

Demographics and Transportation

23rd Annual Demographic Workshop

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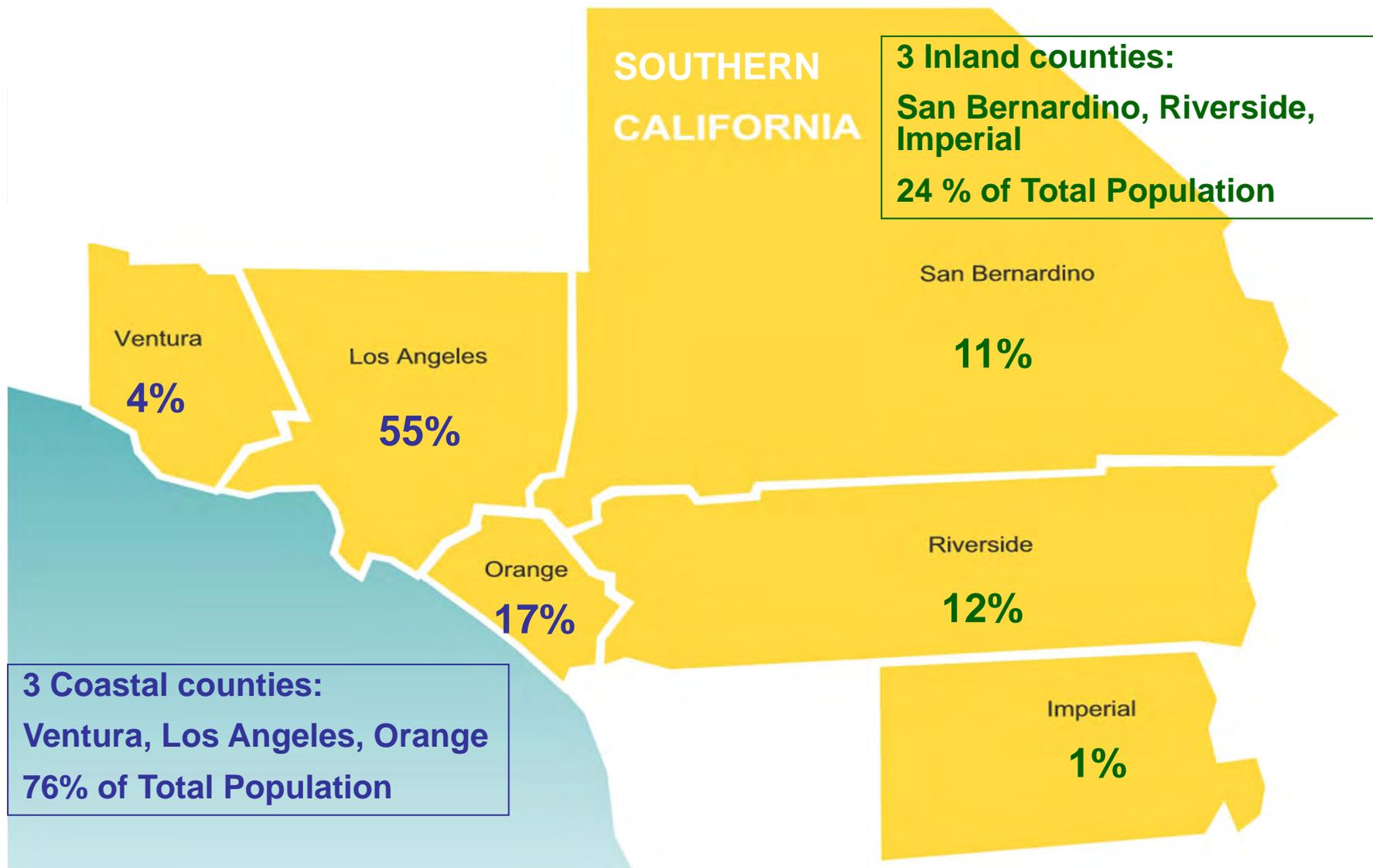
Presentation Structure

- **Introduction**
- **SCAG Demographics & Travel Characteristics**
- **Residential Location and Travel**
- **Residential Location & Commuting of Immigrants**

About SCAG Region

- SCAG
 - Southern California Association of Governments
 - A MPO in Southern California
- Six counties:
 - Los Angeles, Orange, Riverside, San Bernardino, Ventura, Imperial
- 18 million people, 6 million housing, and 7 million jobs
- About 6% of the US and half of California
- Los Angeles is the largest city

SCAG Counties & Population Share



Travel and Demographics

- Travel characteristics of Southern California is generally characterized as prevalent use of freeways and automobiles.
- SCAG region is also known by diversified demographics.
 - High share of Hispanic population, geographic difference in income and racial distribution, new immigrants and their 2nd/3rd generation, and aging of baby boomer.
- Past research has shown the variance of travel pattern by demographic segments.

Objectives

1. Provide updated information on travel characteristics of SCAG region. The last travel survey was conducted during 2000-2001.
2. Analyze the relation between land use and travel characteristics by following demographics:
 - Total population
 - Hispanic status, immigration status, and income level
- Results of this study will be provided to SCAG planners and modelers for their analysis on transportation policy and planning.

About NHTS

- The National Household Travel Survey (NHTS) is a periodic national survey on travel and transportation patterns in the US. The NHTS serves as the nation's inventory of daily travel.
- The 2009 NHTS is the latest survey collected by Federal Highway Administration.
- Previous surveys included the 2001 NHTS, and the former surveys of 1969, 1977, 1983, 1990, and 1995.
- Data is collected on daily trips taken by households and individuals in those households, over a 24-hour period.

NHTS (continued)

- NHTS data is collected for all trips, modes, purposes, trip lengths, and all areas of the country, urban and rural.
- Uses of Surveys:
 - quantify travel behavior
 - analyze changes in travel characteristics over time
 - related travel behavior to the demographics of the travel, and
 - study the relationship of demographic and travel over time

2009 NHTS Add-On

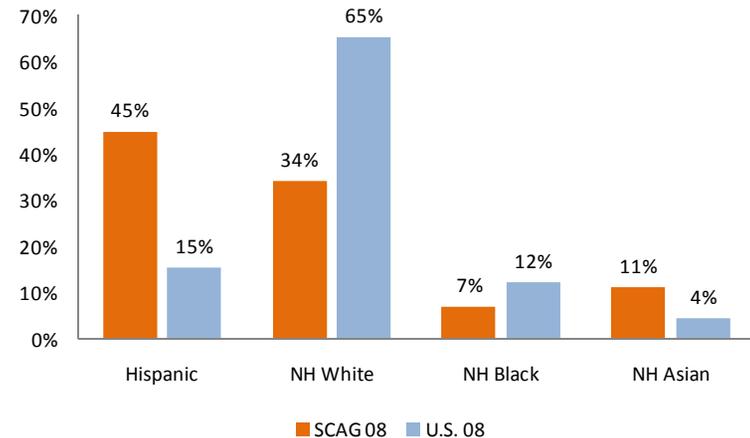
- Thank Transportation System Information (TSI) of California Department of Transportation (Caltrans) for supporting 2009 NHTS California add-on data.
- With about 6,700 household samples, 2009 NHTS provides valuable data and sufficient observations to analyze travel characteristics of SCAG region.
- We created land use characteristics based on household latitude and longitude, SCAG growth forecast data, and GIS database.

SCAG Demographics & Travel Characteristics

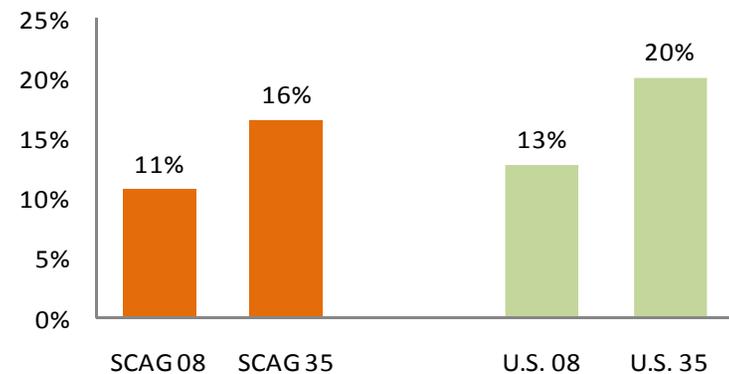
SCAG Population

- 18 million people in 2008
- 22 million in 2035
- 45% is Hispanic (15% US)
 - 53% in 2035
 - Future regional travel forecast will be affected by large % and growth of Hispanic population.
- Aging trend of baby boomer is observed in both SCAG and the US.

