

***HOW THE BUILT, NATURAL, AND SOCIAL ENVIRONMENT
IMPACTS HEALTH AND WELL BEING***

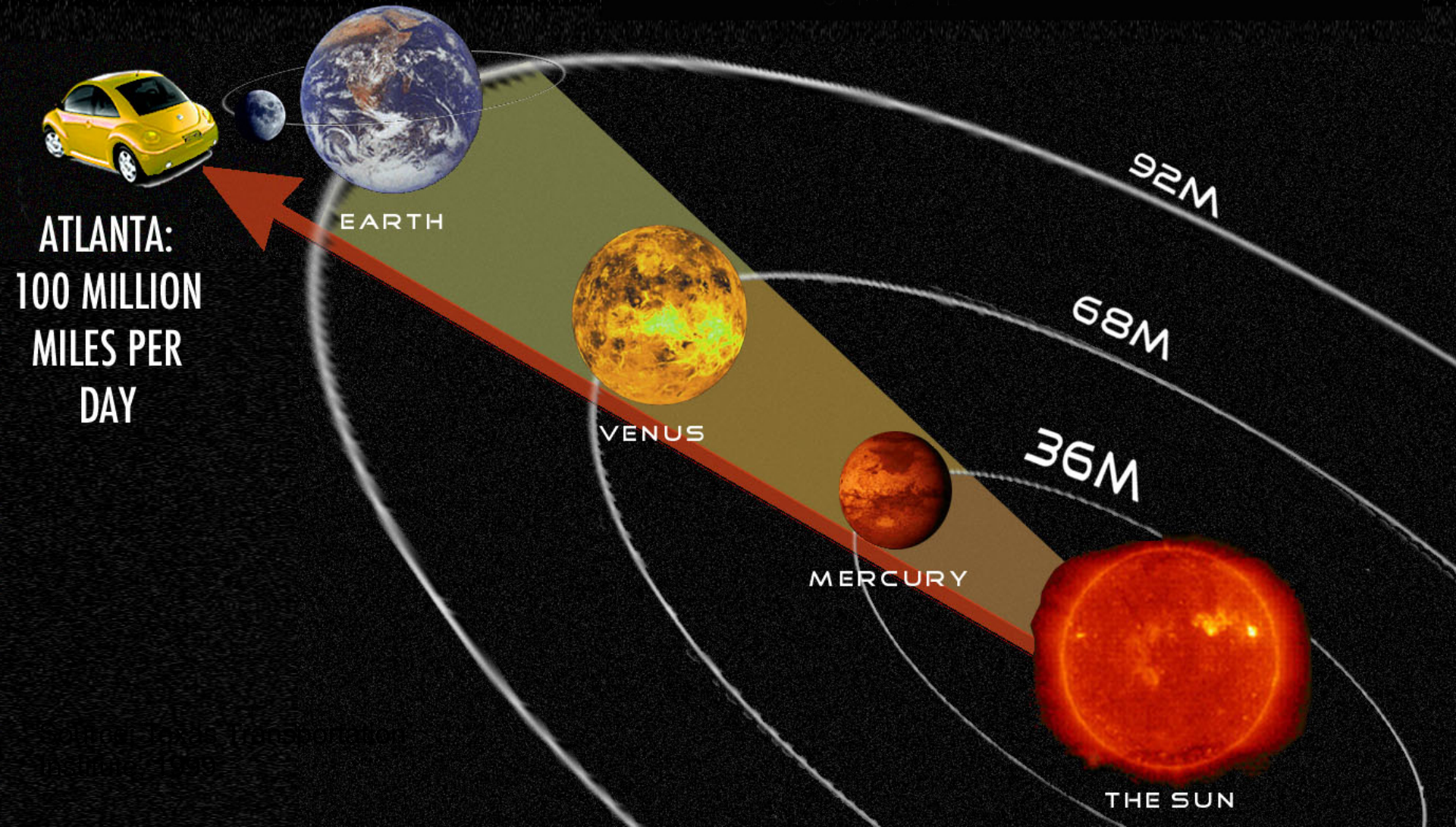
HEALTH EFFECTS INSTITUTE ANNUAL MEETING

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A Day in the Life ...



APPROACH OVERVIEW: DECISION-MAKING

HOW TRANSPORTATION IMPACTS HEALTH COSTS

TRANSPORTATION INVESTMENTS



LAND USE PATTERNS



TRAVEL BEHAVIOR



HEALTH



COSTS



Source: "The Hidden Health Costs of Transportation" APHA
Written by UD4H, Inc. 2010.

