



COVID-19 Behavioral Changes

Adam Levav
Junrong Liu
Ting-Yu Liu
Walesia Robinson II





INTRODUCTION

Background and statement
of objectives



DATA FORMATTING

Cleaning up survey, adding
location data (SLD)



LOGISTIC MODELS

Regress variables against
changes in behavior



VISUALIZATION

Data analysis and graphing



CONCLUSION

Policy proposals, issues
and future work



INTRODUCTION

- COVID-19 lockdown mandates disrupted everyday life
- Demographic factors affect change in routines
- Present opportunities to promote and sustain positive health behaviors



DATA CLEANING & INCORPORATING LOCATION DATA

- Used **Smart Location Database (SLD)** from Environmental Protection Agency
 - Used HUD-USPS dataset to associate data for census tracts from SLD with zip codes given in survey
- Constructed four new variables:
 - Road Density
 - Transit Service Density
 - Pedestrian Intersection Density
 - Activity Density

WHAT ARE THE INFLUENTIAL CHARACTERISTICS?



Three logistic models

- **Generate binary target variables:**
 - Transportation Mode Change
 - Exercise Change
 - Outside Activity (has gone outside for reasons beside grocery/exercise)
- **Selected features:** Age, Sex, Marriage, Household type, Education level, etc.
- **Backwards elimination to remove insignificant variables**

TRANSPORTATION MODE CHANGE

	Estimate	p value
Age	-0.02450	0.05521 .
Household Size	0.3315	0.05675 .
Household Type: Single family home	-1.343	0.03180 *
Worker: Employed part-time	-1.097	0.05293 .
Worker: Retired	-2.309	0.00238 ***
Worker: Unemployed	-2.659	1.14e-08 ***
Road Density	-0.1453	0.04655 *
Transit Service	0.0006003	0.05462 .
Pedestrian Intersection Density	0.02483	0.04557 *

