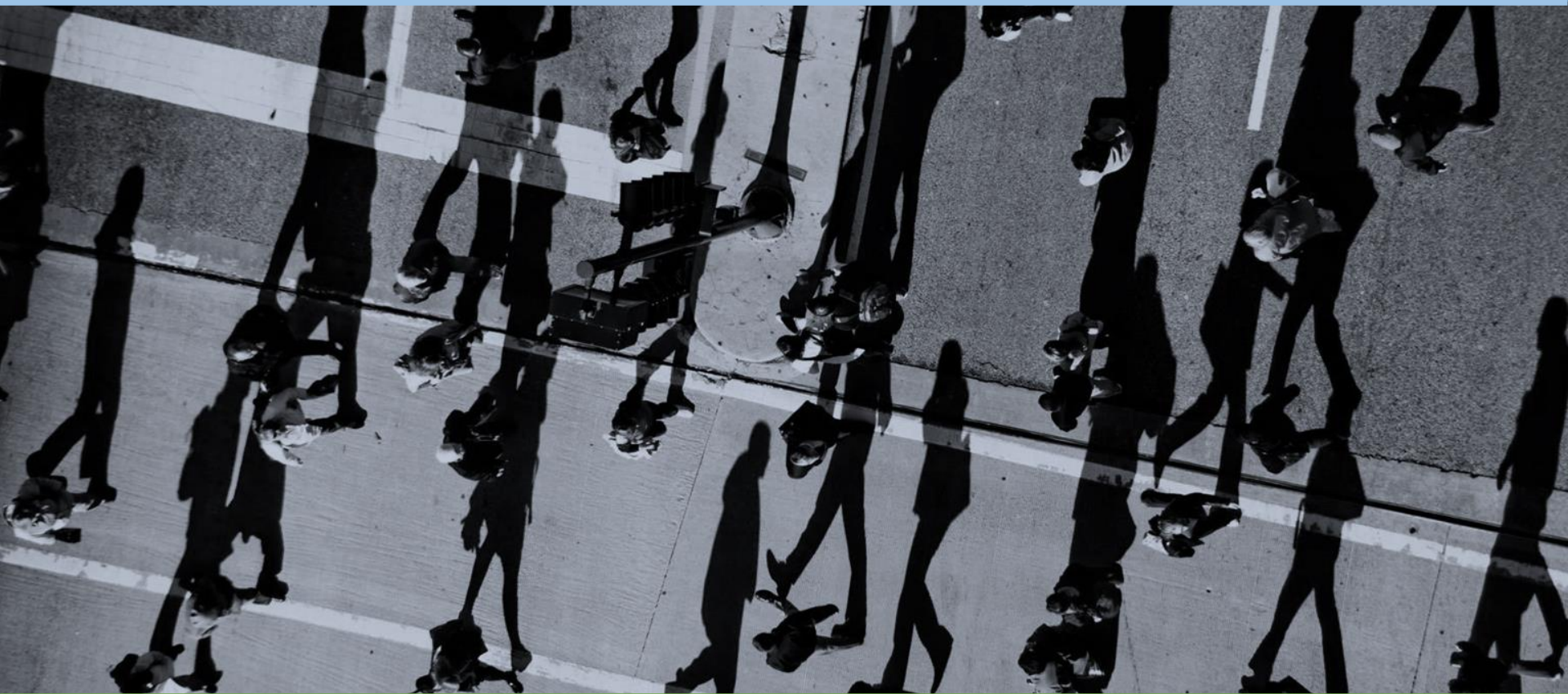


Interactions between the built environment & domain-specific transportation physical activity: evidence from the 2017 NHTS