3 Policy Levels

Regional Accessibility

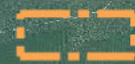


Walkable, Complete
Neighborhoods



Pedestrian Environment
(Micro-scale)





West End Boundary

Stanley Park

Burrard Inlet

Coal Harbour

West Georgia Street

Triangle West

Central Business District

Gastown

West End

Comox-Helmcken Greenway

Burrard Street

Downtown South

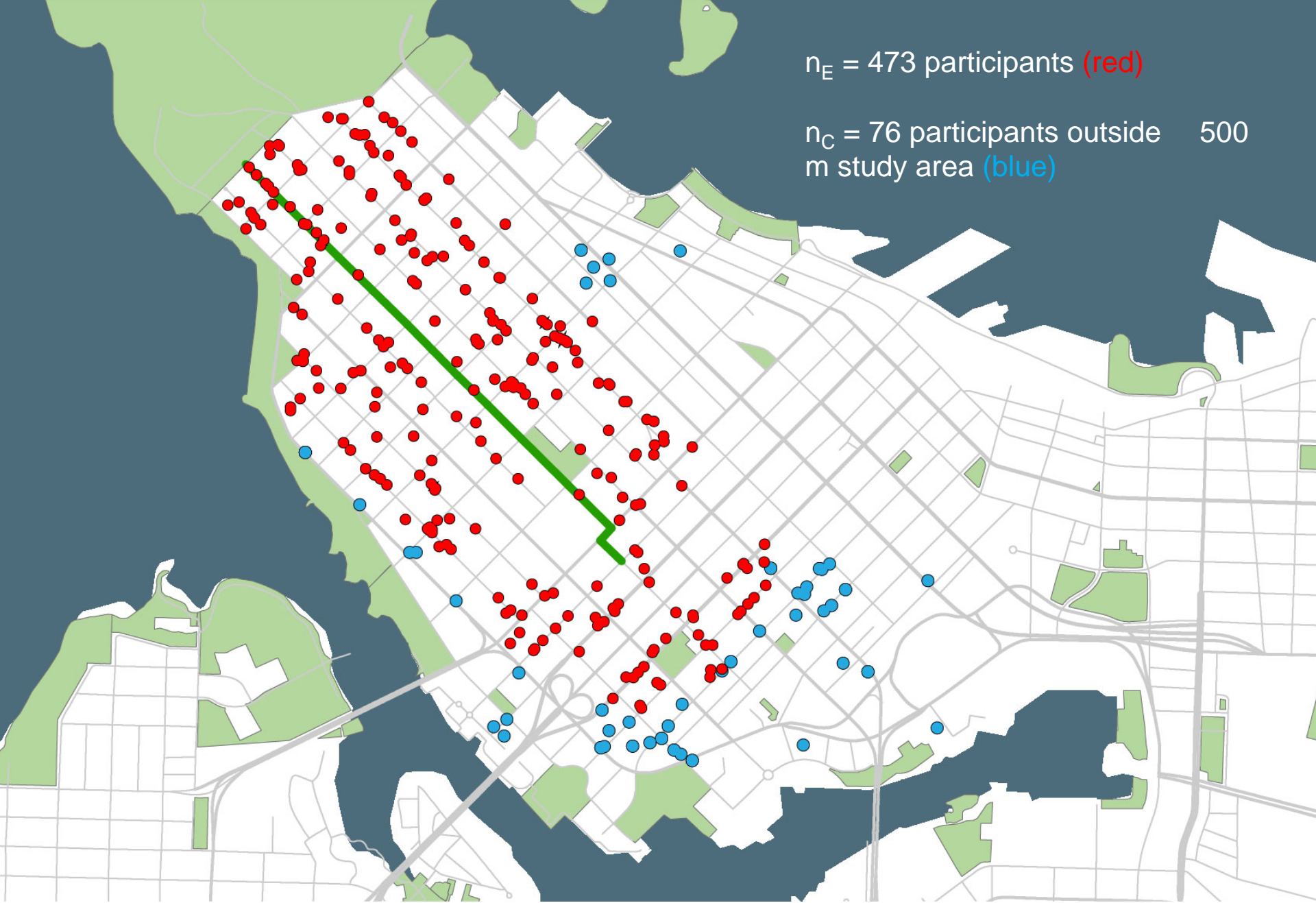
Northeast False Creek

Yaletown

Burrard Bridge

Campbell Bridge

Comox Corridor Greenway Vancouver, BC



$n_E = 473$ participants (red)

$n_C = 76$ participants outside 500 m study area (blue)

Before



After (Counterflow Lanes)



Results

- Study Participants After the Greenway Was Constructed Showed these Changes:
 - 32 % increase in bike trips
 - 23 % decrease in automobile trips
 - 33 % decrease in time spent in cars after the greenways
 - 16 % increase in the number of days engaged in moderate physical activity.
 - 10 % decrease in the number of days in poor physical or mental health
 - 8 % decrease in sedentary time
 - 21% reduction in GHG emission for those within 300 Meters of the Greenway

