Examination of Neighborhood and Perceived Traffic-Related Safety Factors Associated with Active Commuting to School in a Large Urban City

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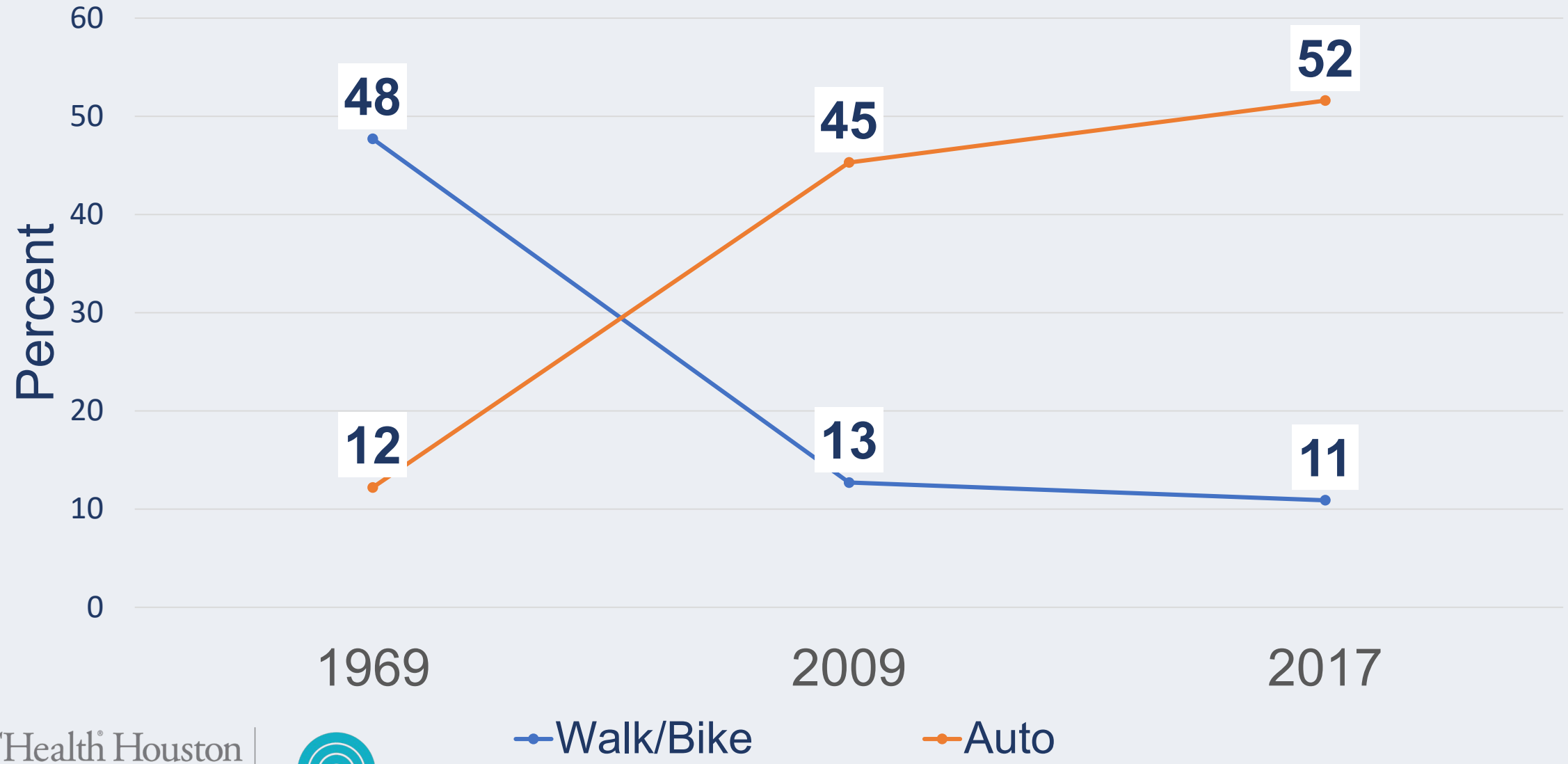
Active Commuting to School (ACS)

- **16%** of children living in Texas met activity physical activity guidelines during 2019-2020.
- **ACS** is an overlooked but meaningful strategy to promote physical activity.
- Can be integrated into daily life.

