COVID-19 Behavioral Changes

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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 *

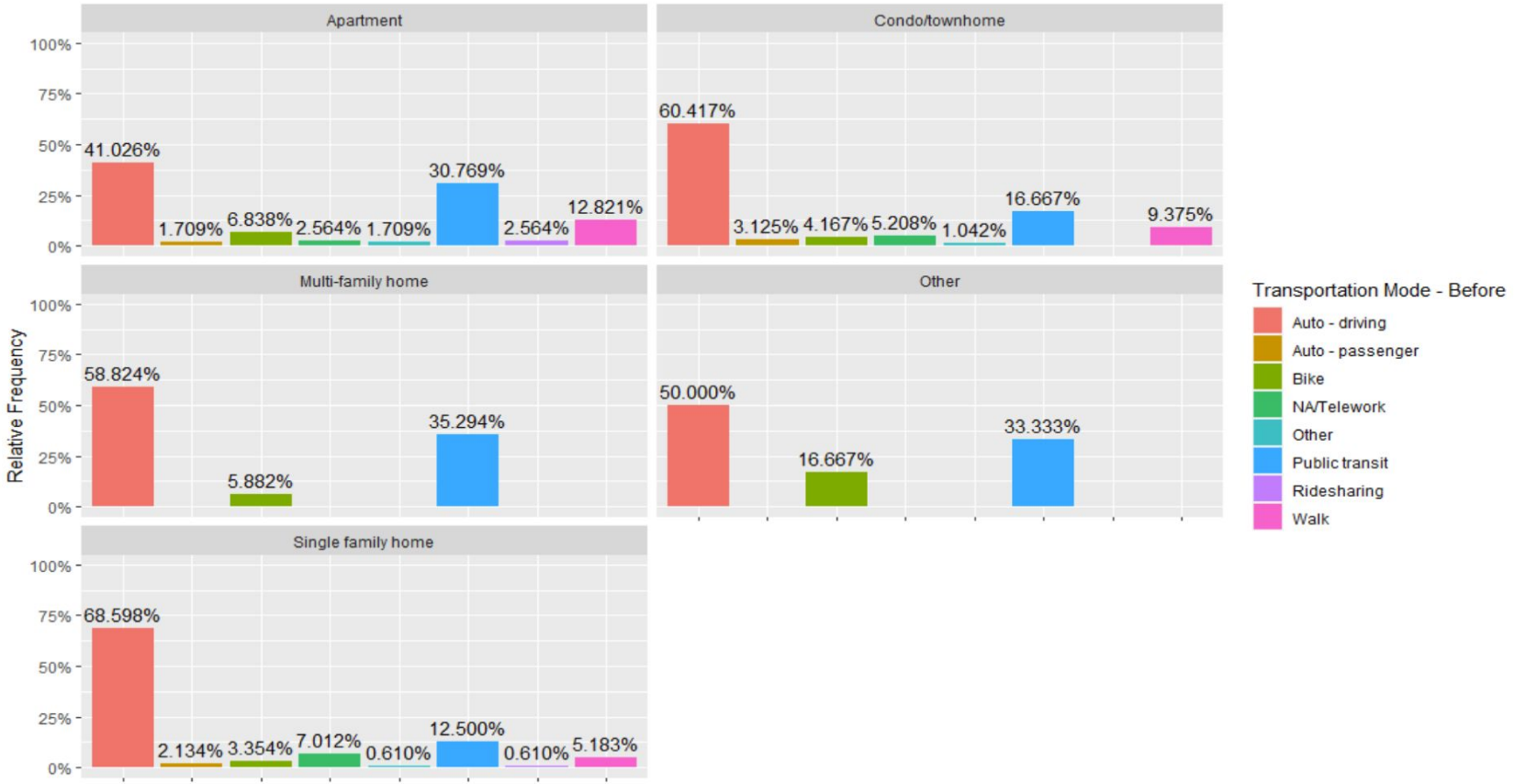
EXERCISE CHANGE