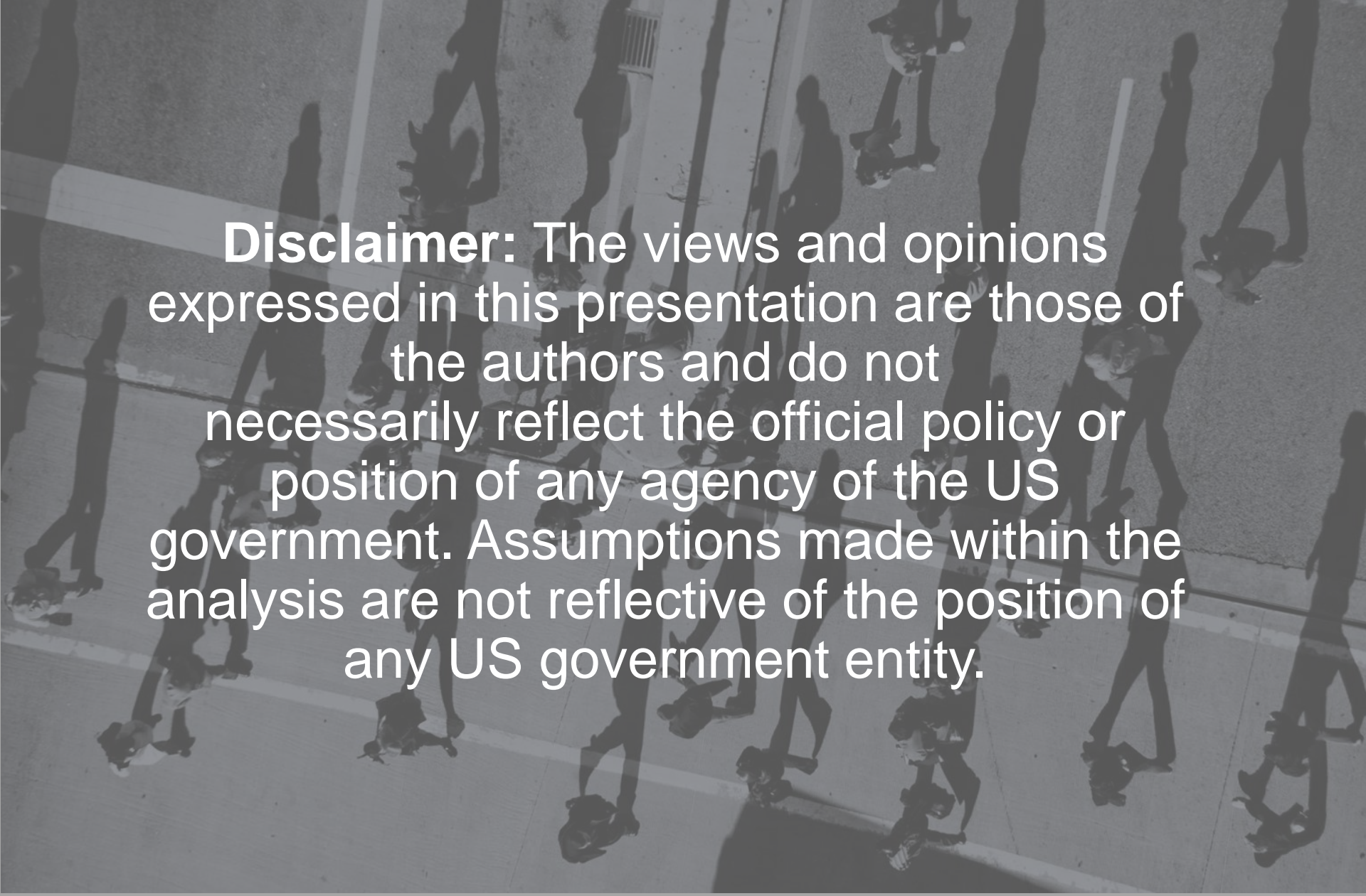


**Ted Mansfield, ORISE Data Fellow
Office of the Under Secretary for Policy, USDOT**

NHTS Data for Transportation
Applications Workshop
Washington, DC, August 8th, 2018



**OAK RIDGE INSTITUTE FOR
SCIENCE AND EDUCATION**



Disclaimer: The views and opinions expressed in this presentation are those of the authors and do not necessarily reflect the official policy or position of any agency of the US government. Assumptions made within the analysis are not reflective of the position of any US government entity.