Race/Ethnicity Distribution - 2008

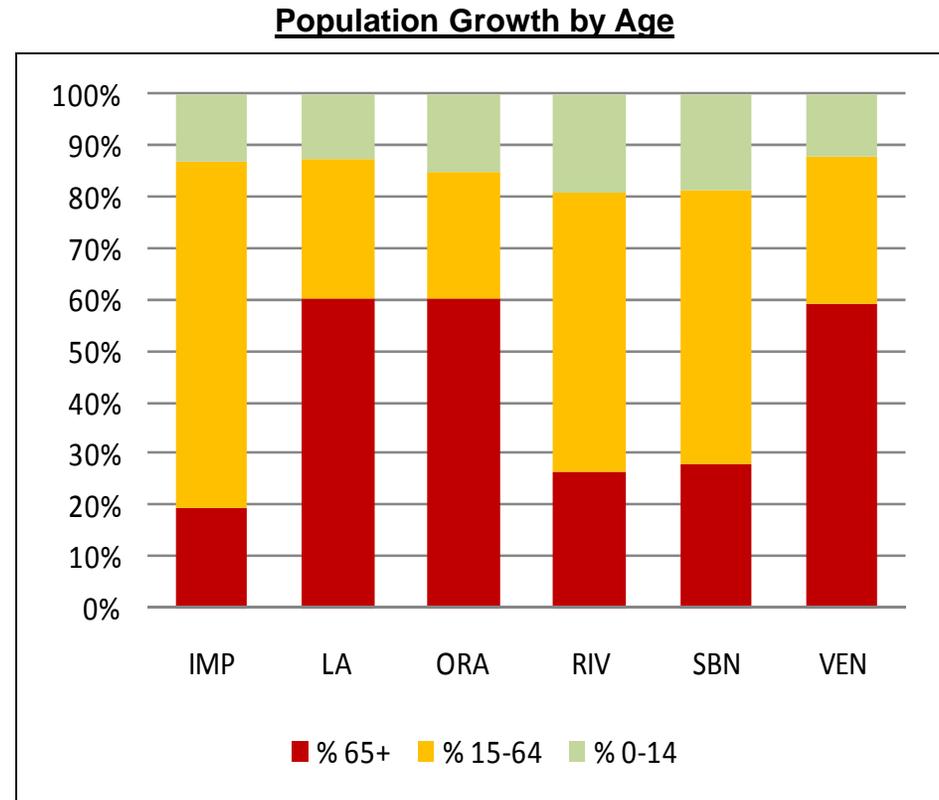


% & Growth of the Elderly (64+)



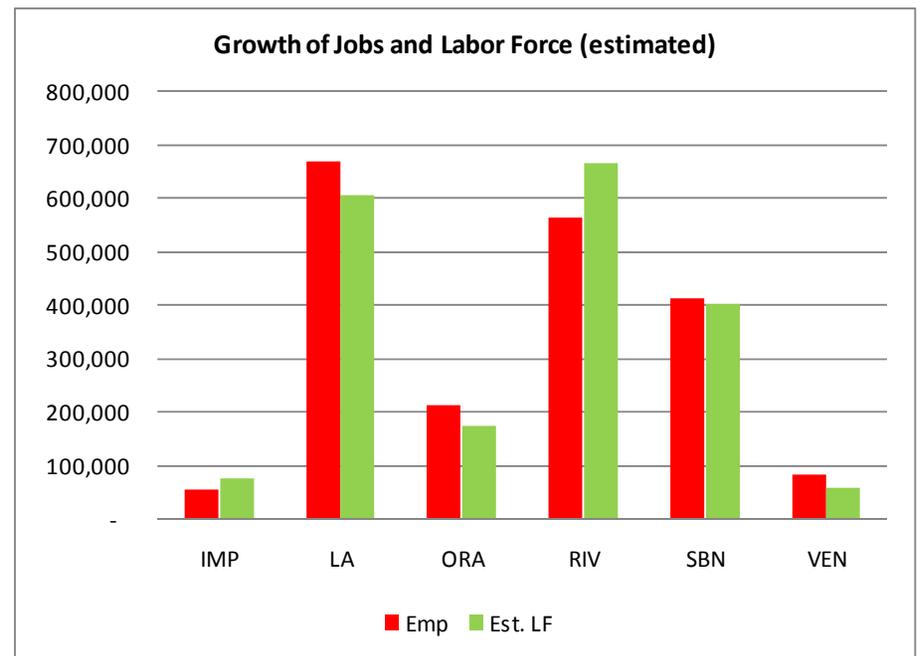
Population Growth

- Population will grow by 4 million between 2008-35.
- 3 coastal counties have higher growth of elderly.
- What kind of travel service should be provided to the elderly in coastal counties?
- 3 Inland counties have higher growth of working-age population.
- More inter-county commuting from Inland?



Job Growth

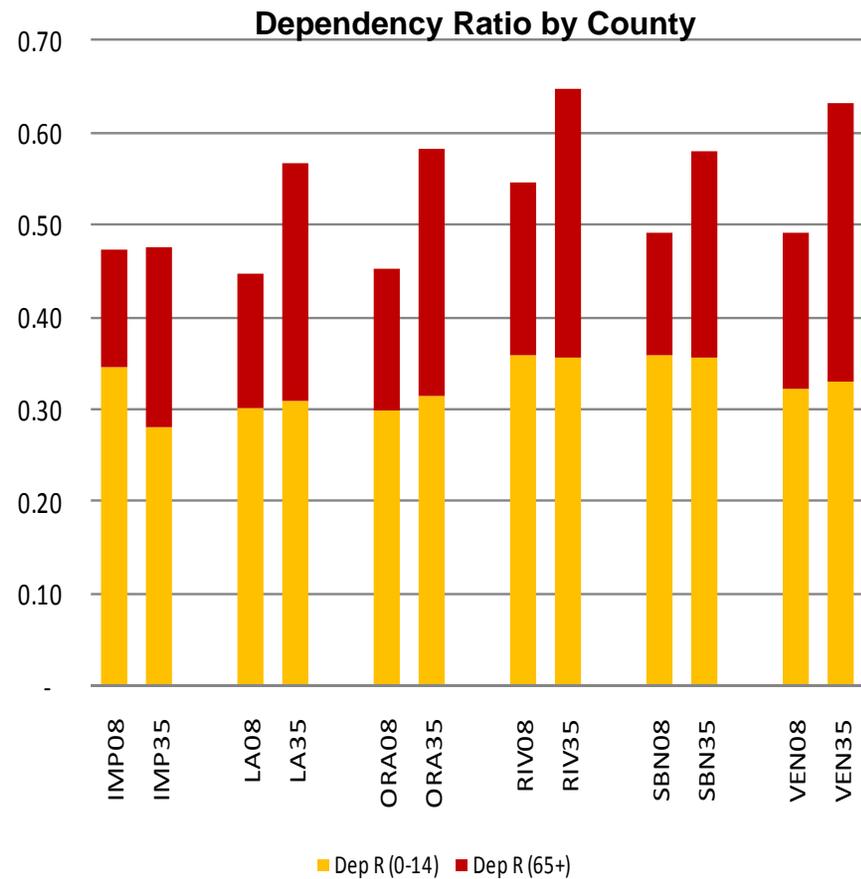
- More job growth than worker growth in 3 coastal counties between 2008-35.
 - Will need more workers from Inland counties?
- More inter-county commuting from Riverside County?
- Relocation of firms to Inland?



Assumption of LFPR: 15-24: 55%; 25-64: 88%; 65+: 30%

Dependency Ratio

- Between 2008 and 2035, SCAG Dependency Ratio will increase from 0.47 to 0.58.
- Will more resources be allocated to social welfare? How will that influence on transportation finance?



** Dependency Ratio: the number of dependents (aged 0-14 and over the age of 65) to the total population (aged 15-64).

Analysis of 2009 NHTS

- Our analysis focuses on
 - Person travel during weekdays
 - Trip distance < 200 miles
- All data analysis is weighted

2009 NHTS Sample Size

	SCAG		US	
File	Samples	Weighted	Samples	Weighted
Households	6,663	5,462,021	156,567	118,896,799
Persons	14,536	16,268,531	308,901	283,053,872
Vehicles	13,798		309,163	
Travel Day Trip	54,555		1,167,321	
Persons wkday	10,409		220,574	

* Sample size to total households for SCAG = 0.12%; for US = 0.13%

Weekday Person Travel

- Compared to the US, SCAG residents drive less, but use more non-motorized modes (walk, bicycle) and transit
- Although Southern California is infamous for its sprawl and auto-oriented urban form, there is less use on vehicle and shorter travel distance than the US.