	Estimate	*p* value
Kids	0.2307	0.0224 *
Road Density	0.05180	0.0293 *

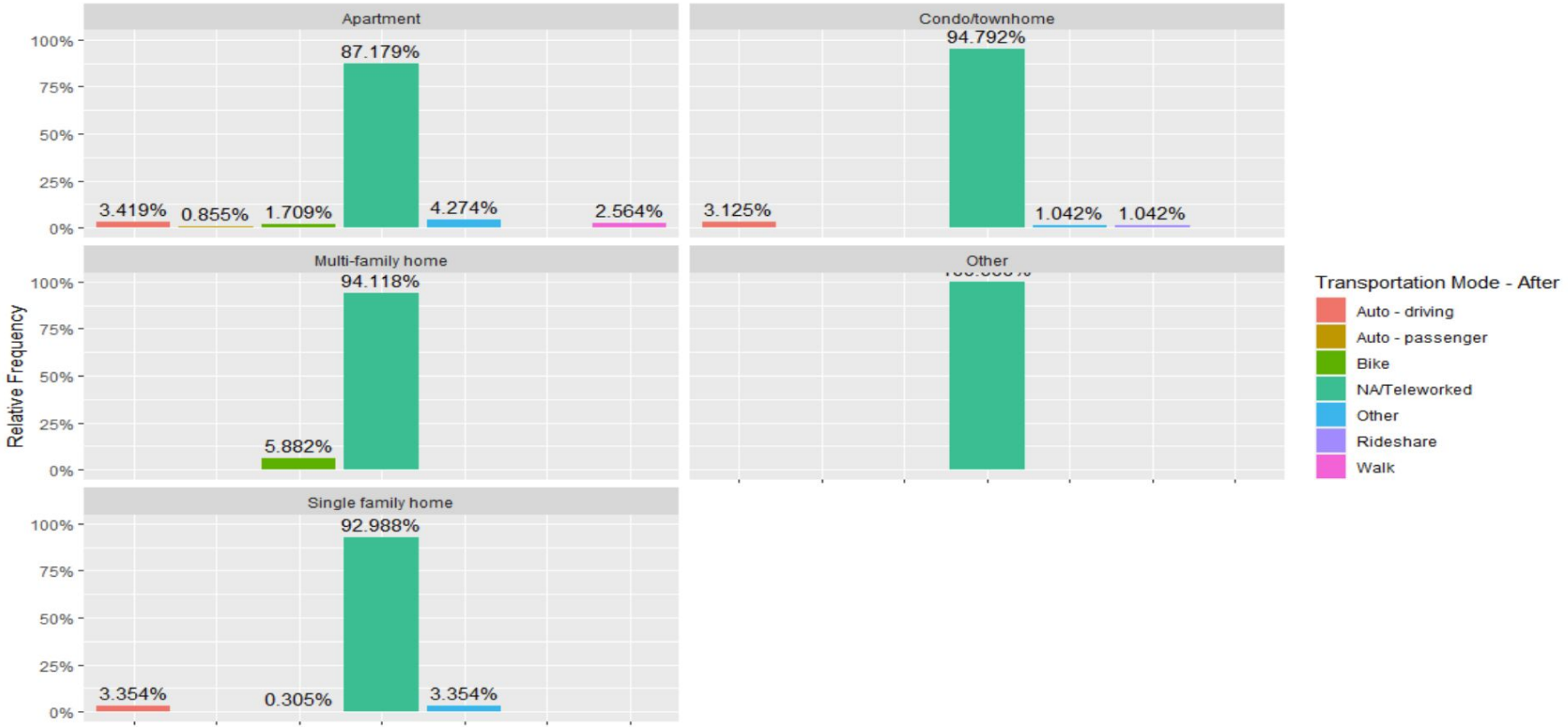
OUTSIDE ACTIVITY

	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 .