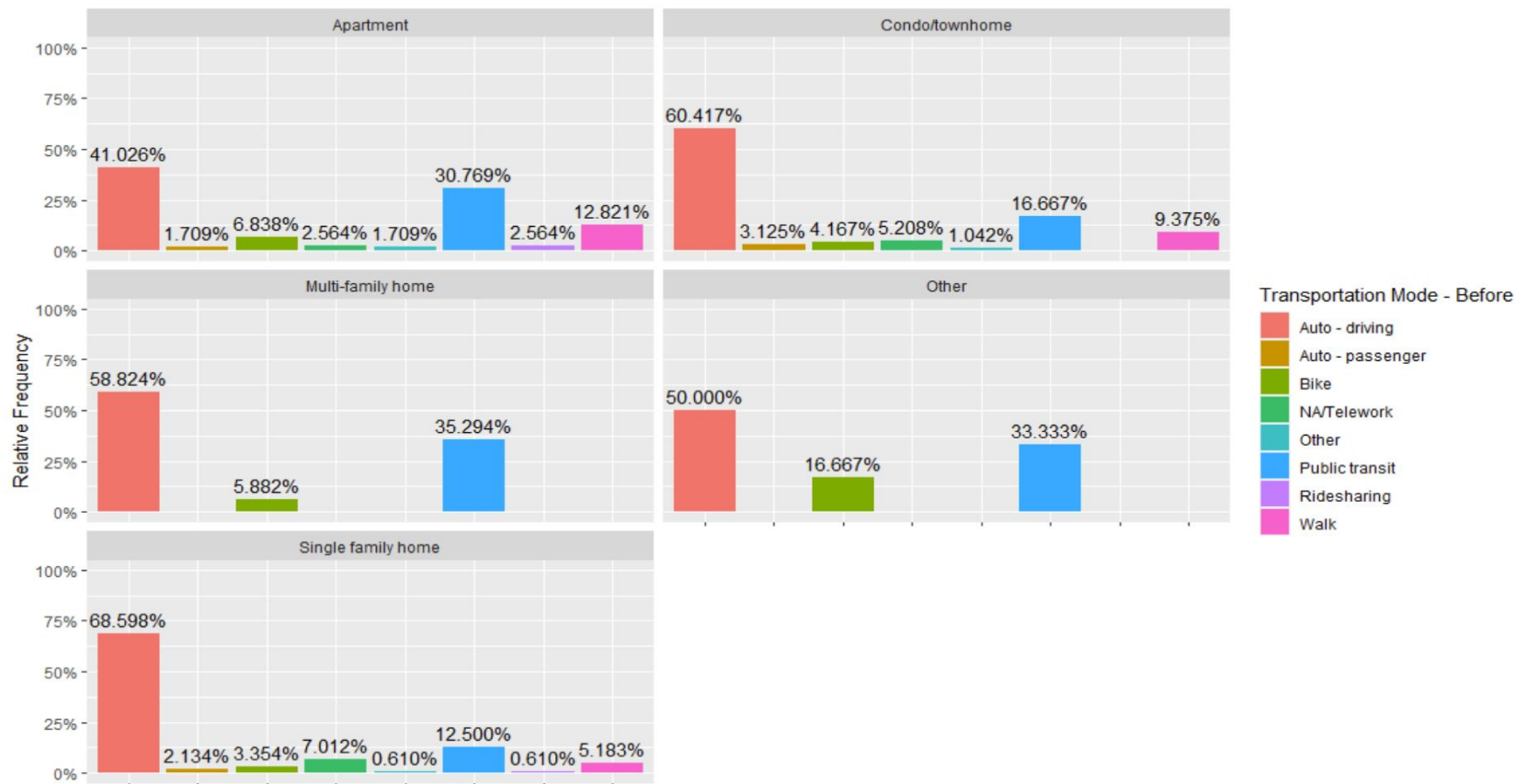
EXERCISE CHANGE

	Estimate	<i>p</i> value
Kids	0.2307	0.0224 *
Road Density	0.05180	0.0293 *

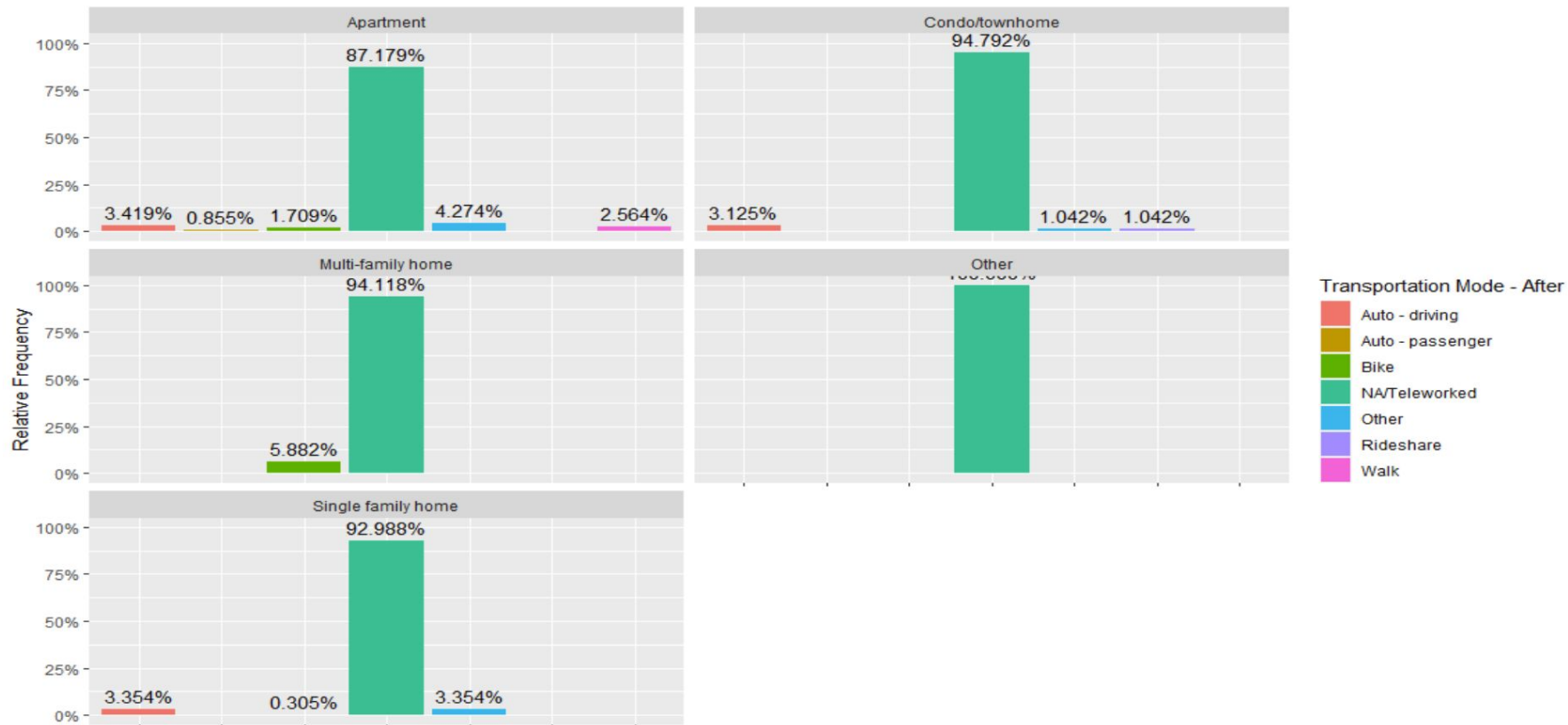
OUTSIDE ACTIVITY

	Estimate	p value