		SCAG	US
Trips			
	Daily trips	3.8	3.9
	% no trip	11%	11%
Mode Share			
	Driver/Auto	56%	62%
	Passenger/Auto	21%	21%
	Non-motorized	17%	12%
	Transit	4%	2%
Distance			
	Daily distance	26	31
	Daily VMT	18	21

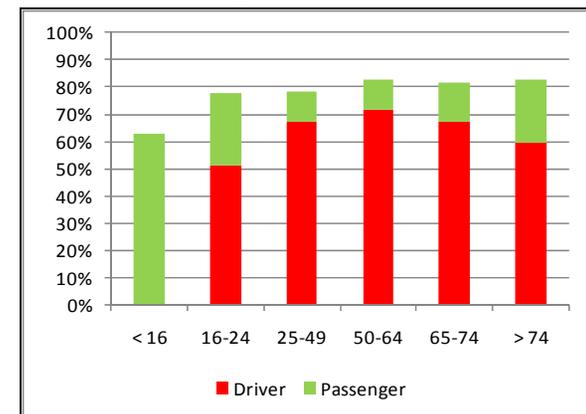
Travel by Age

- Daily trips and travel distance are the highest for the working age population (25-64).
- The elderly rely on a car though drive less.
- 1/3 of the 75+ did not travel on the survey day.

Daily Travel by Age

Age	Daily Trips	Daily Distance	% Auto Use
Below16	3.1	12	63%
16-24	3.5	25	78%
25-49	4.4	33	78%
50-64	4.0	31	83%
65-74	3.4	20	82%
75+	2.7	14	83%

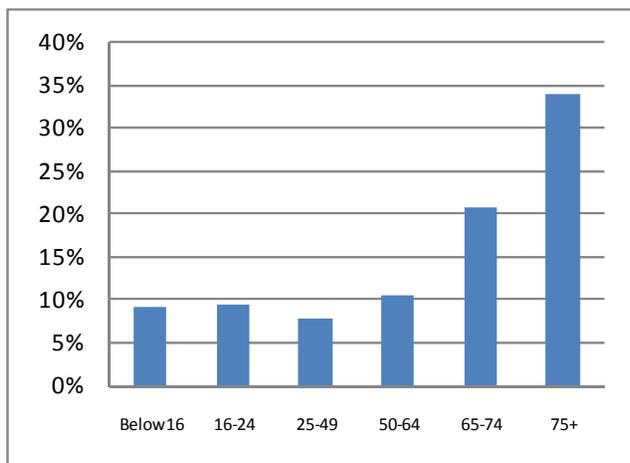
Mode Share by Auto



Travel by Age (Elderly)

- 1/3 of the 75+ did not travel on the survey day.
- The elderly wait for more days than the younger counterparts for the next trip. Their travel decision is probably not daily based. However, when they decide to travel, their daily trips are no less than the younger for non-work purpose
- The elderly is active. They need to travel for participating activities and maintain their daily needs.

% of persons did not travel on survey day



Travel by Age

Age	# days since last travel*	If traveled, # trips for	
		All Purpose	Non-work
Below16	3	3.4	3.4
16-24	2	3.9	3.3
25-49	3	4.7	3.9
50-64	3	4.5	3.6
65-74	4	4.3	4.0
75+	7	4.0	3.9

* Lastday: If the person didn't travel, what is the number of days since last trip

Travel by Race/Ethnicity

- Compared to other groups, Hispanic population drive less; use more non-motorized and transit modes.
- Hispanic household owns less cars than other ethnic group, while maintaining more persons per household. This implies that Hispanic household's higher share on carpool.
- What transportation policy should be considered due to continuing growth of Hispanic population?

Daily Travel by Race/Ethnicity

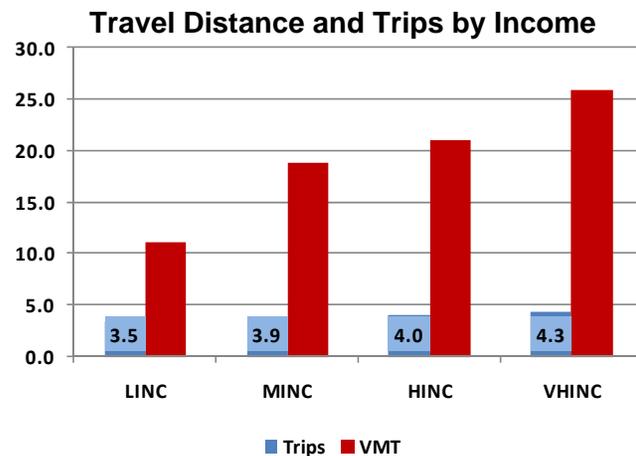
Race	Trips	Distance	Driver_Auto	Passngr_Auto	NM	Transit	Car/Hhsize
NH_WH	4.0	29	67%	18%	12%	1%	0.93
NH_BK	3.8	22	56%	20%	17%	5%	0.74
NH_AS	3.6	26	59%	23%	13%	2%	0.73
HISP	3.7	24	46%	24%	21%	6%	0.57

Household Income & Housing Types

- As expected, people with higher income travel more and longer.

Population Distribution by Income

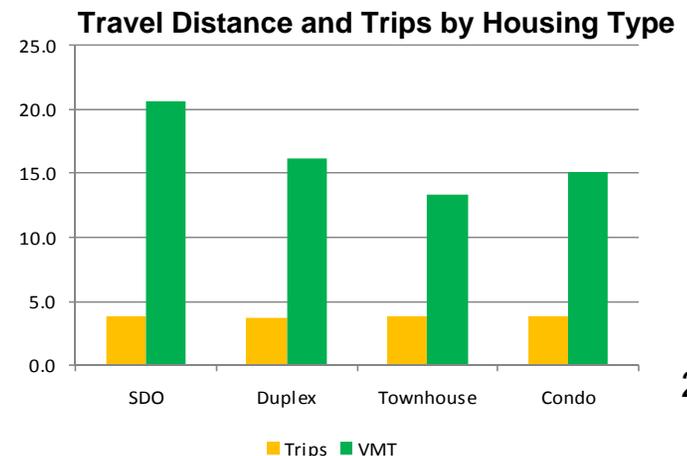
HHINC	Income	% person
Low	<30K	33.4
Medium	30-60K	22.3
High	60-100K	19.1
Very High	100K+	20.8



- People living in single-detached units tend to drive longer than other types of housing units.

