ITEM 9 – Information
October 21, 2020

Regional Travel Survey Briefing: Initial Findings of Observed Daily Trips

Background: As part of its ongoing presentations on the findings from the 2017-2018 Regional Travel Survey, staff will brief the committee on initial key findings from the trip file, focusing on weekday trip rates, trip purpose, mode share, and trip destinations for commute and non-work trips in the region.

National Capital Region
Transportation Planning Board

MEMORANDUM

TO: Transportation Planning Board

FROM: Kenneth Joh, TPB Transportation Planner

SUBJECT: 2017-2018 Regional Travel Survey Briefing: Initial Findings of Observed Daily Trips

DATE: October 15, 2020

BACKGROUND

TPB has conducted a regional household travel survey approximately every ten years since 1968. The survey, which collects demographic and travel information from a randomly selected representative sample of households in the TPB region and adjacent areas, is the primary source of observed data used to estimate, calibrate, and validate the regional travel demand model. The model in turn is used for the travel forecasting and air quality conformity analysis of the region's long-range transportation plan as well as to support other key program activities. The survey data are also used by staff to analyze regional travel trends, and by TPB member jurisdictions and agencies to inform regional and sub-regional transportation studies and to conduct their own analysis for their areas of interest. The purpose of the survey is to better understand the characteristics of the households and persons in the region and to better understand daily travel and activities: how we travel, why we travel, where we go, how long it takes us, and what we do when we arrive. The survey seeks to obtain a complete picture of travel patterns in the region. As a result, the regional household travel survey is a critical and essential element of the TPB work program.

PROGRESS TO DATE

The 2017-2018 Regional Travel Survey (RTS) consisted of two key parts: Part 1 featured a recruitment questionnaire, which was completed by households who were invited and agreed to participate in the survey. These households completed the Part 1 questionnaire, which captured information on household, person, and vehicle characteristics as well as new questions on the use of alternative travel options. Approximately 23,000 households completed the recruitment questionnaire for Part 1. Part 2 consisted of a one-day travel diary, which survey participants completed to record details of every trip that household members took on their assigned travel day. Data collected in Part 2 constitutes actual observed trip information that will provide critical input for developing the regional travel demand model. Approximately 16,000 households completed both parts of the survey, well exceeding the survey goal of a representative sample of 15,000 households.

DESCRIPTION OF FILES

Data collection for the RTS concluded in late 2018. TPB staff is editing and processing the raw datasets that ultimately will yield four key data files that will be used in future analyses:

1. Household File: characteristics of households, including, among others, household size, income, number of licensed drivers, housing type, and number of vehicles and bicycles.

2. Person File: characteristics of individual persons, including, among others, demographic information, employment status, work location, and usual commute mode.

3. Vehicle File: characteristics of household vehicles, including make, model, year, fuel type, and automatic toll payment transponder information.

4. Trip File: recorded trip details, including origin/destination, start/end times, mode of travel, trip purpose, and transit access and egress.

INITIAL FINDINGS OF OBSERVED DAILY TRIPS

The October 21, 2020 briefing focuses on items from the Trip File that comprise detailed observed trip information collected from the travel diary portion of the survey. These items were cross tabulated with data items from the Household File (e.g., household size, household income, household vehicles) and Person File (e.g., age, gender, race/ethnicity). Comparisons of demographic and travel behavior factors were based on sub-regional areas (core, inner suburb, and outer suburb), COG's regional activity centers, and COG's equity emphasis areas.

Survey findings for weekday household and person trip rates are highlighted below:

- Household trip rates generally increase from the core to the outer suburbs, with the lowest average trip rates in the core jurisdictions and the highest average trip rates in the outer suburbs. Household size distribution may partly explain differences in trip rates since there is a larger proportion of 1-person households in the core and a larger share of 3 or more person households in the inner and outer suburbs.
- Household trip rates are significantly lower in equity emphasis areas and regional activity centers across all sub-regional areas.
- Household trip rates increase with the number of workers in the household.
- Household income is strongly correlated with household trip rates, with higher income households taking more trips per household. Trips per household also increase with household size.
- Non-Hispanic whites take significantly more trips on average than other racial/ethnic groups. Asians take fewer trips on average than other racial/ethnic groups.
- No vehicle households take fewer trips per household than households with vehicles. Households without vehicles in the outer suburbs take significantly fewer trips on average than households in the core and inner suburbs.
- Generation X (persons aged 38-53 in 2018) take more trips on average than other age groups. Post-millennials (persons aged 16-21 in 2018) take fewer trips on average than other age groups.
- The person trip rates for females are slightly higher than males. Households with children take slightly fewer trips on average than households with children after normalizing for household size.

Survey findings for mode share of weekday commute and non-commute trips are summarized below:

Commute Trips

- About 70% of commute trips are automobile trips, which include drive alone (62.2%) and HOV 2+ trips (7.6%). HOV 2+ includes drive others (3.5%) and auto passenger trips (4.1%).
- Nearly one-quarter of commute trips are rail (17.6%) and bus trips (4.8%).
- About 6% of commute trips are walk (3.8%) and bicycle trips (2.6%).
- The highest shares of bus, rail, walk, bicycle, and taxi/ride-hail trips are in the core; the highest shares of automobile trips (drive alone, drive others, auto passenger) are in the outer suburbs.
- There are higher shares of non-automobile modes in activity centers compared with non-activity centers.
- There are higher shares of non-automobile modes in equity emphasis areas compared with non-equity emphasis areas.

Non-Commute Trips

- About 79% of trips are by automobile, but there is a much larger share of HOV 2+ trips (43.3%). HOV 2+ includes drive others (18.3%) and auto passenger trips (25.0%).
- There is a much lower share of non-commute trips by bus/rail (4.2%) compared with commute trips by bus/rail (22.4%).
- There is a much higher share of non-commute walk trips (10.8%) compared with commute walk trips (3.8%).
- Similar to commute trips, the largest shares of automobile trips are in the outer suburbs, while bus, rail, walk, bicycle, and taxi/ride-hail trips are highest in the core.
- Similar to commute trips, there are higher shares of bus, rail, walk, and bicycle trips in activity centers compared with non-activity centers.
- Similar to commute trips, there are higher shares of bus, rail, walk, and bicycle trips in equity emphasis areas compared with non-equity emphasis areas.

Overall, the highest shares of bus, rail, walk, bicycle, and taxi/ride-hail trips are in the core, while the outer suburbs have the highest shares of automobile trips. Shares of non-automobile modes are also higher in activity centers and equity emphasis areas, which are generally higher density, mixed use, and more demographically diverse. More than one-third of commute trips are non-single occupancy vehicle (SOV) trips and nearly one-quarter of commute trips are bus and rail trips in the TPB planning region. Additionally, about one-fifth of commute trips in the core are walk and bicycle trips in the region.

NEXT STEPS

TPB staff will continue analysis of the RTS data files over the coming months. As part of this process, TPB members will be asked to share their ideas and provide input on more detailed analysis and survey results they would like to see in subsequent briefings. The next briefing in December will examine changes in observed travel between 2007/2008, when the previous regional household travel survey was conducted, and 2017/2018 for the TPB planning region. TPB staff is also preparing the technical documentation for the public release version of the RTS data files which will be released at a later date.

2017-2018 REGIONAL TRAVEL SURVEY BRIEFING: INITIAL FINDINGS OF OBSERVED DAILY TRIPS

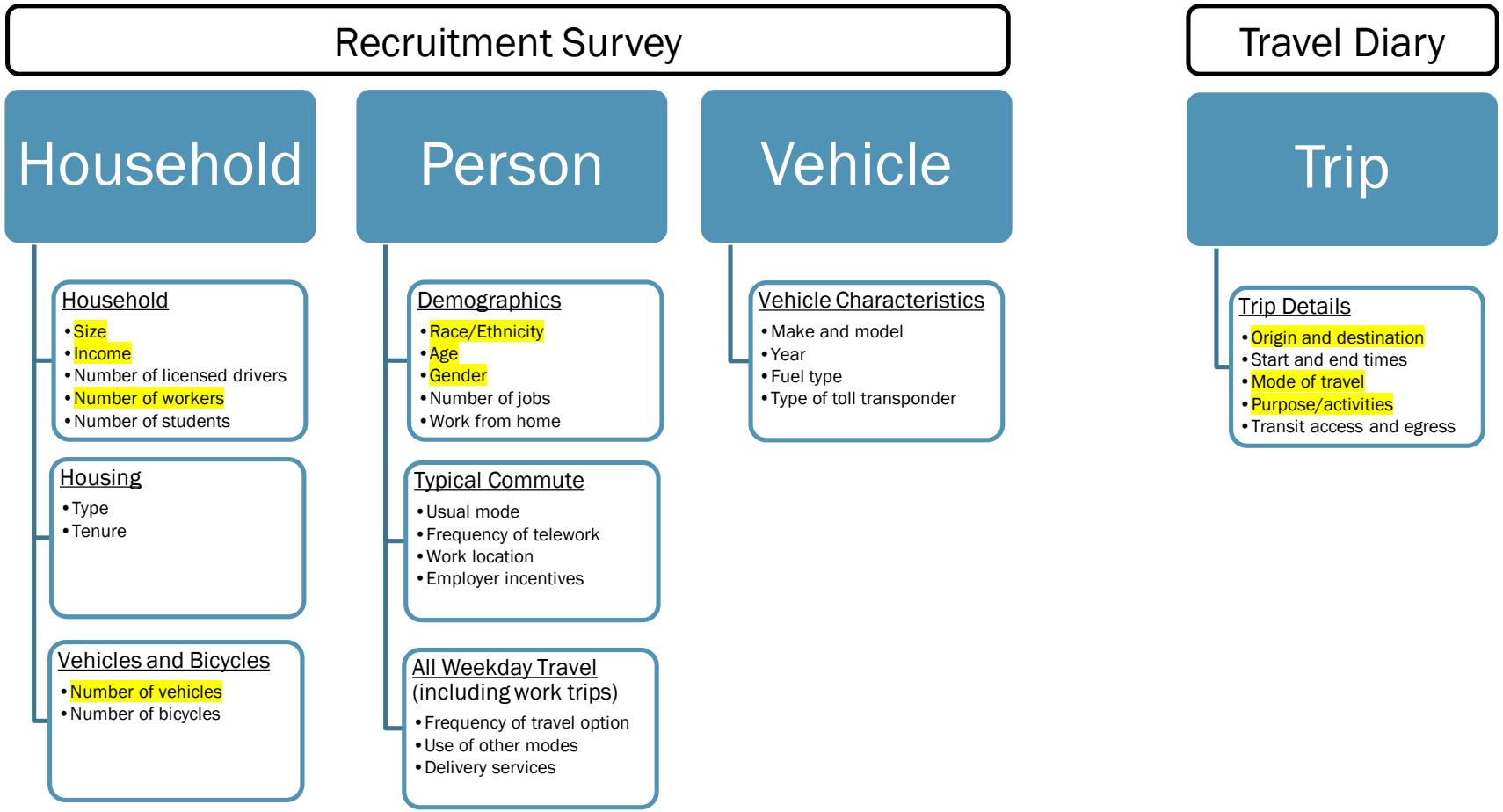
Kenneth Joh, Ph.D., AICP
TPB Transportation Planner

Transportation Planning Board
October 21, 2020

Agenda Item 9

National Capital Region
Transportation Planning Board

Overview of Regional Travel Survey Information



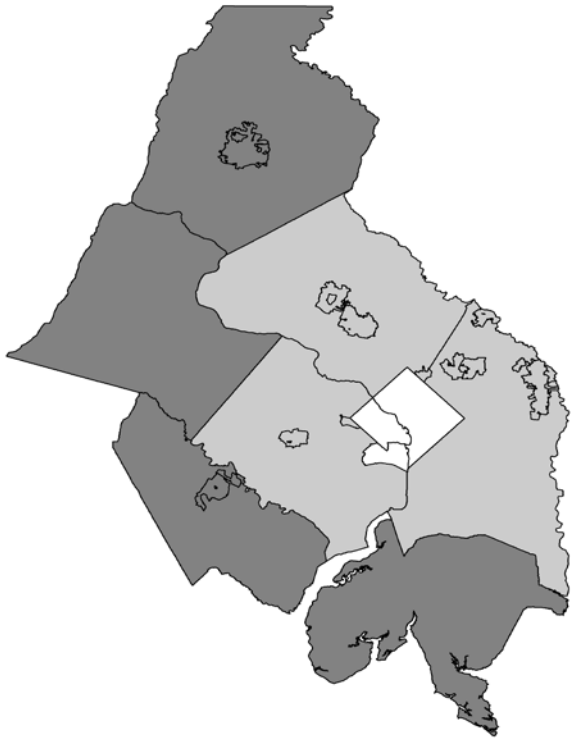
REGIONAL
TRAVEL SURVEY

Planning Our Future Together

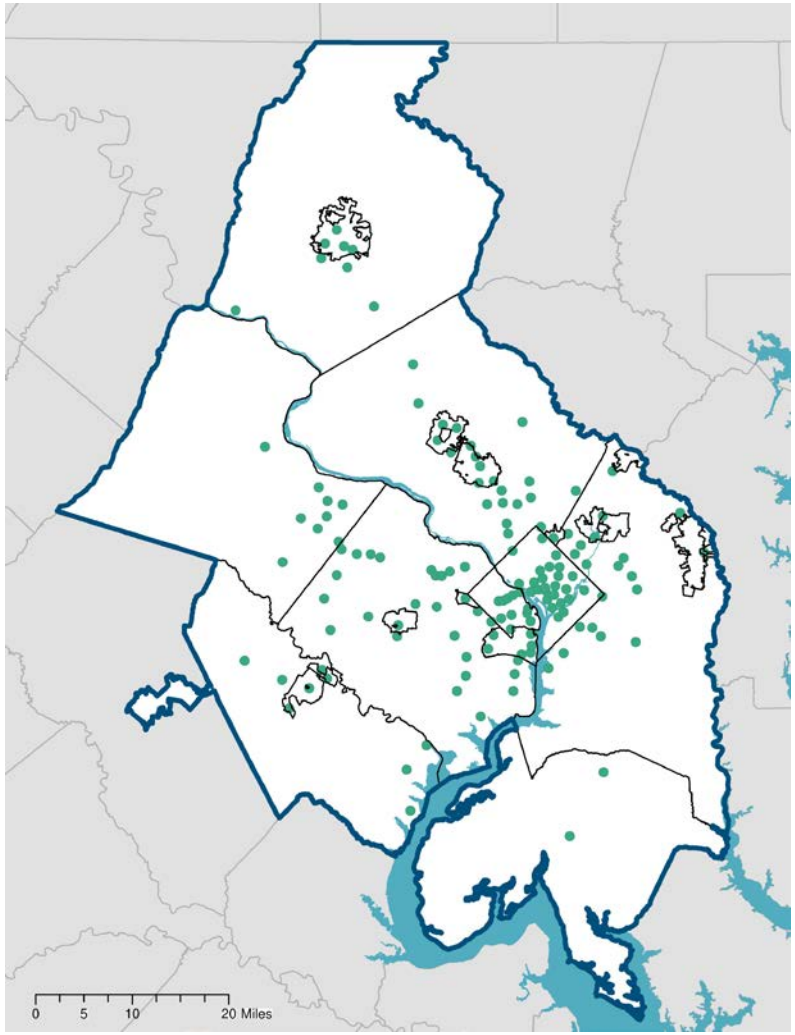
- No. of person trips made by households on a typical weekday
  - Size, location, no. of workers, income, race/ethnicity, vehicle availability, age, gender, presence of children
- Types of trips made by households on a typical weekday
  - Trip purpose, location of household
  - Jurisdictional distribution of commute/non-commute trips by mode