Transportation-health pathways

- Physical activity
- Air pollution
- Crashes
- Many others



Transportation-health pathways

- **Physical activity**

- Air pollution

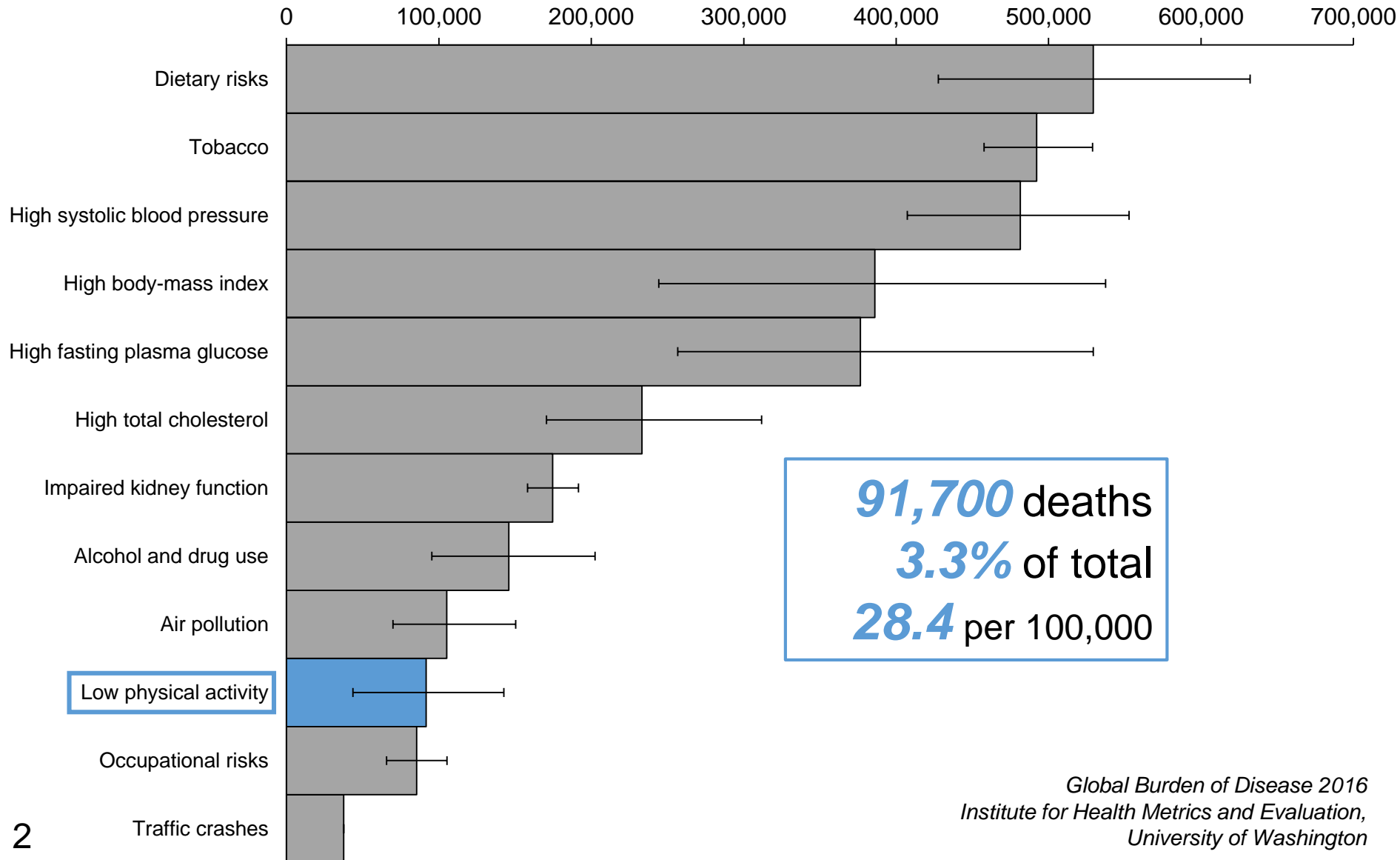
- Crashes

- Many others



Transportation-health pathways

Mortality by Risk Factor in the United States, 2016

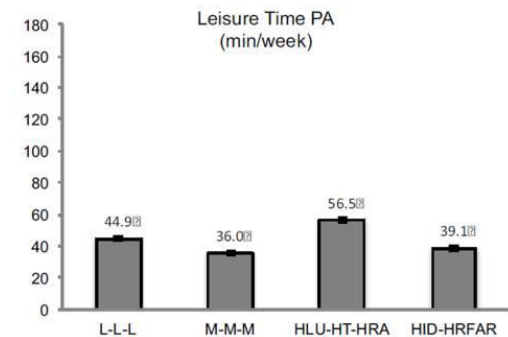
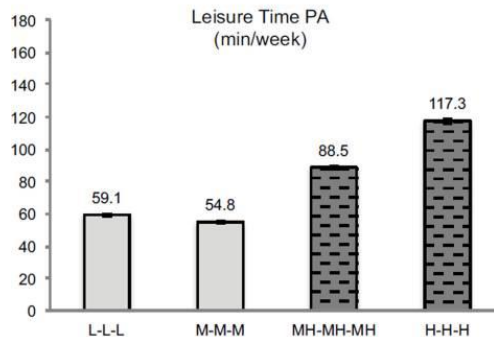
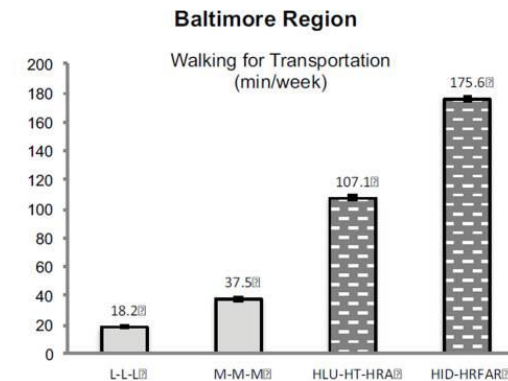
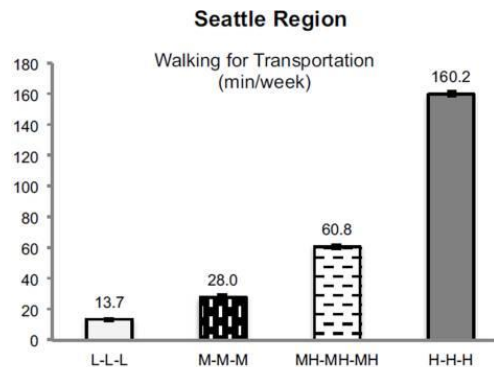


*Global Burden of Disease 2016
Institute for Health Metrics and Evaluation,
University of Washington*