Mode to/from School in US Elementary Schools



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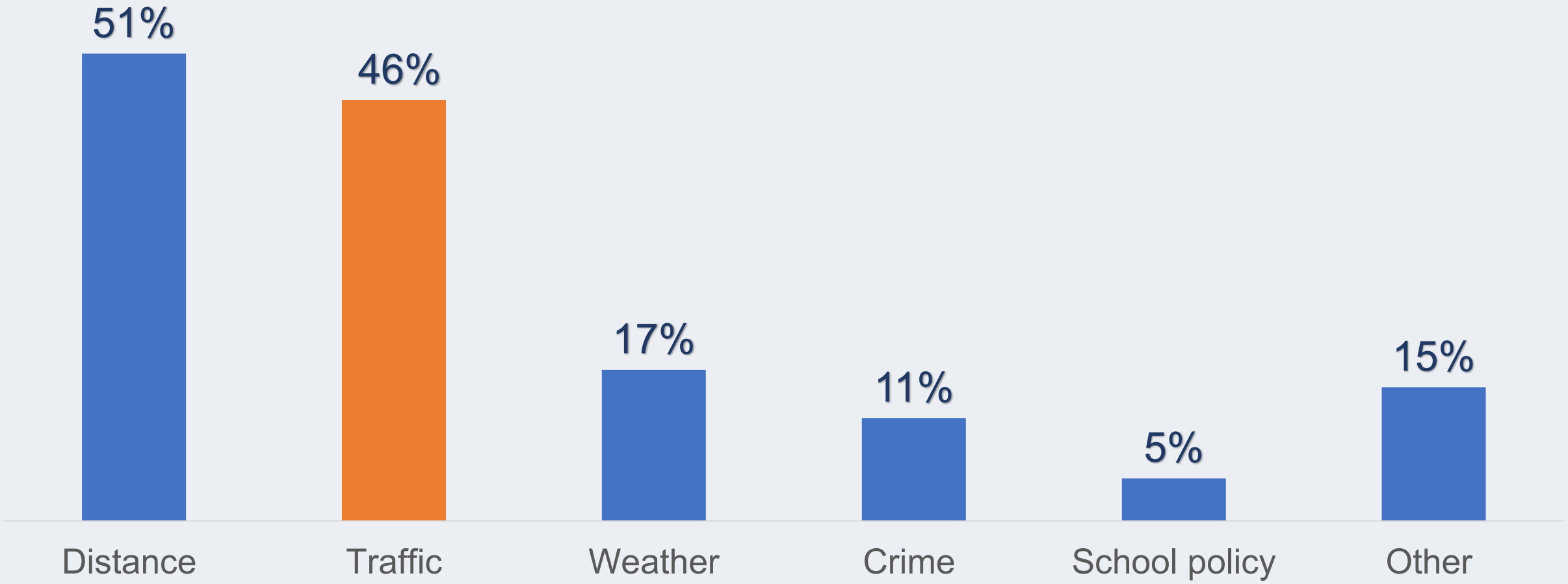
Data from McDonald, 2007; McDonald et al., 2009; Kontou et al., 2020

