For the Health of It: Making the Connection to Land Use and Transportation

Paul Zykofsky, Local Government Commission, Sacramento, CA
Mitch Stripling, Florida Department of Health, Tallahassee, FL
Art Pearce, City of Portland Office of Transportation, Portland, OR

Rail-Volution Conference
Miami Beach, FL
November 1, 2007
Connecting Health and Community Design: An Overview

Paul Zykofsky, BArch, MUP, AICP
Local Government Commission

Rail-Volution Conference
Miami Beach, FL
November 1, 2007
The Ahwahnee Principles, 1991

- Response to our members’ concerns over sprawling, poorly planned development in their communities
- Assembled with assistance from leading architects and planners working on innovative solutions
The Ahwahnee Principles, 1991

- Planning complete and integrated communities with mix of uses
- Different uses should be in walking distance of one another
- Within walking distance of transit stops
- Should contain a diversity of housing types
- Should have a center focus
Embraced by local government officials in California and other states
LGC initiated programs on land use and transportation planning
1993 created Center for Livable Communities
Many cities and counties in California adopted all or part into their planning documents
Since 2001 have organized National New Partners for Smart Growth Conference
Implementation Strategy

- Plans should be developed through an open process and participants in the process should be provided visual models of all planning proposals.
The Economic Benefits of Walkable Communities

Why People Don't Walk and What City Planners Can Do About It

Why are we driving everywhere instead of walking?

Land Use Planning for Safe, Crime-Free Neighborhoods

Transportation Tools to Improve Children's Health and Mobility

Safe Routes to Schools

Why We Need Safe Routes:

Children are at risk from unsafe streets

- Children are one of the most vulnerable populations in terms of road safety

Looking at California Is Doing...
Leadership for Healthy Communities
Advancing Policies to Support Healthy Eating and Active Living
Alternative Patterns of Development

Traditional
Walkable

Conventional
Automobile-Oriented
On your marks, get set, go...

Population Growth: 38%
Vehicle Miles Traveled: 142%
U.S. Population Growth, 1950-1990

- Land has been urbanized 2½ times faster than the increase in urban population

1950
- Urban Population (millions): 70
- Urbanized Land (square miles): 13,000

1990
- Urban Population (millions): 150
- Urbanized Land (square miles): 60,000

Source: National Geographic
Graphic courtesy Design Community & Environment

Source: U.S. Dept. of Commerce, Census Bureau
The Health Impacts of Sprawl

- ↑ global warming
- ↑ air pollution
- ↑ heat island effect
- ↑ car crashes
- ↑ pedestrian injuries
- ↓ water quality
- ↓ mental health
- ↓ social capital
- ↓ physical activity

Credit: Dr. Richard Jackson
84% of California's Global Warming Pollutants Comes from Five Sectors

- 40% Transportation
- 16% Industrial
- 11% Electric Generation (out of state)
- 9% Electric Generation (in state)
- 8.5% Residential and Commercial
IMPACTS OF A WARMING ARCTIC
Greenland Ice Sheet Melt Extent

1992

2002
The projection is that within about 60 years, there will be no summer ice at all on the Arctic Ocean.

US National Snow and Ice Data Center – Sept 2005
Carbon loading of Atmosphere: Traveling just one mile

- A good car: 450 grams
- Walk:
Carbon loading of Atmosphere: Traveling just one mile

- A good car: 450 grams
- Walk: 1 gram
Air pollution

Major pollutants of concern:

- Ozone
- NOx
- CO
- Particulates
- Hydrocarbons
- Lead
- SOx
- Air toxics
- Allergens
Air pollution

Major pollutants of concern:

- Ozone
- NOx
- CO
- Particulates
- Hydrocarbons

Produced by cars and trucks

- Lead
- SOx
- Air toxics
- Allergens

Credit: Dr. Richard Jackson
Ozone health effects

- **Respiratory effects:**
  - Airway inflammation
  - Decreased air flow
  - Increased symptoms, ER visits, medication use, hospitalizations

- **Cardiovascular effects:**
  - Increased mortality

- **Immune effects:**
  - Increased susceptibility to infection
Deaths Due to Asthma in the United States, 1979-1997

