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Webinar: The Impact of Transportation-Related Barriers on Self-Perceived Physical Health among Adults in the US

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Baiden, Philip and Boateng, Godfred, "Webinar: The Impact of Transportation-Related Barriers on Self-Perceived Physical Health among Adults in the US" (2021). *TREC Webinar Series*. 62.
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Impact of Transportation-Related Barriers on Self-Perceived Physical Health among Adults in the U.S.

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NITC Webinar
10/12/2021

Disclaimer

This presentation is based on public data from the 2017 National Household Travel Survey (NHTS) conducted by the Federal Highway Administration (FHWA). The views and opinions expressed in this presentation are those of the authors and do not necessarily represent the views of FHWA or that of its partners. Dr. Baiden had full access to the data and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Introduction

- Access to quality and affordable health care remains a significant problem for individuals living in the U.S (Dickman et al., 2017).

- Barriers that impede access to health care:
  - Race/ethnicity
  - immigration
  - education and income
  - neighborhood
  - housing
  - living in a rural area

Introduction

- Access to transportation in general can facilitate an individual's ability to travel to
  - health care appointments
  - pharmacies to fill prescriptions.
- Household vehicle ownership has been found to influence many aspects of travel demand .
- Lack of access to a vehicle has the potential to significantly
  - impede access to health care
  - Impact adherence to medication and treatment regimens
  - worsen chronic health conditions.

Theoretical Framework

- Social Determinants of Health:
  - *“the conditions in the environments where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks” (U.S. Department of Health and Human Services, 2021, para 1).*
- It shows how unequal access, distribution, and experience of these can result in significant disparities in health access and health outcomes

Domains of SDOH

SDOH include

- ✓ Economic stability: e.g., income, employment
- ✓ Education access: e.g., literacy skills
- ✓ Health care access: e.g., race/ethnicity
- ✓ Neighborhood and built environment: e.g., housing and neighborhood safety
- ✓ Social and community context: e.g., access to healthy foods, air and water quality.

SDOH

- SDOH also looks at the uneven distribution of these factors between groups who hold different positions in society.

- E.g., how SES impedes individuals' access to resources or facilitates access to certain psychosocial experiences that will either promote or hinder an individual’s health

Transportation as a SDOH

- Transportation is an important SDOH
- Lack of transportation can limit access to the basic needs of life.
- Lack of access to transportation is a barrier to healthcare system.
- There is significant research on other SDOH.
- Limited research has been conducted on the association between transportation-related factors on perceived health.

Research Objectives

- To investigate:
  - the prevalence of self-perceived physical health among among adults in the U.S
  - the association between transportation-related factors and self-perceived physical health.

Methods

Data were obtained from the 2017 National Household Travel Survey (NHTS)

- ✓ Conducted by the Federal Highway Administration (FHWA).
- ✓ Covers U.S. residents in the 50 states and DC.
- ✓ Covers the field of public health, environmental analysis, energy consumption, and social welfare.
- ✓ Use to monitor the performance and adequacy of current travel facilities and infrastructure.
- ✓ The 2017 NHTS is the eighth in the series 1969, 1977, 1983, 1995, 2001, and 2009.

Sample

- Uses an addressed based sampling.
- Two-phase sampling consisting of a household recruitment survey and a person-level retrieval survey.
- The 2017 NHTS included over 960,000 respondents.
- Analyses were restricted to 71,235 respondents aged 18 and 64 years.
- Missing data were handled using listwise deletion.

Variables

Explanatory Variables

- **Demographic factors**
- **SES factors**
- **Transportation-related factors**

Outcome Variable

- **SRH**

Variables

- **SRH (Good vs. Poor)**
  - Respondents were asked to rate their physical health on a 5-point Likert scale ranging from excellent, very good, good, fair, and poor.
- **Demographic factors**
  - age, sex, race, and ethnicity
- **SES factors**
  - education, income, and homeownership

Key Independent Variable

- Household vehicle deficit computed by subtracting household size from the number of vehicles in the house.
  - Negative values were considered as having fewer vehicles per household size and were coded as 2.
  - A score of zero was considered as having enough vehicles per household size and were coded as 1.
  - Positive values were considered as having more vehicles per household size and were coded as 0.