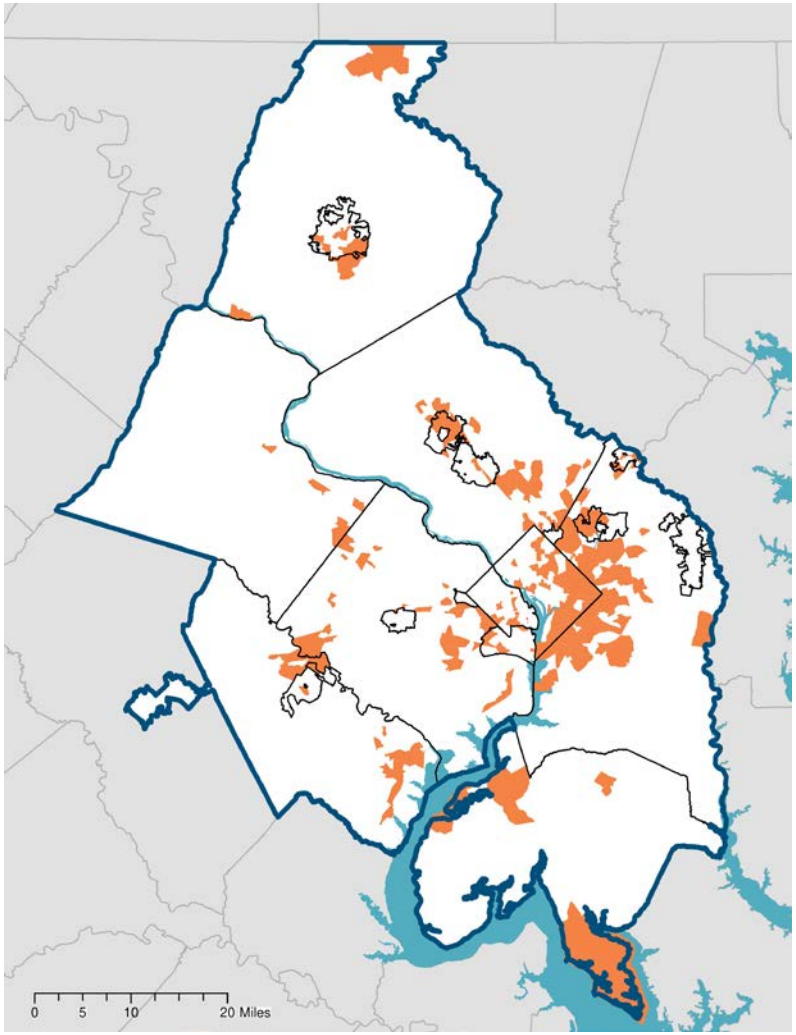
Sub-Regional Areas

Sub-Area	Jurisdiction
Core	District of Columbia
	Arlington County
	City of Alexandria
Inner Suburb	Montgomery County
	Prince George's County
	Fairfax County, including City of Fairfax and City of Falls Church
Outer Suburb	Charles County
	Frederick County
	Loudoun County
	Prince William County, City of Manassas, and City of Manassas Park

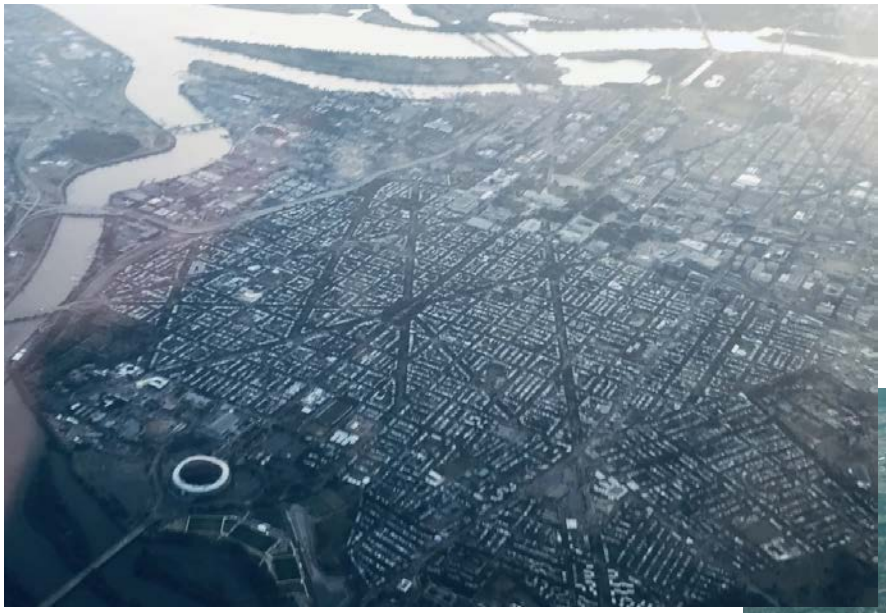


Activity Centers and Equity Emphasis Areas



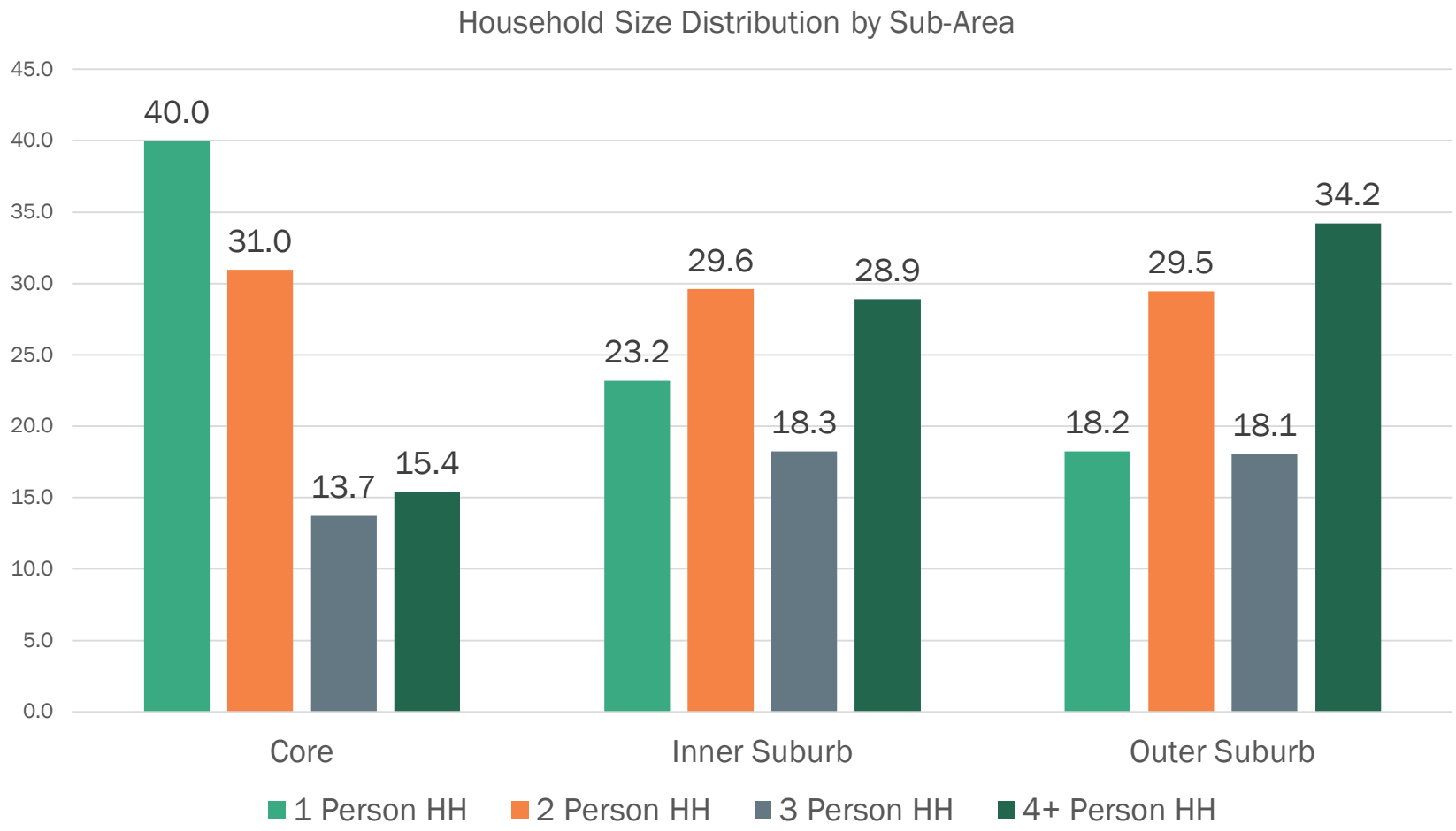


Households in the Region

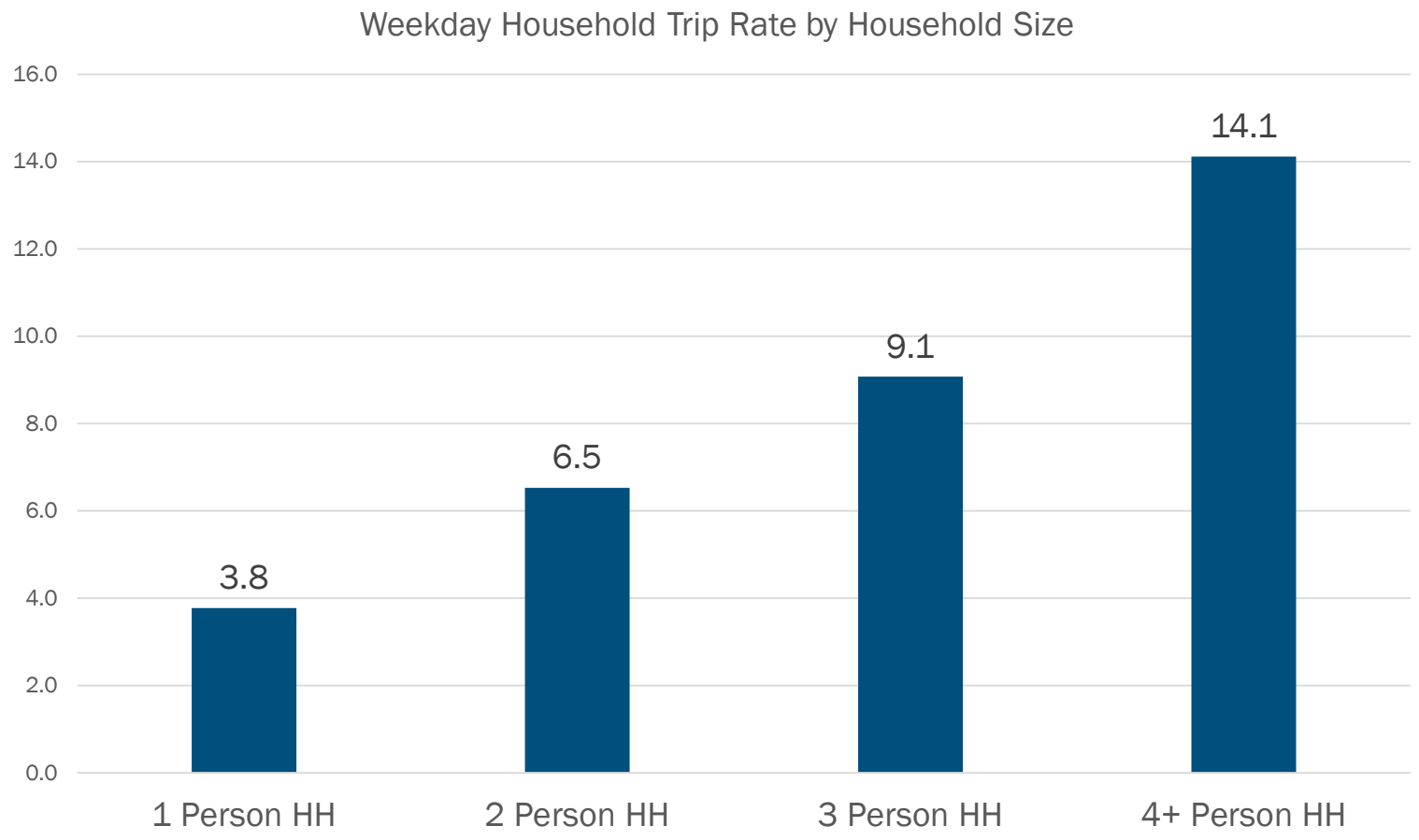


There are 2.1 million households in the TPB region

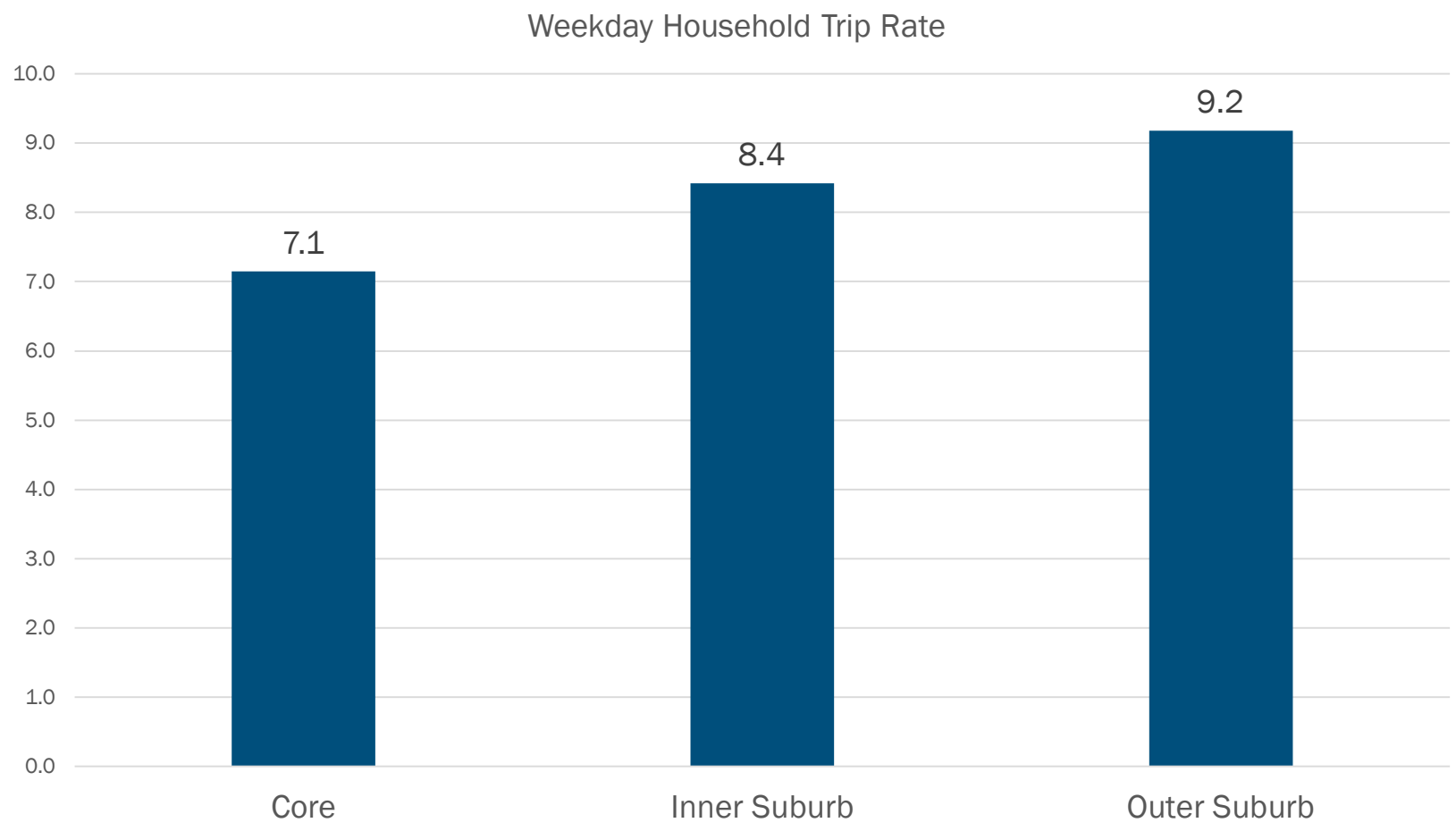
Households in the Core Are Smaller on Average