Age group
- 0 to 4
- 5 to 14
- 15 to 34
- 35 to 64
- 65 +

Average # Deaths/Year

Year
- 79
- 81
- 83
- 85
- 87
- 89
- 91
- 93
- 95
- 97

Credit: Dr. Richard Jackson
Car crashes

- Leading cause of deaths among persons 1-24 years old
- Each year in the United States, motor vehicle crashes account for:
  - Over 40,000 deaths
  - 3.4 million nonfatal injuries
  - 24 million vehicles
  - Estimated $200 billion in costs

Source: NHTSA
Pedestrian Fatality Index

“The most dangerous metropolitan areas to walk in tend to be newer, sprawling, southern and western communities, where vast distances make walking impractical, and where transportation systems are designed for motor vehicle travel at the expense of other transportation options.”

— Surface Transportation Policy Project
“Mean Streets 1997” report
Safety and Community Design

Pedestrian Fatalities

More than half of the pedestrian fatalities occurred on minor arterials and local roads.
Water quantity and quality

- **Quantity:**
  - ↑ runoff
  - ↓ groundwater recharge

- **Quality:**
  - ↑ non-point source pollution
  - ↑ siltation
Road rage: Needless deaths

By Bill Montgomery
bmontgomery@ajc.com

Pat Duron admits that her husband, Chris, resembled “a big, rough bear” who could display a bearish temper.

He had mellowed with marriage, but Chris Duron’s widow and Clayton County police suspect he died Jan. 28 because he was angry enough to confront someone on I-75 who had an even hotter temper — and a gun.

The volatile combination of traffic-induced stress and anger that has become known as road rage has claimed at least five victims — killed or critically wounded — in metro Atlanta in a little more than three years.

Not all were active participants in a confrontation. Two-year-old Anthony Grimes, asleep in the cab of his father’s tractor-trailer, was critically injured by a gunshot April 21 from a car jockeying for the same lane on I-20 near Villa Rica. The shooting of the child, like Duron’s slaying, remains unsolved.

In the other fatal incidents:

■ Truck driver William Henry Sluder, 49, was killed on I-20 in downtown Atlanta in March 1999 by gunfire from an Oldsmobile Delta 88. The case has not been solved.

■ Sarkis Hazzouri, 38, a Cobb County businessman, was shot in

Please see ROAD RAGE, ALL
Methylphenidate (Ritalin) Consumption, United States and Elsewhere, 1987 - 1998


Credit: Dr. Richard Jackson
And the problem keeps getting worse...

- 49% rise in use of ADHD drugs by children under 5 from 2001-2004
- 21% increase in antidepressant use

Sacramento Bee, May 17, 2004
Sprawl and Physical Activity

- ↑ trip distances
- ↑ vehicle trips
- ↓ walking

↑ overweight
↑ obesity

Credit: Dr. Richard Jackson
Physical Activity

- Concern over impacts of sedentary lifestyle on public health
- 200,000 deaths/year attributable to physical inactivity
- Increase in seriously overweight youth
  - 5% in 1963-70
  - 14% in 1988-94
Obesity Trends Among U.S. Adults

* BMI ≥ 30, or ~ 30 lbs overweight for 5’4” woman

Source: Behavioral Risk Factor Surveillance System, CDC
Obesity* Trends Among U.S. Adults

* BMI ≥ 30, or ~ 30 lbs overweight for 5’4” woman

1991

Source: Behavioral Risk Factor Surveillance System, CDC
Obesity* Trends Among U.S. Adults

* BMI ≥ 30, or 
~ 30 lbs overweight for 5’4” woman

1995

Source: Behavioral Risk Factor Surveillance System, CDC
Obesity* Trends Among U.S. Adults

* BMI ≥ 30, or ~ 30 lbs overweight for 5’4” woman

1999

Source: Behavioral Risk Factor Surveillance System, CDC
Obesity* Trends Among U.S. Adults

* BMI $\geq 30$, or
~ 30 lbs overweight for 5’4” woman

2003

No Data | <10% | 10%-14% | 15-19% | $\geq 20\%$ | $\geq 25\%$ | Orange

Source: Behavioral Risk Factor Surveillance System, CDC
BMI US Females 1988-1994

NHANES -- Measured
NHANES – In person interview-- self-reported
BRFSS – Telephone Interview
An American Epidemic