Confounding Variables

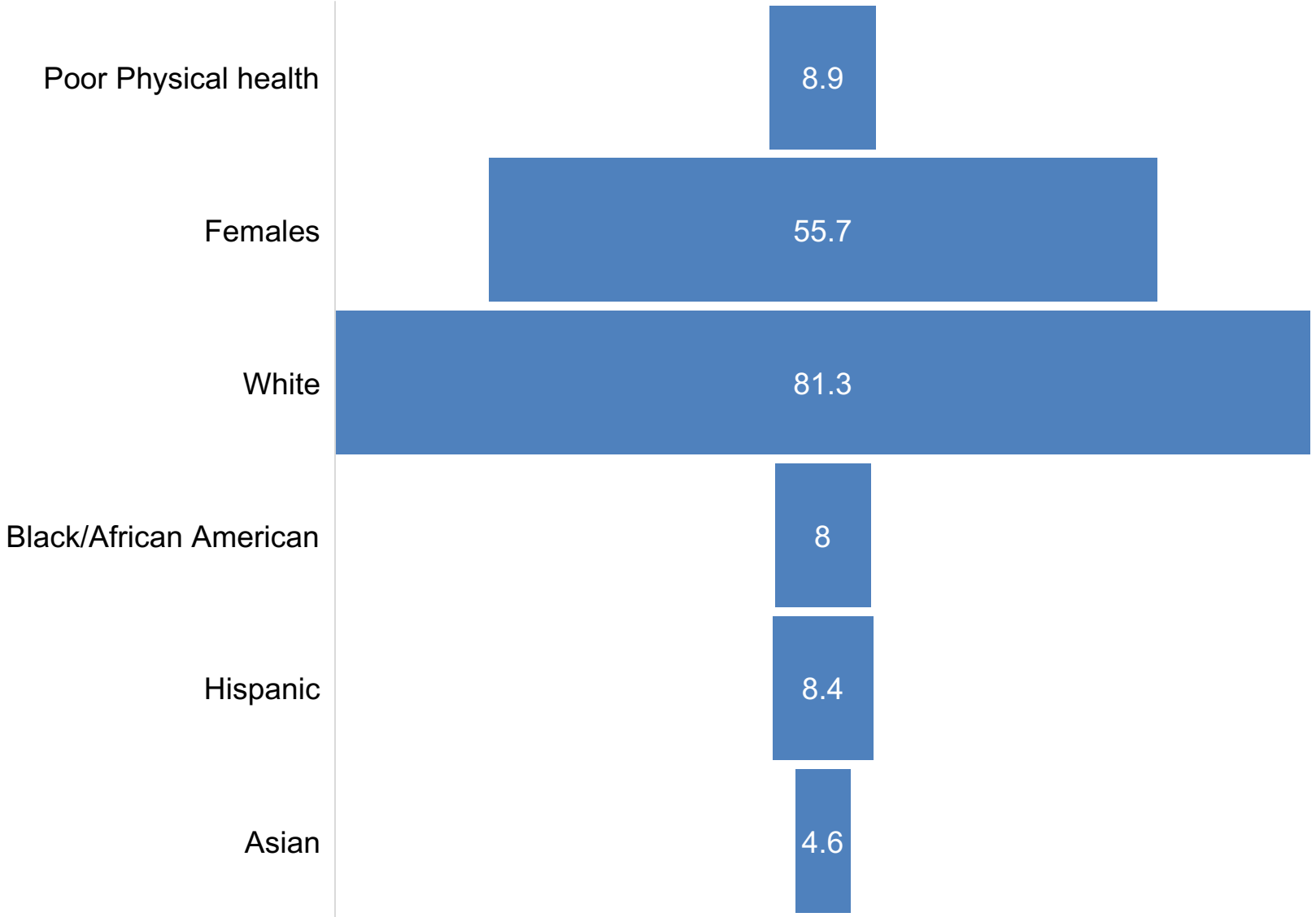
Frequency of use for the following modes of transportation was coded as a binary variable into “0 = Daily - a few times a year” vs. “1 = Never”:

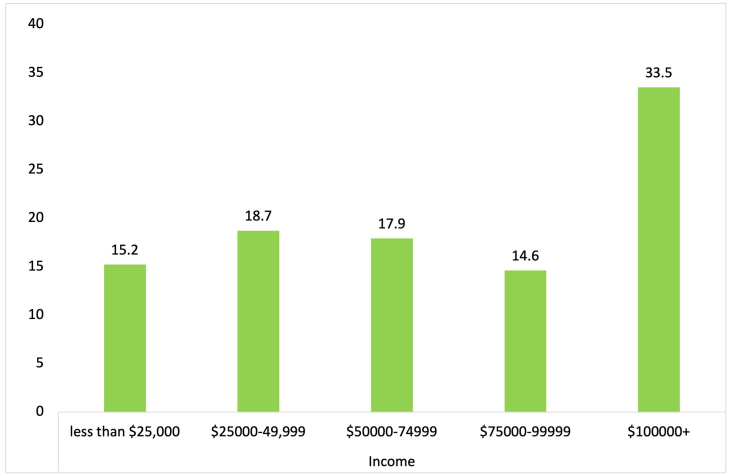
- Walking
- Biking
- Personal vehicle
- Taxi/rideshare
- Bus
- Train
- Paratransit