Parent Reported Barriers for ACS



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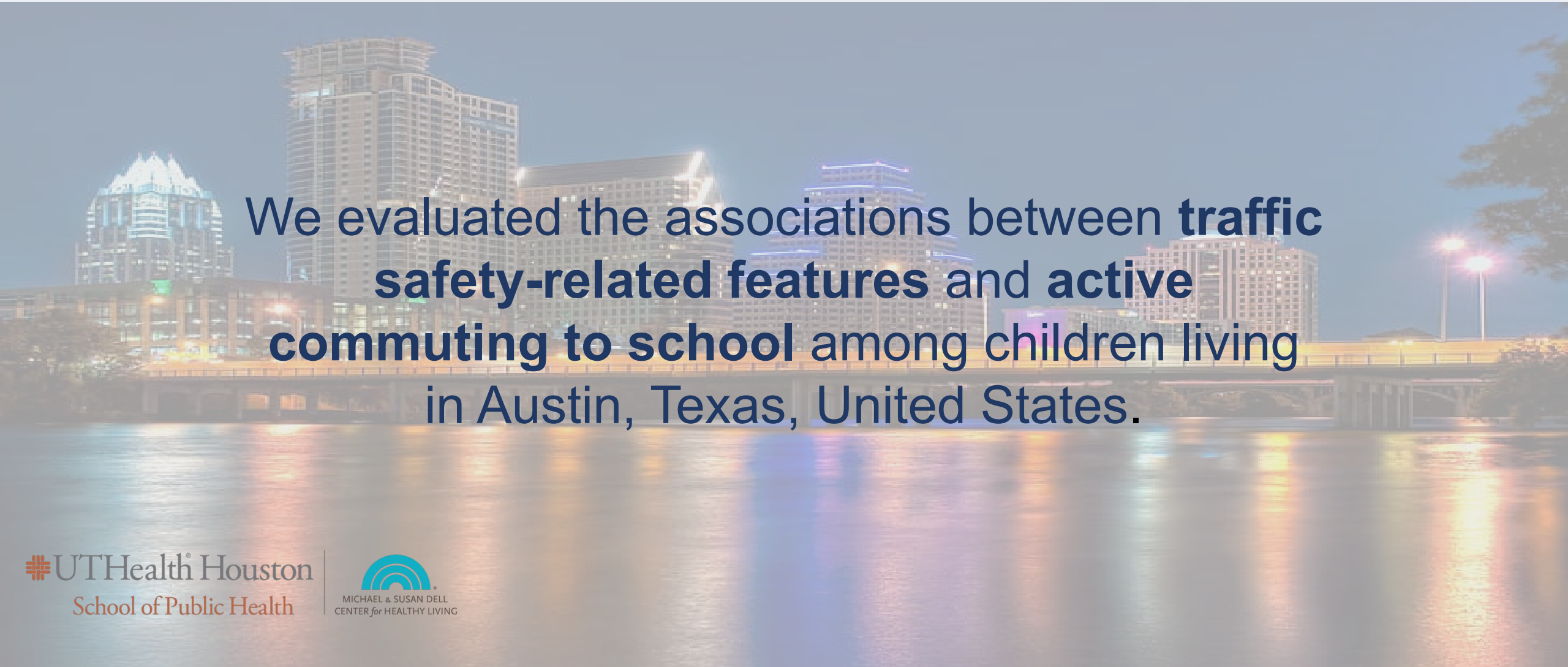
Data from Omura et al. (2017)

Data inconclusive for neighborhood traffic-related safety features, which can be targets for urban planning initiatives like SRTS.

- No studies to examine **neighborhood** and **parental perceptions of traffic-related safety** together in one study.
- **Data availability** of neighborhood traffic-related safety metrics **is a barrier** to researchers.

Study Objective



We evaluated the associations between **traffic safety-related features** and **active commuting to school** among children living in Austin, Texas, United States.

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Methods - STREETS

- **Safe TRavel Environment Evaluation in Texas Schools Study**
  - Five-year natural experiment (2018-2023)
  - Evaluating SRTS infrastructure projects in Austin, Texas
  - Inclusion criteria
    - 3rd grade
    - Live within one Euclidean mile of school (20 min walk)
    - Ability to engage PA
    - Ability to complete survey in English or Spanish
- **Baseline STREETS cohort study data, pre-COVID (2019-2020)**
  - Cross-sectional study design

