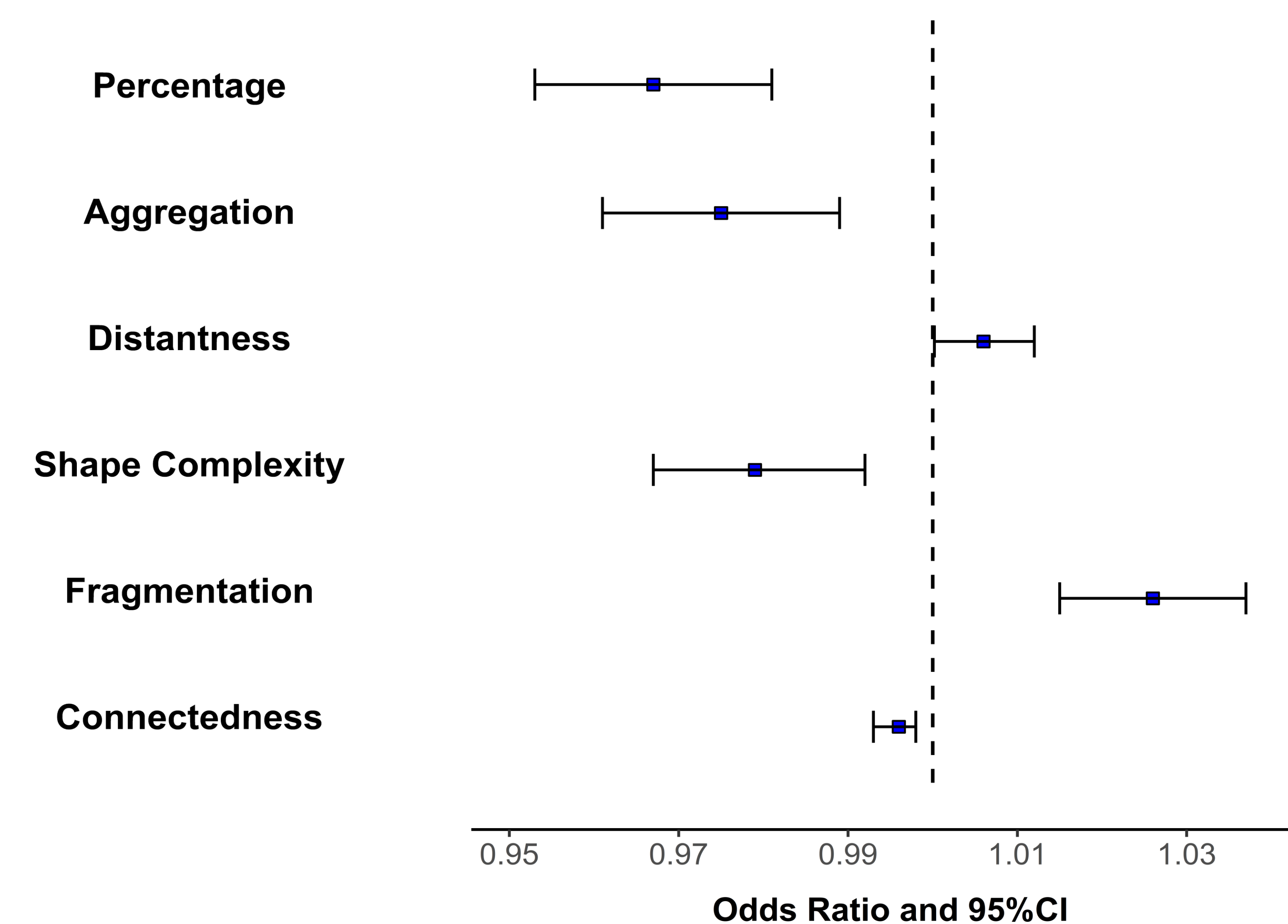


Figure 2. Odds ratios and 95% CI for preterm birth per IQR change in census tract level greenspace morphology among Georgia live births.

Conclusions

- Our study complements other studies by showing the importance and protective effects of greenspace morphology.
- The observed effects are particularly prominent in census tracts characterized by a moderate level of greenspace percentage, high poverty rates, and among Black women.
- Our findings suggest the need for tailored greenspace planning strategies based on varying levels of greenness in different areas.
- For locations with low greenness, increasing the greenspace percentage may be prioritized. In areas with a medium level of greenness, strategic enhancement of greenspace morphology is recommended. For areas with high greenness, the focus should be on improving spatial closeness of greenspace.

Acknowledgement

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