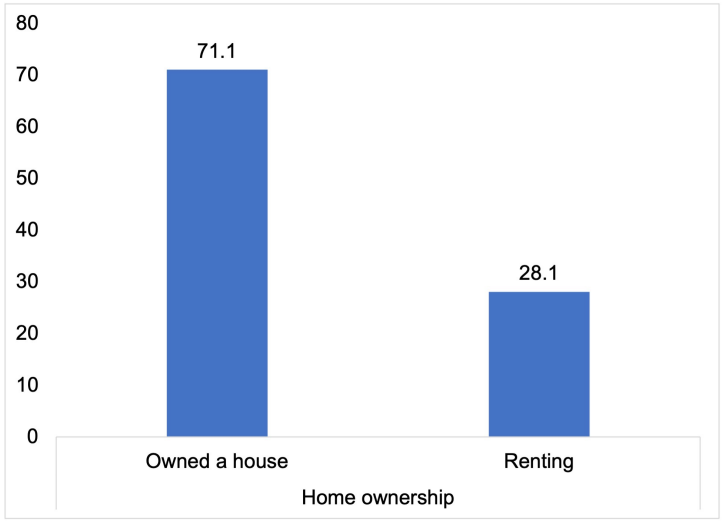
Data Analysis

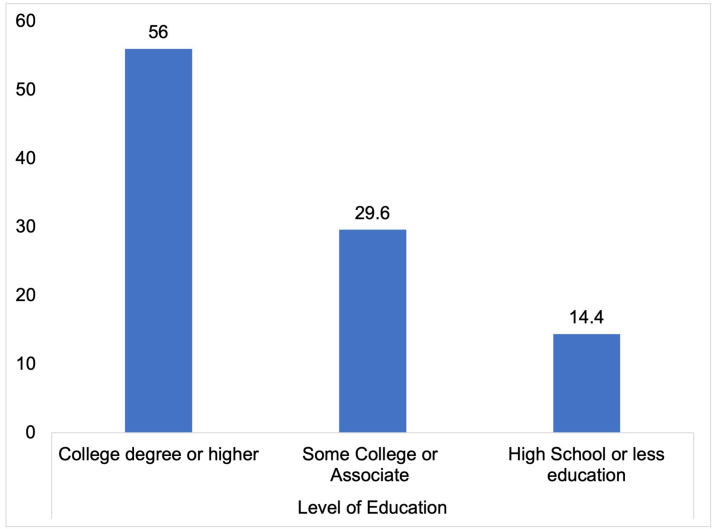
- Descriptive statistics
- Bivariate analysis using Pearson Chi-square.
- Multivariable analysis using binary logistic regression
  - Model 1 had demographic factors
  - Model 2 had variables in Model 1 plus SES factors.
  - The final and fully adjusted model includes variables in Model 2 plus transportation-related factors.
- Omnibus Tests of Model Coefficients and the Nagelkerke pseudo-R square.

Demographic Results



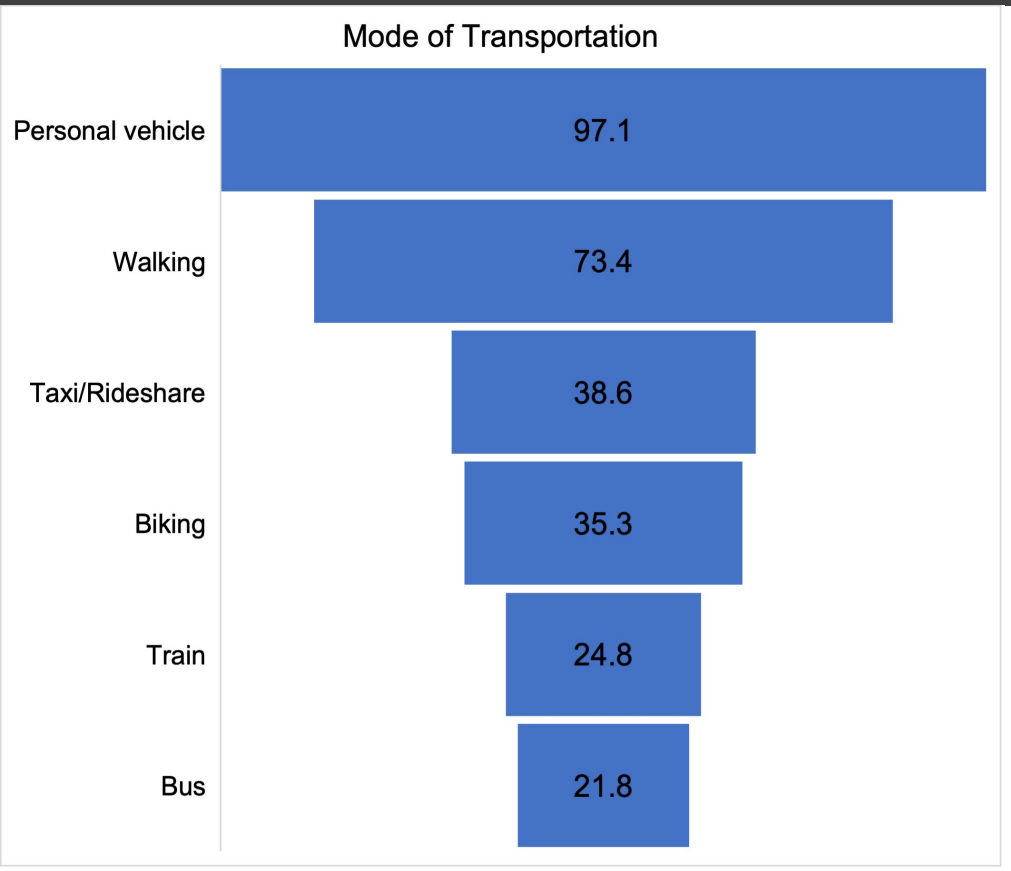

40
35
30
25
20
15
10
5
0
15.2
18.7
17.9
14.6
33.5
less than $25,000
$25000-49,999
$50000-74999
$75000-99999
$100000+
Income