Sex: Male	0.46313	0.018116 *
Household Size	-0.44413	0.000187 ***
Kids	0.24725	0.058917 .
Education: Some college or associate's degree	0.69766	0.007593 **
Household type: Condo/Townhome	0.66150	0.025960 *
Household Type: Single family home	0.72333	0.027222 *
Household Type: Multi-family home	1.41930	0.006009 **
Road Density	0.02032	0.078441 .

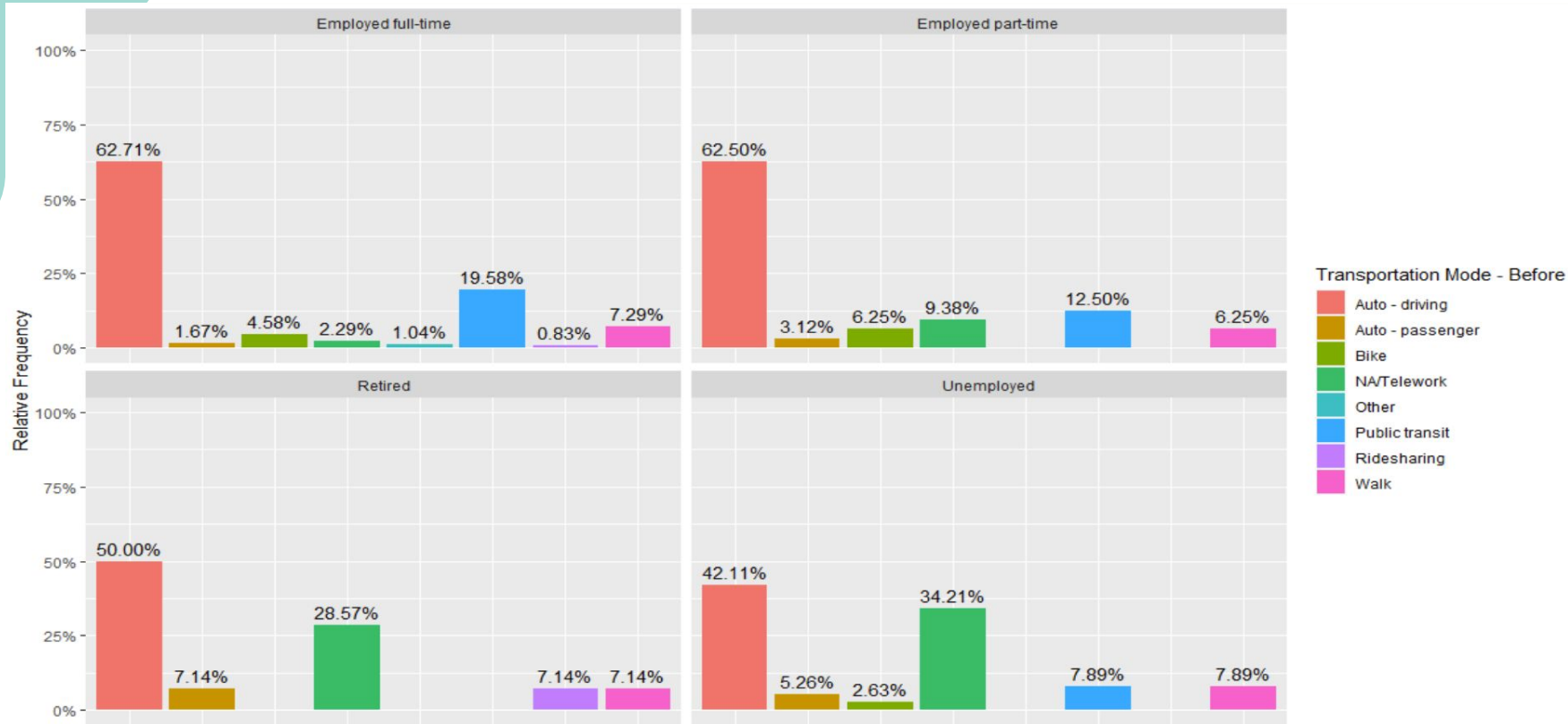
TRANSPORTATION BY HOUSEHOLD TYPE - BEFORE