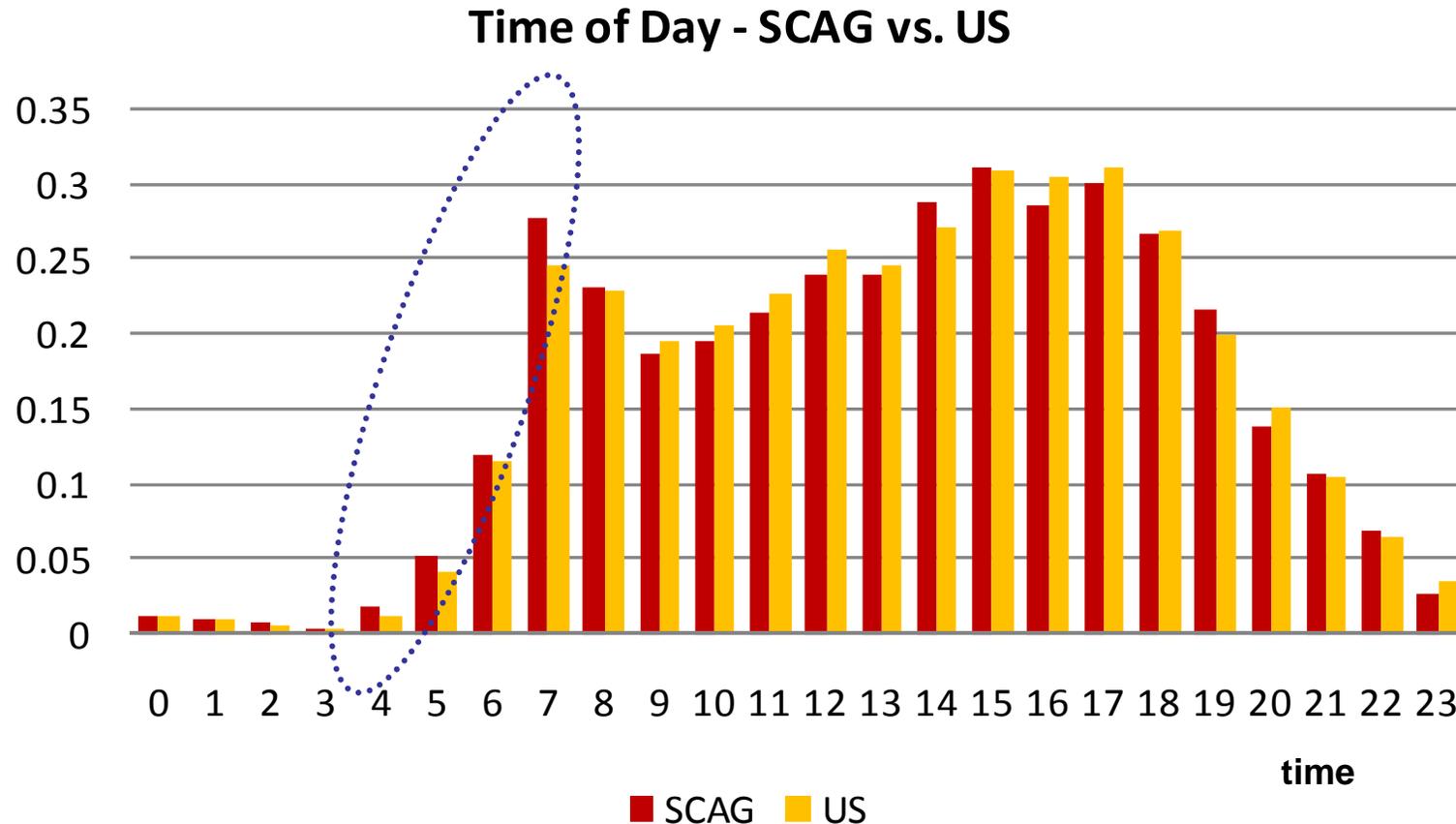
Population Distribution by Housing Type

Housing Type	% person
Single, detached	61.2
Duplex	8.7
Rowhouse/townhouse	27.6
Apartment/condo	2.2

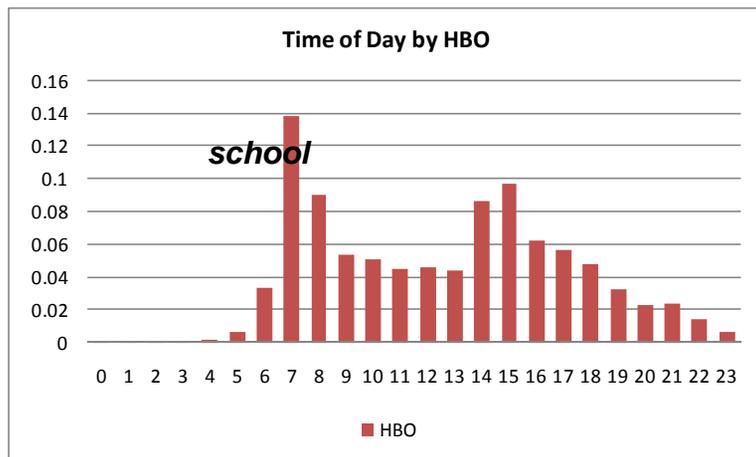
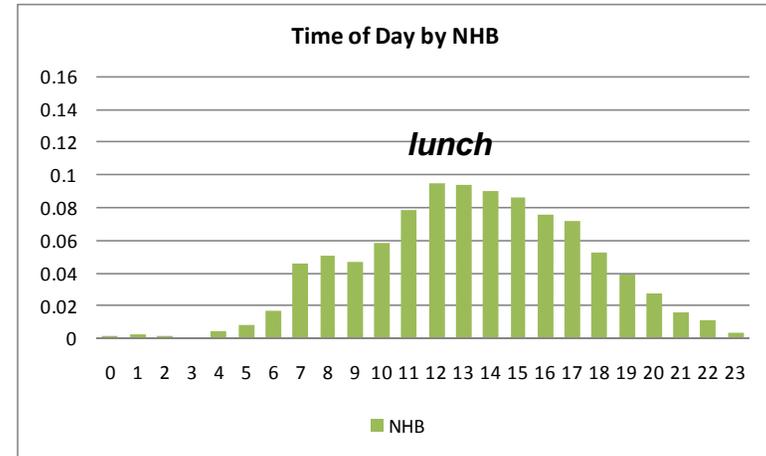
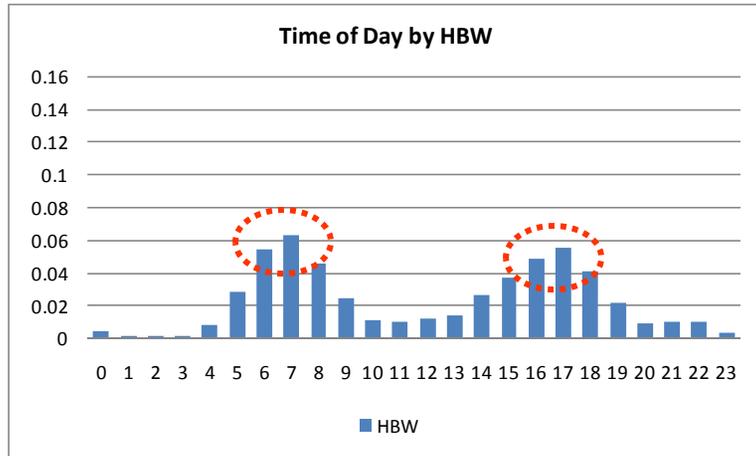


Time of Day (% persons are traveling)

- Compared to the US, SCAG region shows higher % of people traveling in the morning (4:00-8:00).

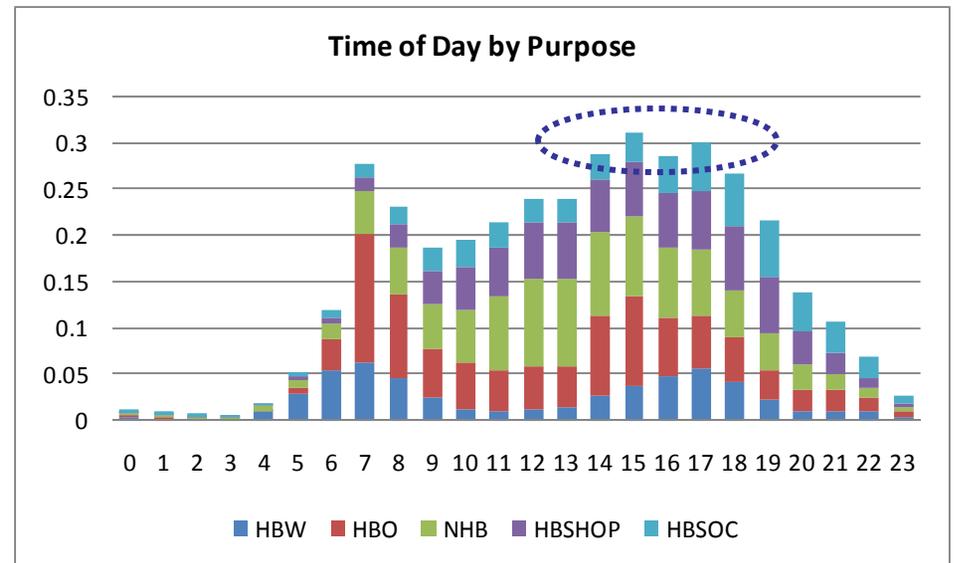
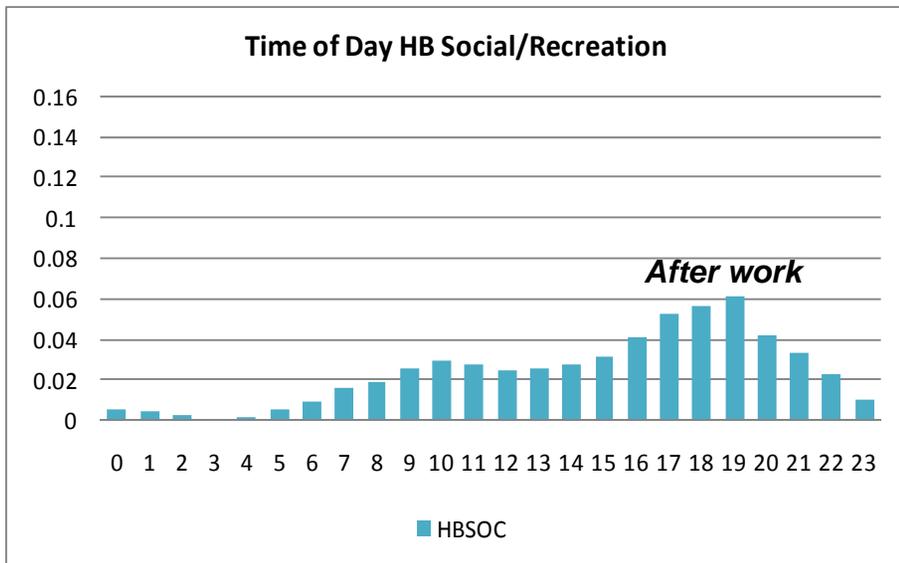