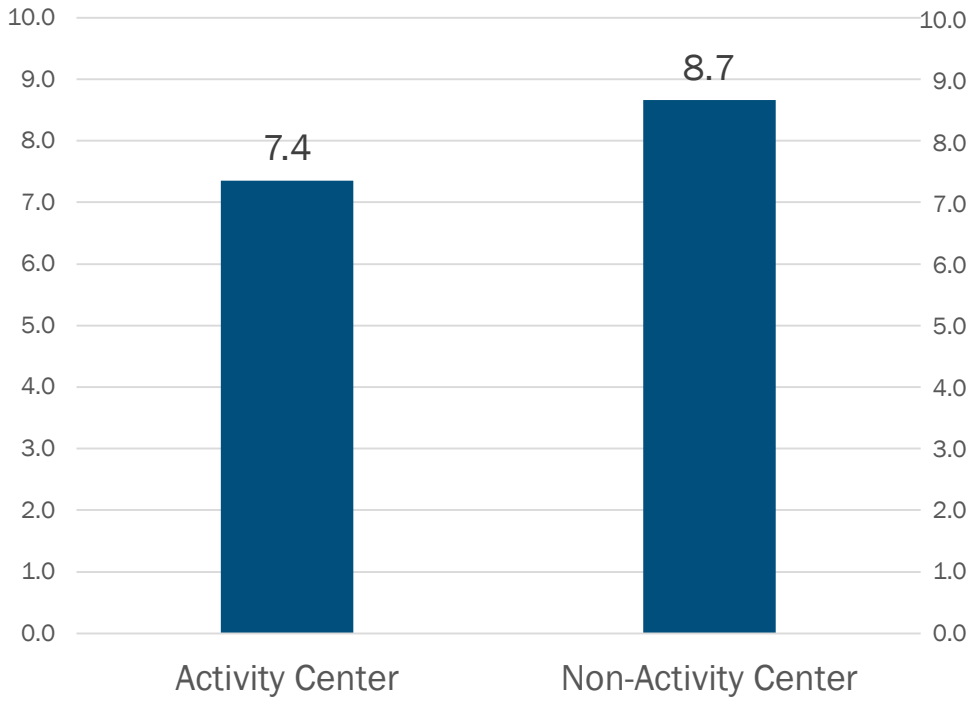
Household Trip Rates Increase with Household Size