Walkable neighborhoods → more walking

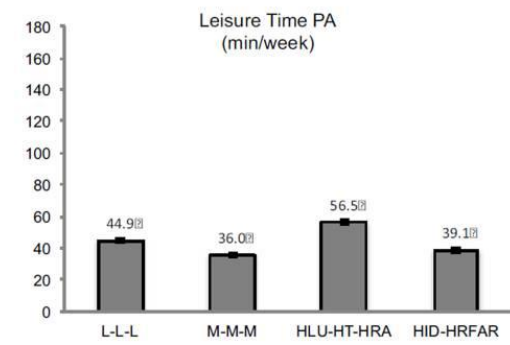
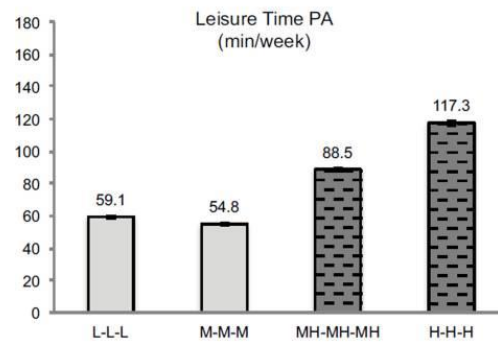
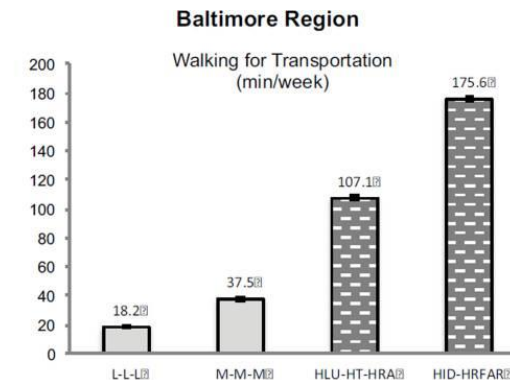
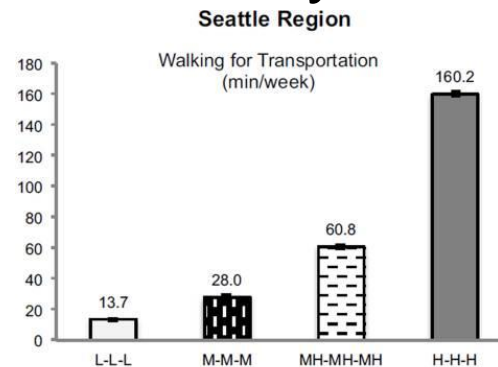
- Walkability is multi-dimensional
 - Population/employment density
 - Land-use diversity
 - Physical design
 - Access to destinations
 - Distance to transit
- Studies in many contexts show associations

Adams, Marc A., et al. "Patterns of walkability, transit, and recreation environment for physical activity." *American journal of preventive medicine* 49.6 (2015): 878-887



Walkable neighborhoods → more walking

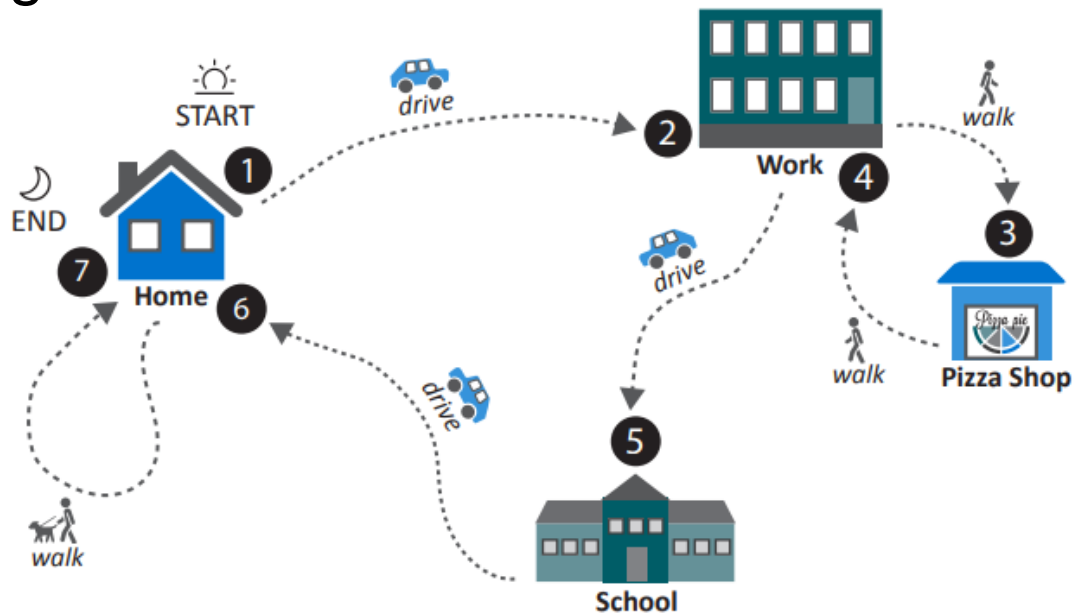
- Are these relationships consistent...
 - Across trip purposes?
 - Across sub-populations?
- Does increased transportation physical activity **substitute** for physical activity in other domains?



Adams, Marc A., et al. "Patterns of walkability, transit, and recreation environment for physical activity." *American journal of preventive medicine* 49.6 (2015): 878-887