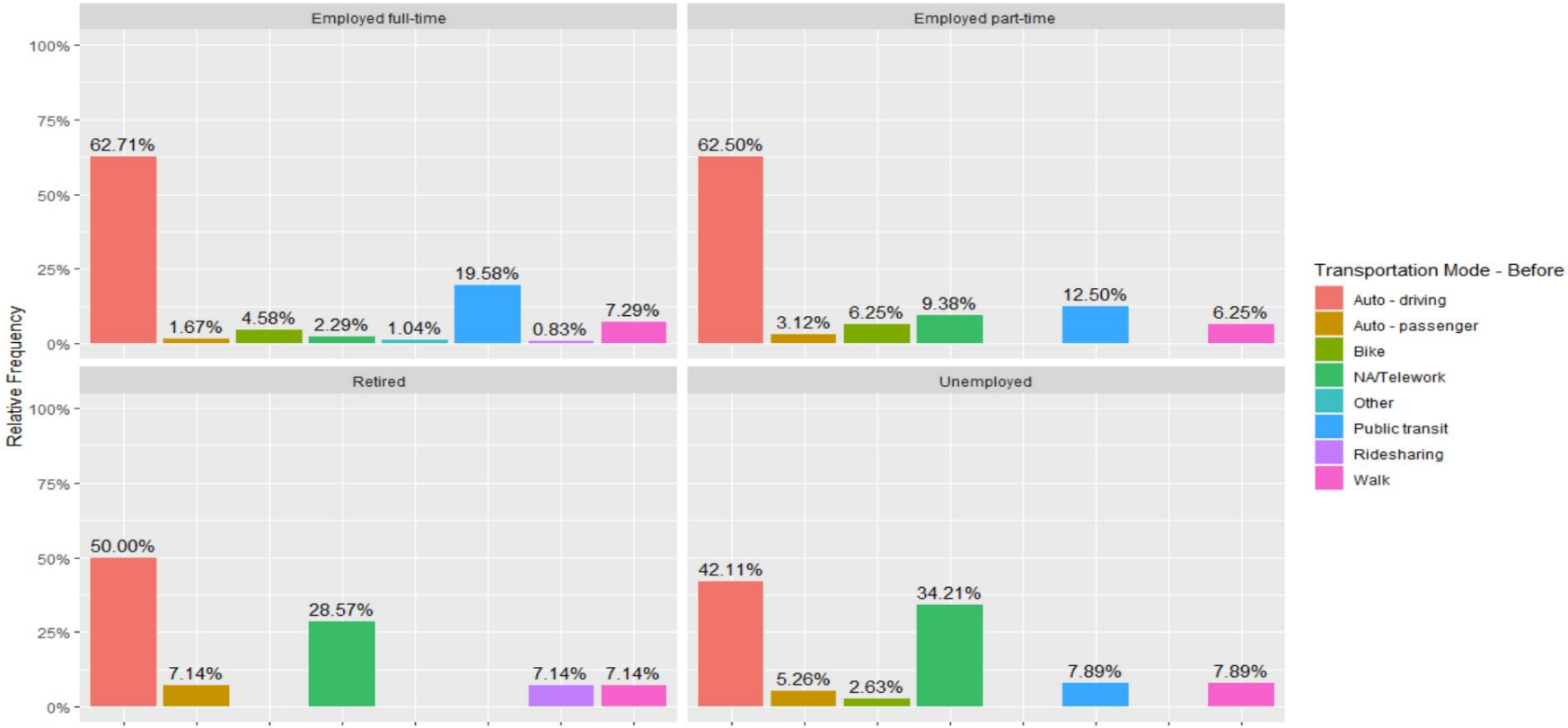
TRANSPORTATION BY HOUSEHOLD TYPE – BEFORE