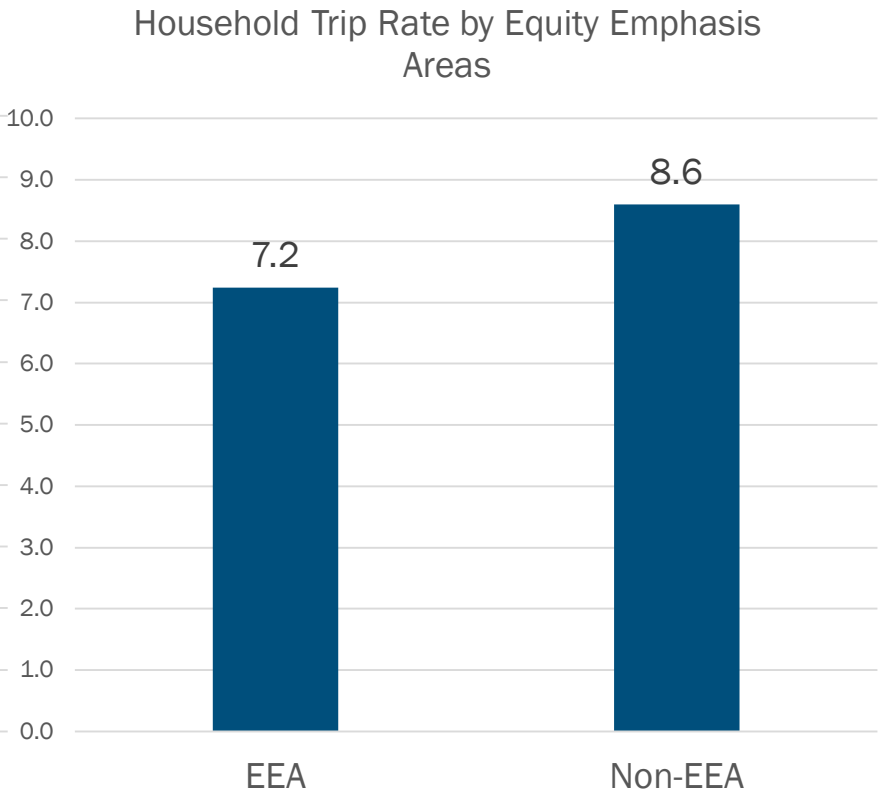


Household Trip Rate Increases from Core to Suburbs

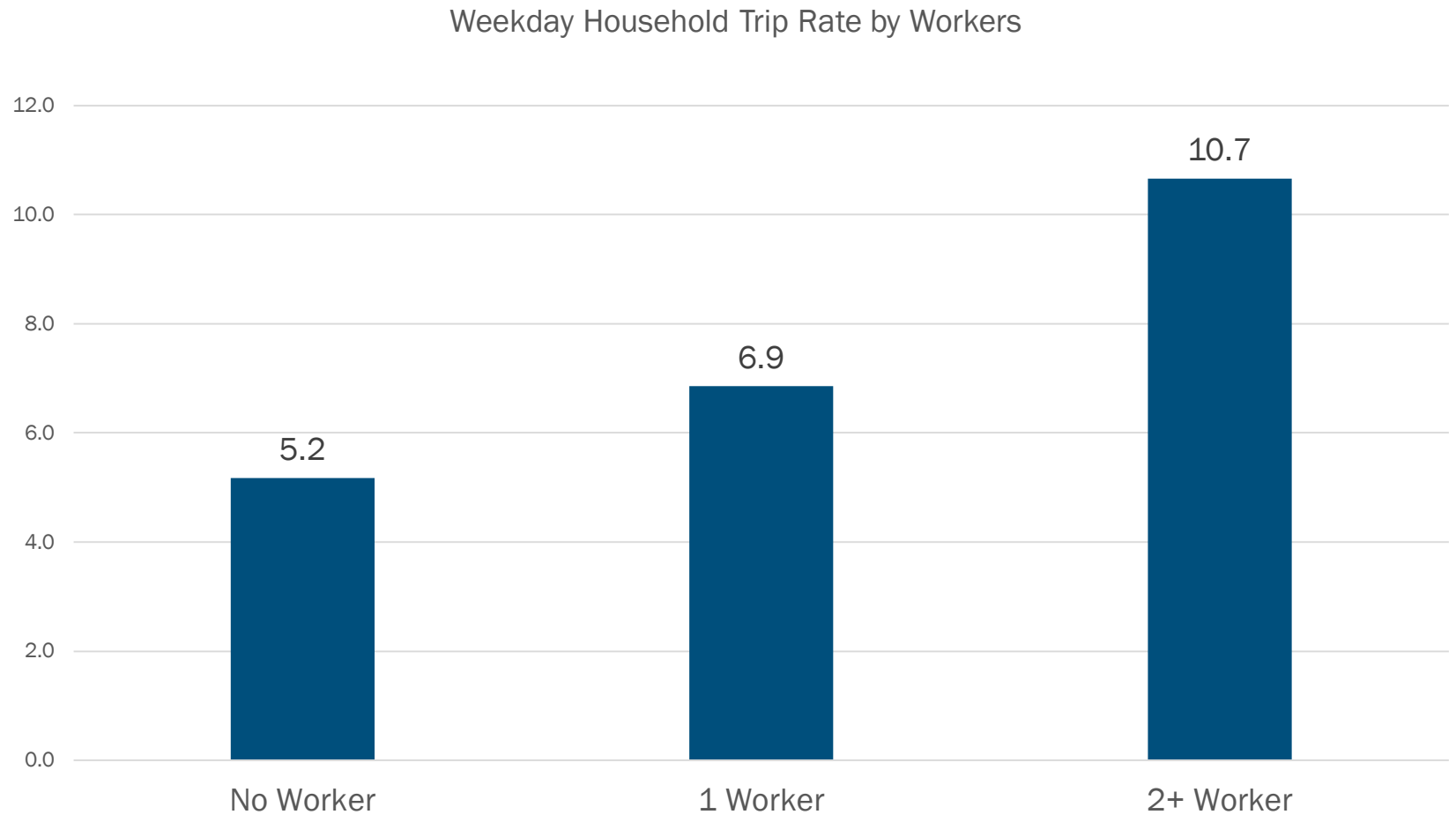


Lower Household Trip Rates in Activity Centers and Equity Emphasis Areas

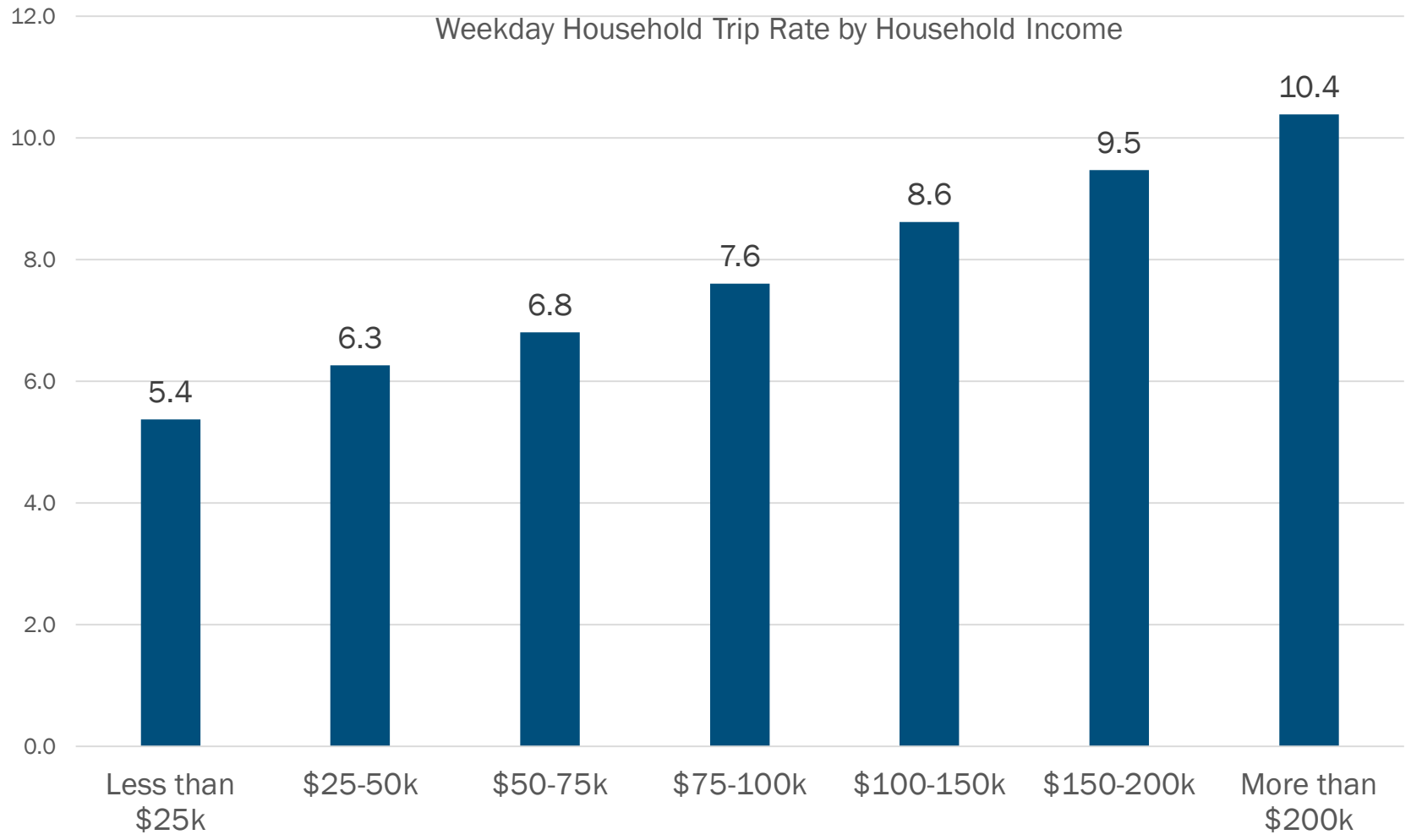




Household Trip Rate Increases with Number of Workers

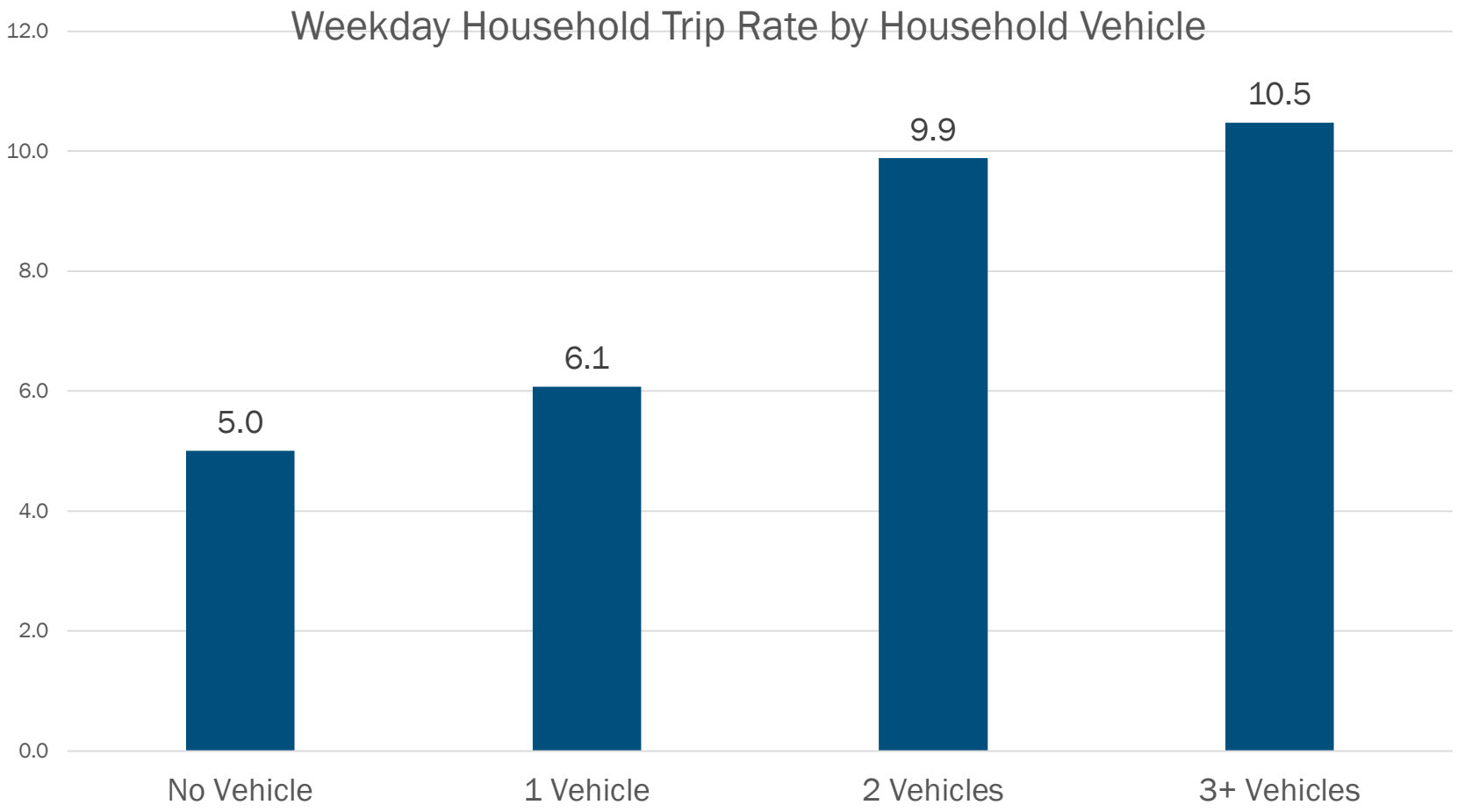


Household Trip Rate Increases with HH Income

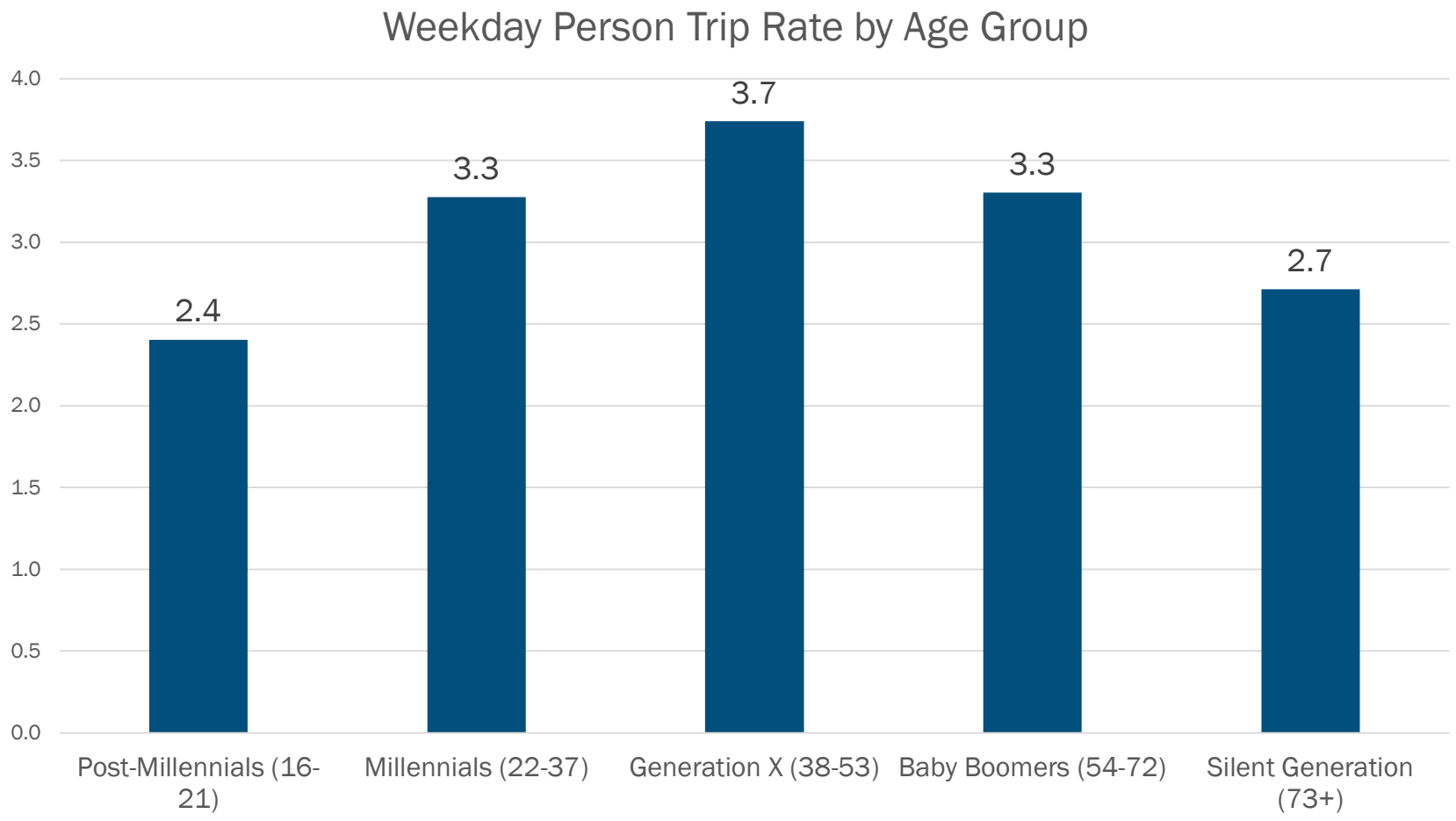


Weekday Person Trip Rate Varies by Race/Ethnicity

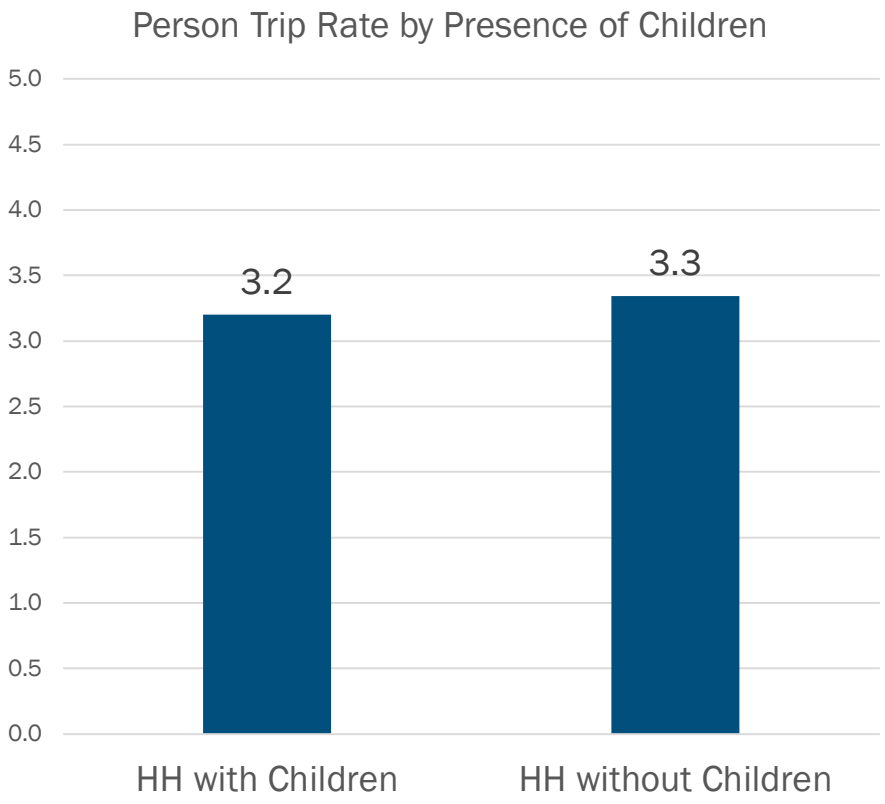
Household Trip Rate Increases with Vehicle Availability



Life Stage Influences Weekday Person Trip Rate



Females and Persons in Households without Children Produce a Slightly Higher Trip Rate

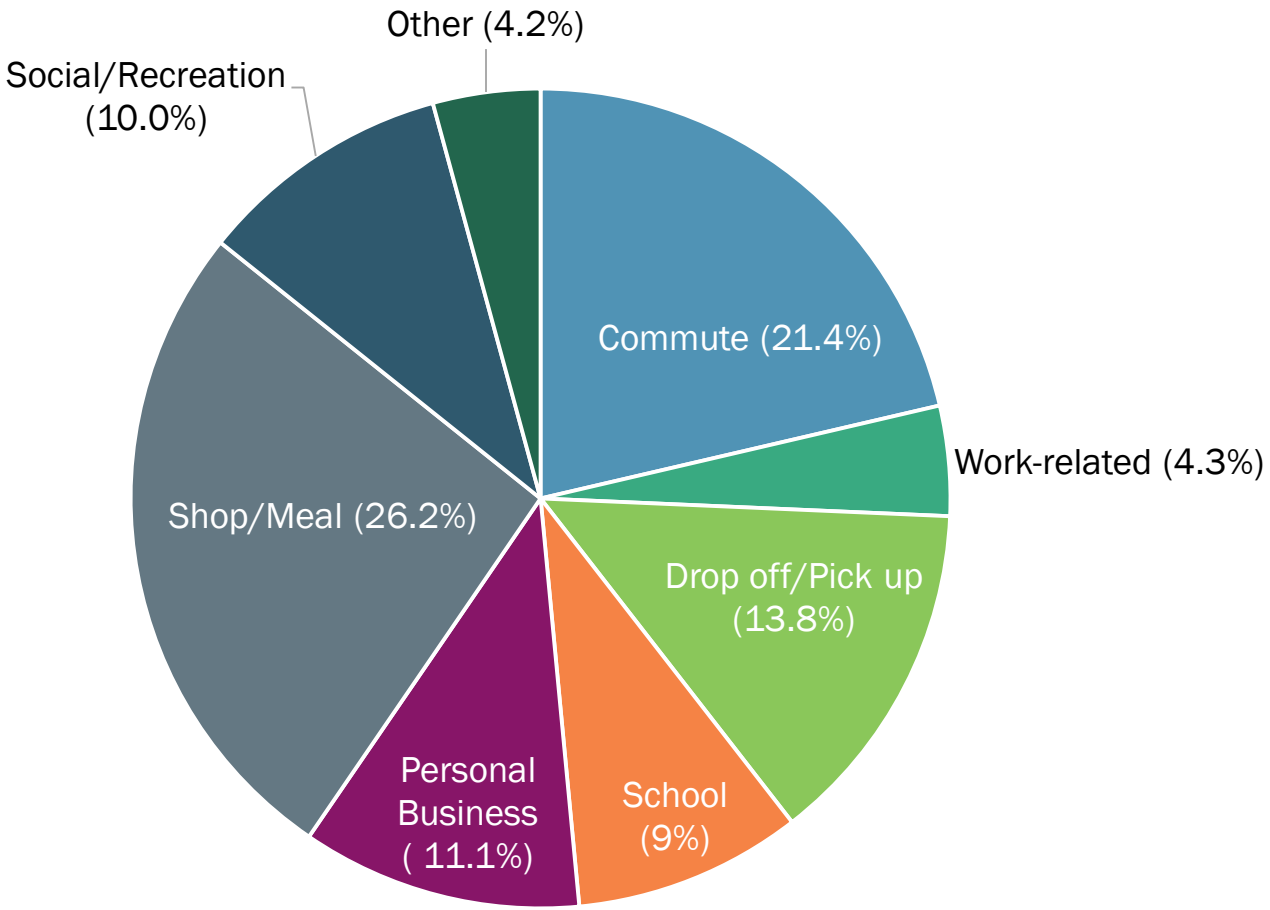


Summary of Weekday Person/Household Trip Rates

- Household trip rates increase from core to outer suburbs
- Household trip rates lower in equity emphasis areas and regional activity centers
- Trips per household increase with household income and size
- Non-Hispanic whites take more trips per person than other race/ethnic groups
- No vehicle households take fewer trips per household than households with vehicles
- Post-millennials take fewer trips per person than other age groups

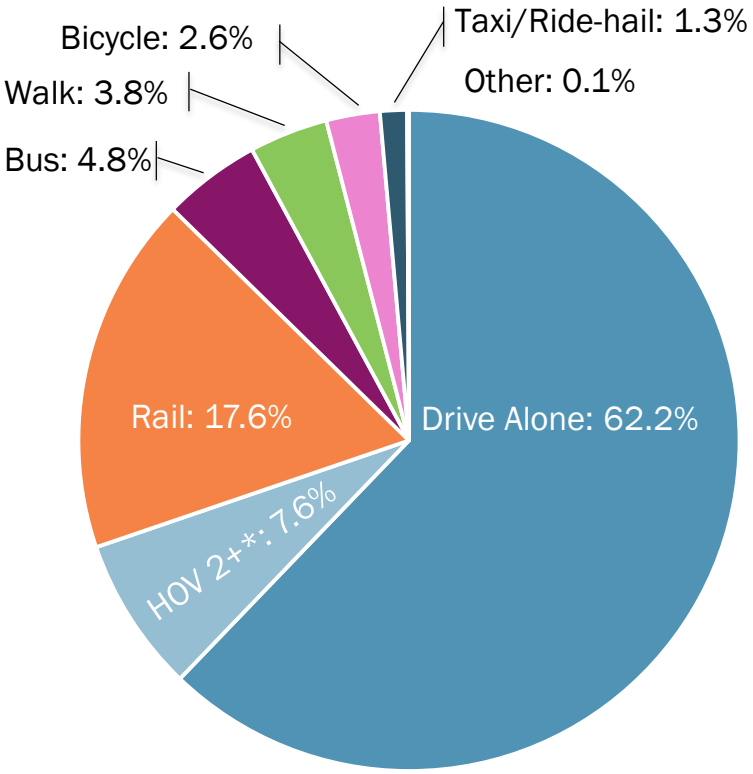
Daily Trip Share by Purpose (All Modes – TPB Region)

An estimated 17.1 million trips are made on a typical weekday in this region

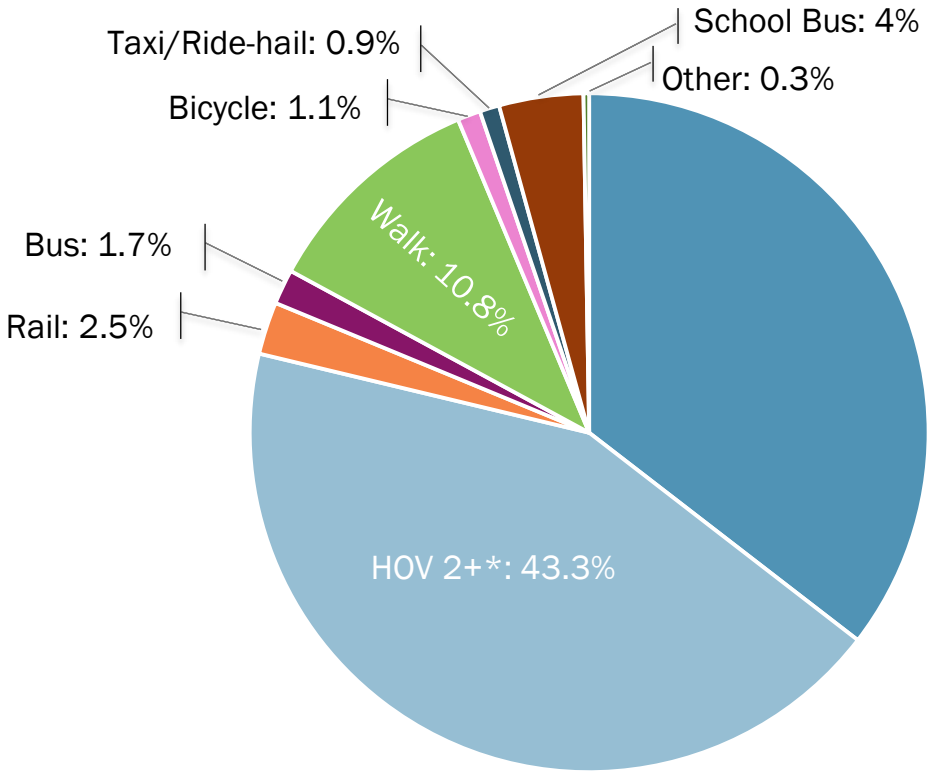


Mode Share of Weekday Trips (TPB Region)