Diabetes

The silent killer: Scientific research shows a ‘persistent explosion’ of cases—especially among those in their prime

BY JERRY ADLER AND CLAUDIA KALB

Something terrible was happening to Yolanda Benitez’s eyes. They were being poisoned; the fragile capillaries of the retina attacked from within and were leaking blood. The first symptoms were red lines, appearing vertically across her field of vision; the lines multiplied and merged into a haze that shut out light entirely. “Her blood vessels inside her eye were popping,” says her daughter, Janette Roman, a Chicago college student. Benitez, who was in her late 40s when the problem began four years ago, was a cleaning woman, but she’s had to stop working. After five surgeries, she has regained vision in one eye, but the other is completely useless. A few weeks ago, awakening one night in a hotel bedroom, she walked into a door, setting off a paroxysm of pain and nausea that hasn’t let up yet. And what caused this catastrophe was nothing as erotic as pesticides or emerging viruses. What was poisoning Benitez was sugar.
Relationship Between BMI and Risk of Type 2 Diabetes

Diabetes and Gestational Diabetes Trends Among Adults in the U.S., BRFSS

1997-98

Diabetes and Gestational Diabetes Trends Among Adults in the U.S., BRFSS

Michael Ramirez

The United State of Obesity
Underlying Causes of Death in the US

- Tobacco: 19%
- Diet/Activity Patterns: 14%
- Alcohol: 5%
- Microbial Agents: 4%
- Toxic Agents: 3%
- Firearms: 5%
- Sexual Behavior: 3%
- Motor Vehicles: 3%
- Illicit Drug Use: 3%

Explaining the Obesity Epidemic

- Not genetic or biological changes
- But sweeping societal and environmental changes
The Unfortunate Result

The Problem
- 27% of adults are sedentary
- 61% of adults are overweight
- 1 in 4 adults is obese

The Outcome
- Obesity, Cardiovascular Disease, Cancer, Diabetes
- Physical inactivity is a primary factor in over 250,000 deaths annually.
- Medical costs associated with physical inactivity and its consequences may exceed $120 billion annually.

Physical Inactivity/Overweight Trends Among Youth

- 1 in 7 youth ages 6–19 is overweight
- Children spend more time watching television in a year than they do attending school
The Disappearing Walk to School

- 1 in 4 trips made by 5-15 year olds are for the journey to and from school.
- Only 10% of these trips are made by walking and bicycling.
- Of school trips one mile or less, about 28% are walk-based and less than 1% are bike-based.
The Disappearing Walk

- One fourth of all trips people make are less than one mile, yet three-fourths of these short trips are made by car.

Source: Nationwide Personal Transportation Study (NPTS), 1970, 1990, 1995
Non-Motorized Trips 1977-1995

% of Total Trips

- Bike Trips
- Walk Trips

Nationwide Personal Transportation Survey - USDOT
Problem: Can’t walk or bike there from here...
The harangues haven’t worked...

Percentage of Adults reporting participation in regular and sustained activity 1986-1994 BRFSS*

*25 states and the District of Columbia
“Reliance on physical activity as an alternative to car use is less likely to occur in many cities and towns unless they are designed or retrofitted to permit walking or bicycling. The location of schools, work sites, and shopping areas near residential areas will require substantial changes in community or regional design.”

The good news...

“Physical activity need not be of vigorous intensity for it to improve health.”

The good news...

- Significant health benefits can be obtained through moderate amount of physical activity on most days of the week:
  - 30 minutes of brisk walking or raking leaves
  - 15 minutes of running
  - 45 minutes of playing volleyball
Factors that Influence Active Living/Health

- Land Use Mix
- Density
- Site Design
- Connectivity
- Street Design
Residents of mixed-use communities have more opportunities to walk and use transit.