Time of Day by Purpose



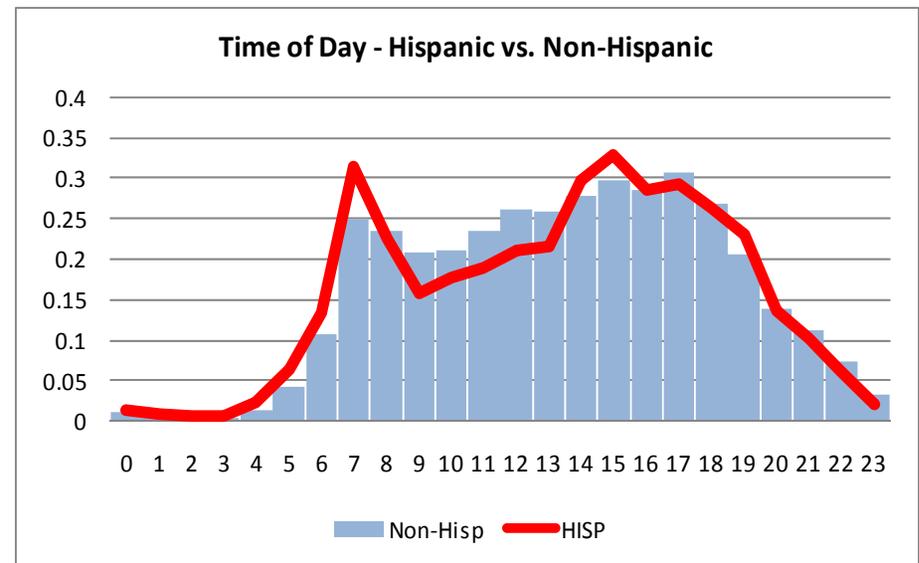
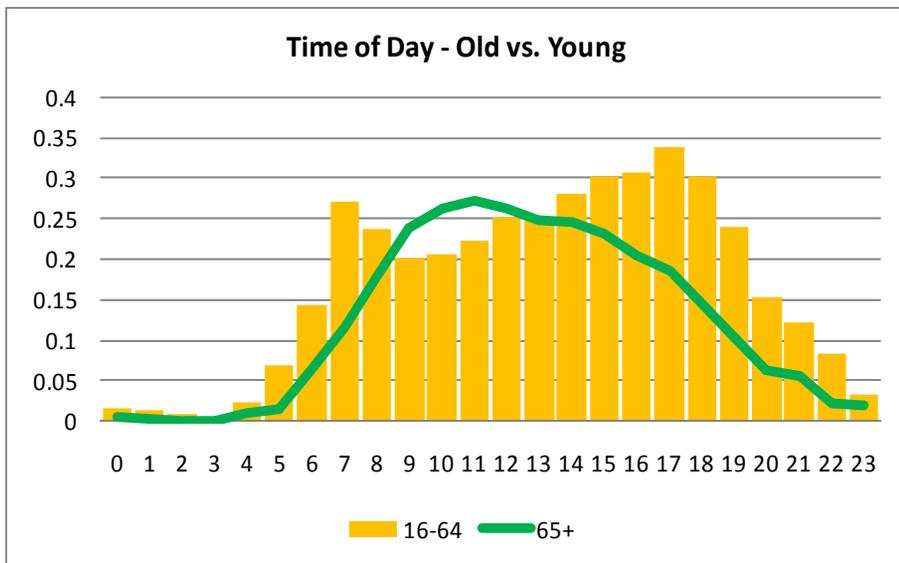
Time of Day by Purpose

- PM peak appears during 2 pm-6 pm due to travel demand for multiple activities
- PM peak lasts longer than AM peak. Travel demand is higher in the afternoon



Time of Day of Elderly & Hispanic

- Peak travel period for the elderly is around noon.
- More significant two peaks to Hispanic (7 am-8 am and 3 pm-4 pm) than non-Hispanic



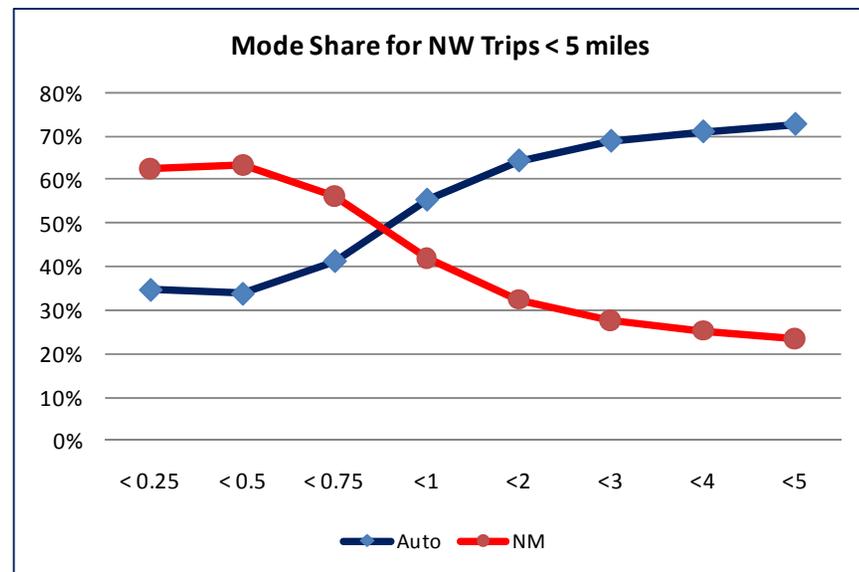
Trip Length

- Average trip length is 3 miles (median = 2 miles).
- Trip length is the shortest for shopping (4.5 mi), and the longest for work (12.8 mi).
- Non-motorized share is the highest for short trip (less than 1 mile).
- One approach to promote walk is to increase neighborhood shopping opportunity.

Trips Length by Purpose

TRIPPURP	%	Mean	Median
HBO	25.0	6.1	2
HBSHOP	21.9	4.5	2
HBSOCREC	14.5	8.6	3
HBW	11.3	12.8	8
NHB	27.1	7.5	3
ALL		7.3	3

* trip length >0 and <=200, all days



Residential Location and Travel

Introduction

- Travel behavior theory recognized that daily travel choices are related to choices of residential location, housing type, job location, school location, mode for commute and auto ownership.
- Land use policy, such as SB 375, based on the concept of residential location - daily travel relation, is suggested to reduce problems caused by auto use, including congestion, air pollution, and GHG emissions.
- Does this residential location - daily travel relation work for people with different demographic background?
- We use NHTS to examine the relation between residential land use characteristics, distance to work, and mode for commute