Commute Trips



Non-Commute Trips



* Includes Drive Others and Auto Passenger Trips

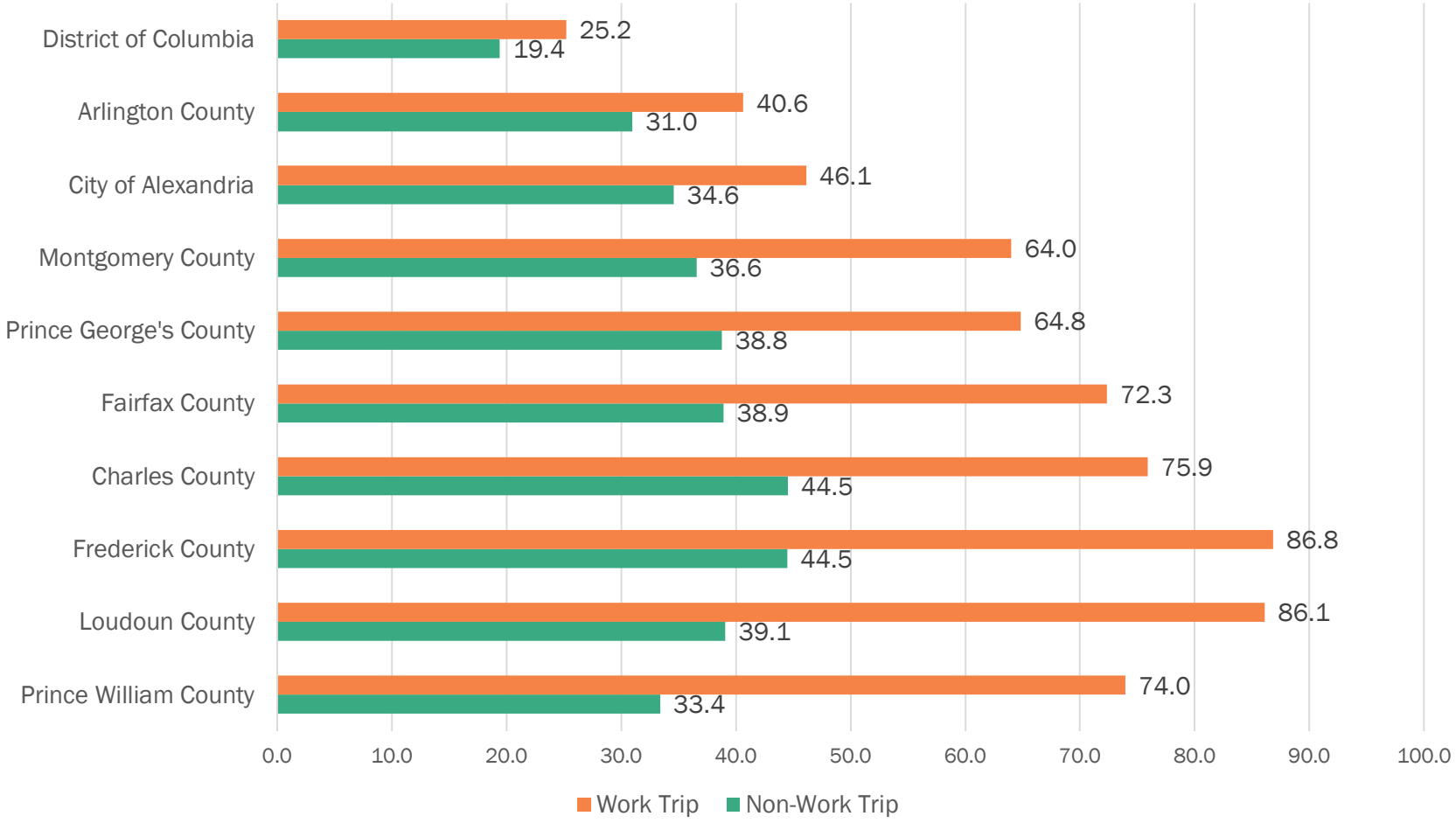
Mode Share of Commute Trips by Sub-Area, Activity Center, and Equity Emphasis Area

Commute Mode	Core	Inner Suburb	Outer Suburb	Not in Activity Centers	Activity Centers	Not in EEAs	EEAs
Drive Alone	31.9	67.4	80.3	67.8	49.1	65.0	52.3
Drive Others and Auto Passenger	4.2	7.6	11.0	8.3	6.0	7.4	8.3
Rail	31.7	17.0	4.4	14.7	24.2	16.8	20.2
Bus	9.8	3.4	3.2	4.1	6.4	3.8	8.2
Walk	11.2	2.2	0.5	0.9	2.3	3.4	5.3
Bicycle	7.6	1.4	0.4	2.2	7.8	2.5	3.1
Taxi/Ride-Hail	3.4	0.9	0.1	2.0	4.1	0.9	2.7
Other	0.1	0.1	0.1	0.1	0.0	0.0	0.0

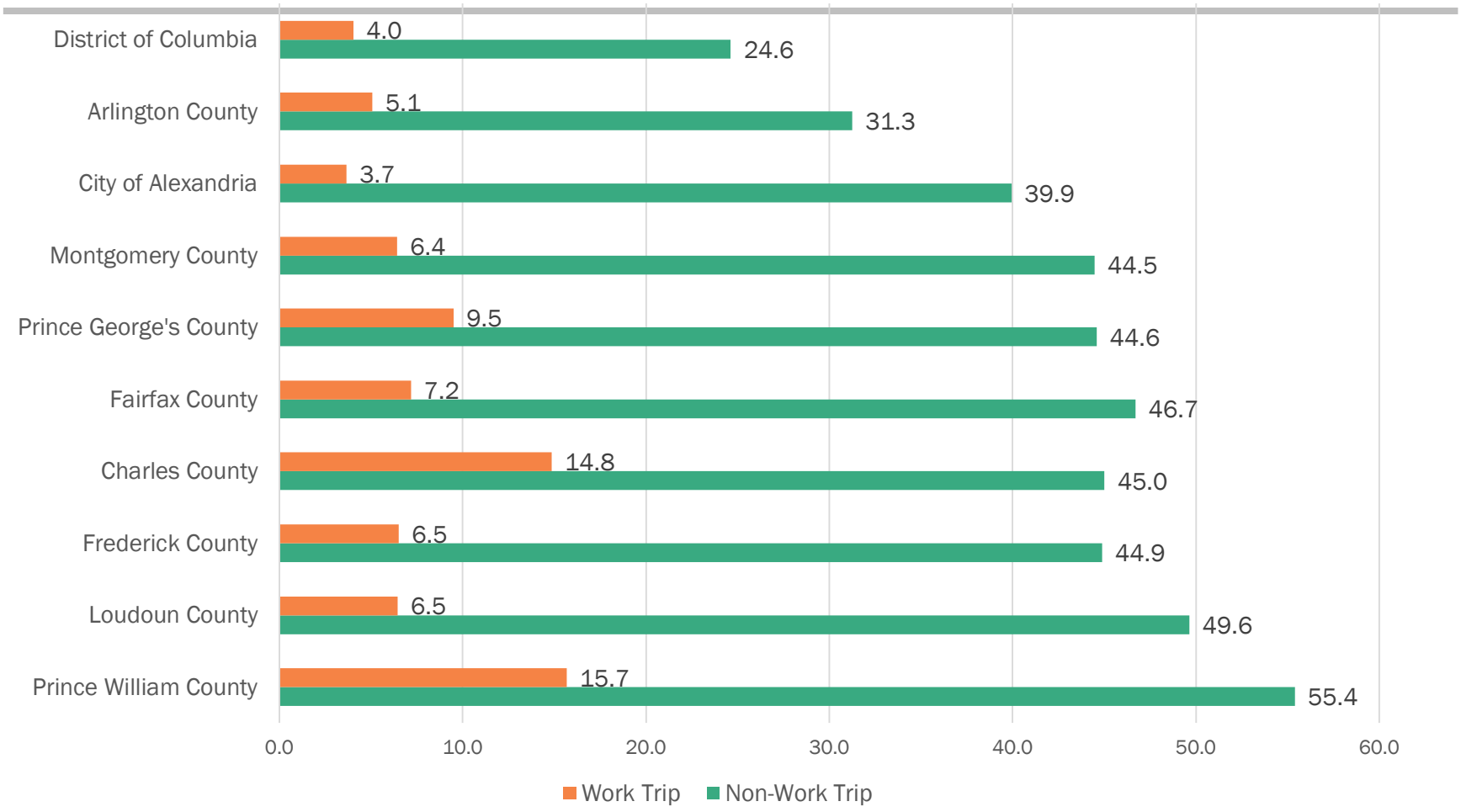
Mode Share of Non-Commute Trips by Sub-Area, Activity Center, and Equity Emphasis Area

Non-Commute Mode	Core	Inner Suburb	Outer Suburb	Not in Activity Centers	Activity Centers	Not in EEAs	EEAs
Drive Alone	24.6	38.0	38.5	36.9	31.1	36.6	31.1
Drive Others and Auto Passenger	28.6	45.3	50.5	45.6	36.2	44.2	39.4
Rail	6.5	1.8	0.7	2.0	4.1	2.1	4.2
Bus	4.3	1.3	0.3	1.4	2.4	0.9	4.9
Walk	28.3	7.4	4.1	8.0	19.3	10.0	13.9
Bicycle	2.9	0.8	0.2	0.9	1.6	1.0	1.5
School Bus	1.4	4.4	5.4	4.3	3.2	4.2	3.4
Taxi/Ride-Hail	2.9	0.6	0.2	0.7	1.7	0.8	1.4
Other	0.5	0.2	0.1	0.2	0.4	0.3	0.2

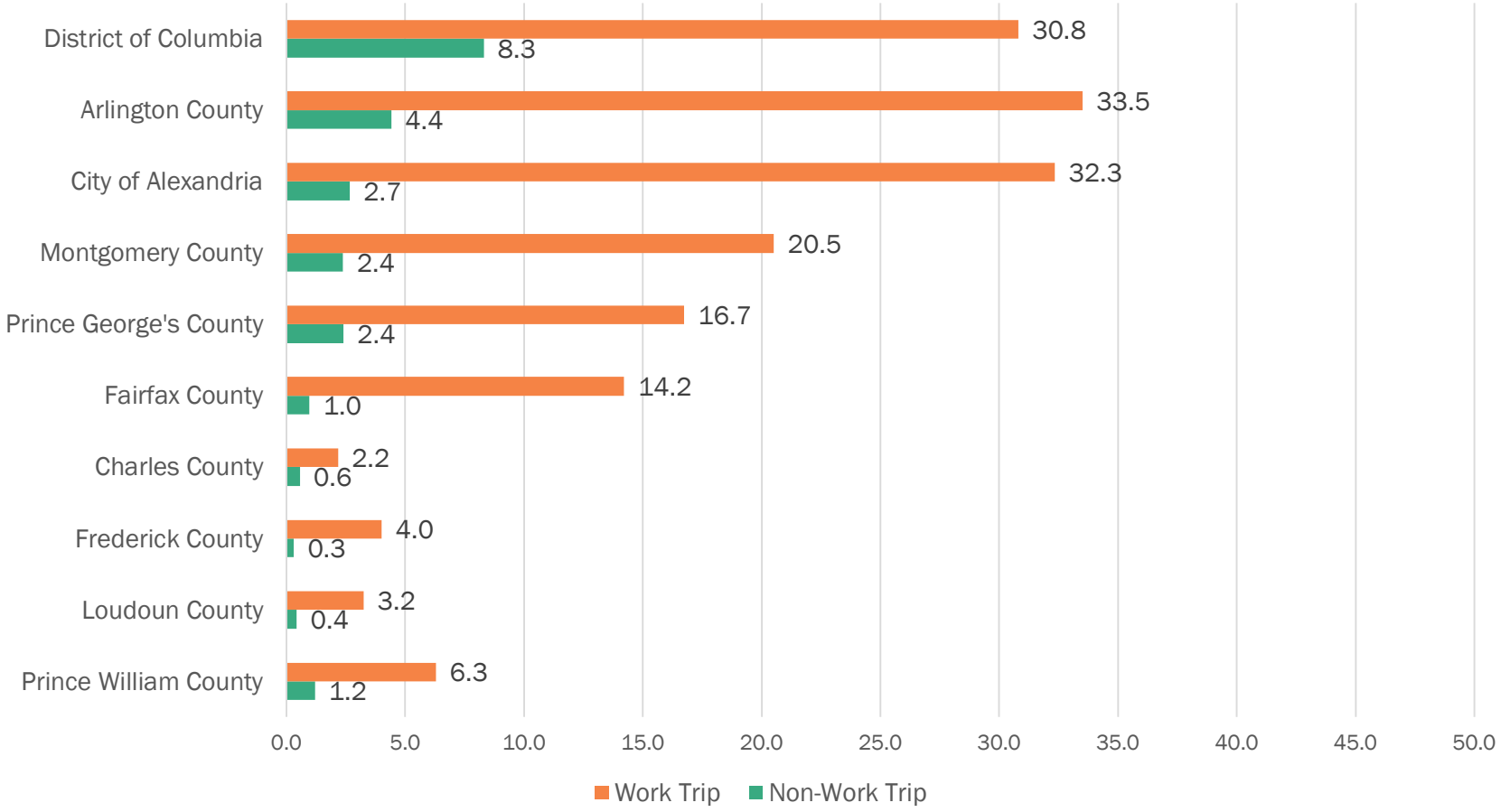
Mode Share of Weekday Trips – Drive Alone