For trips less than one mile (75% of trips), mixed-use communities generate up to 4-times as many walk trips.
Land Use Mix — Example

Housing over retail
Dallas, TX
Land Use Mix — Example

Housing over market

Addison, TX
Land Use Mix — Example

Housing next to retail
Salinas, CA
Land Use Mix — Example

Housing over retail
Sacramento, CA
Land Use Mix

Developers are embracing more and more
Appropriate residential and employment density (>7 units and 100 employees per acre) are associated with increased walk, bike, and transit trips.
Compact vs. Low Density Development
American Farmland Trust Study of Growth in California’s Central Valley — 1995-2040
Low Density Development Scenario (3 units/acre)

Compact vs. Low Density Development
Compact vs. Low Density Development

...vs. More Compact Development Scenario (6 units/acre)
Projected Loss of Agricultural Sales in 2040

(Millions of 1993 dollars)

Cumulative loss (1995-2040): $72 billion

Compact vs. Low Density Development

City Revenues/Public Service Costs in 2040
(Millions of 1993 dollars)

Cumulative loss (1995-2040): $29 billion

Land Use Pattern Affects Travel — Higher Density can reduce Vehicle Trips

Significant reduction as we go from 3-4 units/acre to over 20 units/acre

Source: John Holtzclaw, PhD, Sierra Club
Land Use Pattern Affects Travel — Density to Support Transit

For Light Rail Service
- 18-25 units/acre in urban area

For Bus Service
- 7 units/acre (every 30 minutes)
Land Use Pattern Affects Travel — Density to Support Retail

For a 10,000 sq.ft. Convenience Store
- 7 units/acre

For a 25,000 sq.ft. Small Supermarket
- 18 units/acre
Compact Development

Kettner Row, San Diego
Compact Development
Uptown Village, Dallas

“The traditional family — married couples with children — is slowly declining in number, while households made up of single persons living alone, singles living together, and married couples without children are growing rapidly. These three groups will account for 90 percent of the net new household growth projected in this decade, according to U.S. Census Bureau figures.”

Site Design — Summary of the Literature

- Design features that promote walk/bike trips
  - Appropriate levels of residential density, land use mix, and street connectivity
  - Short building setbacks
  - Neighborhood parks and greenspace
Site Design — Example
Connectivity —
Summary of the Literature

- Poor connectivity reduces pedestrian mobility and trips
- As the number of intersections and blocks increase the number of walk trips increase
- As the number of cul-de-sacs and loops increase the number of walk trips decrease
Trip Assignment: Traditional
Conventional Pattern of Development
Trip Assignment: Conventional
Traditional vs. Conventional

Central Business Districts at the same scale

Savannah, Georgia
Irvine, California
Street Design — Summary of the Literature

- Perceptual qualities of the street influence pedestrian use
- Good pedestrian environments
  - maintain visual and sensory attention
  - streets are calm, narrow, and complex
Street Design

- Influences trip choices
  - Safe, quiet, slow, shaded streets encourage people to walk, ride bicycle or take transit instead of driving a car
Street Design

- Can help create more livable neighborhoods
  - Improve property values
  - Lower costs
  - Improve quality of life
Street Design

- Can help revitalize retail areas
Principles of Healthy Streets

- Street as an outdoor room
- People feel more comfortable when trees and houses provide a sense of enclosure
- Eyes on the street make the street safer
Principles of Healthy Streets

- Streets designed for people, not just cars
- Friendly to cars, pedestrians and cyclists
Principles of Healthy Streets

- Streets designed so drivers feel comfortable at slow speeds
  - 15-25 mph on neighborhood streets
  - 25-35 mph on avenues and boulevards
Principles of Healthy Streets

- Narrower streets are slower and safer
  - Longmont, CO study of 20,000 accidents
    - Found street width had the greatest relationship to injury accidents
  - Accidents/mile/year were higher on wider streets
    - 40-foot wide street 2.23 a/m/y
    - 36-foot wide street 1.21 a/m/y
    - 24-foot wide street 0.32 a/m/y

Recommended Designs for Different Types of Roadways
Recommended Designs for Different Types of Roadways

“Major”:
- Arterials and collectors

“Urban”:
- Development intensity
- Mix of land uses
- Efficient, attractive choices
  - Walking
  - Transit
  - Biking
Healthy Streets Need Good Sidewalks

- Detached from curb
- At least 5 feet wide
- Planting strip helps shade street and sidewalk