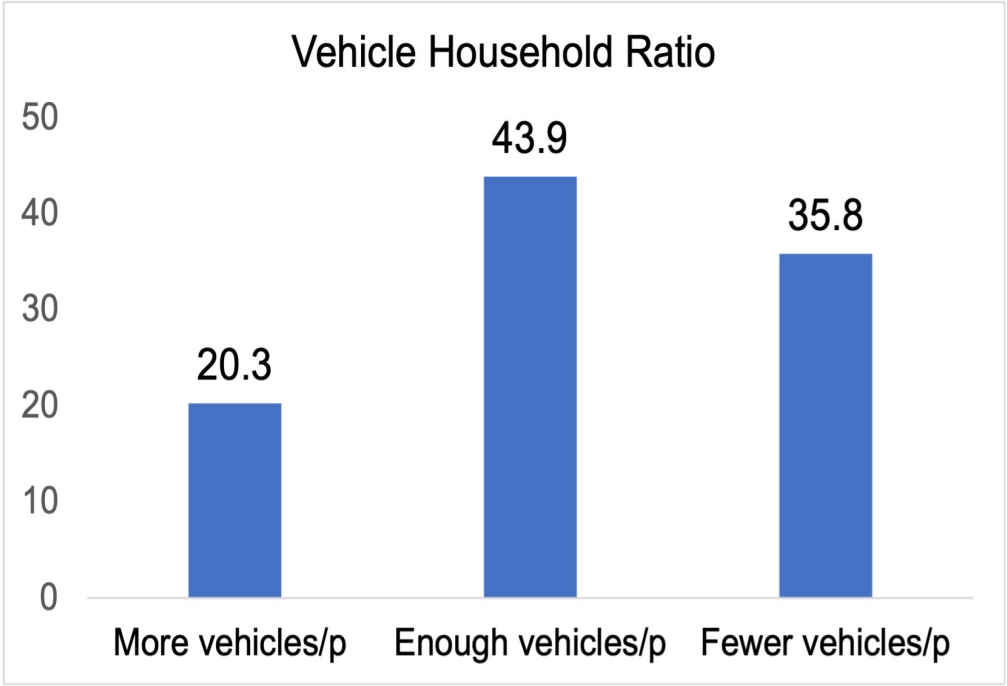

80
70
60
50
40
30
20
10
0
71.1
28.1
Owned a house
Renting
Home ownership


60
50
40
30
20
10
0
56
29.6
14.4
College degree or higher
Some College or Associate
High School or less education
Level of Education