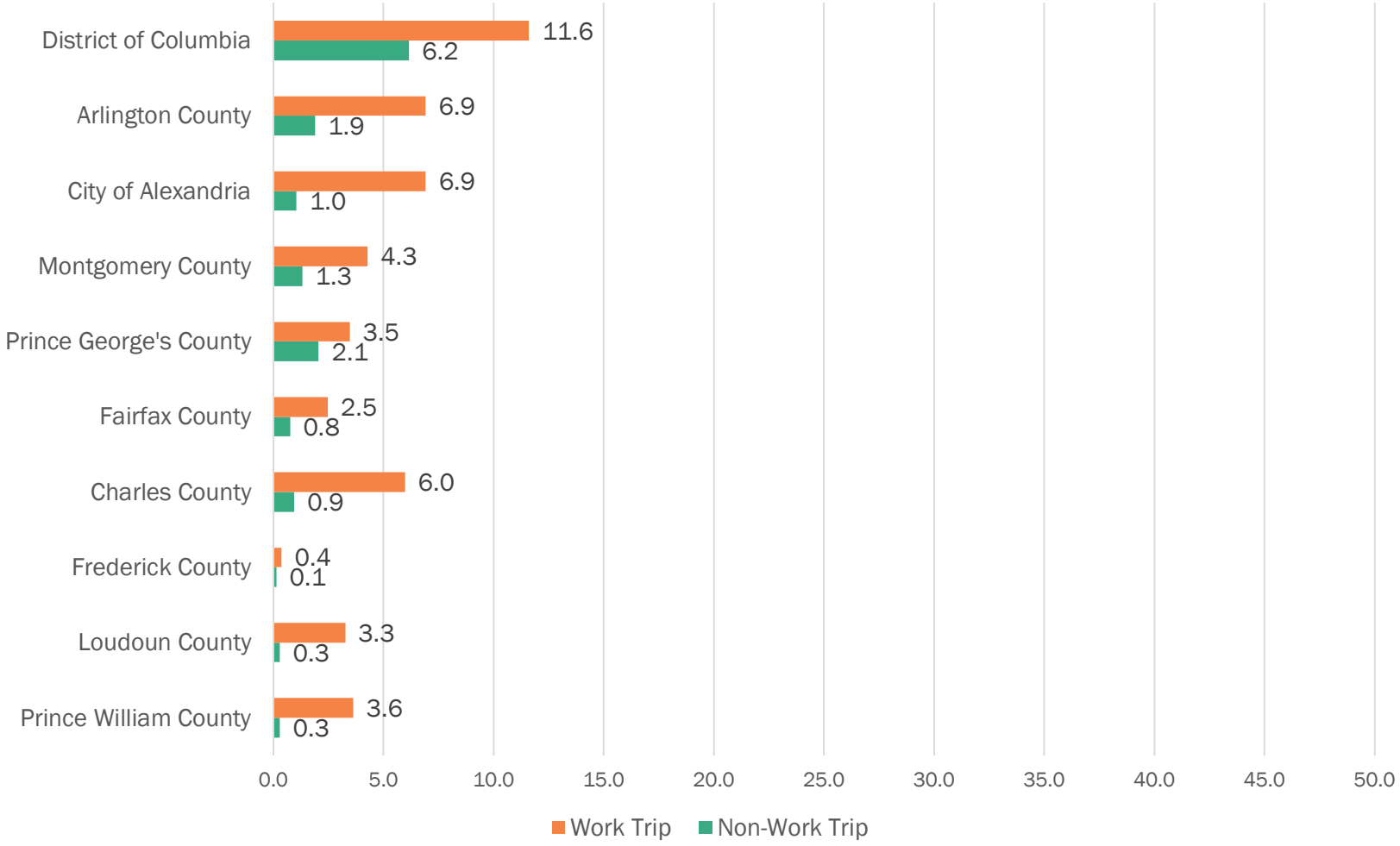
Mode Share of Weekday Trips – Drive Others and Auto Passenger



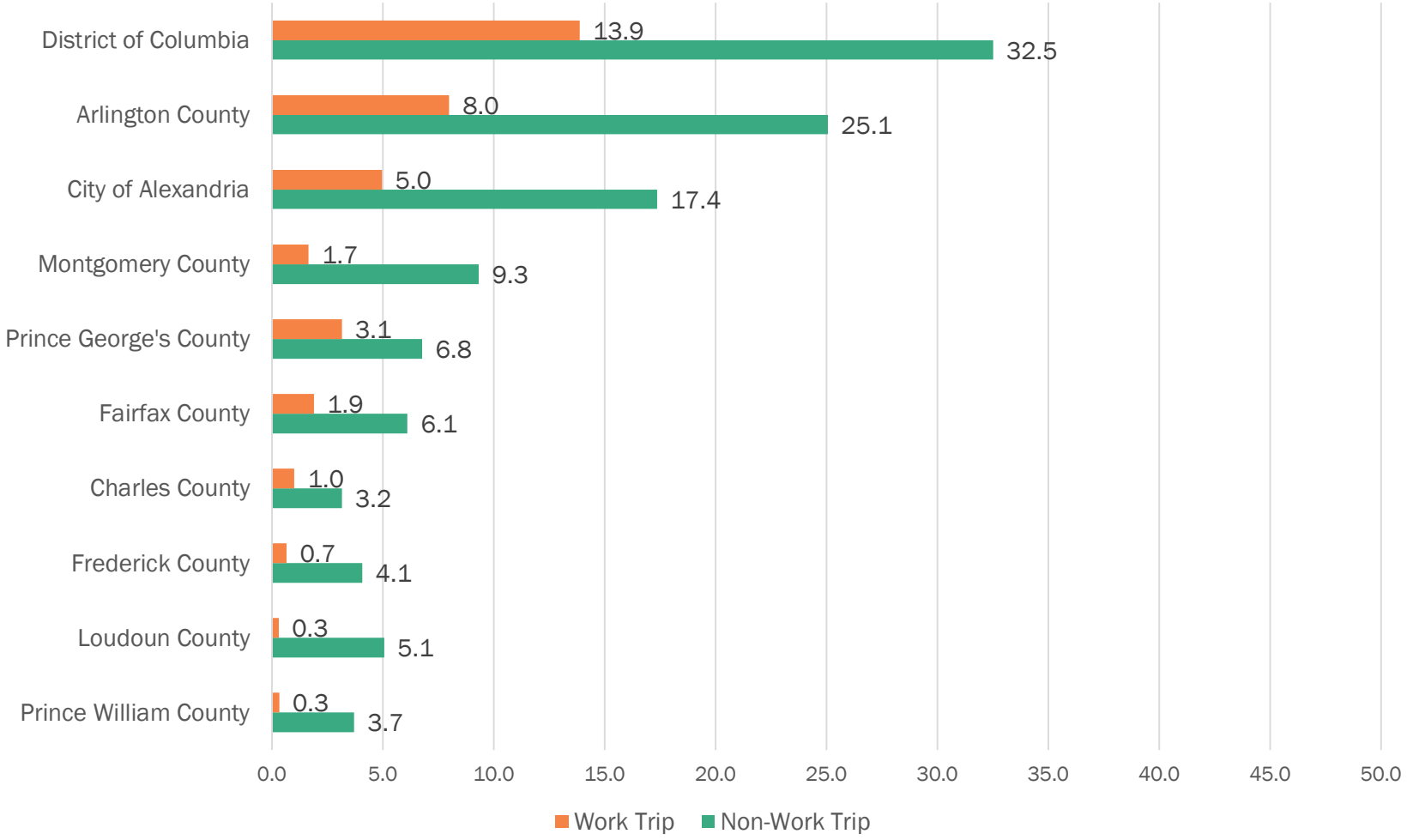
Mode Share of Weekday Trips – Rail



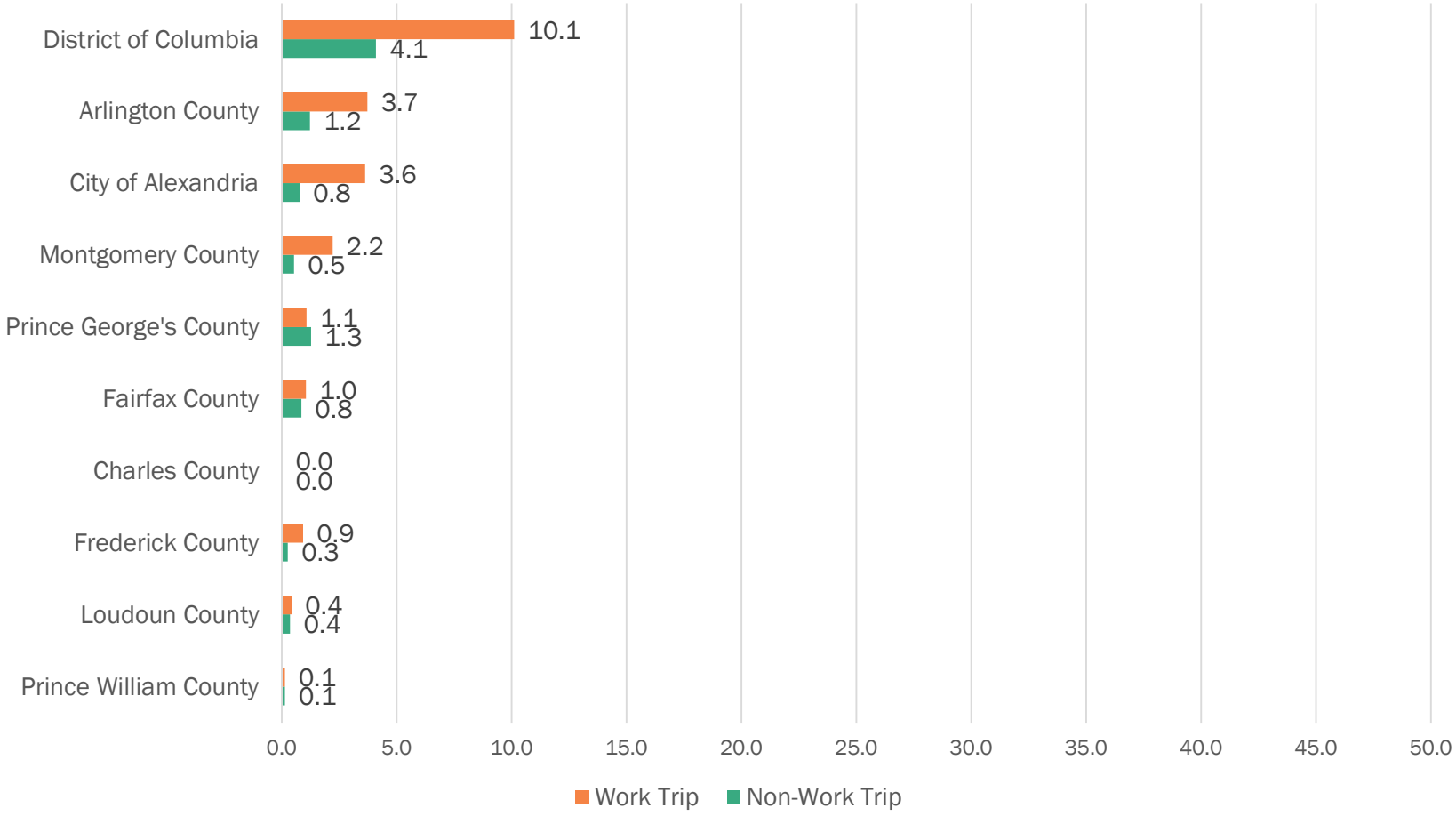
Mode Share of Weekday Trips – Bus



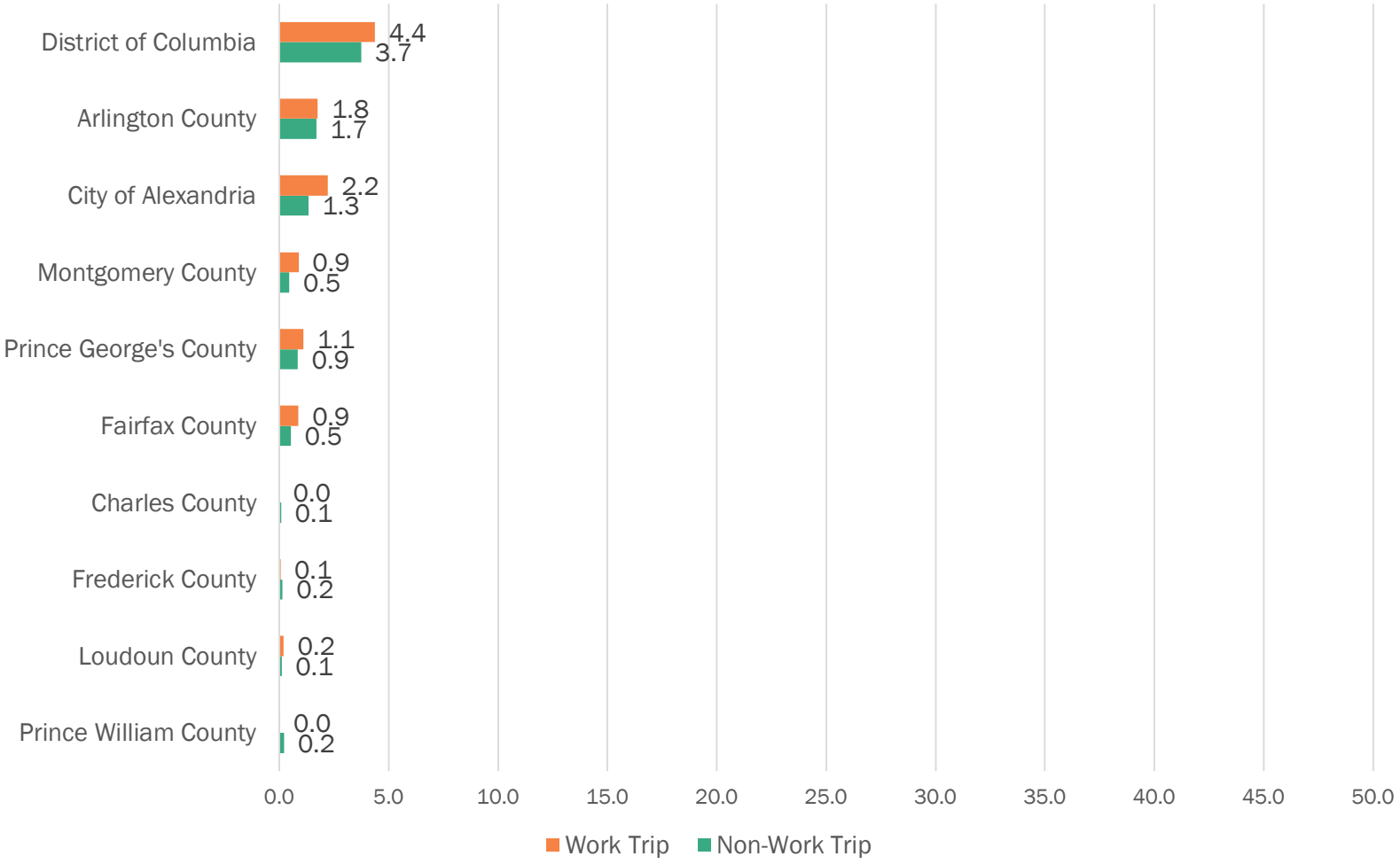
Mode Share of Weekday Trips – Walk



Mode Share of Weekday Trips – Bicycle



Mode Share of Weekday Trips – Taxi/Ride-Hail



Summary of Mode Share of Weekday Trips

- Highest share of bus, rail, walk/bike, and taxi/ride-hail in the core, largest share of auto trips in the outer suburbs
- Higher share of bus, rail, walk/bike, and taxi/ride-hail in activity centers and equity emphasis areas
- More drive alone and bus/rail trips for work trips; more walk trips for non-work trips
- More than one-third of commute trips in the TPB region are non-SOV (single occupancy vehicle) trips
- Nearly one-quarter of commute trips are bus and rail trips
- Nearly one-fifth of work trips in the core are by walk/bike

Looking Ahead: Next Steps

- Continue analysis of the RTS trip file
- Examine changes in observed travel between 2007/2008 and 2017/2018 for the TPB region
- Prepare technical documentation and the public release version of the RTS data files