Tools to Quantify Health Impacts of Built Environment Changes

- San Diego Healthy Works Tool (CPPW / ARRA)
- California Public Health Assessment Model (CHPAM)
 - ✓ Southern California Association of Government's (SCAG) Regional Transportation Plan (RTP)
- National Public Health Assessment Model (NPHAM)
- National Environmental Database (NED)
- Monetizing Los Angeles region active transportation health outcomes

Evidence Links

Built Environment to Health

- regional accessibility
- walkable neighborhoods
- pedestrian micro-scale



- ✓ Physical Activity
- ✓ Body Mass Index
- ✓ Obesity
- ✓ Diabetes
- ✓ Cardiovascular Disease
- ✓ Mental Health
- ✓ Cancers

CALIFORNIA PUBLIC HEALTH ASSESSMENT MODULE (CPHAM)

Funders: California Strategic Growth Council (Lead) Office of Policy Research, SCAG, SACOG



CALIFORNIA STRATEGIC
GROWTH COUNCIL

Key Elements:

- Quantitative statistical models of **built environment & health**
 - BMI, likelihood of being obese, likelihood of having high blood pressure/heart disease/type 2 diabetes



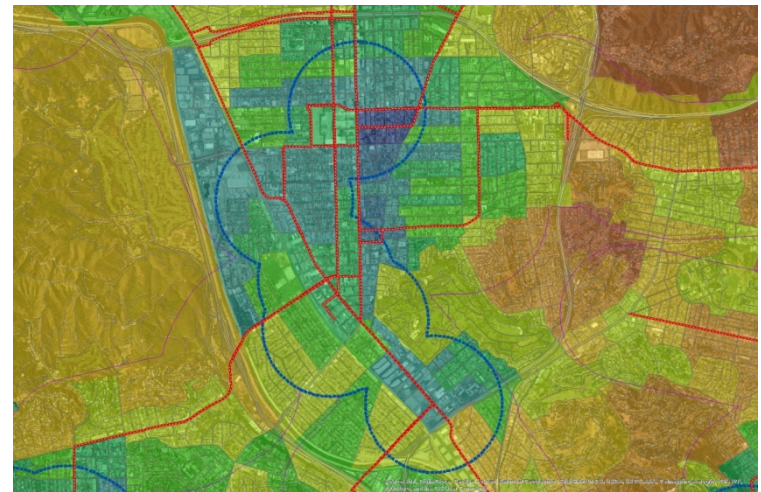
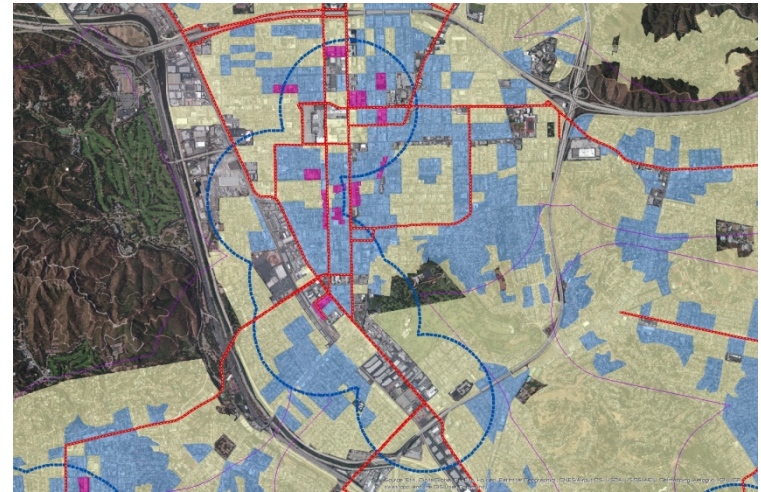
STRENGTH OF APPROACH

- **Large sample sizes**
 - 53,733 California Household Travel Survey participants
 - 40,617 California Health Interview Survey participants
- **Cohort-specific model development**
 - 4 age groups (seniors, adults, teens, children)
 - For adults, three HH income groups (<\$50k, \$50-100k, >\$100k)
- **California-specific evidence base**
 - CHIS and CHTS data were collected from a representative cross-section of Californians
- **Variability in built environment characteristics**
 - 30-county study area covers a broad range of built environments and travel behaviors across California

Modeling Los Angeles Region- Predictions

Adults: Ages 18-64	2040 Trend	Adopted Plan	Glendale
Recreation Physical Activity - Minutes Daily	14.6 min	+ .4%	+ 9%
Walking - Minutes Daily	12.1 min	+ 33%	+ 10%
Biking - Minutes Daily	1.6 min	+ 26%	+ 12%
Auto - Minutes Daily	64.8 min	- 4.4%	- 6%
Obese Population (%)	26.3%	- 1.3%	-3%
High Blood Pressure (%)	21.5%	- 1.2%	- 1%
Heart Disease (%)	4.4%	- 1.0%	0%
Diabetes - Type 2 (%)	6.1%	- 1.0%	- 11%

MORE HIGH QUALITY TRANSIT AREAS, GLENDALE (LA COUNTY)