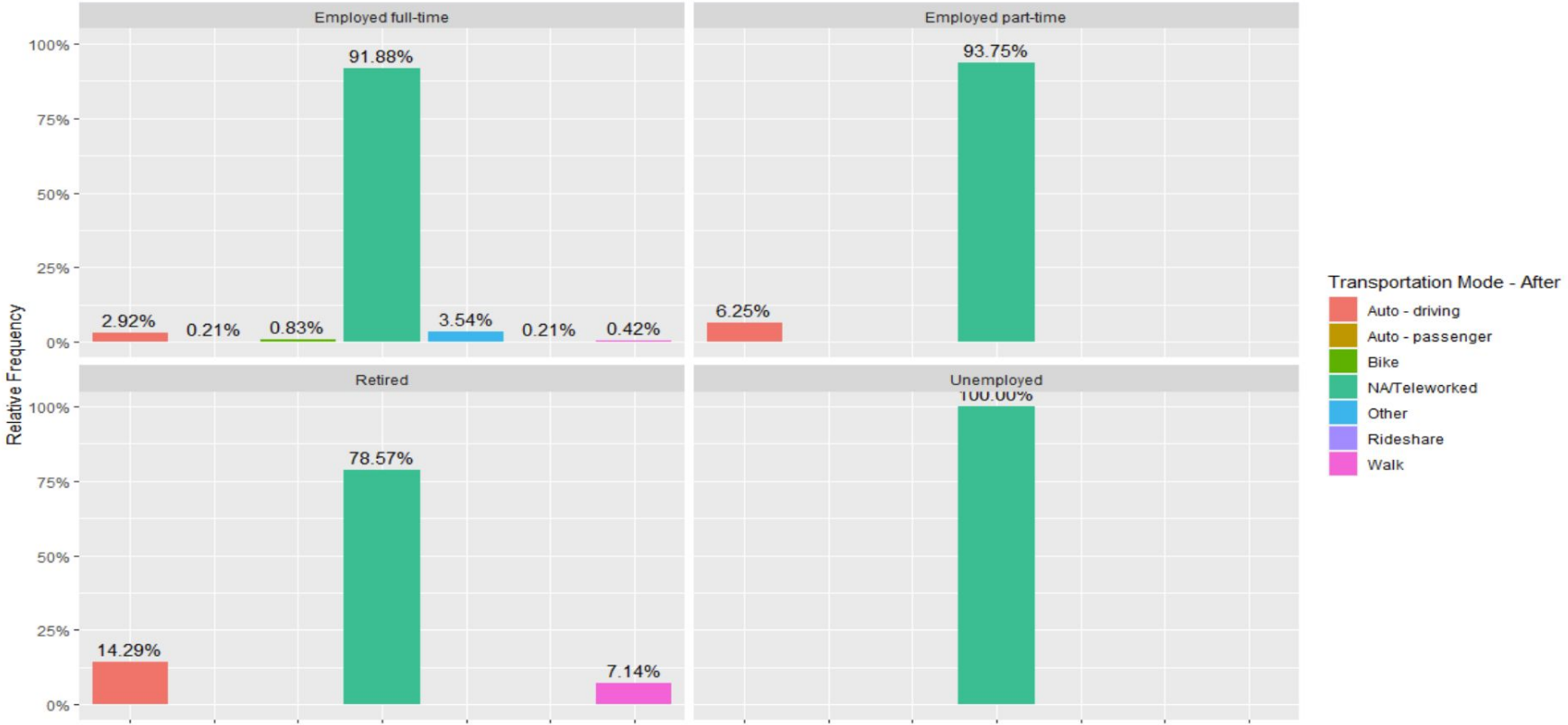
TRANSPORTATION BY HOUSEHOLD TYPE – AFTER