Methods - STREETS Parent Survey

- **Active commuting to school (outcome: binary, “yes” vs “no”)**
  - “yes” = walk or bike to or from school ≥1days/week
- **Perception of traffic-related safety (exposure: binary “high” vs “low”)**
  - 3 items asking about parent concerns related to:
    - Traffic safety
    - Intersection and crossing safety
    - Traffic speed of cars
  - **2 items asking about parent perceptions of:**
    - Sidewalk availability
    - Safe road crossings

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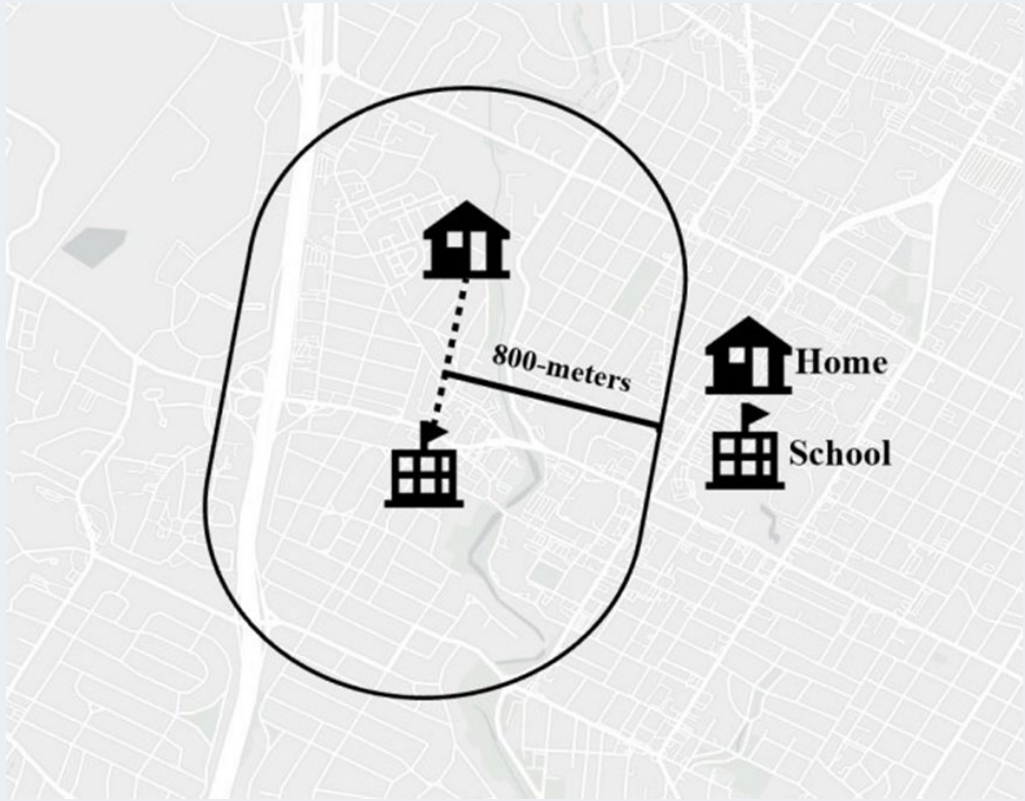
Surveys adapted from National SRTS parent survey, the Neighborhood Environment Walkability Survey (NEWS); parent survey in CDC Kids-Walk-to-School guide.

Methods – GIS constructed metrics

- **Neighborhood traffic-related safety features (exposure)**
  - Bike lane coverage
  - Sidewalk coverage
  - Pedestrian beacons
  - Traffic and pedestrian signals
  - Average traffic volume (AADT)
  - Major roads coverage (arterials)
  - High-speed road coverage (>30mph)



Route-to-school neighborhood environment:
800-meter-Euclidean “sausage” buffer

Statistical Analysis

- Complete case analysis
- Unadjusted and adjusted logistic regression models
  - ICC = 5.5% for school clustering effect (no MLM)
  - $p<0.05$ in unadjusted model to be included in adjusted model