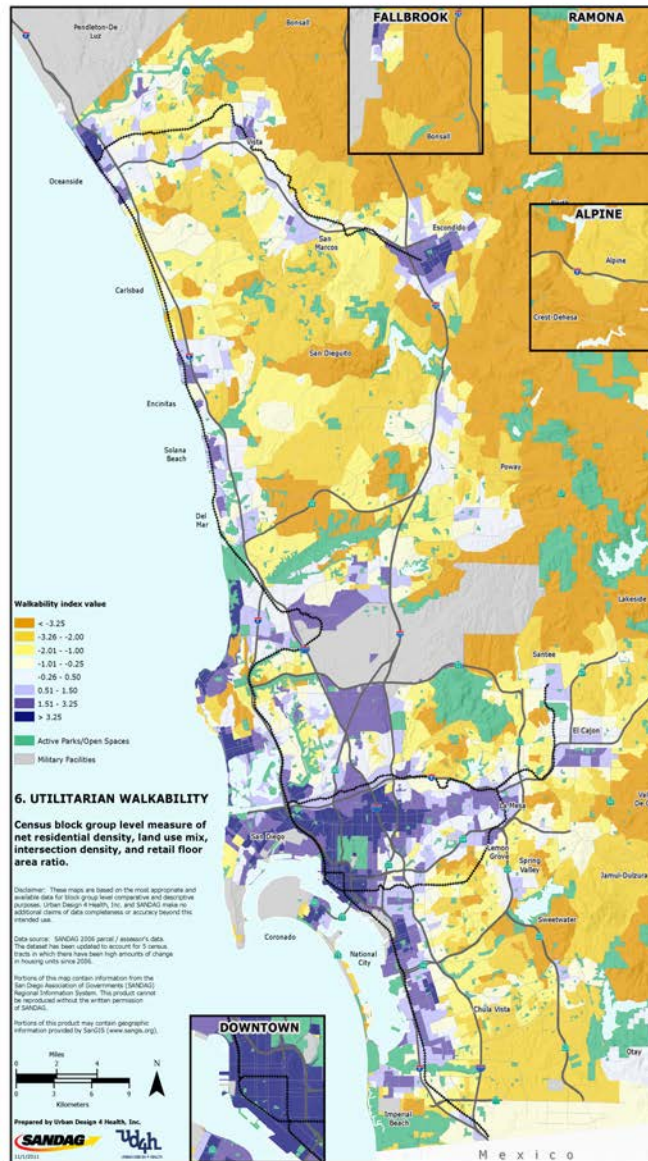


COMPOSITE

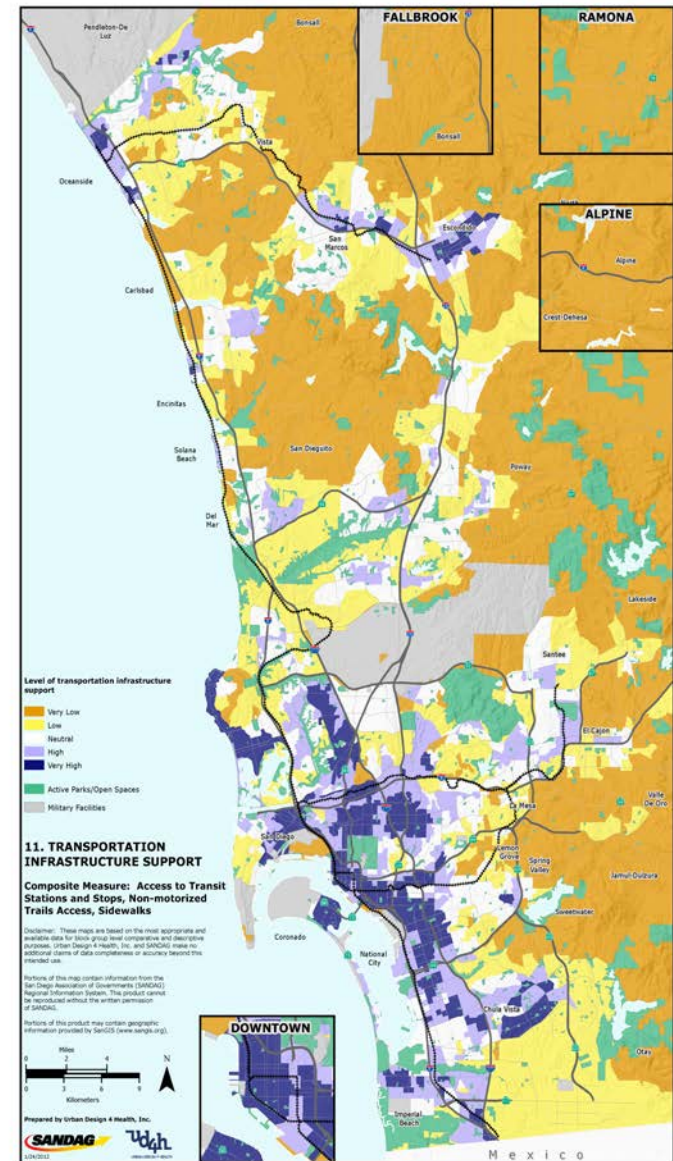
Variable
Examples:

San Diego

Health
Communities
Atlas

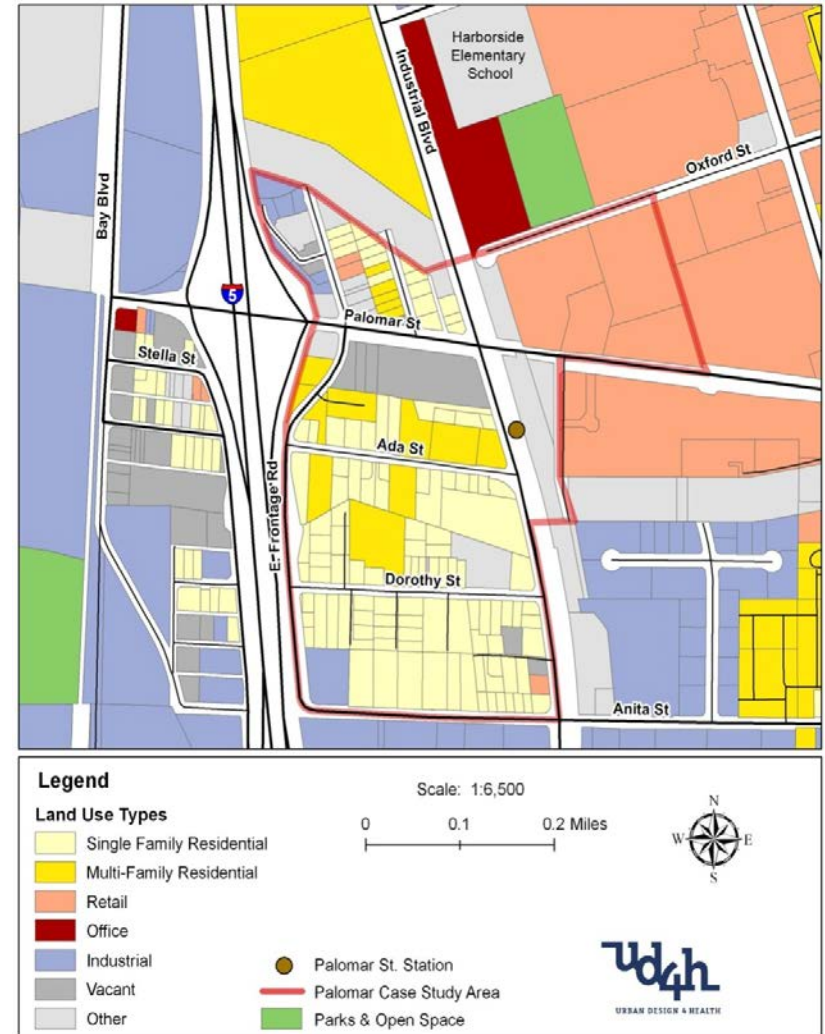
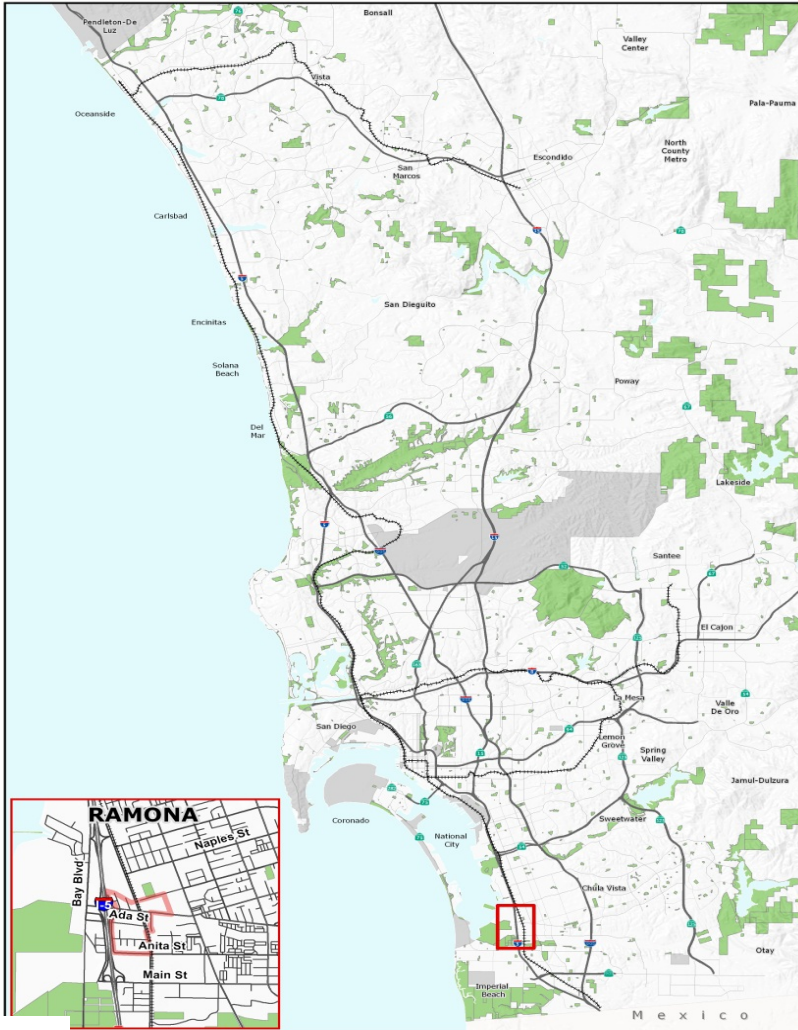