TRANSPORTATION BY HOUSEHOLD TYPE - AFTER



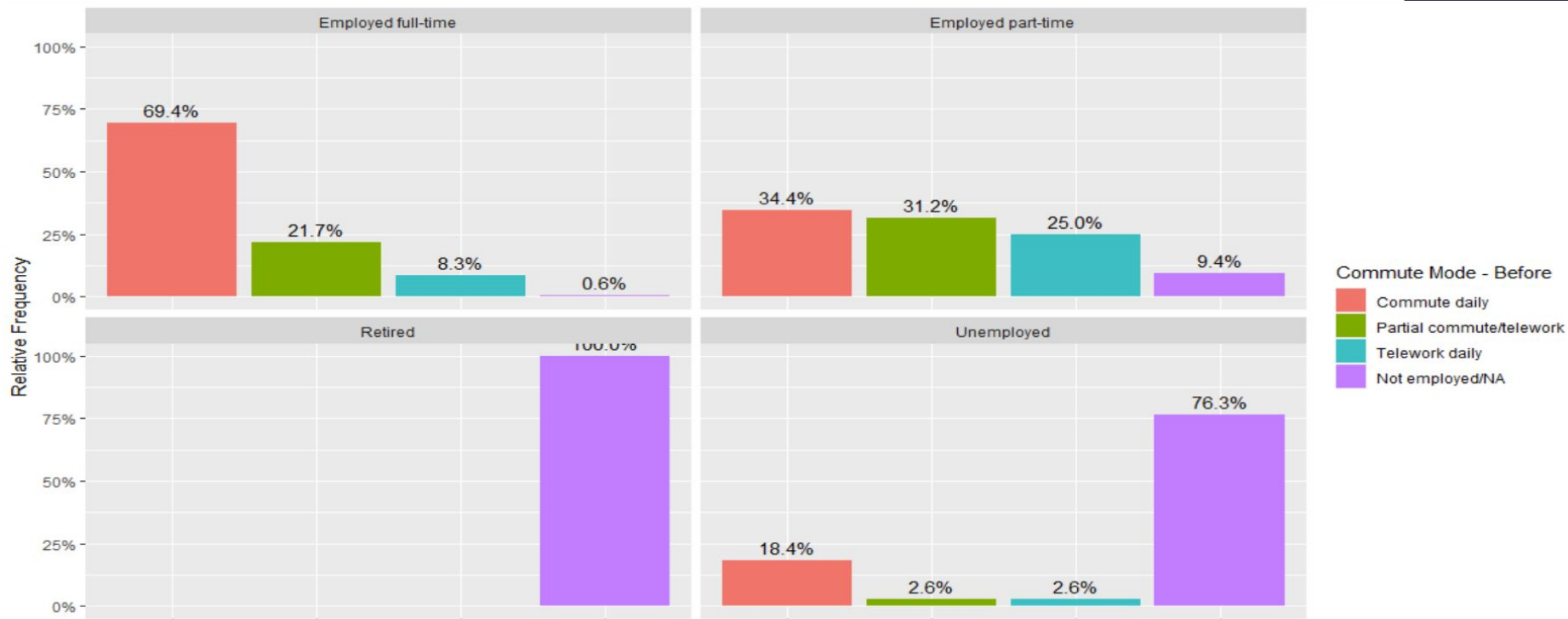
TRANSPORTATION BY EMPLOYMENT - BEFORE



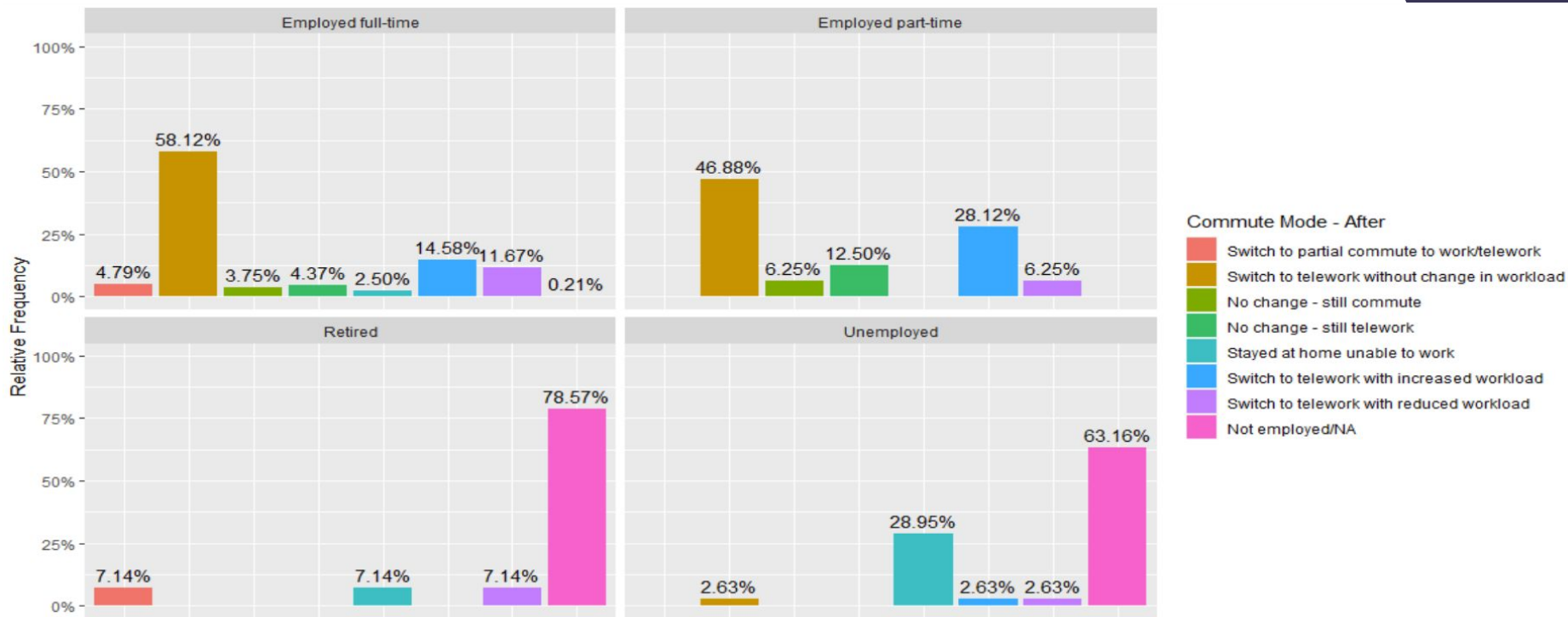
TRANSPORTATION BY EMPLOYMENT - AFTER



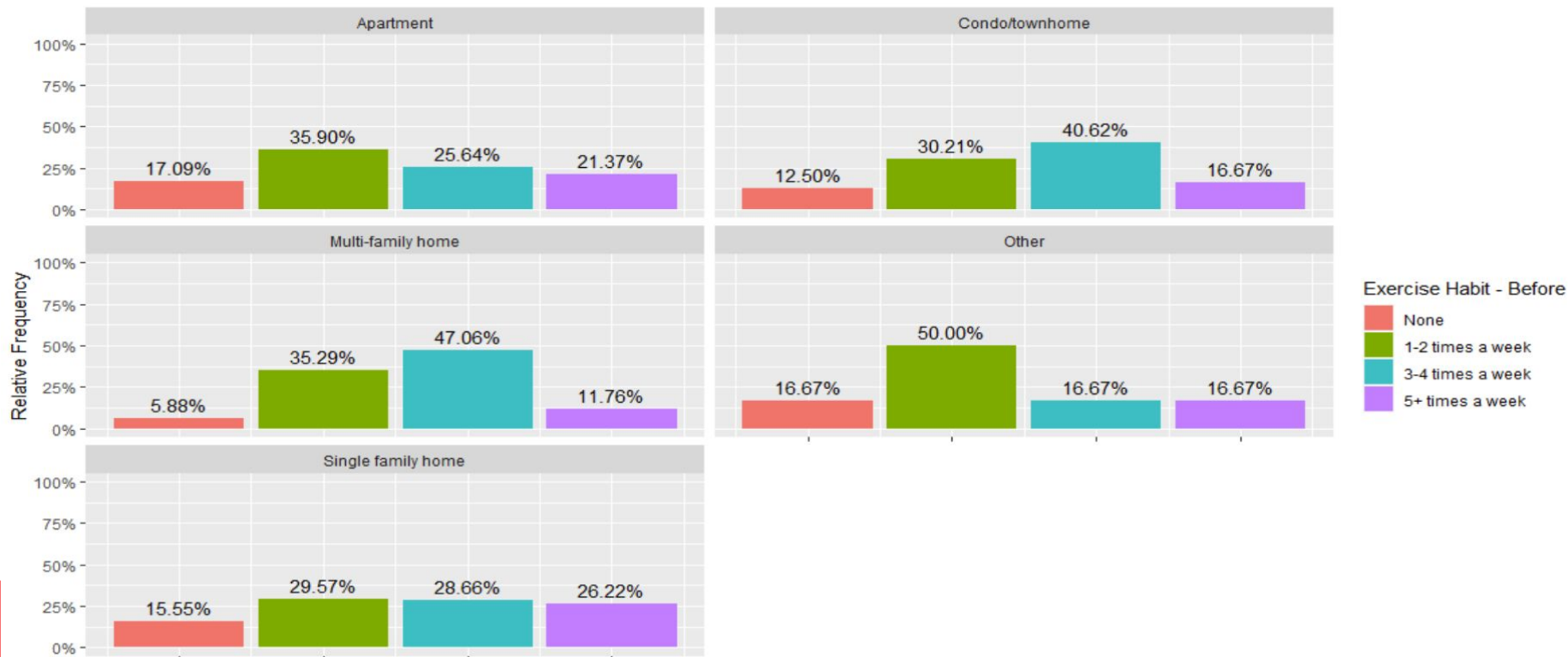
COMMUTE MODE BY EMPLOYMENT - BEFORE



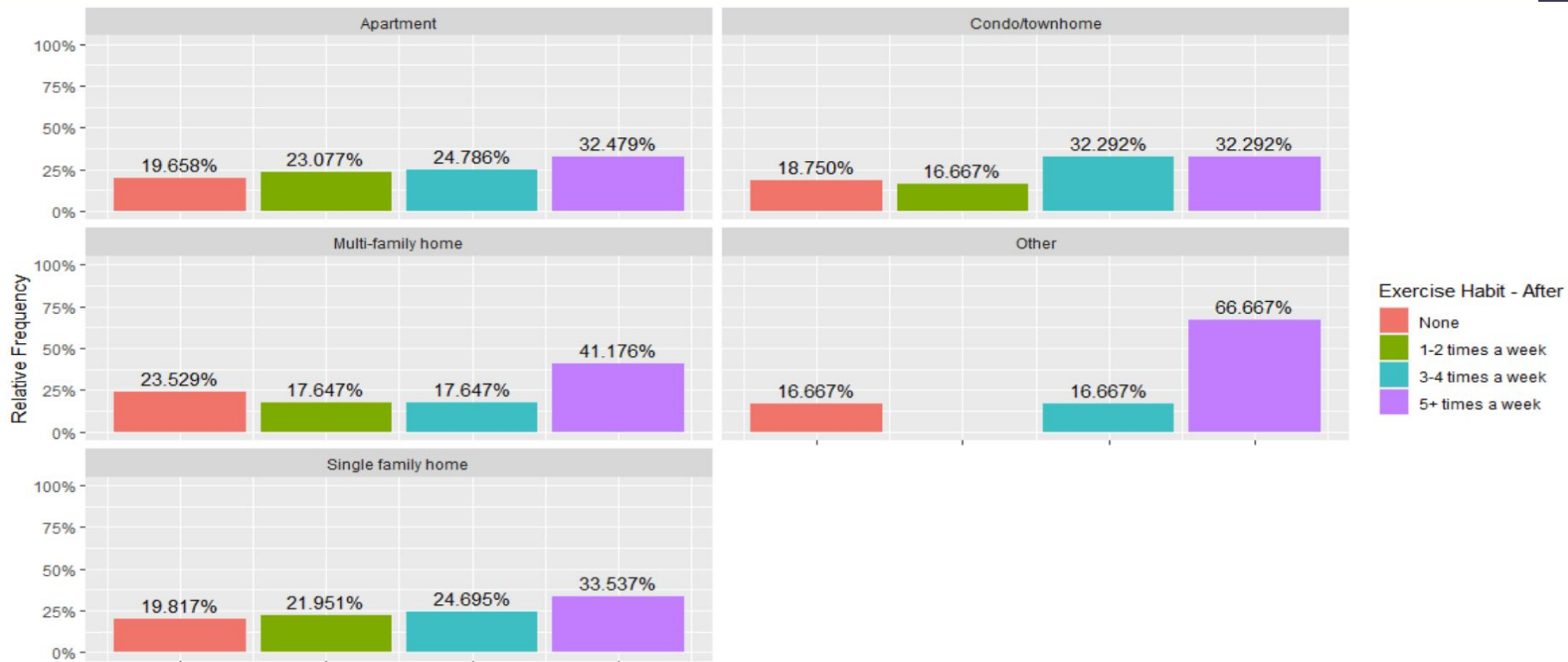
COMMUTE MODE BY EMPLOYMENT - AFTER



EXERCISE HABIT BY HOUSEHOLD TYPE - BEFORE

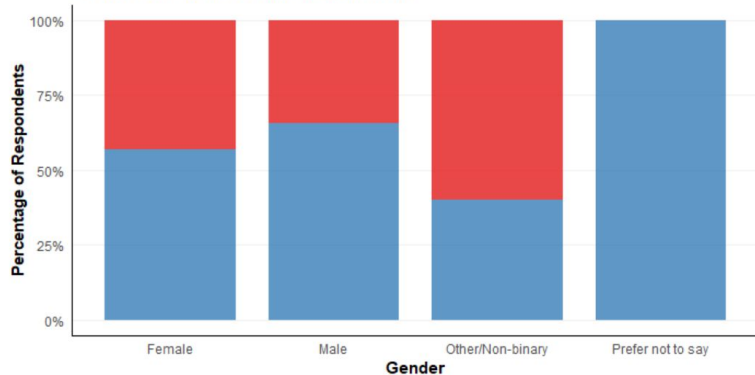