SES Results

Transportation-Related Results



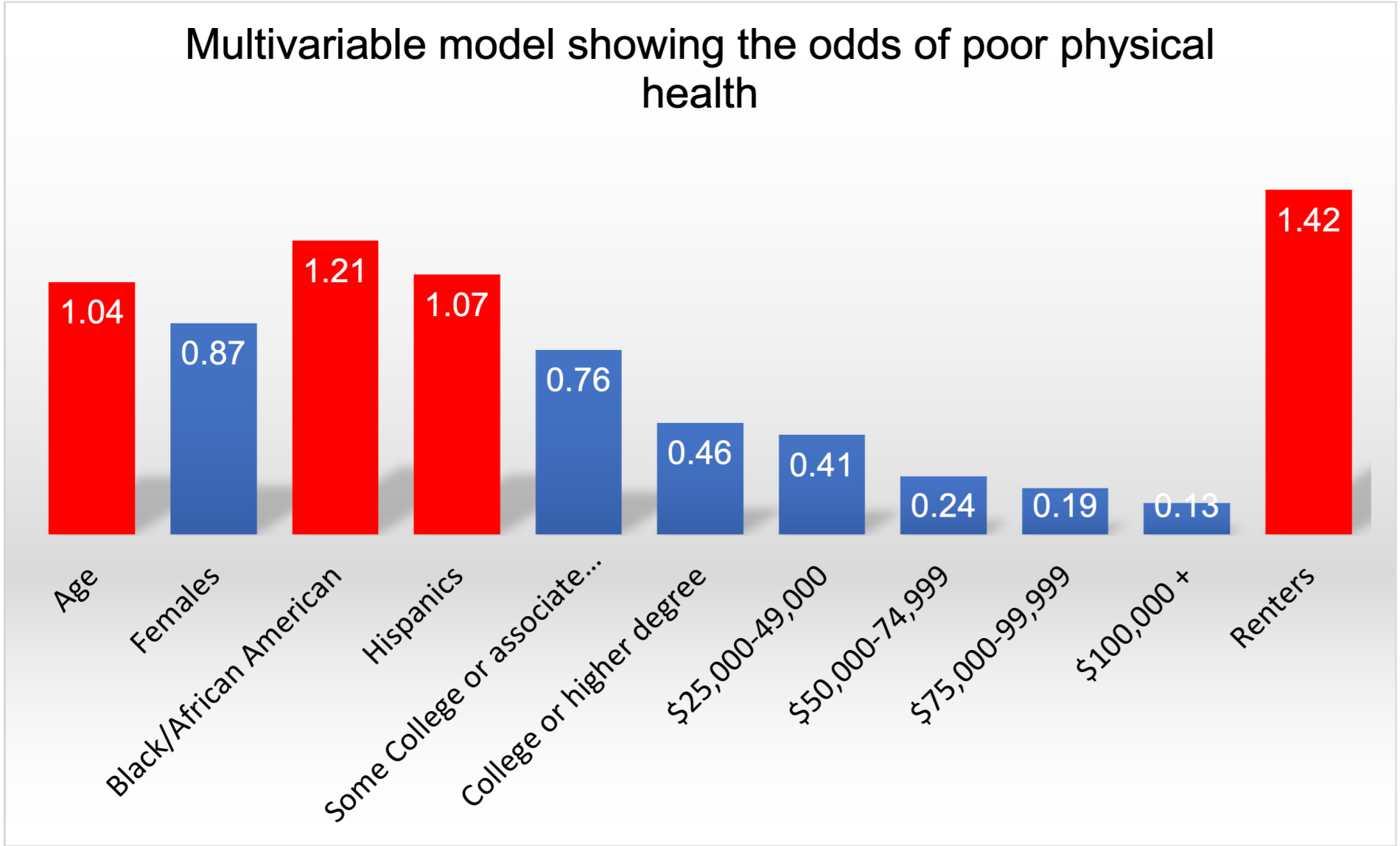


Bivariate Results

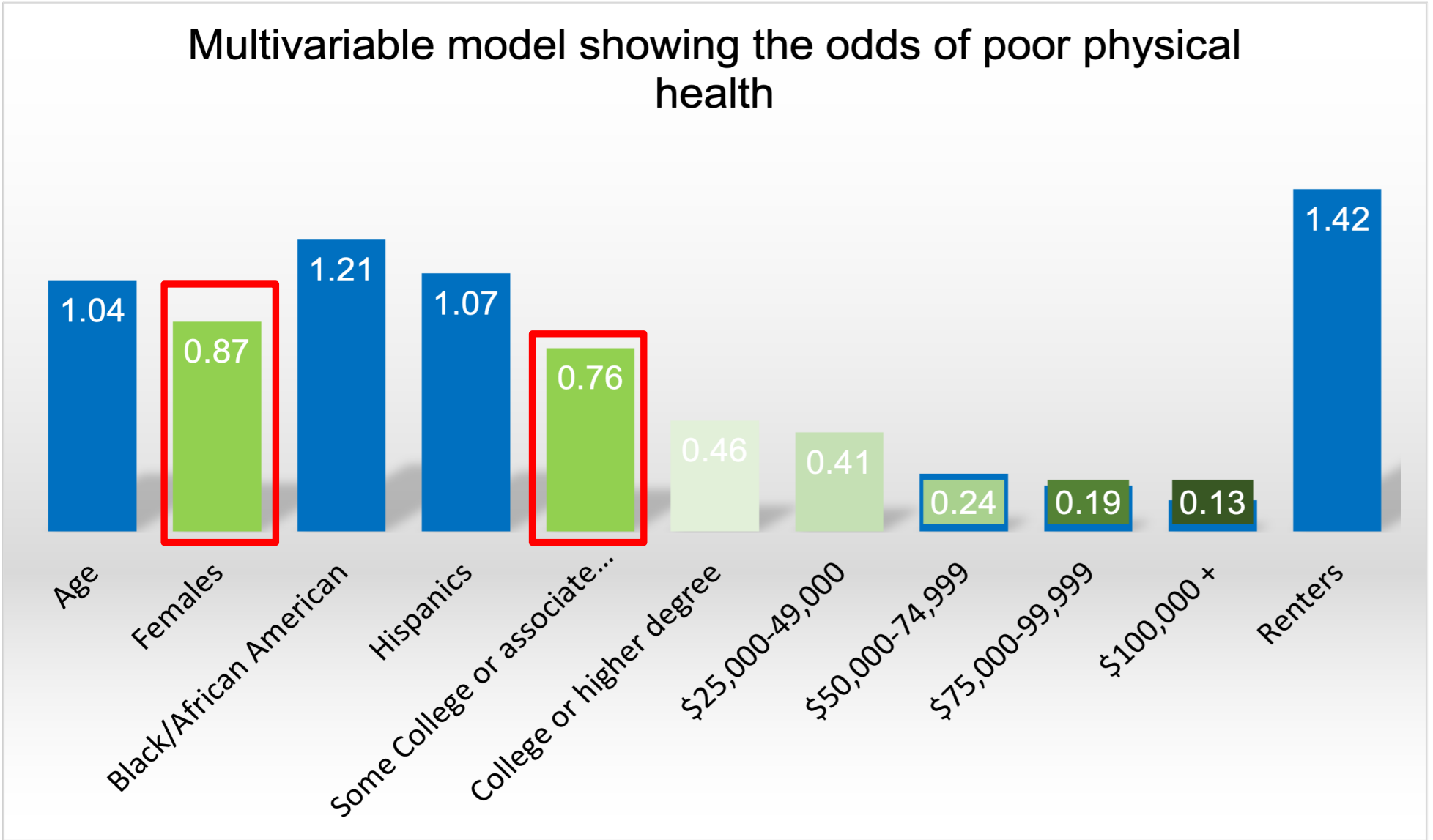
- About 42% of respondents who perceived their physical health as poor compared to 35.2% of respondents who perceived their physical health as good had fewer vehicles per individual in the household ($\chi^2 = 138.54$, df = 2, $p < 0.001$).
- The proportion of females who had fewer vehicles per individual in the household (38.3%) was significantly greater than the proportion of males who had fewer vehicles per individual in the household (32.6%; $\chi^2 = 650.67$, df = 2, $p < 0.001$).
- 53.1% of Asians compared to 47.0% of American Indian/Alaska Native/Native Hawaiian/Pacific Islanders, 46.8% of Black/African Americans, and 33.1% of Whites had fewer vehicles per individual in the household ($\chi^2 = 1188.60$, df = 8, $p < 0.001$).