Results – Analytic Sample

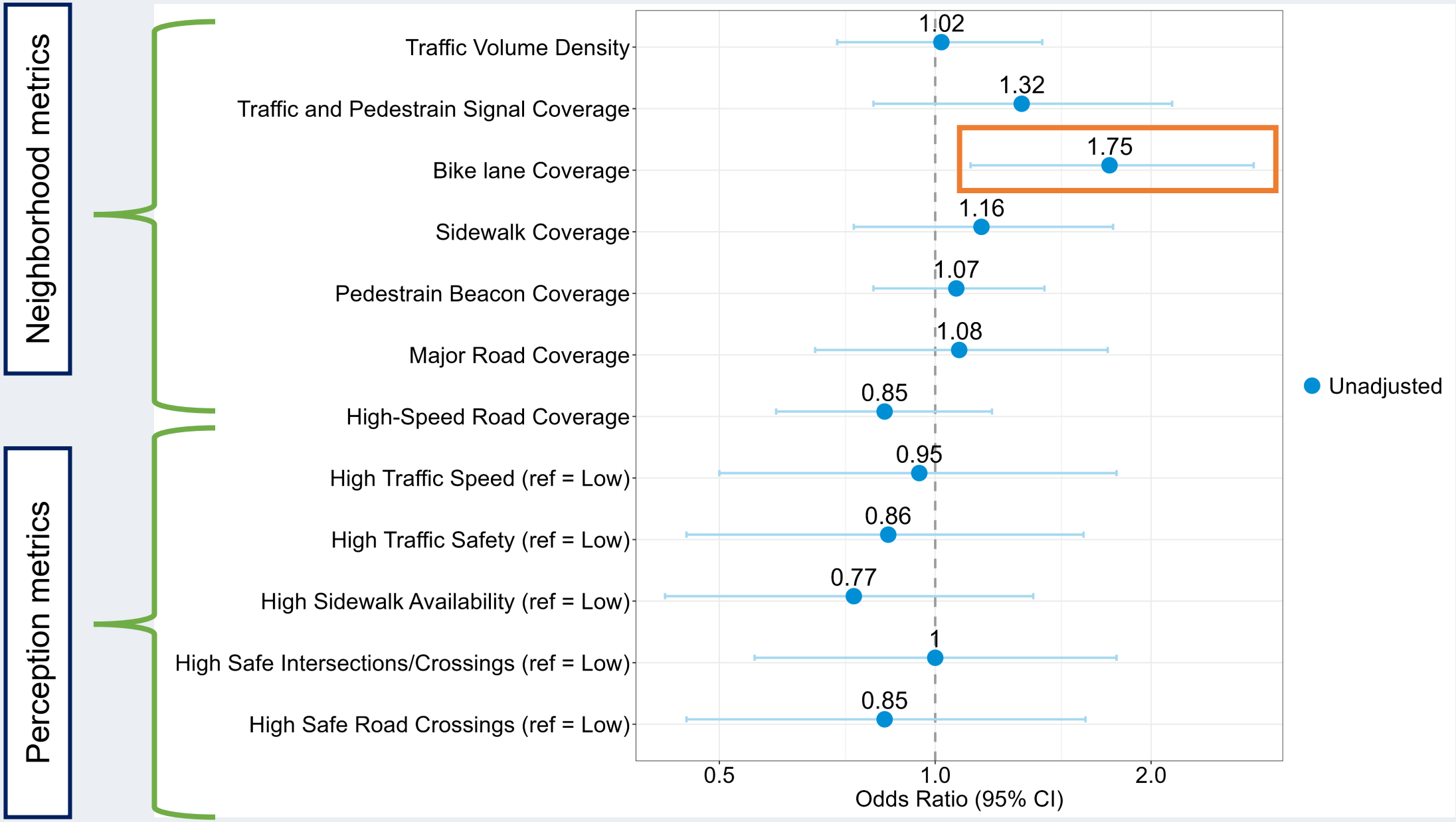
184 Parent-child dyads

22 Elementary schools

50% ACS ≥1 days/week

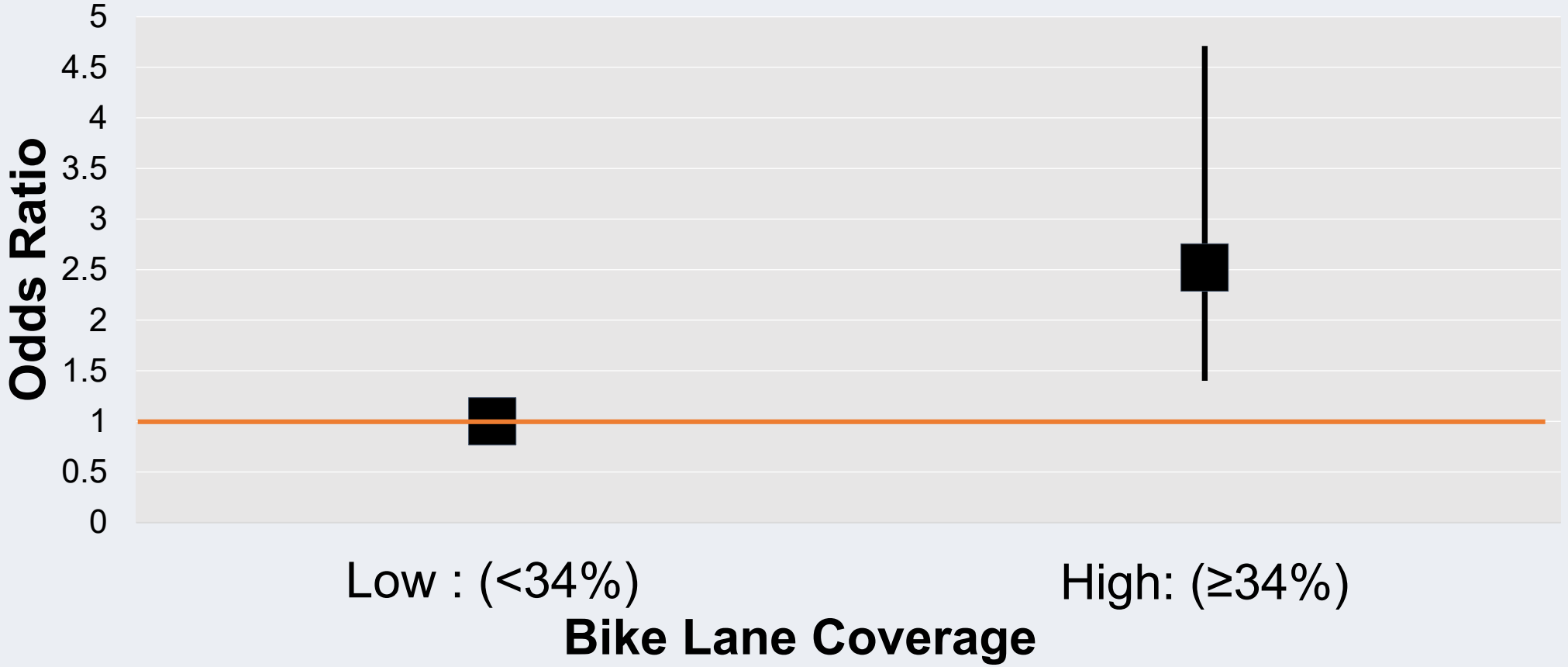
57% Female

7% Asian or Mixed (race or ethnicity)
7% Black or African America
31.5% Hispanic or Latinx
10.3% Multiple or other race/ethnicities
44% Non-Hispanic, White



Neighborhood metrics scaled to IQR range; Perception metrics binary (“High” vs. “Low”)