TRANSPORTATION BY EMPLOYMENT – BEFORE



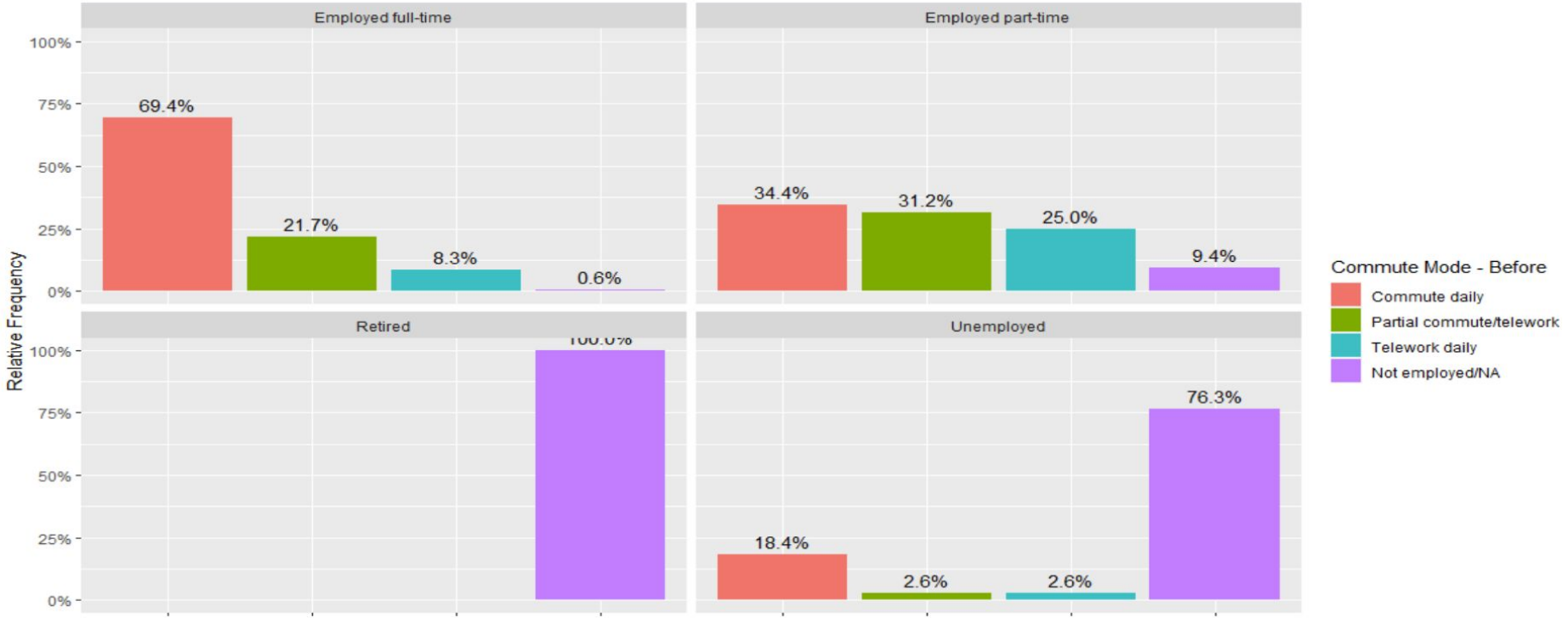
TRANSPORTATION BY EMPLOYMENT – AFTER



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

COMMUTE MODE BY EMPLOYMENT – BEFORE