EXERCISE HABIT BY HOUSEHOLD TYPE - AFTER



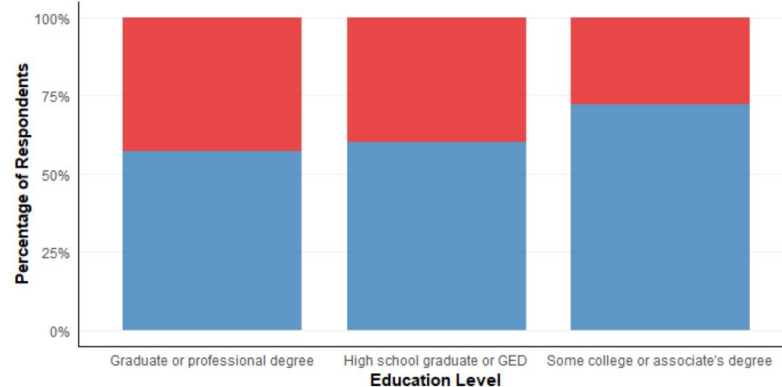
FACTORS INFLUENCING NON-ESSENTIAL EXCURSIONS

Gender vs. Non-essential Excursions



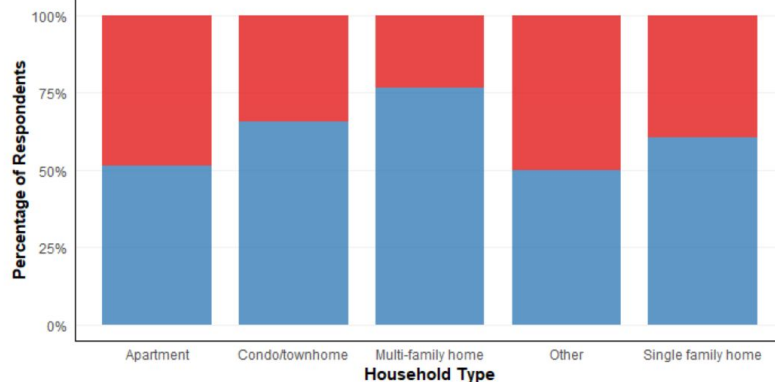
Went Out for Non-essential Purposes ■ No ■ Yes

Education Level vs. Non-essential Excursions



Went Out for Non-essential Purposes ■ No ■ Yes

Household Types vs. Non-essential Excursions



Went Out for Non-essential Purposes ■ No ■ Yes

DATA-DRIVEN POLICY PROPOSALS

- Dedicated park times in urban areas
 - IoT linked/enabled applications to facilitate crowd safety and monitoring
 - Arranging and promoting public park areas for outdoor socially-distanced exercise.
 - More flexible work hours and schedules
 - Prioritize work-life balance & mental health for all workers
- 
- A large, abstract, red shape is located in the bottom right corner of the slide. It has a smooth, organic form with several rounded protrusions and indentations, resembling a stylized drop or a modern logo element.

LIMITATIONS & FUTURE WORK

- Survey construction
- Additional demographic points
- Diversity in research participation
- WHOQOL-BREF incorporation

THANK YOU!

Special thanks to:

- Our mentor, Dr. Danul Gunatilleka
- Our judges: Dr. Paul Rodrigues, Leia Dickerson, Kristen Lee, and John Malone
- UMD National Center for Smart Growth
- Data Challenge 2021 Planning Team