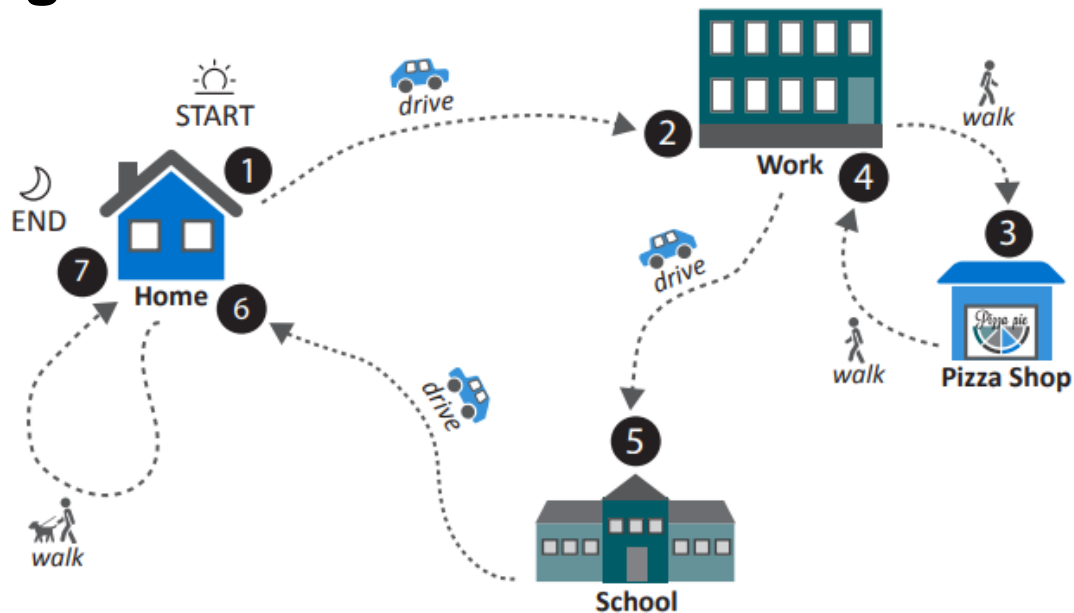
The 2017 NHTS

- New questions
 - Self-reported health status
 - Other physical activity
 - Weekly walk/bike trips for exercise
- Other changes
 - Loop trips
 - Walking to/from transit



The 2017 NHTS

- New questions
 - **Self-reported health status**
 - **Other physical activity**
 - Weekly walk/bike trips for exercise
- Other changes
 - **Loop trips**
 - **Walking to/from transit**



Approach: consistency

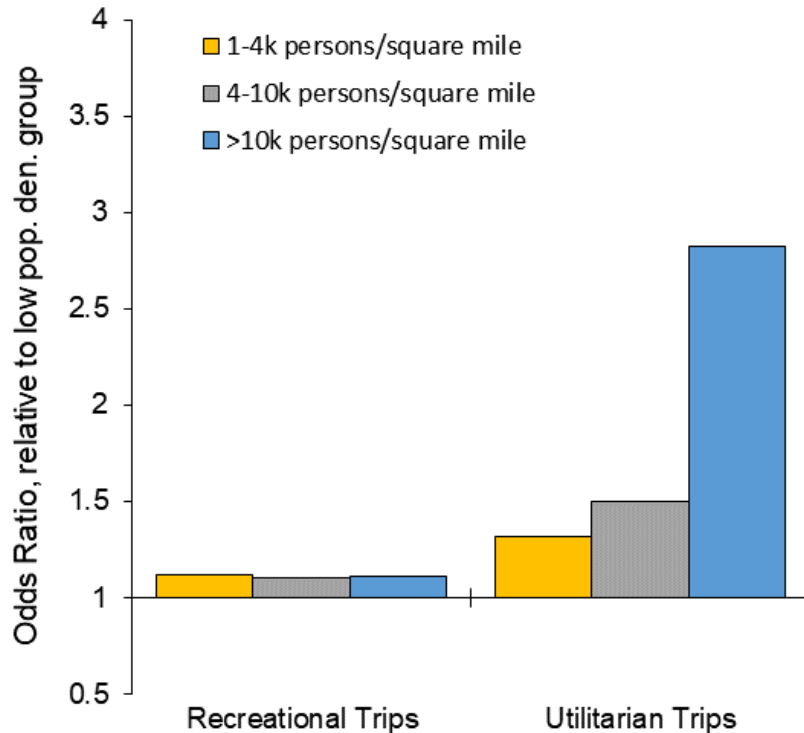
Testing consistency across trip purposes, sub-populations:

1. Derive walk, bike duration during assigned travel day
2. Compare to CDC recommendations (*coded yes=1*)
 - 30 min/day for walking
 - 15 min/day for biking (vigorous physical activity)
3. Estimate regression models, function of **built environment & individual characteristics**
 - Naïve models (*recreational/utilitarian walking & biking*)
 - Adjusted models (*include self-reported health*)
 - Interacted models (*self-reported health x population density*)

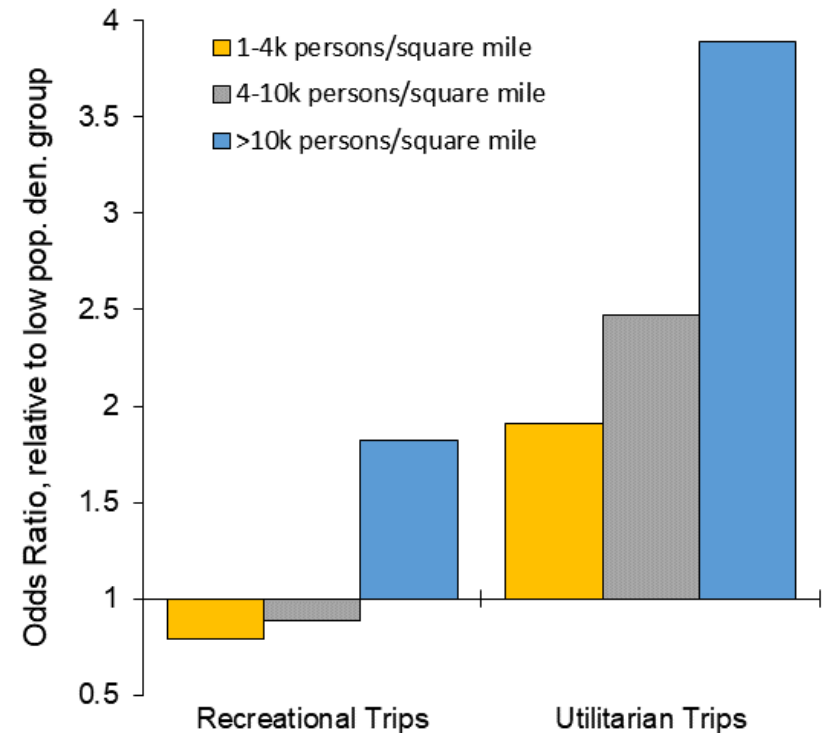
Consistent across trip purposes?