COMMUTE MODE BY EMPLOYMENT – AFTER

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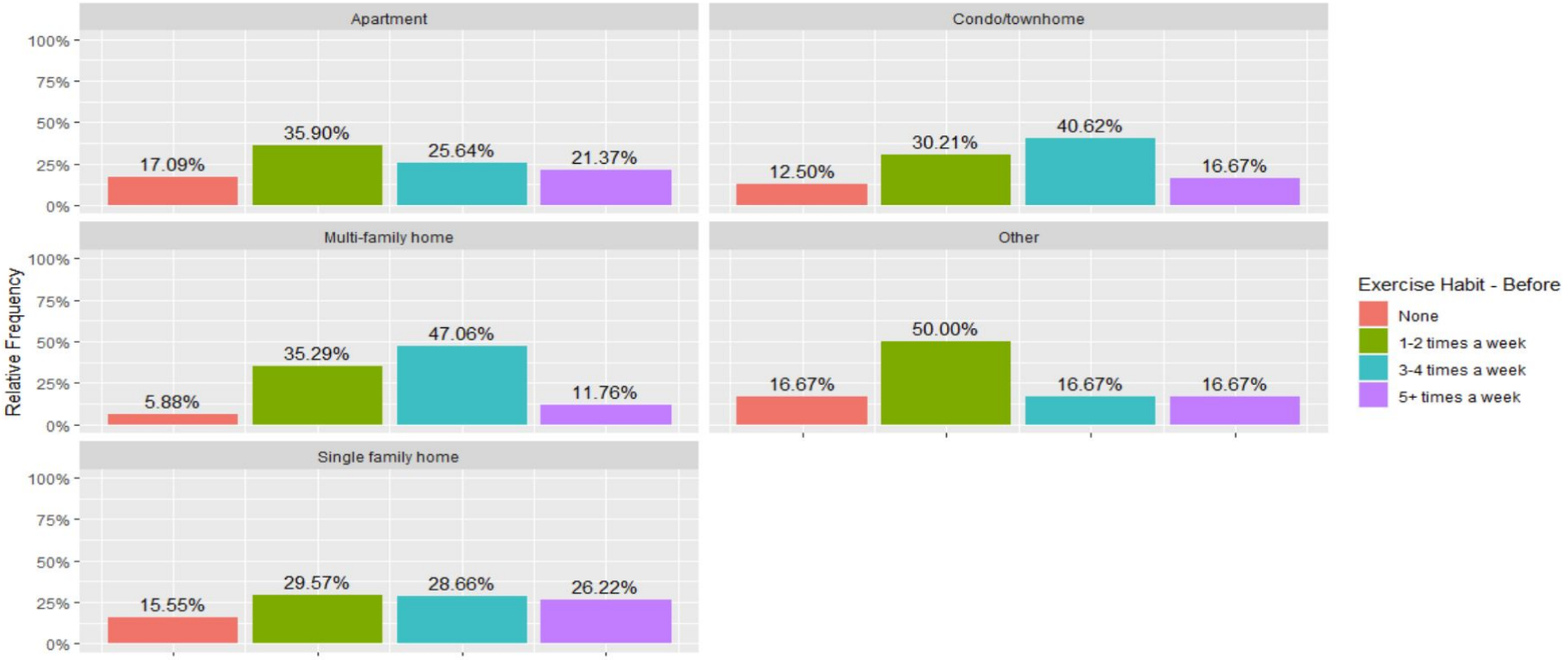
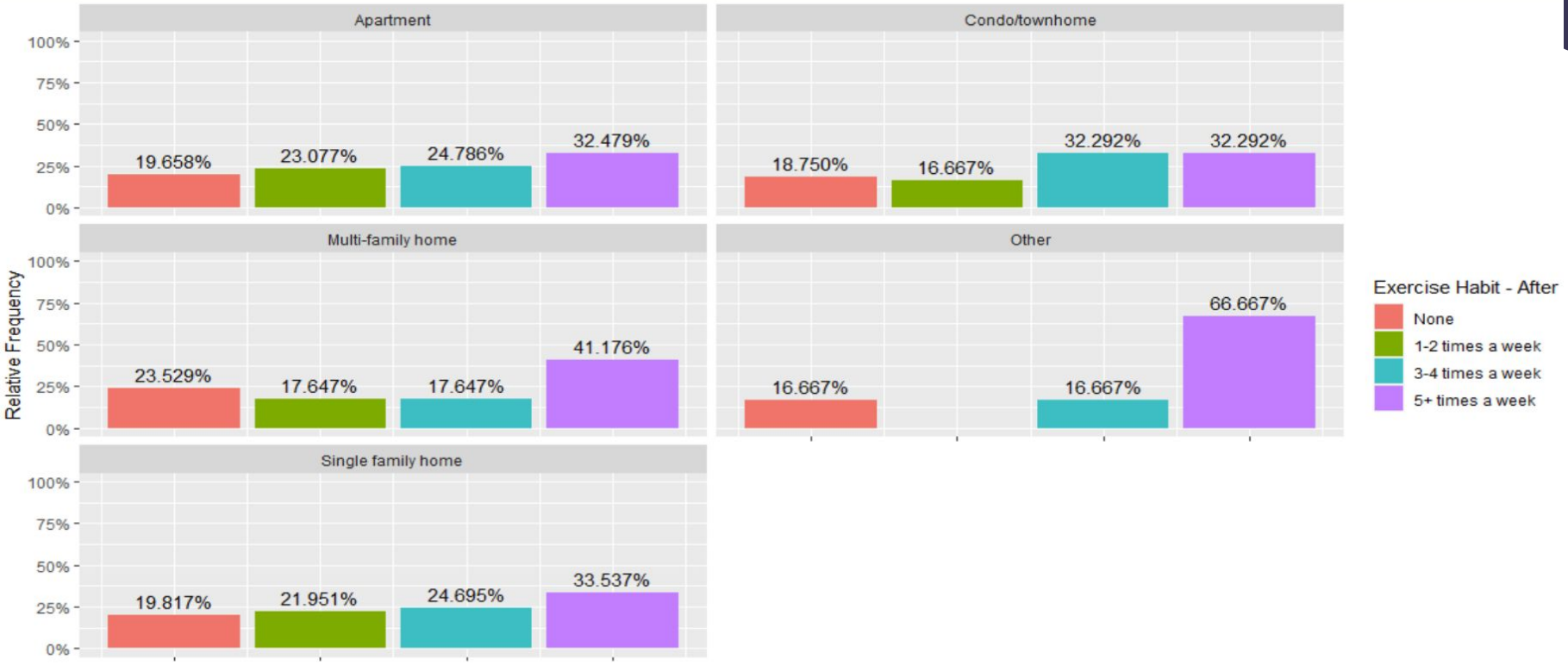
EXERCISE HABIT BY HOUSEHOLD TYPE - BEFORE



