GEOGRAPHY OF STRUCTURAL INEQUITY: RACIAL RESIDENTIAL SEGREGATION AND TIMELY ACCESS TO TRAUMA CENTERS

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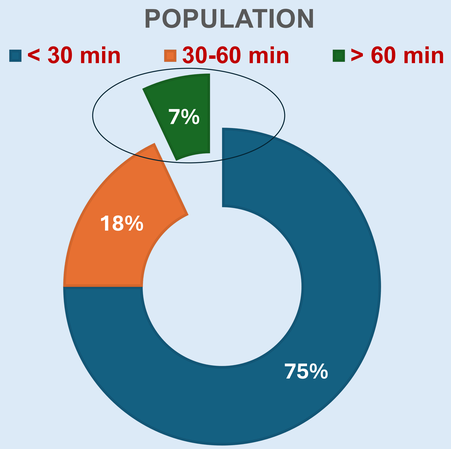
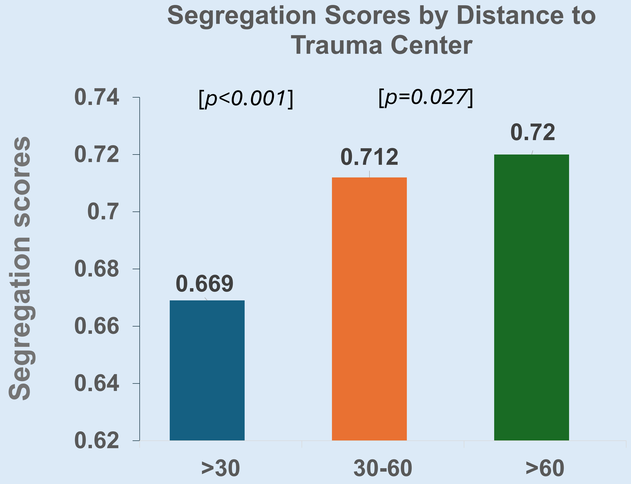
Background:

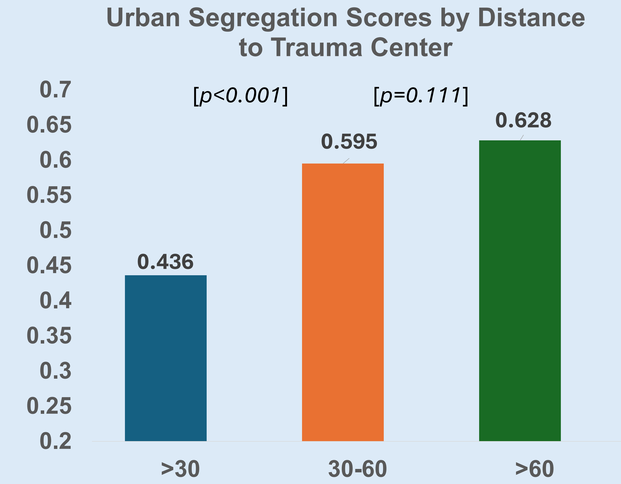
- Timely access to a trauma center (TC) is critical for survival, with residential proximity a key determinant of outcomes.
- The impact of racial/ethnic residential segregation on TC proximity remains unclear.
- **Objective:** Evaluate the national association between residential segregation and TC access.

Methods:

- **Design:** Cross-sectional study: All U.S. TCs from 2022–2025.
- **Mapping:** Generated <30, 30–60, and >60-minute travel time service areas utilizing historical traffic data.
- **Analysis:** Calculated mean racial/ethnic residential segregation scores at the ZIP code level (range 0–1; higher scores = greater segregation).







Distance to Trauma Center (min)

Results:

- Of 328.9 million residents, 75% live <30 minutes from a TC, while 7% live >60 minutes away.
- Among those >60 minutes away, 92.2% reside in rural areas.
- National segregation scores increased stepwise with travel time: 0.669 (<30 minutes), 0.712 (30–60 minutes), and 0.720 (>60 minutes).
- In urban areas, segregation also rose from 0.436 (<30 minutes) to 0.595 (30–60 minutes).

Conclusions:

- Racial/ethnic residential segregation is a structural barrier to timely trauma care.
- While the highest segregation levels and greatest distances impact rural areas, segregation increased with travel distance in urban areas as well.

Equity-focused investments in rural and underserved regions should integrate measures of structural inequity into trauma system planning to ensure just and timely access to care for everyone