Probability of meeting CDC-recommended physical activity levels during assigned travel day via:

Walk trips



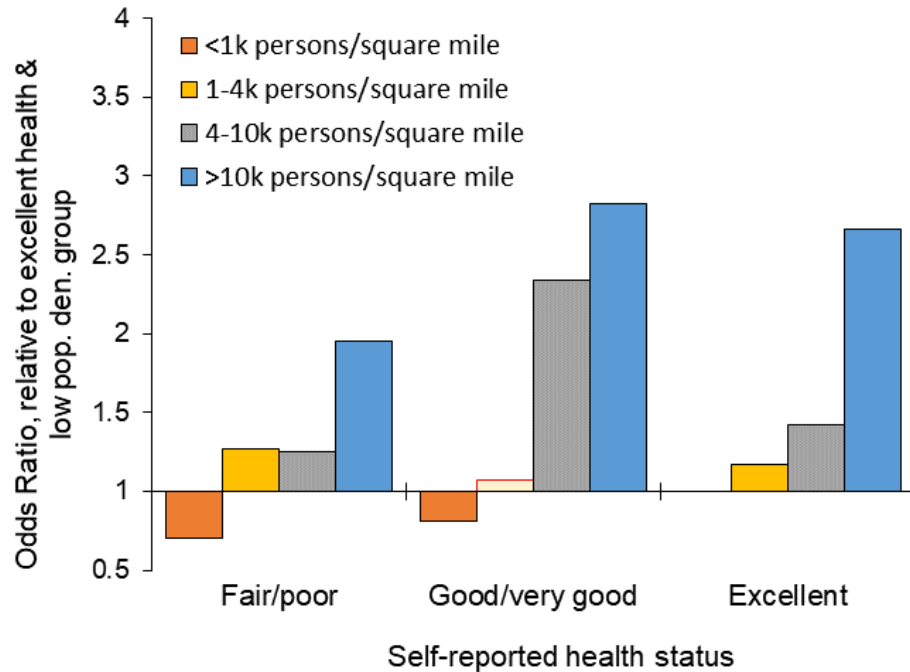
Bike trips



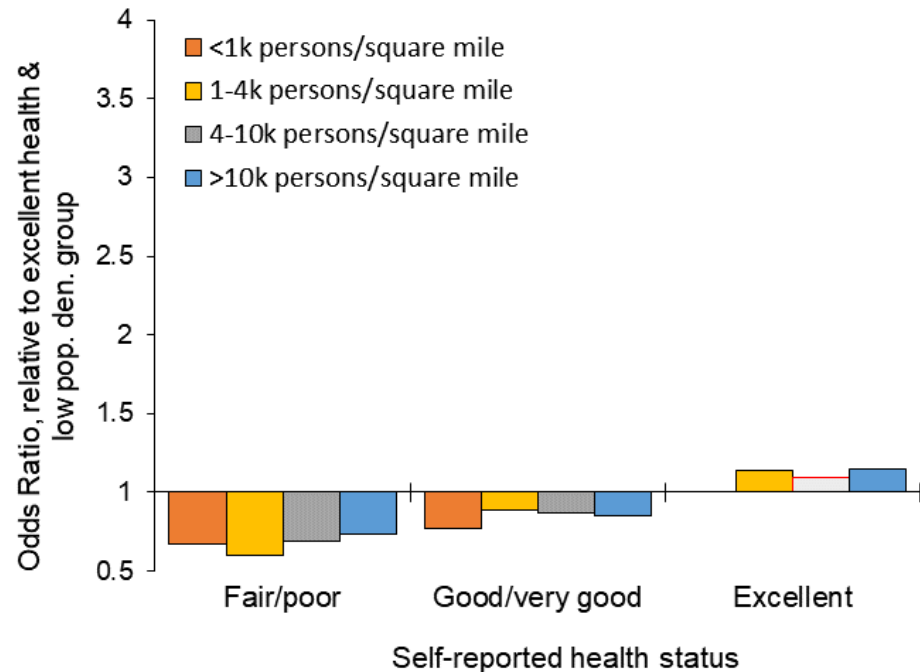
Consistent across sub-populations?