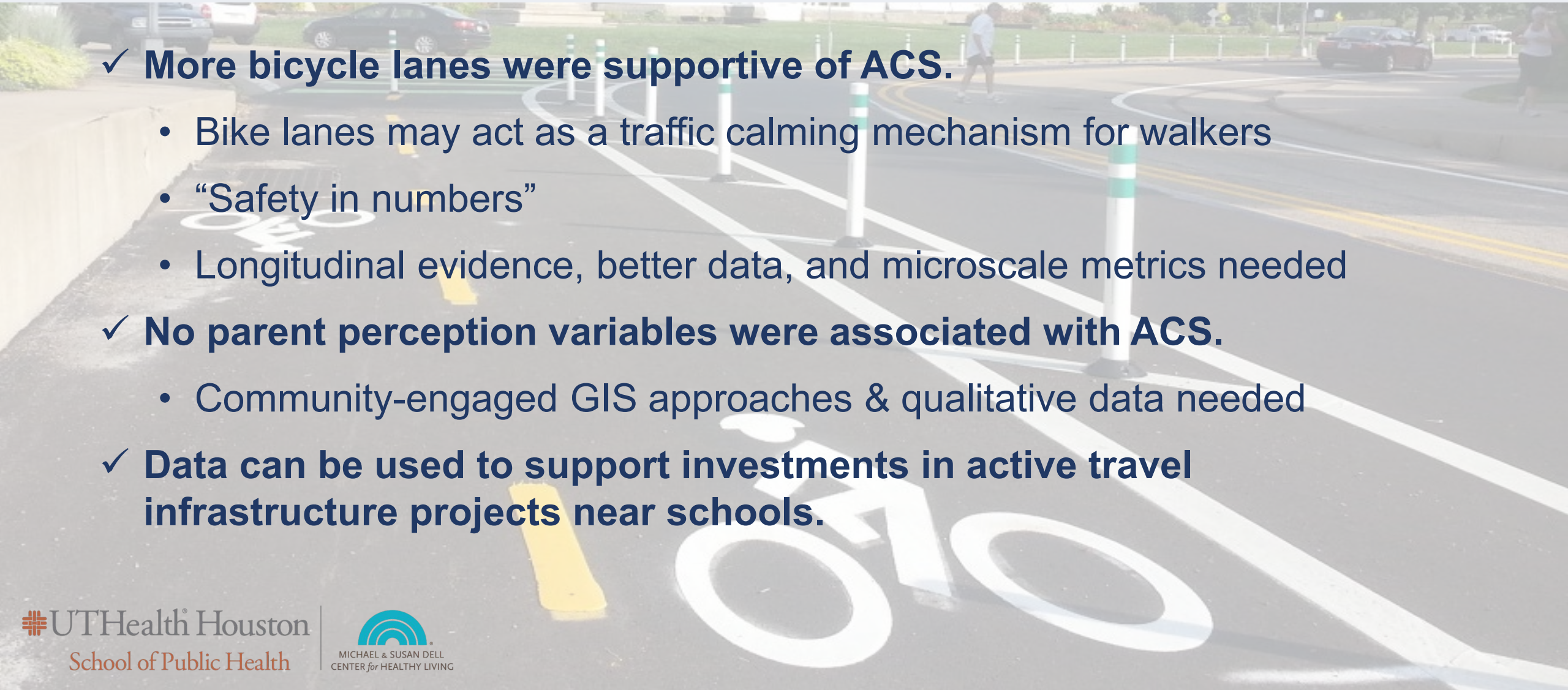
High bicycle lane coverage was significantly associated with 2.5x the odds of ACS compared to low coverage.



Proportion of length of bicycle lanes (km) / length of the road network (km)

Note: Adjusted for child age, child gender, parent education, child race/ethnicity, child independent mobility, population density, intersection density, and area racial/ethnic composition.

Implications



- ✓ **More bicycle lanes were supportive of ACS.**
  - Bike lanes may act as a traffic calming mechanism for walkers
  - "Safety in numbers"
  - Longitudinal evidence, better data, and microscale metrics needed
- ✓ **No parent perception variables were associated with ACS.**
  - Community-engaged GIS approaches & qualitative data needed
- ✓ **Data can be used to support investments in active travel infrastructure projects near schools.**

Thank you!

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