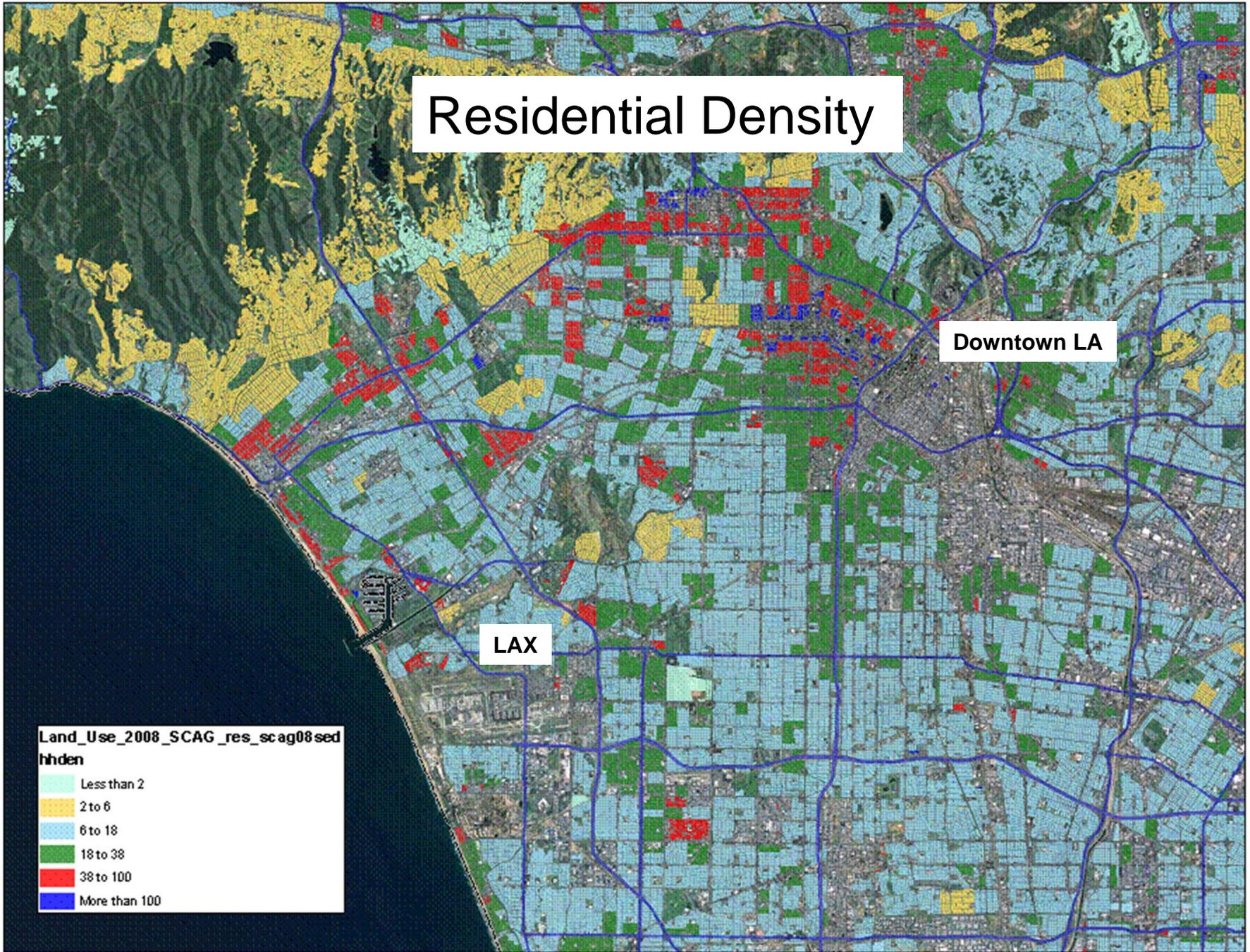
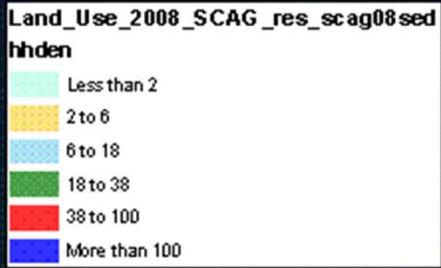
Residential Land Use

- Residential land use characteristics of neighborhoods:
 - Residential density (housing units per acre)
 - Local service accessibility (employee per acre)
 - local service = retail + other service + business service + finance + accommodation/food
- Use SCAG TAZ zones as neighborhoods
 - 11,268 zones, based on 2000 Census block group

Residential Density

Downtown LA

LAX



Local Service Accessibility

Downtown LA

LAX

T2_SCAG_0814

<all other values>

ACCL

01 LS.0075

02 0.015

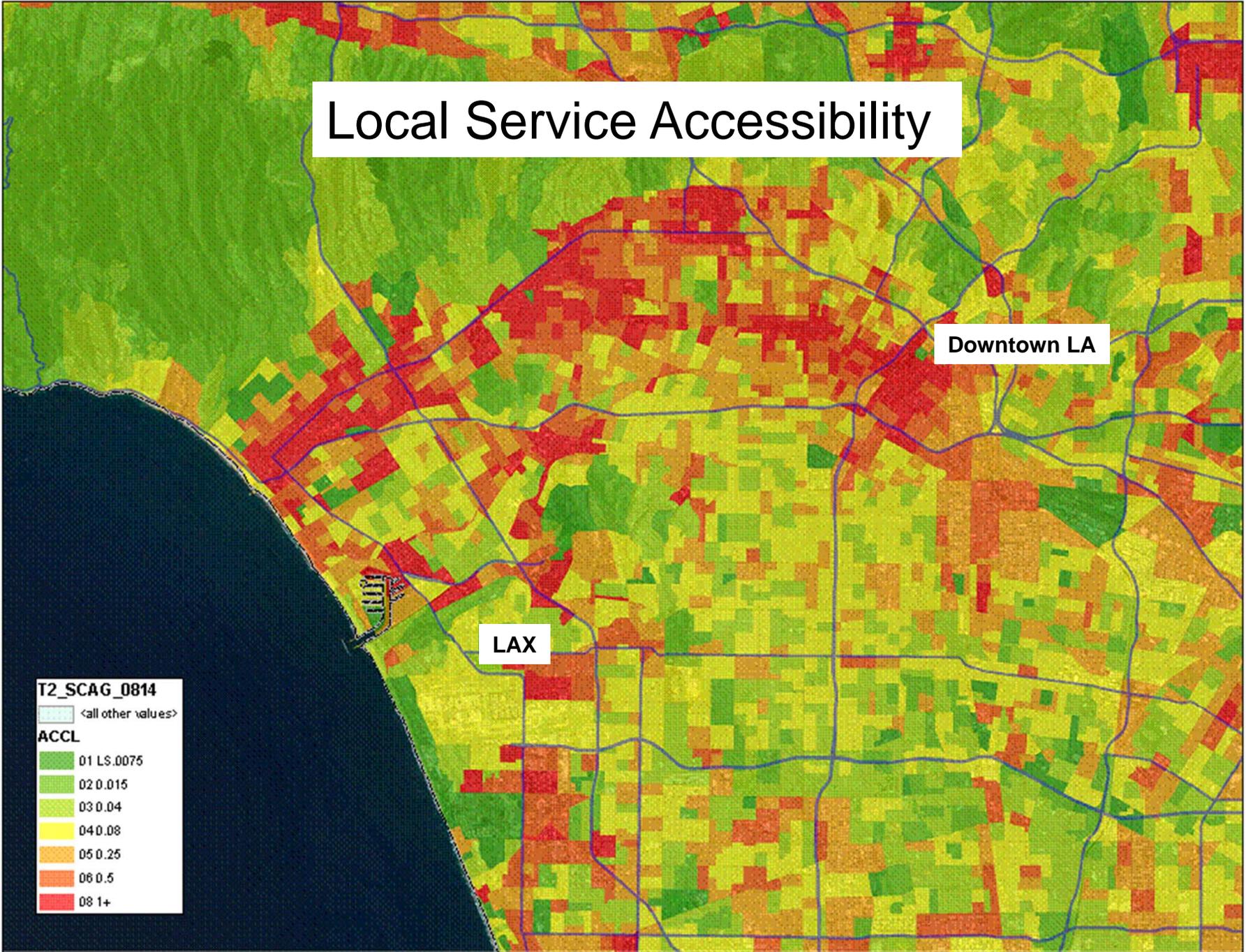
03 0.04

04 0.08

05 0.25

06 0.5

08 1+

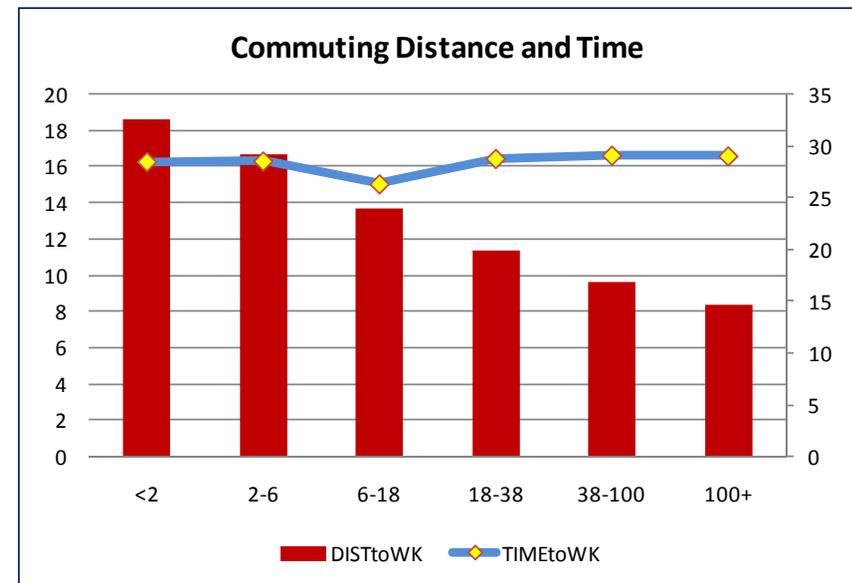


Residential Density & Commuting Distance

- Households in lower density neighborhoods:
 - Higher % of single family
 - Most have at least one car
- People living in higher density neighborhoods:
 - Shorter commuting distance
 - Work location closer to home
- Commuting time is about the same for different density.
- Closeness of work location to home is associated with high residential density.