Probability of meeting CDC-recommended physical activity levels during assigned travel day via:

Utilitarian walking



Recreational walking



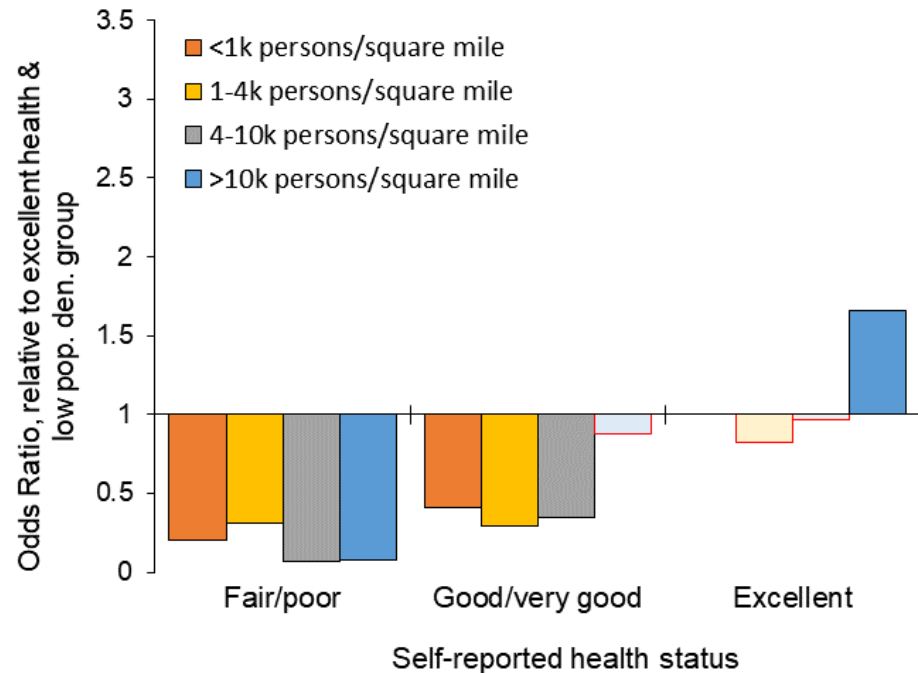
Consistent across sub-populations?

Probability of meeting CDC-recommended physical activity levels during assigned travel day via:

Utilitarian biking



Recreational biking



Findings: consistency

- Utilitarian walking/cycling
 - Population density associated with increased odds of meeting CDC recommendations **within all self-reported health sub-populations**
- Recreational walking/cycling
 - Weak associations **only amongst those reporting excellent health**

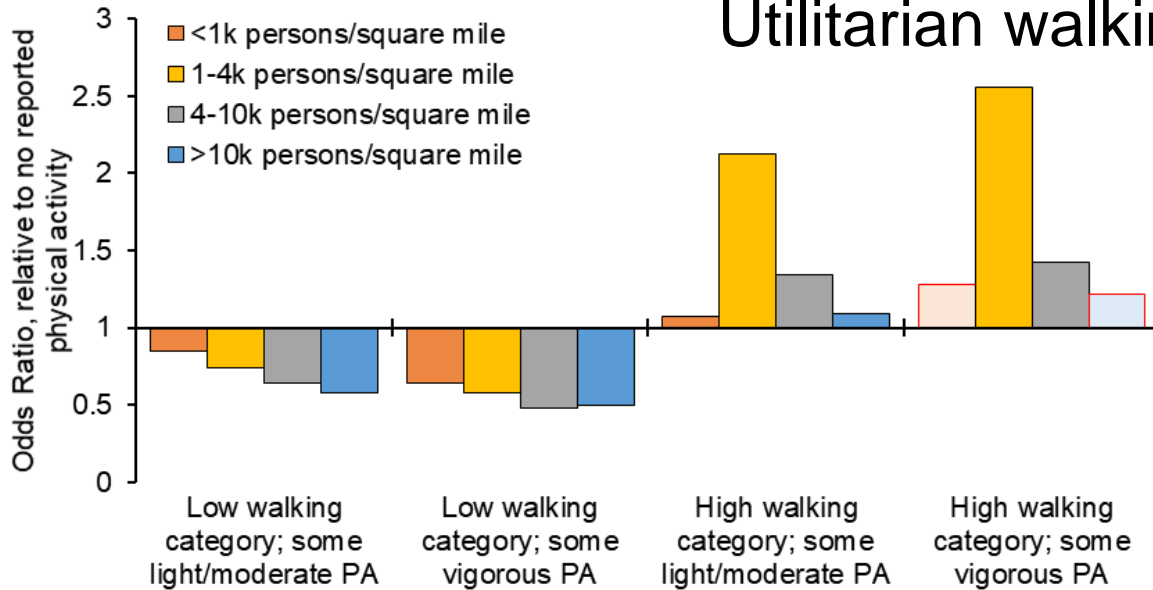
Approach: activity substitution

Testing for evidence of activity substitution:

1. Estimate likelihood of reporting light/moderate or vigorous physical activity over previous week; function of **built environment & individual characteristics**
 - Naïve model (*recreational/utilitarian walking & biking*)
 - Adjusted models (*include whether or not respondent met CDC recommendations through utilitarian/recreational walking/biking health*)
 - Interacted models (*met CDC rec x population density*)

Evidence of substitution?