WALKABILITY



**TRANSPORTATION
INFRASTRUCTURE**

CASE STUDY: PALOMAR GATEWAY



PALOMAR GATEWAY RESULTS SUMMARY

All adult health metrics improved



- 68% increase minutes of daily transportation walking
- 15.4% reduction in high blood pressure
- 9.6 % reduction in type II diabetes

"GREEN PRESCRIPTION"

Background: Exposure to **nature and green** space help to:

- Encourage physical activity
- Reduce stress
- Promote restoration
- Improve air quality



Project: Green Prescription,
Sacramento Tree Foundation



Purpose:

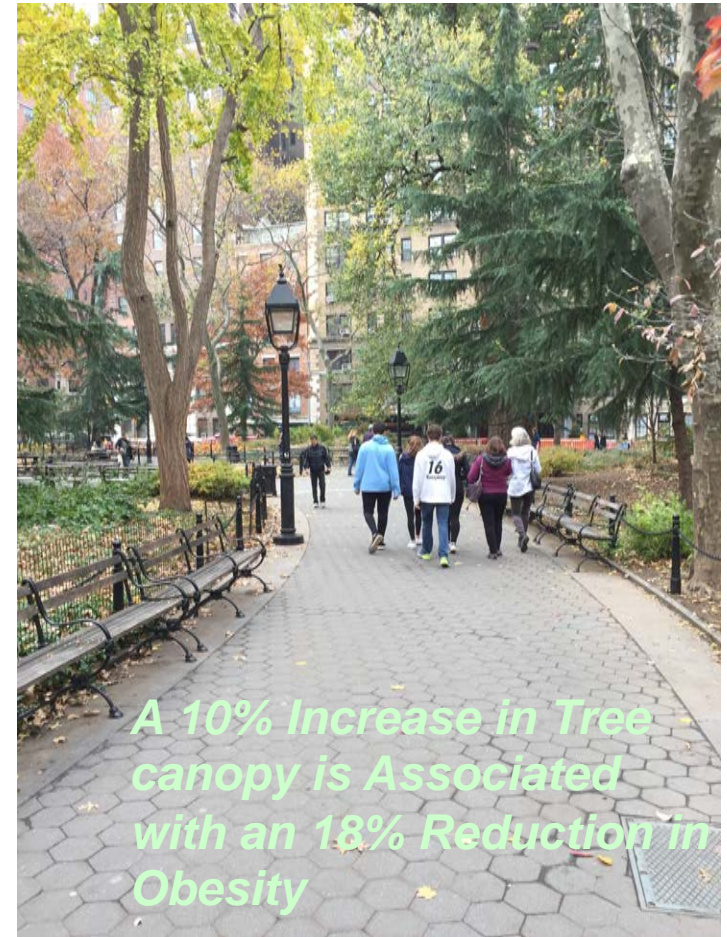
- Identify the health impact of urban **tree canopy**
- Understand health-related benefits of **tree planting**

Source: Ulmer, JM, Wolf, KL, Backman, DR, Tretheway, RL, Blain, CJ, O'Neil-Dunne, J & Frank, LD. (2016). Multiple Health Benefits of Urban Tree Canopy: The Mounting Evidence for a Green Prescription. *Health & Place*, 42, 54-62.

"GREEN PRESCRIPTION"

Results: ↑ neighborhood tree canopy associated with:

- Adults
 - More vigorous physical activity
 - Less obesity/overweight status
 - Less asthma
 - Better general health
 - Better social cohesion
- Teens
 - Less obesity/overweight status
 - Better general health
 - Fewer depressive symptoms
- Children
 - Less obesity/overweight status
 - Better general health



NATIONAL PUBLIC HEALTH ASSESSMENT MODEL (N-PHAM)

Goal: Develop a nationally applicable health impact tool that empower communities and developers to **quantify localized health impacts of alternative land use and transportation investment scenarios**

Funder: U.S. Environmental Protection Agency



Key Elements:

- Statistical regression models of **built, natural, and social environment effects on health**
 - Direct connection with modeled land use, walkability and health outcomes
- **Block group** level analysis and model predictions
 - Models developed from California statewide travel and health surveys



Residential Density and Mix of Housing Type



If I were to move, I'd like to find a neighborhood ...