EXERCISE HABIT BY HOUSEHOLD TYPE – AFTER



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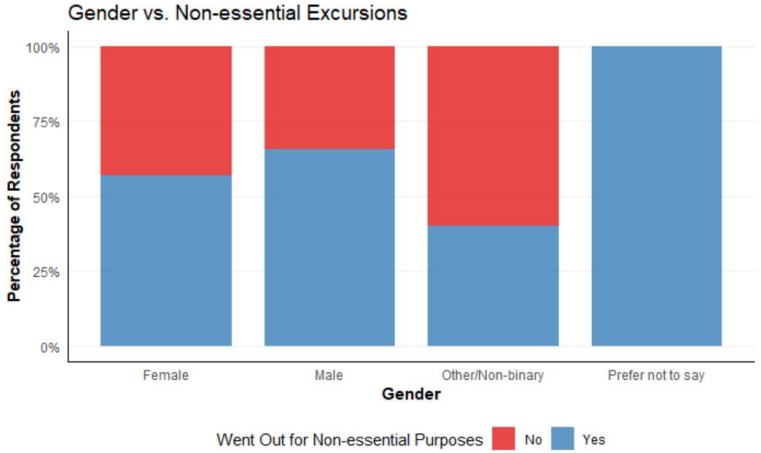
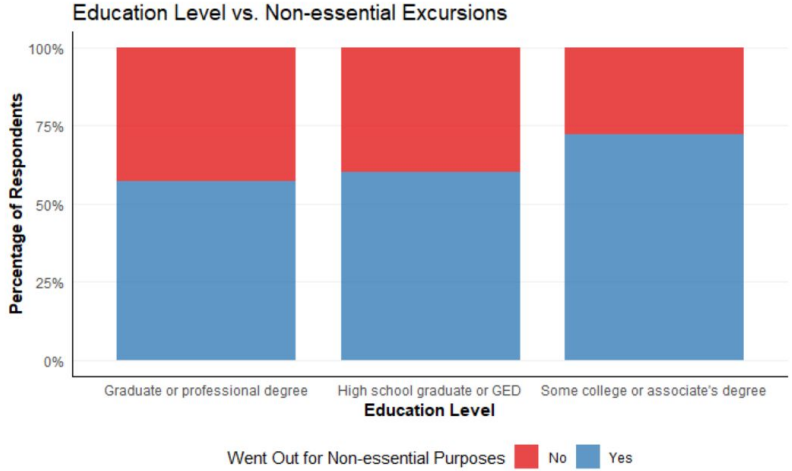
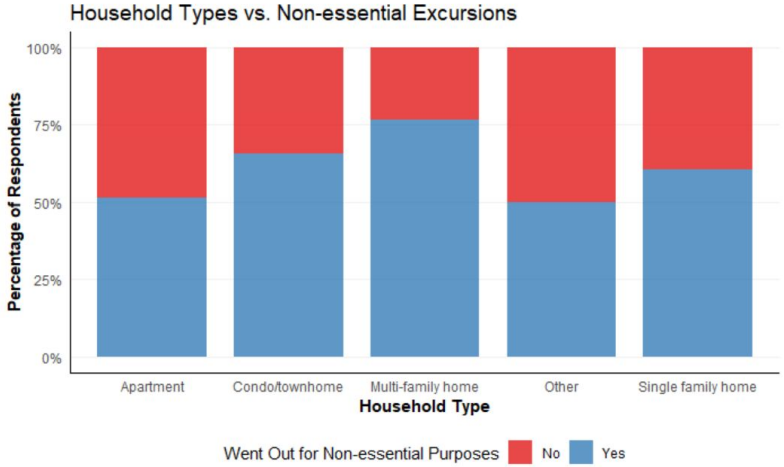
FACTORS INFLUENCING NON-ESSENTIAL EXCURSIONS







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LIMITATIONS & FUTURE WORK

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

THANK YOU!

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- Our mentor, Dr. Danul Gunatilleka
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- UMD National Center for Smart Growth
- Data Challenge 2021 Planning Team

COVID-19 BEHAVIORAL CHANGES DATASET

- **Methodology**:
  - R tidyverse library for data cleaning
  - Logistic models incorporating SLD location dataset
  - Bar charts (stacked & non-stacked)

- **Findings**:
  - Transportation mode changes by employment status
  - Exercise changes by household type, road density, kids
  - Non-essential travel changes by sex and household type

- **Takeaways**:
  - Innovative policies to promote and sustain positive health behaviors
  - Strive for quality data and inclusive representation