**SIDEWALK FEATURES**

- Width (minimum 5'), 6 feet if at back-of-curb (AASHTO)
- Crossfall 1:50
- Pedestrians need a 2 foot wide buffer to all edges, curb, buildings, bridge railings etc.
- Buffer to motor vehicles (4-10'), nature-strip 7 feet wide to plant trees
- Street lighting, shade
- Pavers can be used for enhancement
Healthy Neighborhoods Need Good Street Crossings
Road Diets

Before

After

Castro Street, Mountain View, CA
# Road Diets in Seattle
*(4 to 3 lanes)*

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<th>Roadway</th>
<th>Date</th>
<th>ADT Before</th>
<th>ADT After</th>
<th>Collision Reduction</th>
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<td>Greenwood Ave N</td>
<td>Apr-95</td>
<td>11872</td>
<td>12427</td>
<td>24 to 10 58%</td>
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<tr>
<td>N 80th St to N 50th</td>
<td></td>
<td>13606</td>
<td>14949</td>
<td>19 to 16 59%</td>
</tr>
<tr>
<td>N 45th Street</td>
<td>Dec-72</td>
<td>19421</td>
<td>20274</td>
<td>45 to 23 49%</td>
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<tr>
<td>Wallingford Area</td>
<td></td>
<td>10549</td>
<td>11858</td>
<td>18 to 7 61%</td>
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<tr>
<td>8th Ave NW</td>
<td>Jan-94</td>
<td>12336</td>
<td>13161</td>
<td>15 to 6 60%</td>
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<td>Ballard Area</td>
<td></td>
<td>13606</td>
<td>14949</td>
<td>14 to 10 28%</td>
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<tr>
<td>Martin Luther King Jr W</td>
<td>Jan-94</td>
<td>11872</td>
<td>12427</td>
<td>24 to 10 58%</td>
</tr>
<tr>
<td>North of I 90</td>
<td></td>
<td>13606</td>
<td>14949</td>
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<tr>
<td>Dexter Ave N</td>
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</table>
Doctors Agree

“With your head full of brains and your shoes full of feet, you're too smart to go down any not-so-good street. And you may not find any you'll want to go down. In that case, of course, you'll head straight out of town.”

— Theodore Geisel (aka Dr. Seuss)
from the book Oh, the Places You’ll Go
Access to Healthy Food: Farmers Markets, Community Gardens

- Support Farmers Markets, Community Gardens, Farm-to-School programs
- Support access to nutritious food in neighborhoods
- Zone out junk food
Safe Routes to School

Based on a national course developed with support from:

U.S. Department of Transportation
Federal Highway Administration

NISSA
People Saving People

CDC
Centers for Disease Control and Prevention

EPA
United States Environmental Protection Agency

Prepared by the Pedestrian and Bicycle Information Center
Success story: Marin County, CA encouragement programs

- Walk or Wheel Wednesdays
- Frequent Rider Mile Contests
- Walking school buses
- Fliers, posters, newsletters
- Media coverage
- Website
Marin County, CA, results

- 64% increase in the number of children walking to school
- 114% increase in the number of children biking to school
- 91% increase in carpooling
- 39% decrease in children transported to school by private car

Elements of Safe Routes to School programs

- Education
- Encouragement
- Engineering
- Enforcement
Conduct Walkability Audits

- Work with residents to identify problems
- Facilitate community-driven plan
- Identify implementation steps
The perfect invention for the most OBSESE NATION on EARTH...THE SEGWAY TRANSPORTER!

DON'T WALK

The way cities and suburbs are developed could be bad for your health

Cover Story

The potential for actually tackling some of these things, with the savvy of the folks who have tackled tobacco, is enormous,” says Ellen VanderWiel, head of America Walks, a pedestrian advocacy group based in Portland, Ore.

A study by the national Centers for Disease Control and Prevention is tracking 8,000 residents of Atlanta to determine whether the neighborhood they live in influences their level of physical exercise. The Robert Wood Johnson Foundation in New Jersey.

Please see COVER STORY next page.

By Dwight Yorke, USA TODAY
Message is getting out

Published by Island Press
For more information

- Local Government Commission
  Center for Livable Communities
  - Web: [www.lgc.org](http://www.lgc.org)
  - Phone: 800-290-8202

- New Partners for Smart Growth Conference
  - Washington, D.C.
  - February 2008 [www.newpartners.org](http://www.newpartners.org)