A. that is a lively and active place, even if this means it has a mixture of single family houses, townhouses, and small apartment buildings that are close together on various sized lots.

or

B. with single family houses farther apart on lots 1/2 acre or more, even if this means that it is not an especially lively or active place.

Prefers a Walkable
Community Design

Maximum

Preferences

1

2

Built Environment

Low Walkability

High Walkability

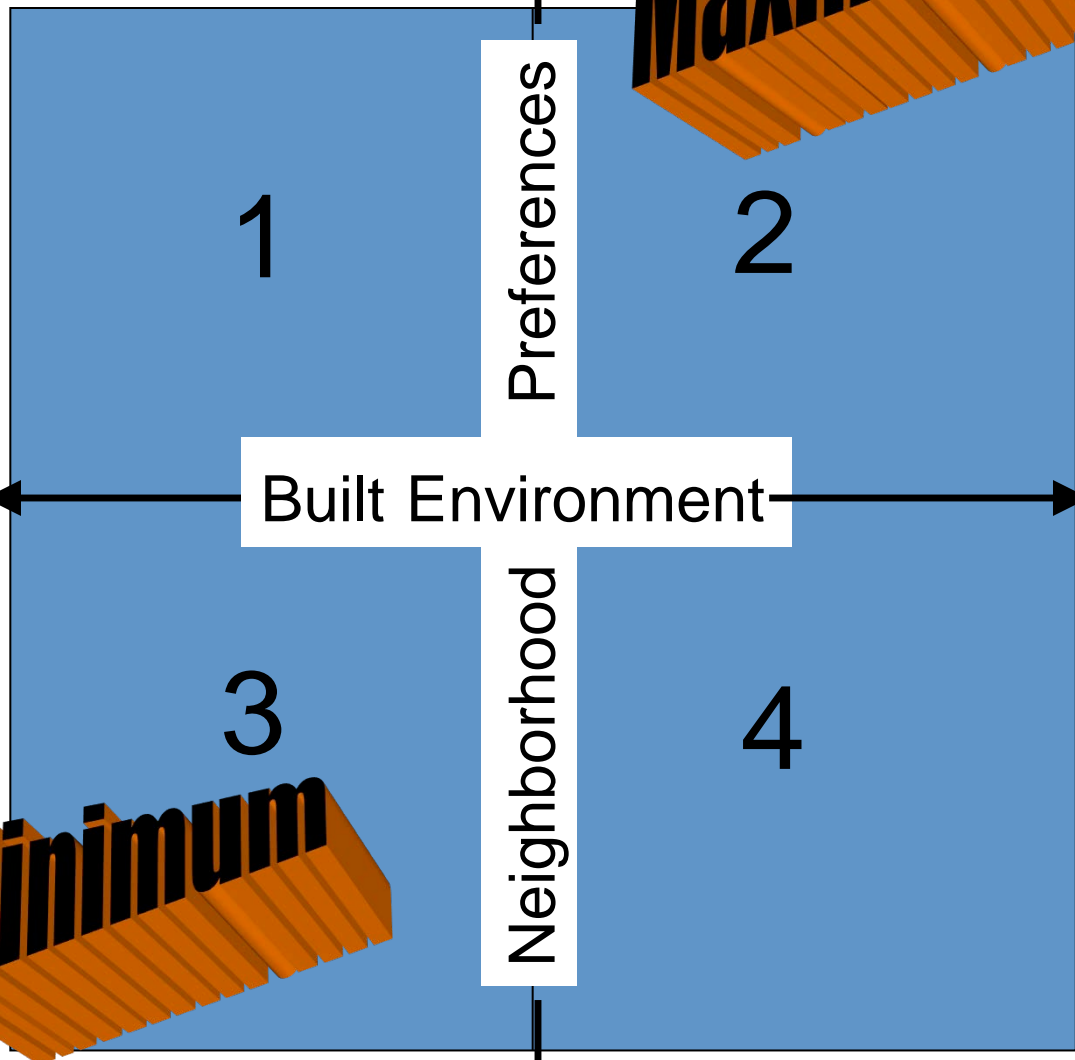
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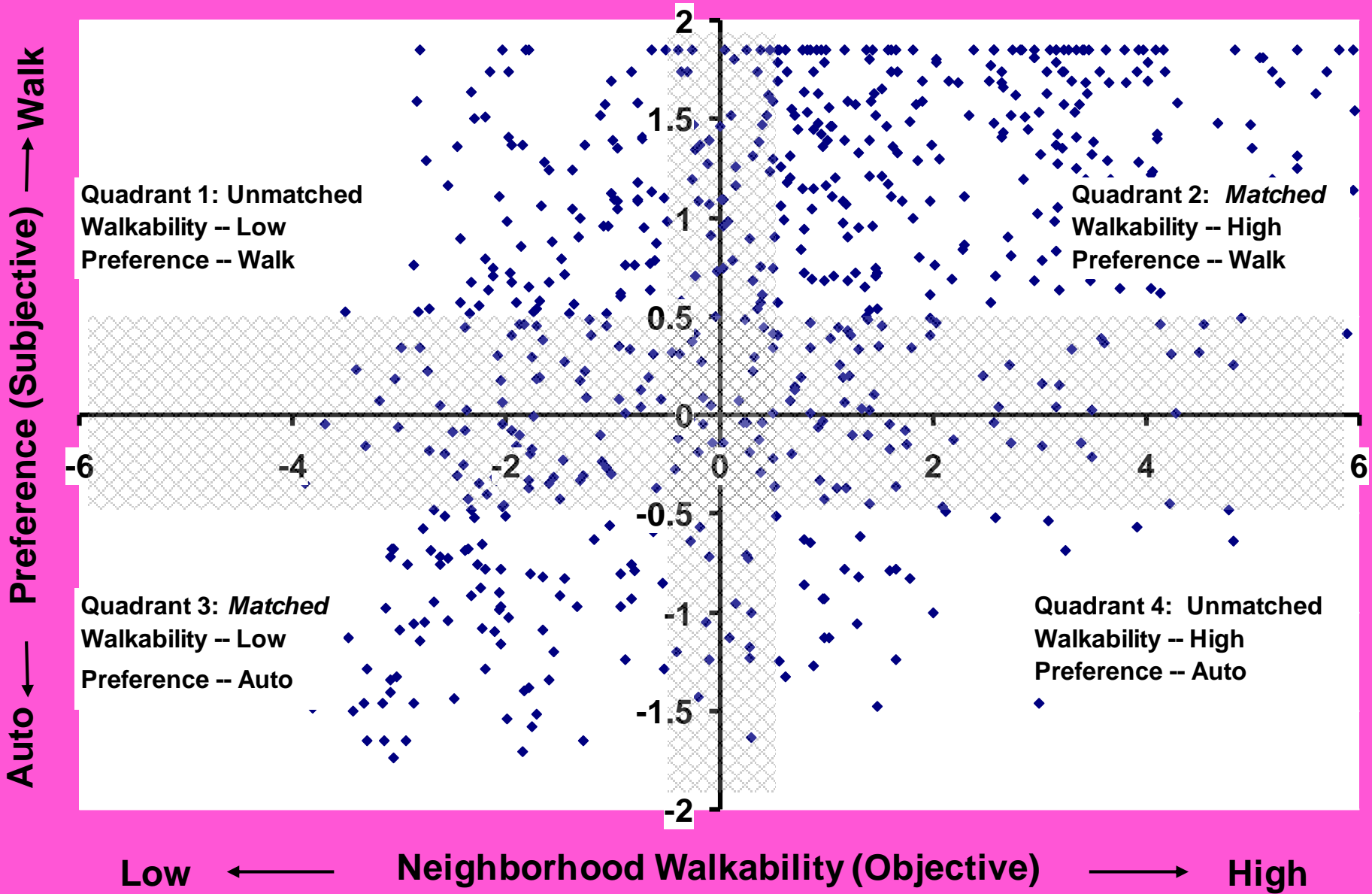
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Neighborhood

Minimum

Prefers Auto - Based
Community Design





PREFERENCE VS NEIGHBORHOOD DESIGN

Walkability & Preference Groups		Percent Taking a Walk Trip (n)	Average Daily Vehicle Miles Traveled (n)
	Preference for Neighborhood Type	Walkability of Current Neighborhood	
I	High	Low	16.0% (188) 36.6 (188)
II	High	High	33.9% (446) 25.8 (446)
III	Low	Low	3.3% (246) 43.0 (246)
IV	Low	High	7.0% (43) 25.7 (43)

It's All About Energy

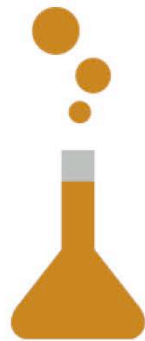


On 350 calories — one apple tart or a “special” slice of Ray's Pizza — a cyclist can travel 10 miles, a pedestrian 3.5 miles, and an automobile 100 feet.

Transportation Alternatives, Bicycle Blueprint, 1998

TRANSPORTATION ENERGY INDEX

THE GLOBAL WARMING GAMBLE



FUEL MIX



VEHICLE
EFFICIENCY



DEMAND

Policy Levers to Reduce
Transportation - Related CO₂ emissions



Questions?

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