Kenneth Joh, Ph.D., AICP

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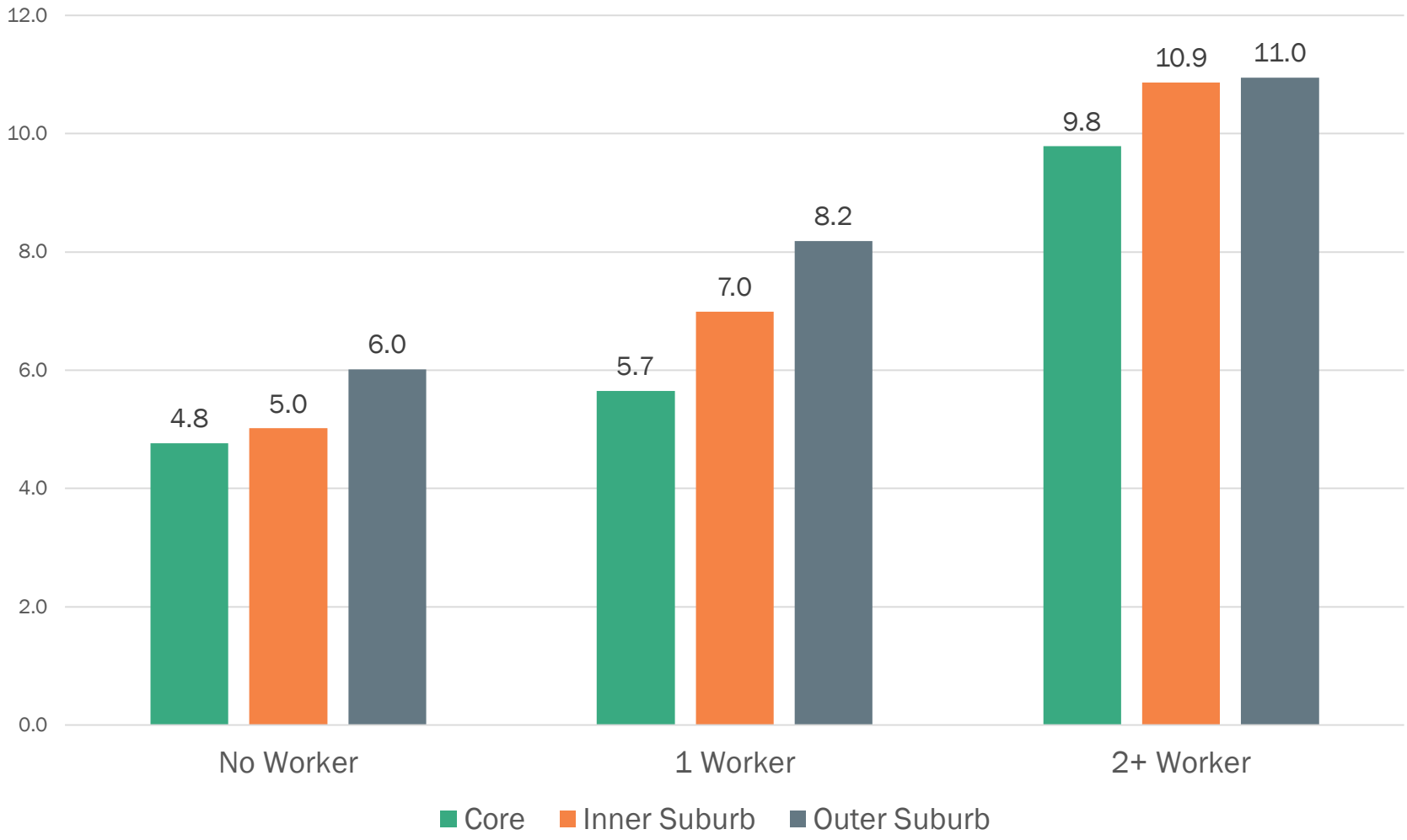
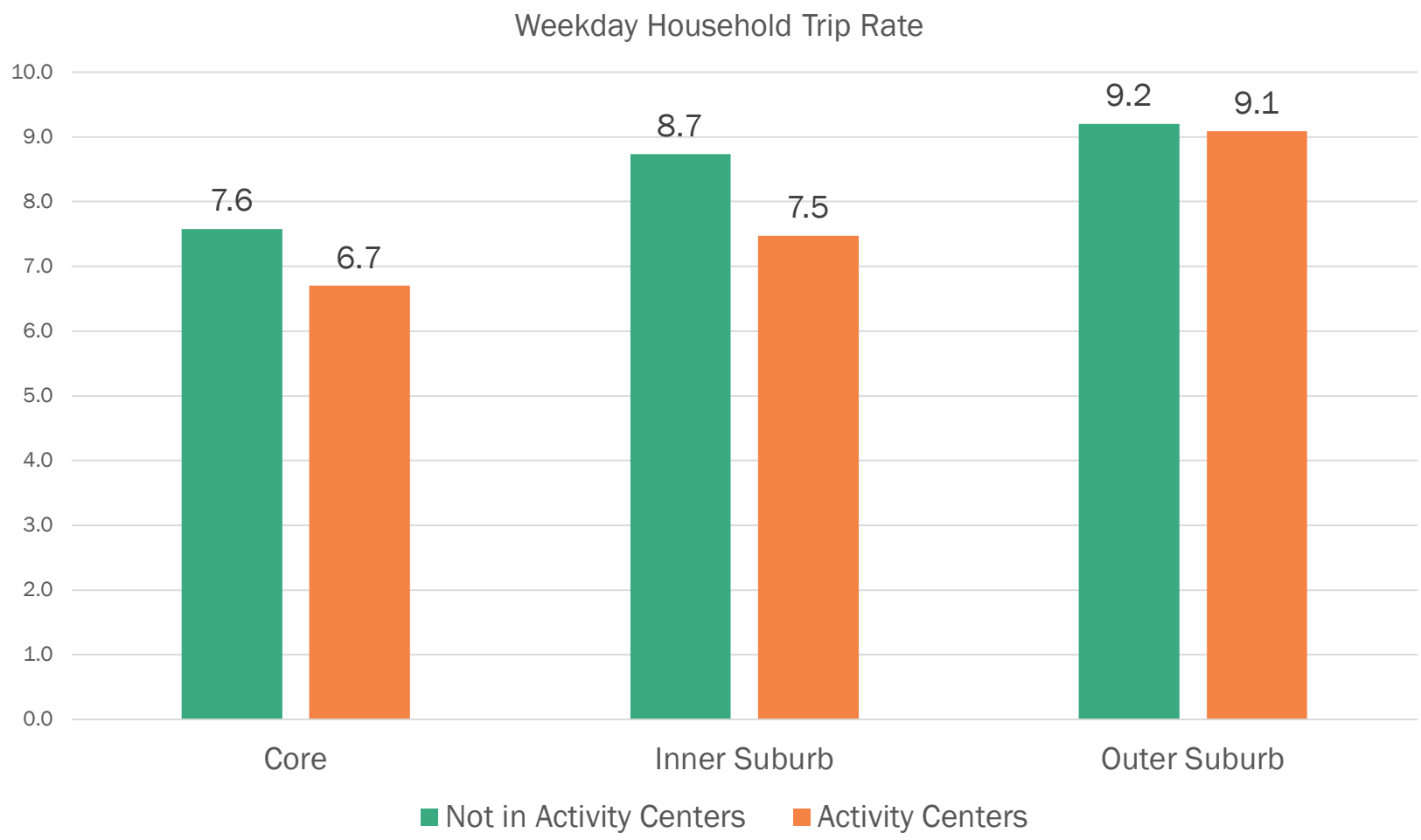
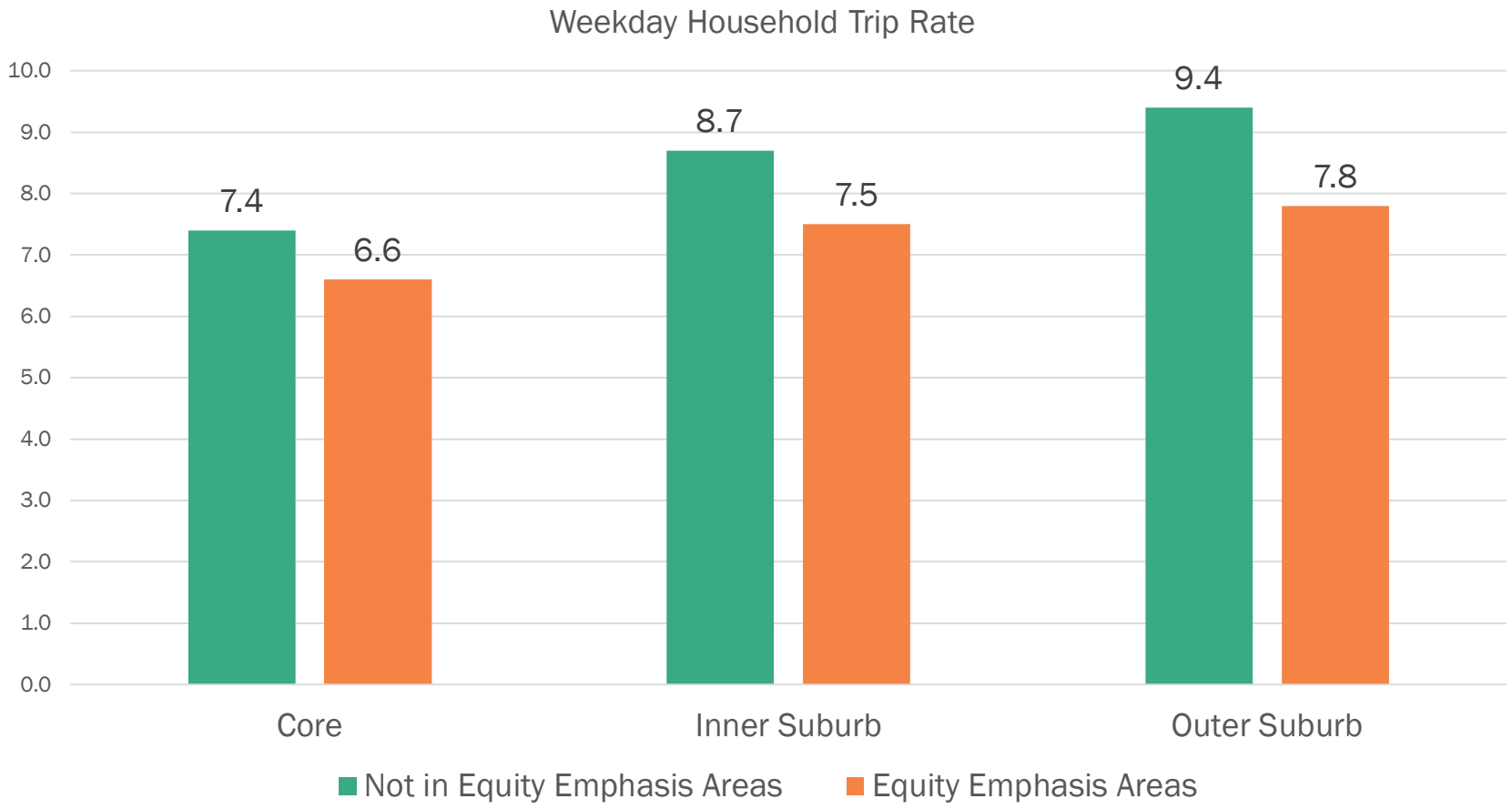
Weekday Household Trip Rate by Workers



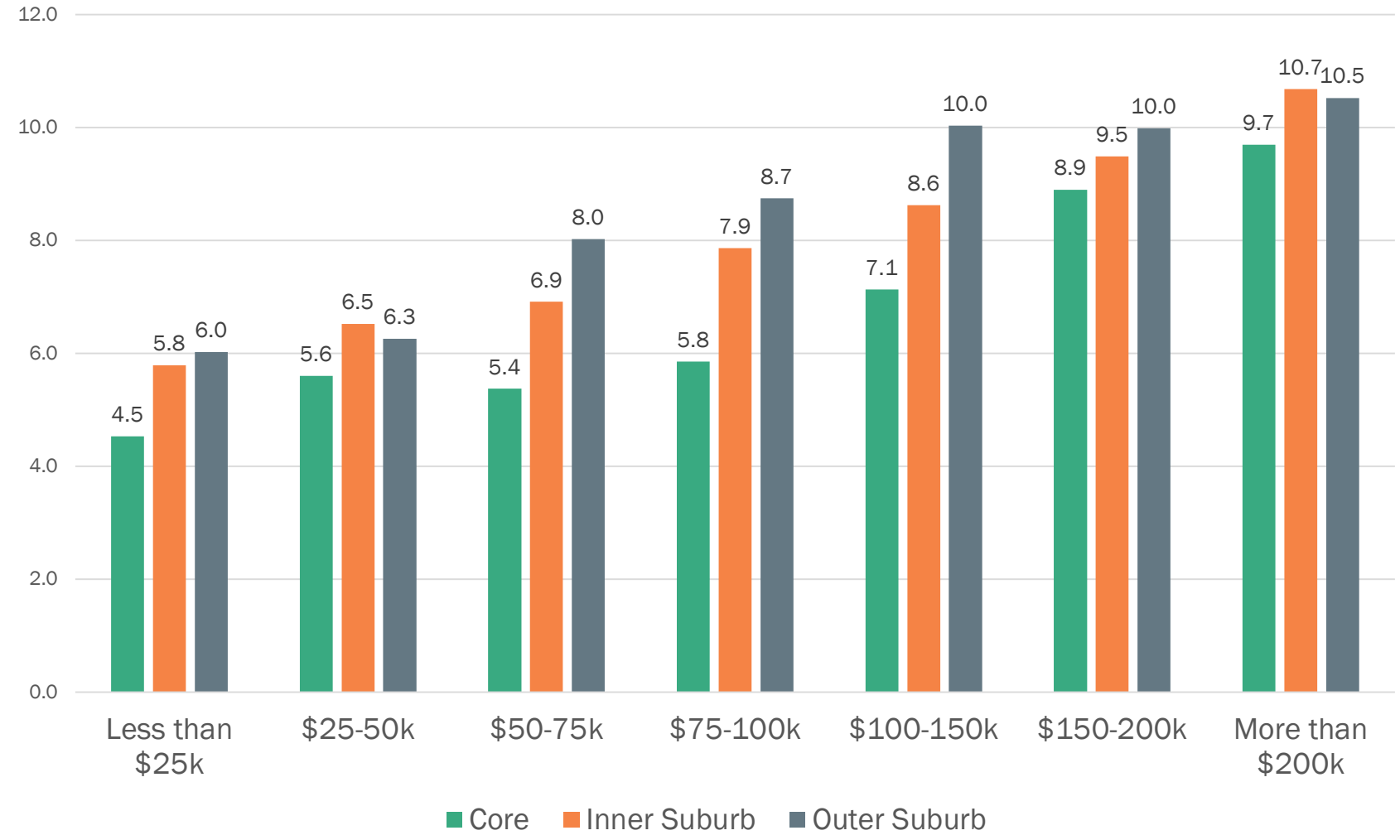
Households in Activity Centers Produce Lower Trip Rates