Household Characteristics and Commuting

Res Density	Households		Workers	
	% SDO	% No car	DISTtoWK	TIMEtoWK
<2	89	2	19	28
2-6	85	2	17	29
6-18	59	8	14	26
18-38	22	15	11	29
38-100	11	18	10	29
100+	4	38	8	29



Residential Density & Commuting Mode

- Residents of higher density neighborhoods:
 - Cars are less available to household members.
 - Transit services are more available.
 - Workers in high density neighborhoods are less likely to commute by a car; more likely by transit and non-motorized modes.
- Results are expected.

Commuting Mode by Density

Residential Density	Car/Hhsize	Transit Density	% Commuting Mode		
			Auto	Transit	NM
<2	0.9	0.0	93	2	1
2-6	0.8	0.0	91	2	2
6-18	0.6	0.1	88	4	3
18-38	0.5	0.3	82	10	5
38-100	0.5	0.5	78	12	6
100+	0.3	1.2	63	19	14

Hispanic - Commuting Distance

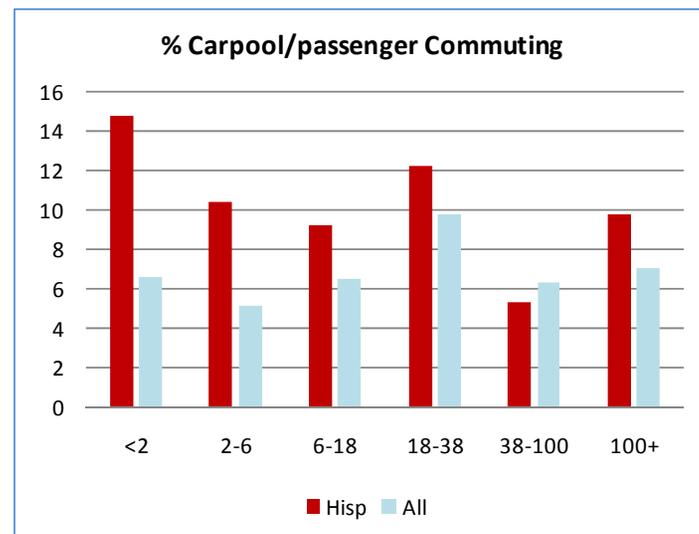
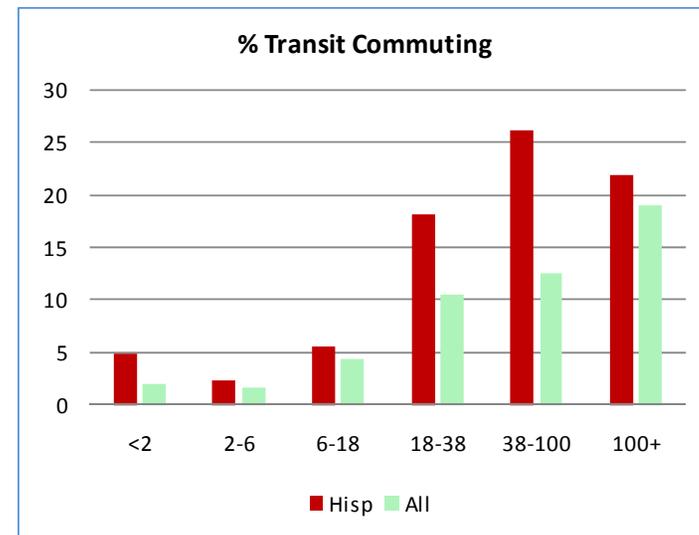
- Compared to total population,
 - Hispanic households living in lower density neighborhoods are shown lower % of living in a single-family house.
 - Cars are less available than total population.
- Commuting distance also decreases with density, but
 - Hispanic workers living in very low density neighborhoods (<2) travel much shorter distance to work (12 mi) than total population (19 mi).

Household Characteristics and Commuting

	Households				
Res Density	% SDO	Car/Hhsize	% No car	DISTtoWK	TIMEtoWK
<2	75	0.7	5	12	22
2-6	79	0.6	2	19	31
6-18	57	0.5	13	13	27
18-38	23	0.4	18	12	31
38-100	11	0.3	29	10	33
100+	0	0.2	49	7	27

Hispanic - Commuting Mode

- A car is still the major commuting mode to Hispanic workers living in lower density neighborhoods.
- Compared to total population,
 - Hispanic commuters have higher % of transit use, especially in high-density areas.
 - They also have higher % of carpool use, especially in low-density areas.



Residential Location & Commuting of Immigrants

Introduction

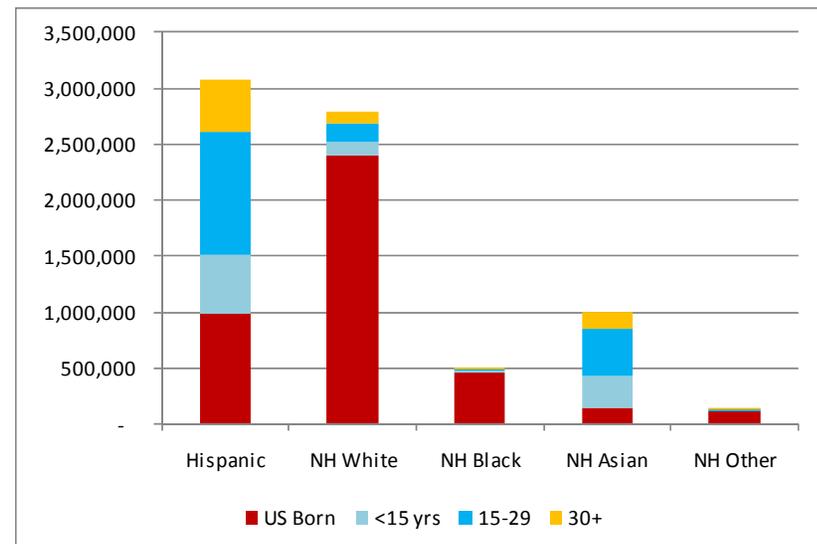
- Each year, many immigrants move to Southern California.
- Will immigrants change their behavior after years living in this region?
- The objective is to analyze the difference between newer immigrants, long-term immigrants, and the US born, in terms of their residential location-housing-travel relation.
- Focus on adults between 30-60 years old – they are primary decision makers of their family.
- By three race/ethnicity groups: Hispanic, Non-Hispanic White, and others. This study focuses on Hispanic population, due to larger share to total population.

Immigrants Aged 30-60 Years Old (2009 ACS)

- 2009 ACS shows that 45% of SCAG population aged 30-60 years old are immigrants.
- 2/3 of Hispanic aged 30-60 are immigrants.
- About half of Hispanic aged 30-60 are immigrants who entered US < 30 years.
- Will high % of Hispanic population be continued to the future?
- Is travel behavior of newer immigrants the same as the US born?

% Total pop 30-60 yrs old (SCAG Region)			
	Total	US Born	Immigrants
Hispanic	41%	13%	28%
NH White	37%	32%	5%
NH Black	7%	6%	1%
NH Asian	13%	2%	11%
NH Other	2%	1%	0%
Total	100%	55%	45%

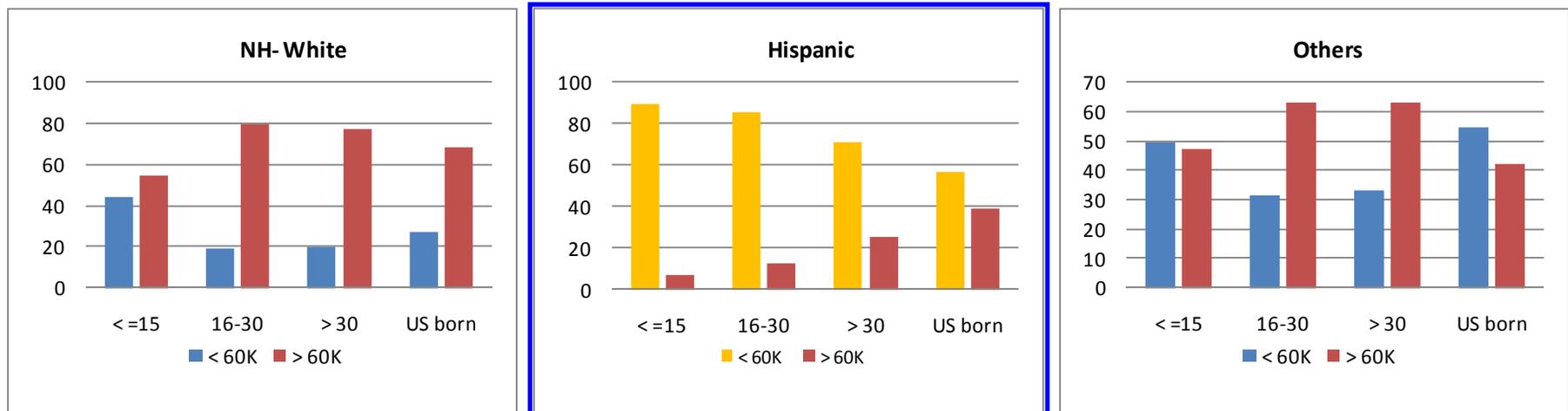
Persons aged 30-60, by immigration status