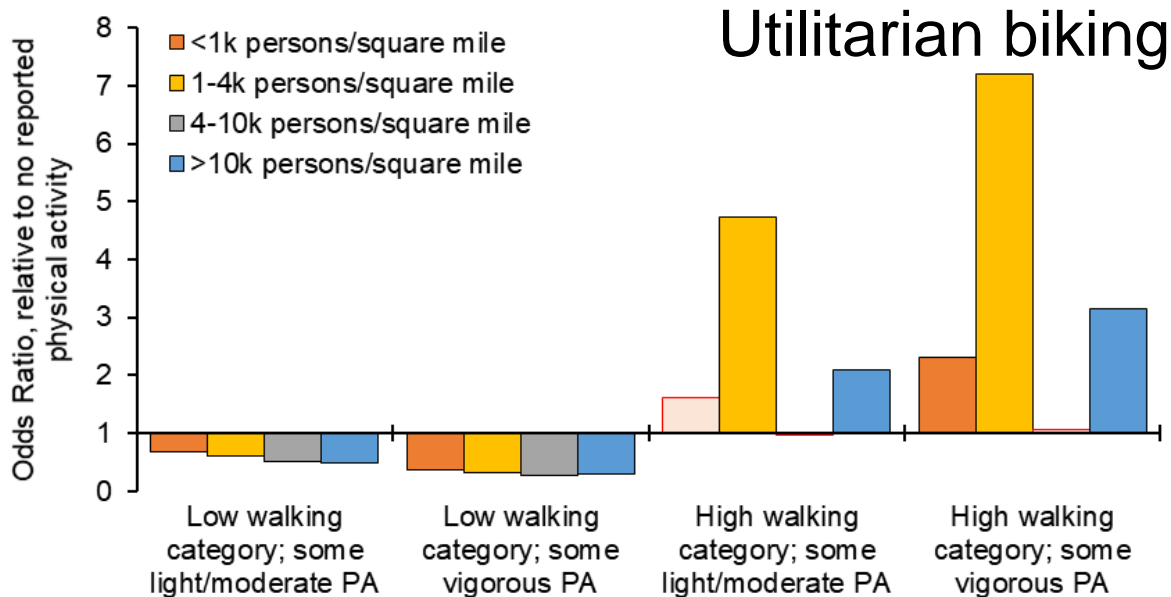
Utilitarian walking



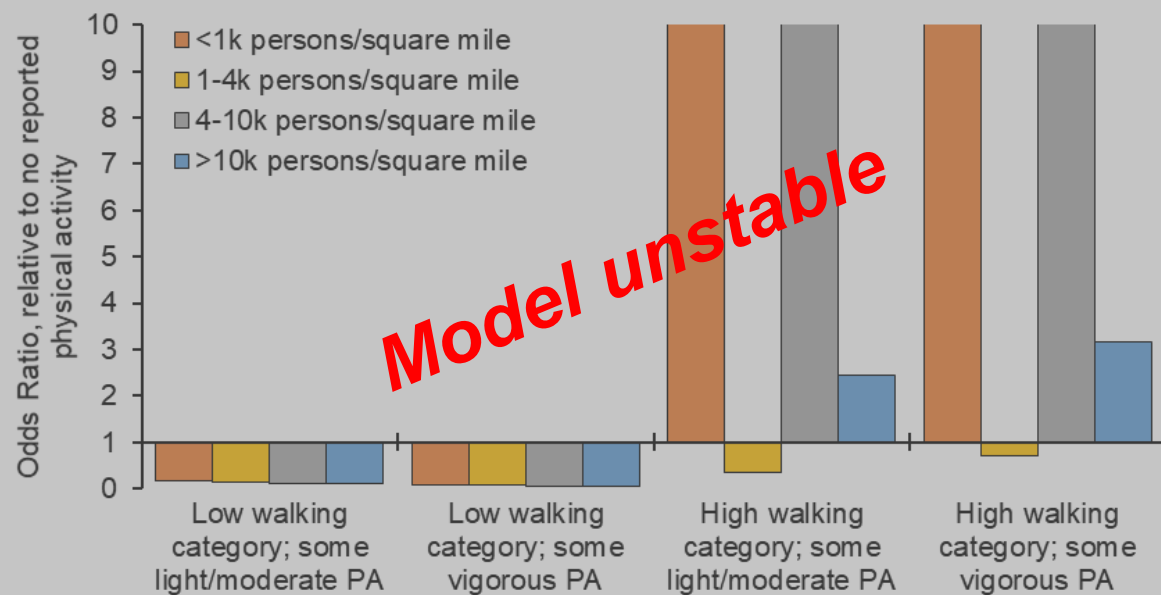
Recreational walking



Evidence of substitution?



Recreational biking



Findings: substitution

- Utilitarian walking/cycling
 - **Limited evidence** of activity substitution
- Recreational walking
 - **Some evidence** activity substitution may occur
- Recreational cycling
 - Regression models unstable; small sub-populations

Implications & future work

- Utilitarian trips may be **more responsive to built environment changes**
- Opportunity to **address entrenched health disparities**, underserved communities
- Supports more **refined quantitative health impact assessment** of investments supporting active transportation
- Future work
 - Quasi-experimental methods
 - Next-gen NHTS impact on active modes?

Questions?



theodore.mansfield@rsginc.com