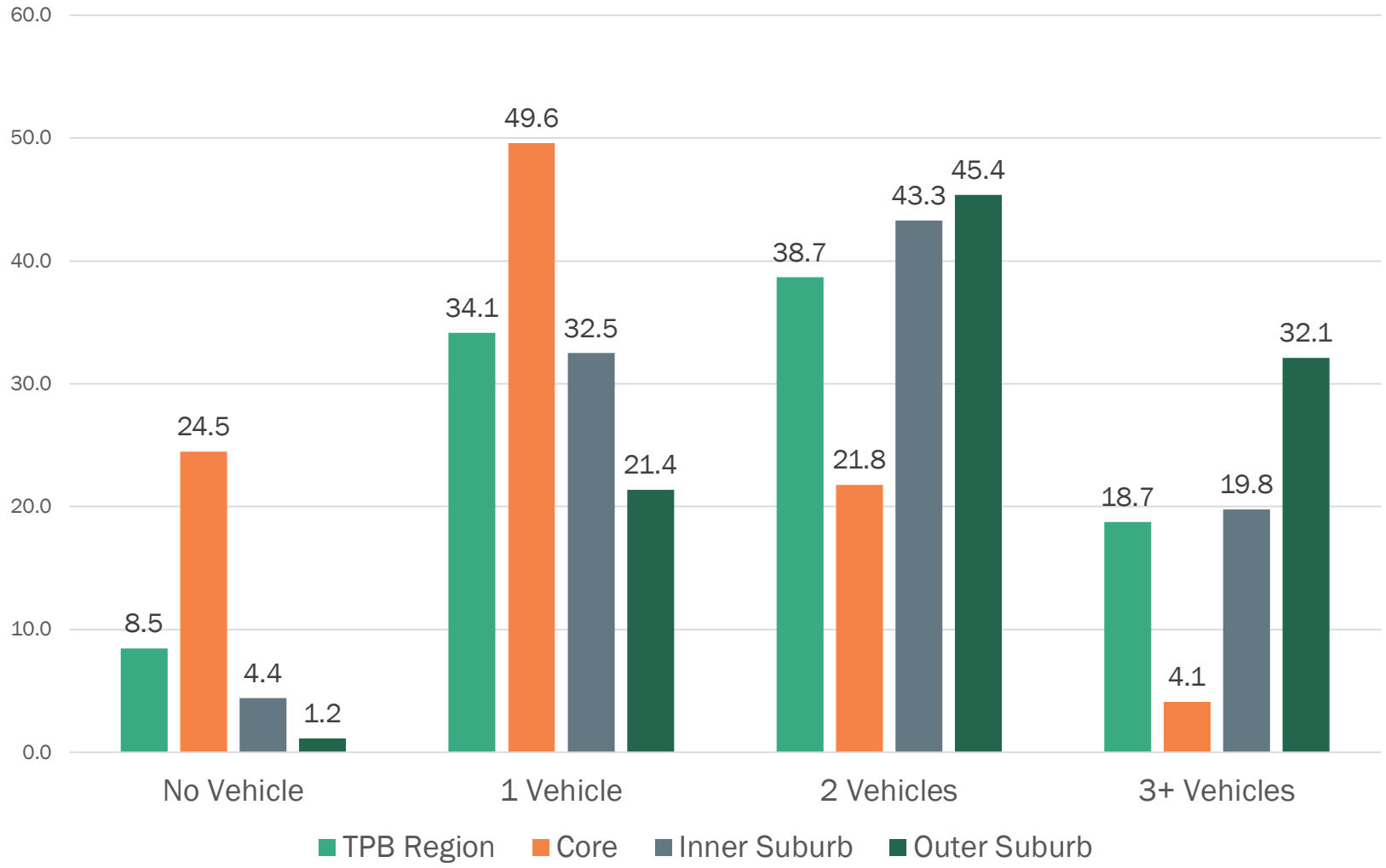
Households in Equity Emphasis Areas Produce Lower Trip Rates



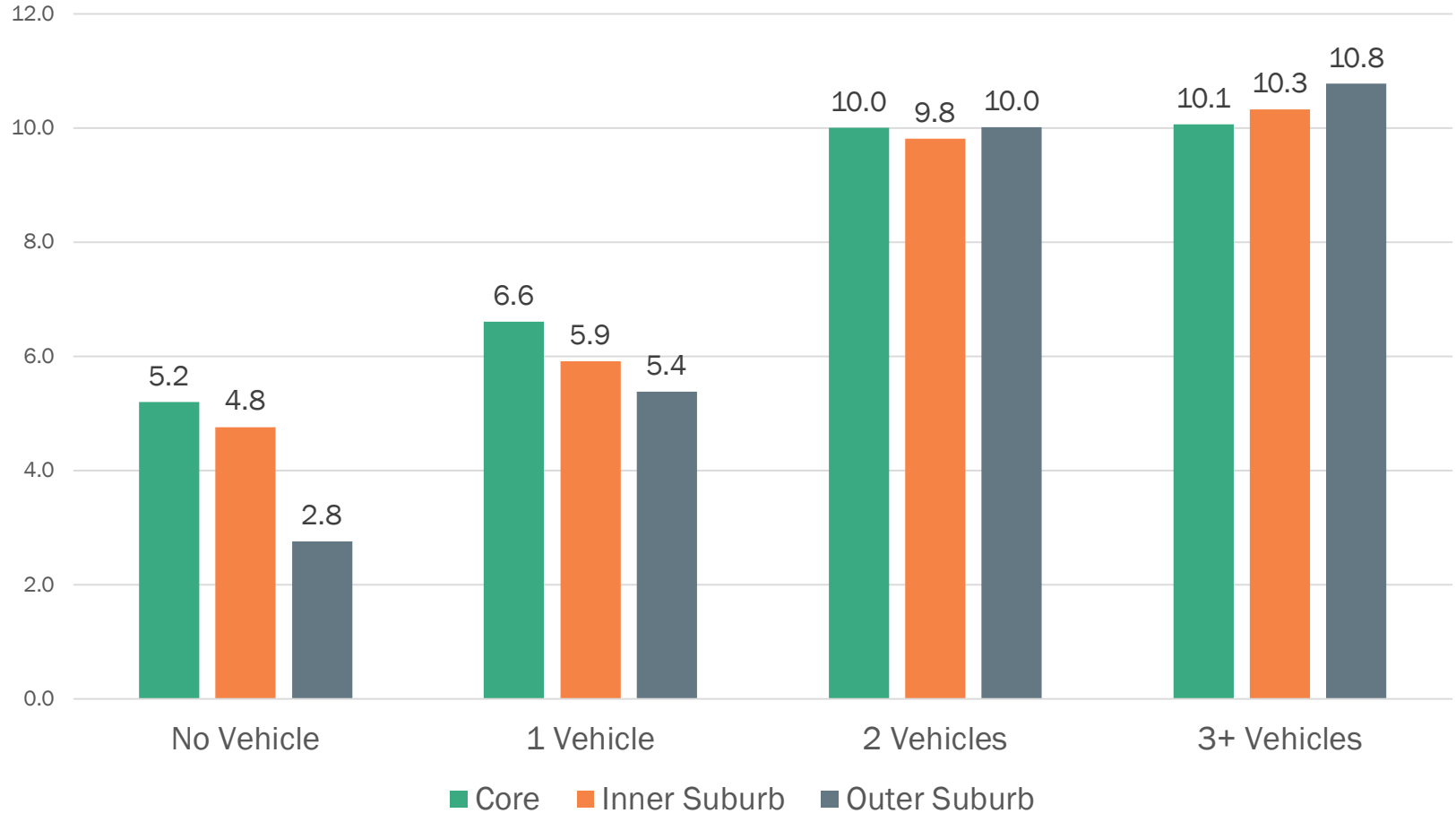
Weekday Household Trip Rate by Household Income



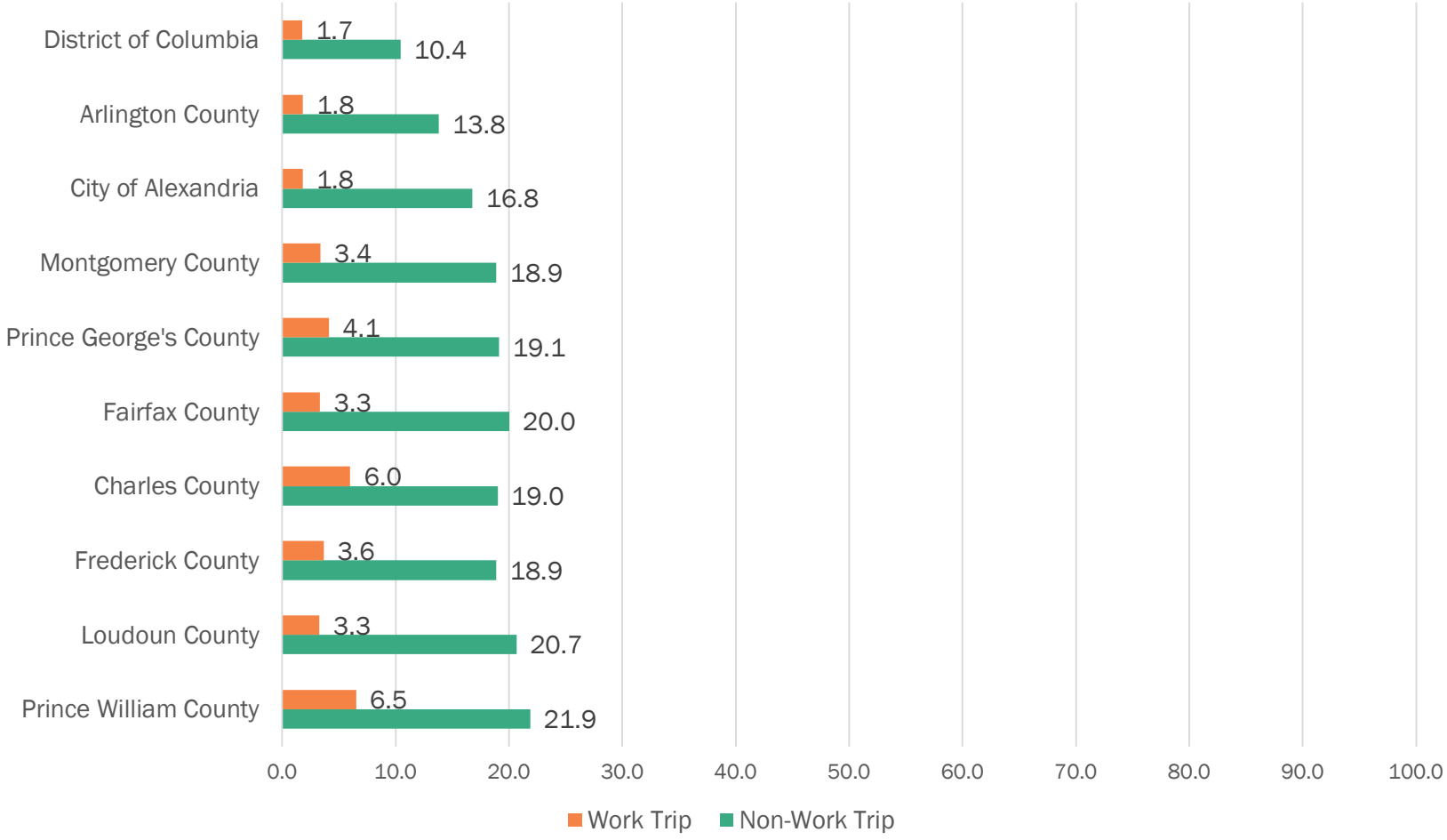
Household Vehicle Distribution by Sub-Area



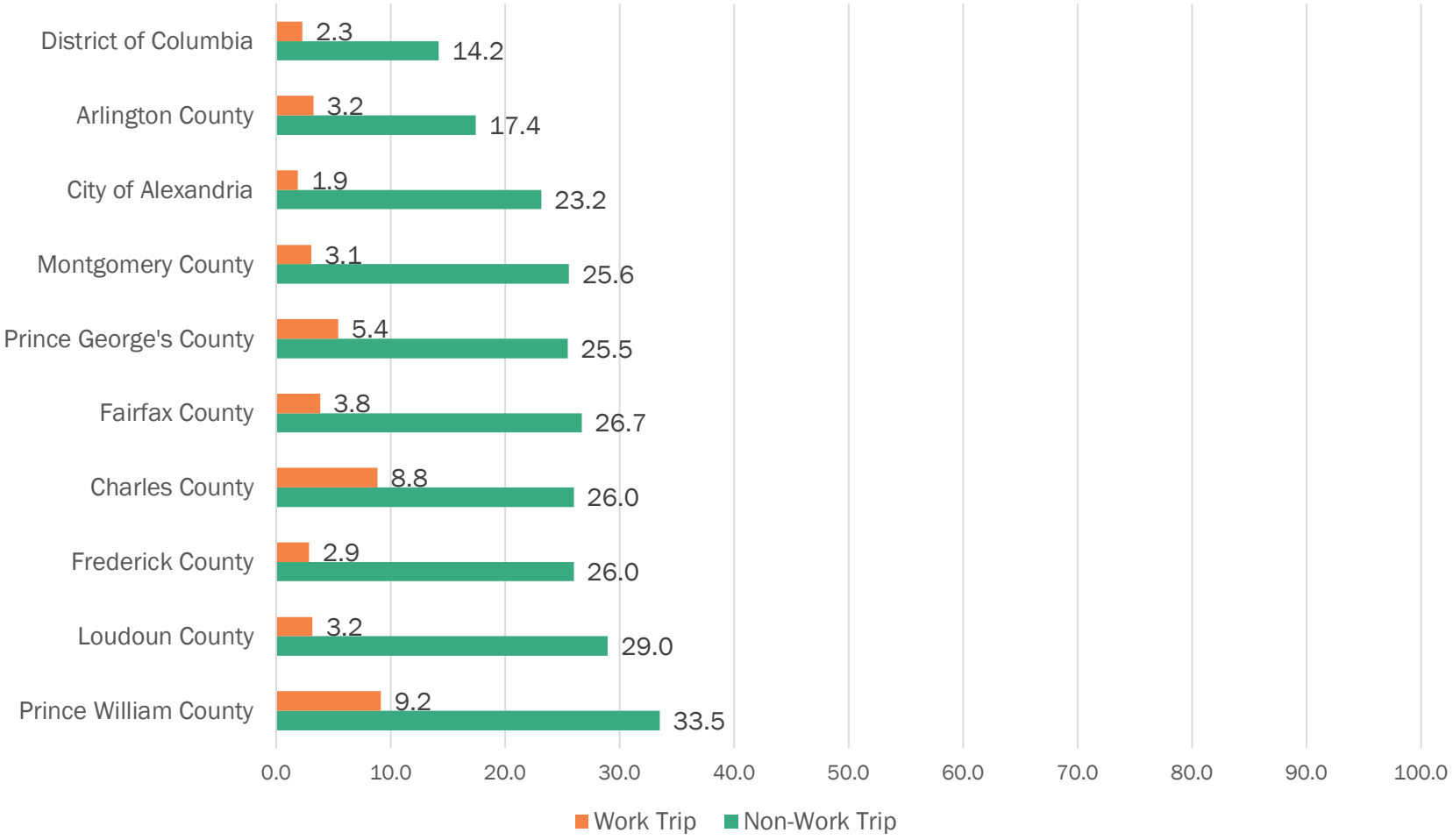
Weekday Household Trip Rate by Household Vehicle



Mode Share of Weekday Trips – Drive Others



Mode Share of Weekday Trips – Auto Passenger



Commute Destinations of Households

Commute Mode	Core to Core	Core to Inner Suburb	Inner Suburb to Core	Inner Suburb to Inner Suburb
Drive Alone	27.5	66.3	44.4	72.0
Drive Others	1.7	1.8	3.5	3.6
Auto Passenger	2.5	2.2	4.0	4.0
Rail	33.2	19.5	42.3	11.5
Bus	10.6	3.6	3.3	4.5
Walk	12.4	1.7	0.4	2.7
Bike	8.4	1.9	1.9	1.4
Taxi/Ride-Hail	3.5	3.0	0.2	0.2