Household Income

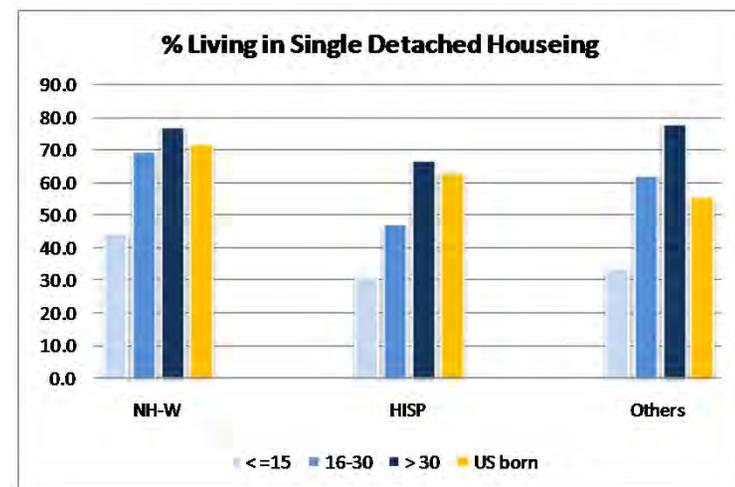
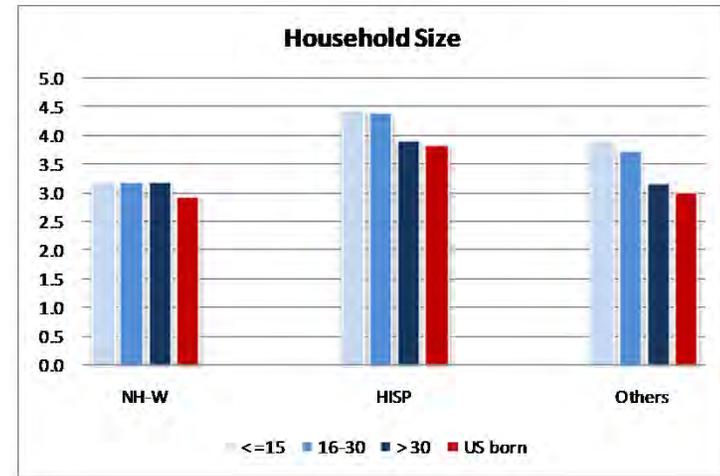
- Income status is improved to Hispanic immigrants as they stay longer in the US.
- Non-Hispanic: Income is higher for immigrants who entered US > 15 years than for the US born.

Household Income by Immigration Status



Household Size & Housing Type

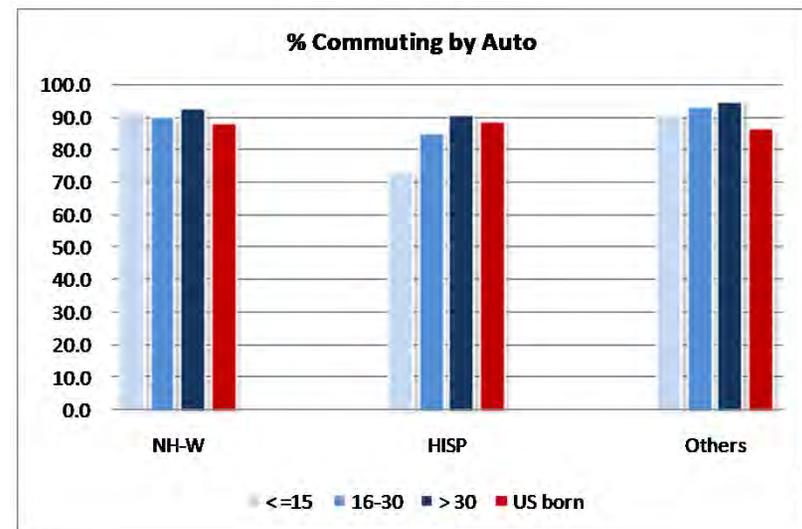
- Longer-term immigrants show reduction of household size.
- Most newer immigrants live in multiple-unit housing. As immigrants stay longer in the US, more will live in a single family house, which is similar to the US born.
- Newer immigrants show different household characteristics – lower income, larger household size and less living in a single family house.



Commuting Distance and Mode

- Commuting distance of long-term Hispanic immigrants travel 4 miles (and 33%) longer than new immigrants.
- In addition, as Hispanic immigrants entered US longer, they tend to use a car as commuting mode.
- Immigrants of other ethnic groups show higher auto share than the US born.

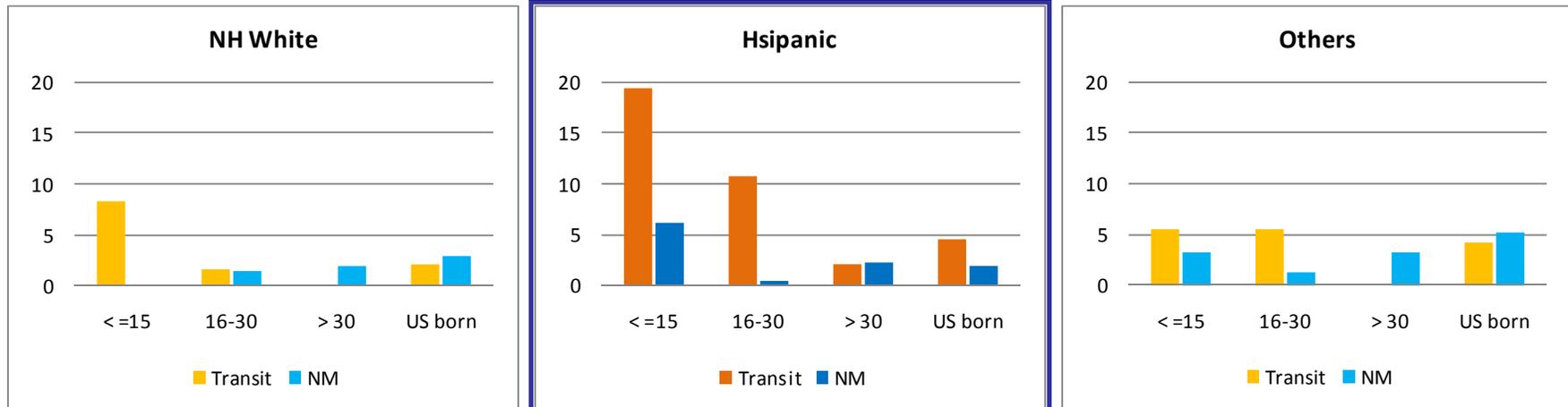
Distance to Work			
Years in US	NH-W	HISP	Others
< =15	14	12	13
16-30	16	14	13
> 30	18	16	15
US born	17	16	14



Commuting Mode

- The use of transit significantly drop as Hispanic immigrants entered US longer.
- The impression of high transit use to Hispanic population is attributed to newer immigrants.

Share of Transit and Non-motorized



Summary

- As Hispanic immigrants stay longer in the US, their income status is improved, and they tend to live in a single-family house within a lower-density neighborhood, just similar to the US born.
- They also commute longer distance, drive more and use less transit than new Hispanic immigrants.
- This travel behavior assimilation of Hispanic immigrants and the second generation challenges transportation modeling that use race/ethnicity.

Thank you

Discussion

1. Provide updated information on travel characteristics of SCAG region
2. Introduce NHTS data
3. Travel characteristics by demographic segments. By their age, race/ethnicity, ...
4. Travel demand and future change of demographics composition
5. Relation between residential location and daily travel behavior
6. Assimilation of immigrants, and their travel behavior