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

HEALTH EFFECTS INSTITUTE ANNUAL MEETING

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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)
n_E = 473 participants (red)

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

predicts

✓ Physical Activity
✓ Body Mass Index
✓ Obesity
✓ Diabetes
✓ Cardiovascular Disease
✓ Mental Health
✓ Cancers
**Funders:** California Strategic Growth Council (Lead) Office of Policy Research, SCAG, SACOG

**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

30 counties / 25 million People
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

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

California Public Health & Activity Model – Scenario Planning for Southern California Association of Governments
Variable Examples:

San Diego

Health Communities Atlas

WALKABILITY

TRANSPORTATION INFRASTRUCTURE
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
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

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

**“GREEN PRESCRIPTION”**

**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.

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.
High Walkability  

Prefers a Walkable Community Design

Low Walkability  

Prefers Auto-Based Community Design

Built Environment

Preferences

Maximum

Minimum

Neighborhood

1

2

3

4
Quadrant 1: Unmatched
Walkability -- Low
Preference -- Walk

Quadrant 3: Matched
Walkability -- Low
Preference -- Auto

Quadrant 2: Matched
Walkability -- High
Preference -- Walk

Quadrant 4: Unmatched
Walkability -- High
Preference -- Auto
## PREFERENCE VS NEIGHBORHOOD DESIGN

<table>
<thead>
<tr>
<th>Walkability &amp; Preference Groups</th>
<th>Percent Taking a Walk Trip (n)</th>
<th>Average Daily Vehicle Miles Traveled (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preference for Neighborhood Type</td>
<td>Walkability of Current Neighborhood</td>
<td>16.0% (188)</td>
</tr>
<tr>
<td>I</td>
<td>Low</td>
<td>33.9% (446)</td>
</tr>
<tr>
<td>II</td>
<td>High</td>
<td>3.3% (246)</td>
</tr>
<tr>
<td>III</td>
<td>Low</td>
<td>7.0% (43)</td>
</tr>
<tr>
<td>IV</td>
<td>High</td>
<td>7.0% (43)</td>
</tr>
</tbody>
</table>
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
THE GLOBAL WARMING GAMBLE

Policy Levers to Reduce Transportation - Related CO2 emissions
Questions?

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