Multivariate Results

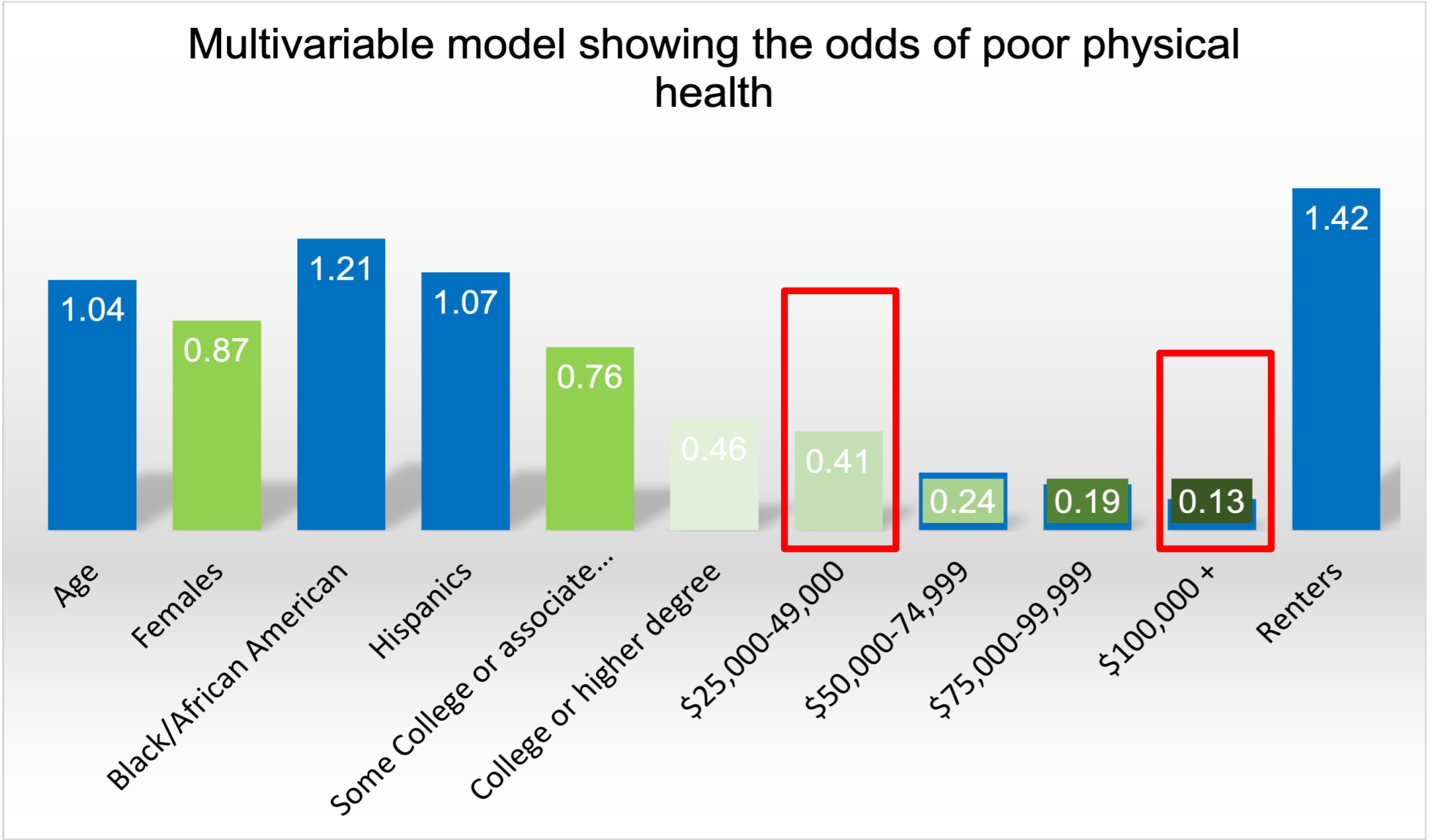
Multivariate Results - Demography



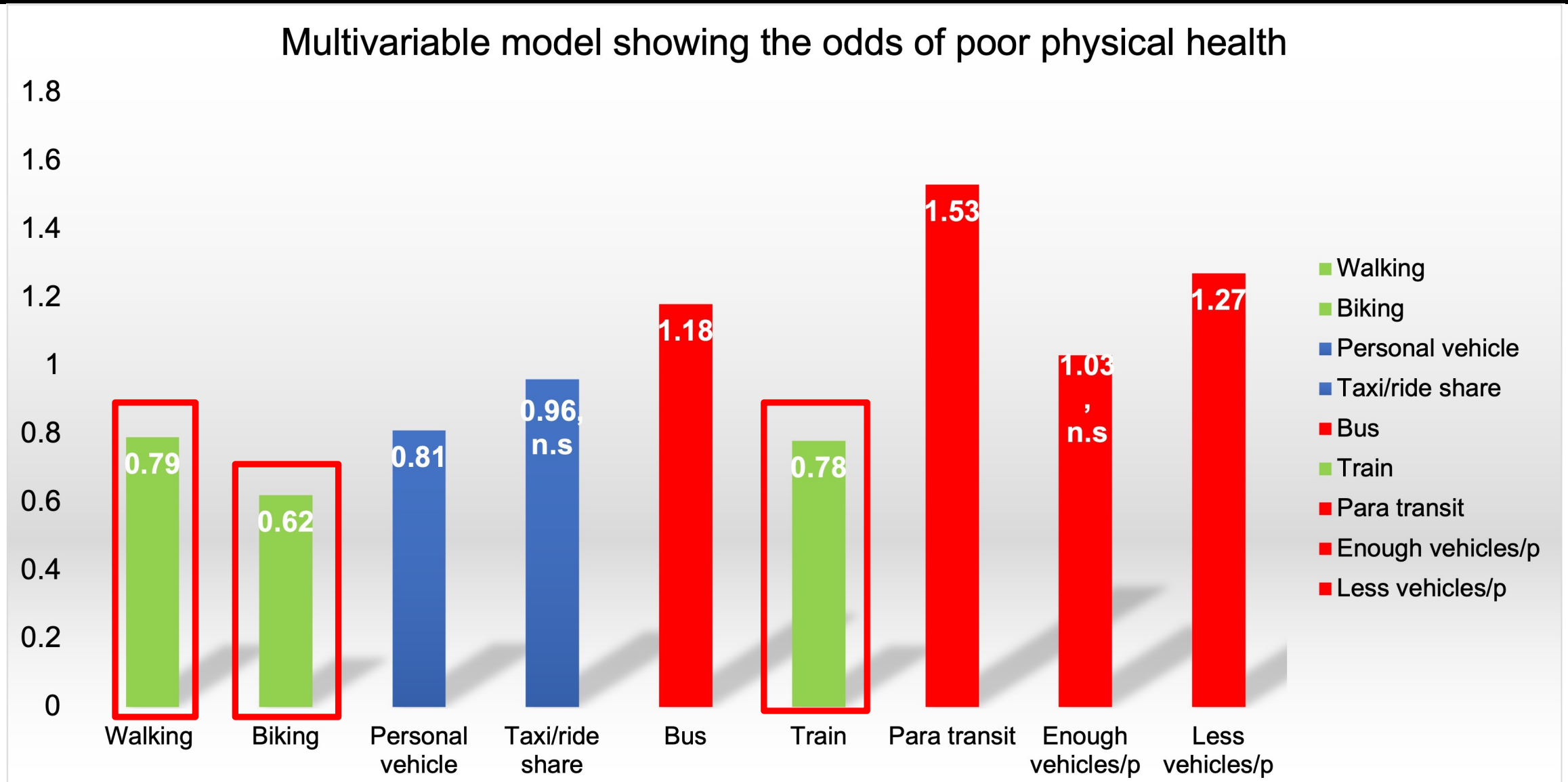
Multivariate Results - Demography



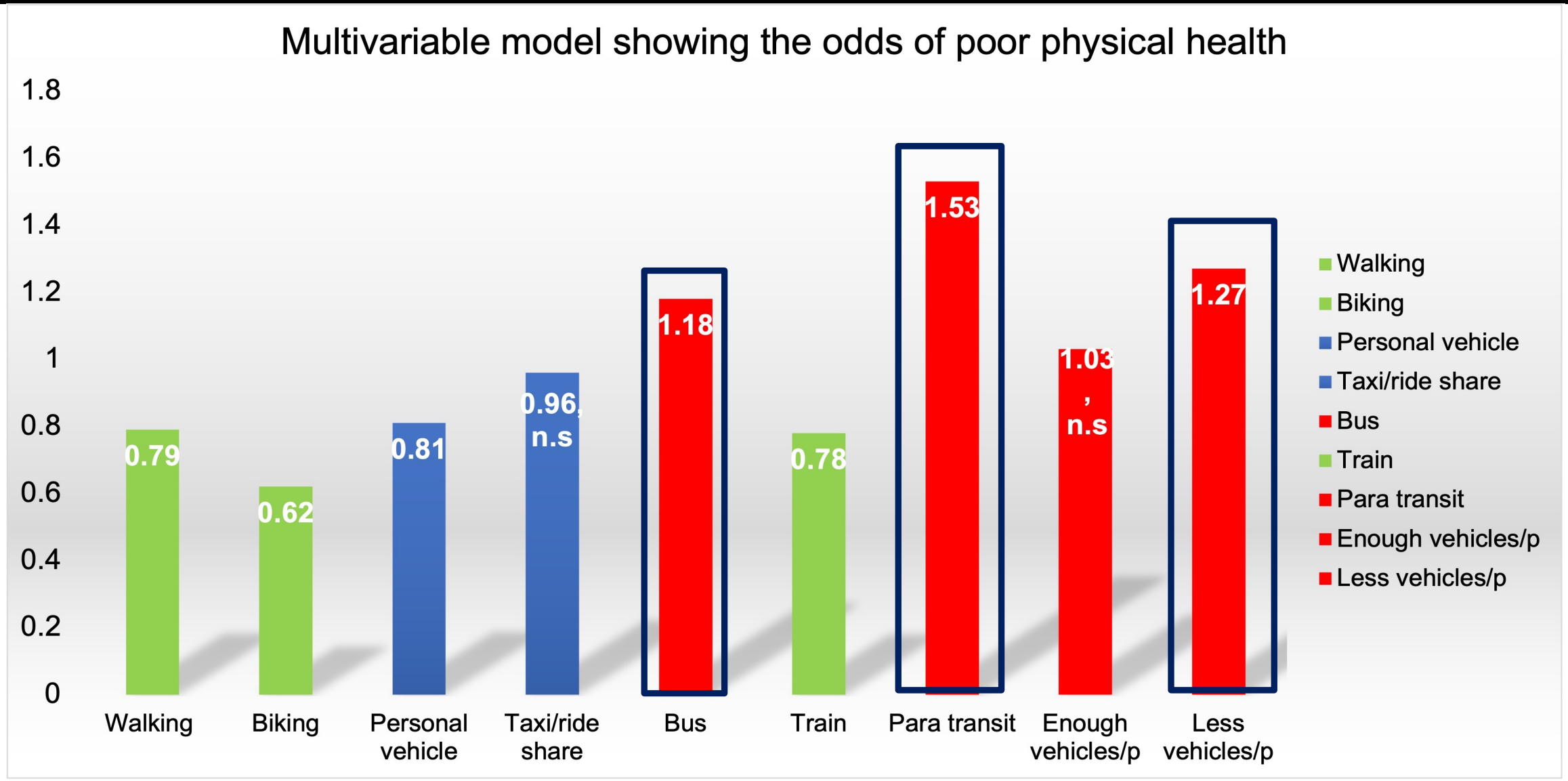
Multivariate Results - Demography



Multivariate Results – Mode of Transportation



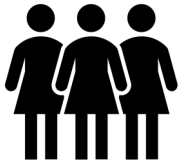
Multivariate Results – Mode of Transportation



Discussion

- About 9% of respondents rated their heath as poor.

- On average, respondents had 1.21 vehicles per household.



- More than one in three respondents (35.8%) had vehicle-deficits and are more likely to be poor, with lower education, renters, and Black/African American or Hispanic (Blumenberg et al., 2020)

How Many Vehicles is “Enough"?

- Car-deficit households are more likely to be poor.
- Not having enough vehicles per household was associated with a greater likelihood of poor health.
- But there was no difference in health outcomes between the people who had enough and the people who had more.
- Data from the 1997 to 2017 NHIS showed that in 2017, more than 5.8 million individuals in the U.S., representing 1.8%, experienced a delay in accessing medical care as a result of not having access to transportation (Wolfe et al., 2020).
- A significant increase in transportation barriers between 2003 and 2009, with those living in poverty and who have chronic conditions disproportionately impacted by these transportation barriers.

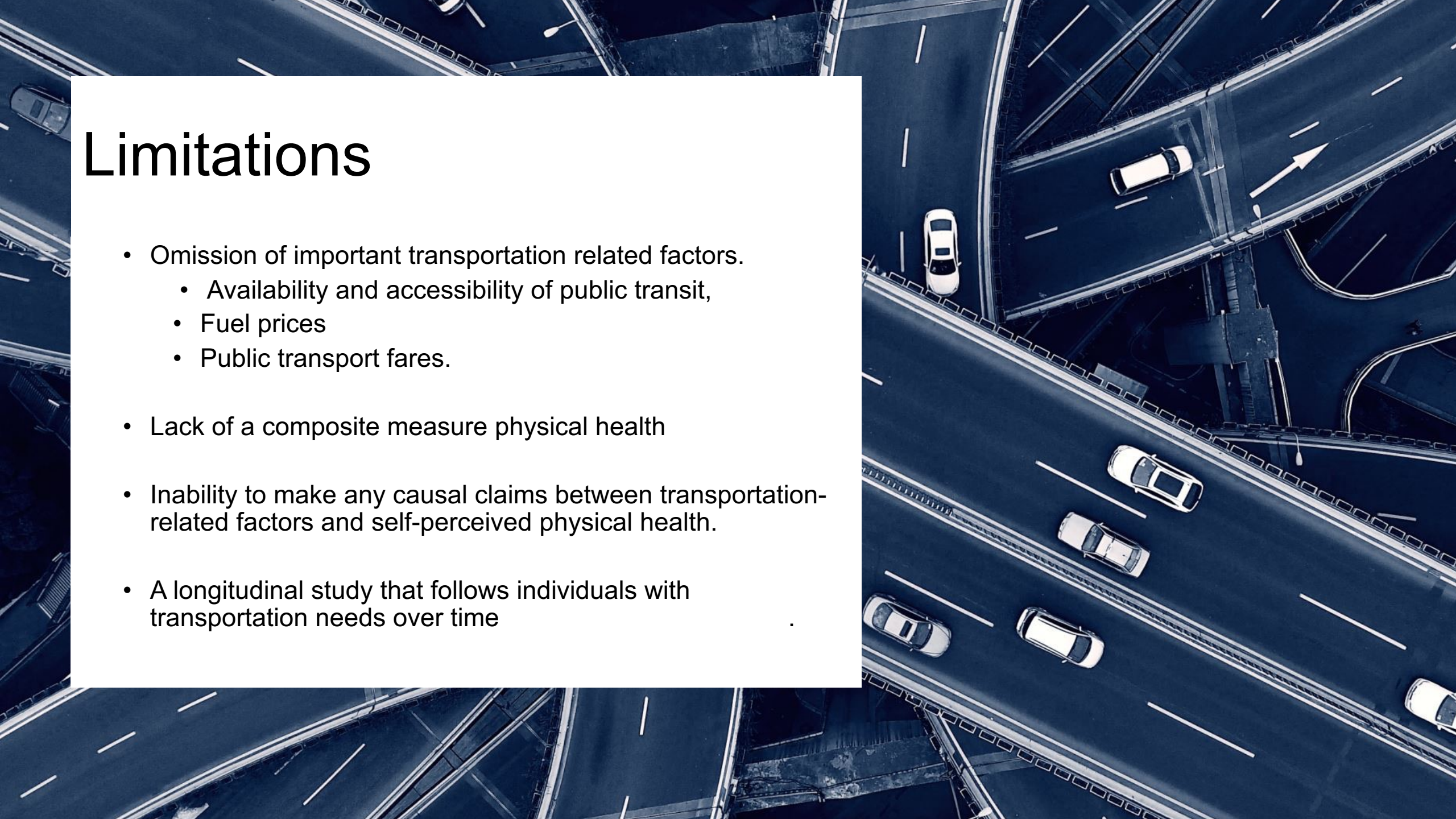
Discussion

- Transportation barriers was one of the main reasons impeding access to health care among American Indian elders (Sommerfeld et al., 2021).

- Other barriers reported included long travel times to doctors or emergency care and lack of community health programs as major transportation-related challenges.

Discussion

- Walking and biking increase the likelihood of good health.
- Building sustainable sustainable cities and good health may require policies that promote walking, biking, and the use of public transport systems (e.g., trains).
- No carbon emissions are associated with walking, biking, or trains that are powered with electricity.



Limitations

- Omission of important transportation related factors.
  - Availability and accessibility of public transit,
  - Fuel prices
  - Public transport fares.
- Lack of a composite measure physical health
- Inability to make any causal claims between transportation-related factors and self-perceived physical health.
- A longitudinal study that follows individuals with transportation needs over time .

Study implications

- Need for pavements and safer pedestrian walkways.
- Increase the number of bicycle lanes in major cities.
- Increase access to public transportation or mass transit systems to reduce number of vehicles on the road.
- Reduce congestion with public transportation systems.

Conclusions

- Females, racial/ethnic minority, and individuals with lower SES were more likely to have fewer vehicles per individual in the household.

- Persons with a lower vehicle to household ratio were more likely to report poor perceived physical health when compared to their counterparts with more vehicles per individual in the household.

- Walking, biking, and train use do improve physical health and promote sustainable cities.

Acknowledgement

Questions?

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