

# Impacts on Health of the Built Environment

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Habitat and Health Congress  
Universidad de los Andes, Santiago, Chile  
22 August 2024, by Zoom

# Key Message

- Public Health and the Built Environment are highly interconnected



# Why Health and Built Environment?

- Public health promotes **healthy behaviors** such as physical activity, nutritious food
- Planners, architects, and transportation professionals design and build the physical environment that facilitates or hinders **healthy behaviors**
- Public health and design professionals need to work together

# Make the Healthy Choice the Easy Choice



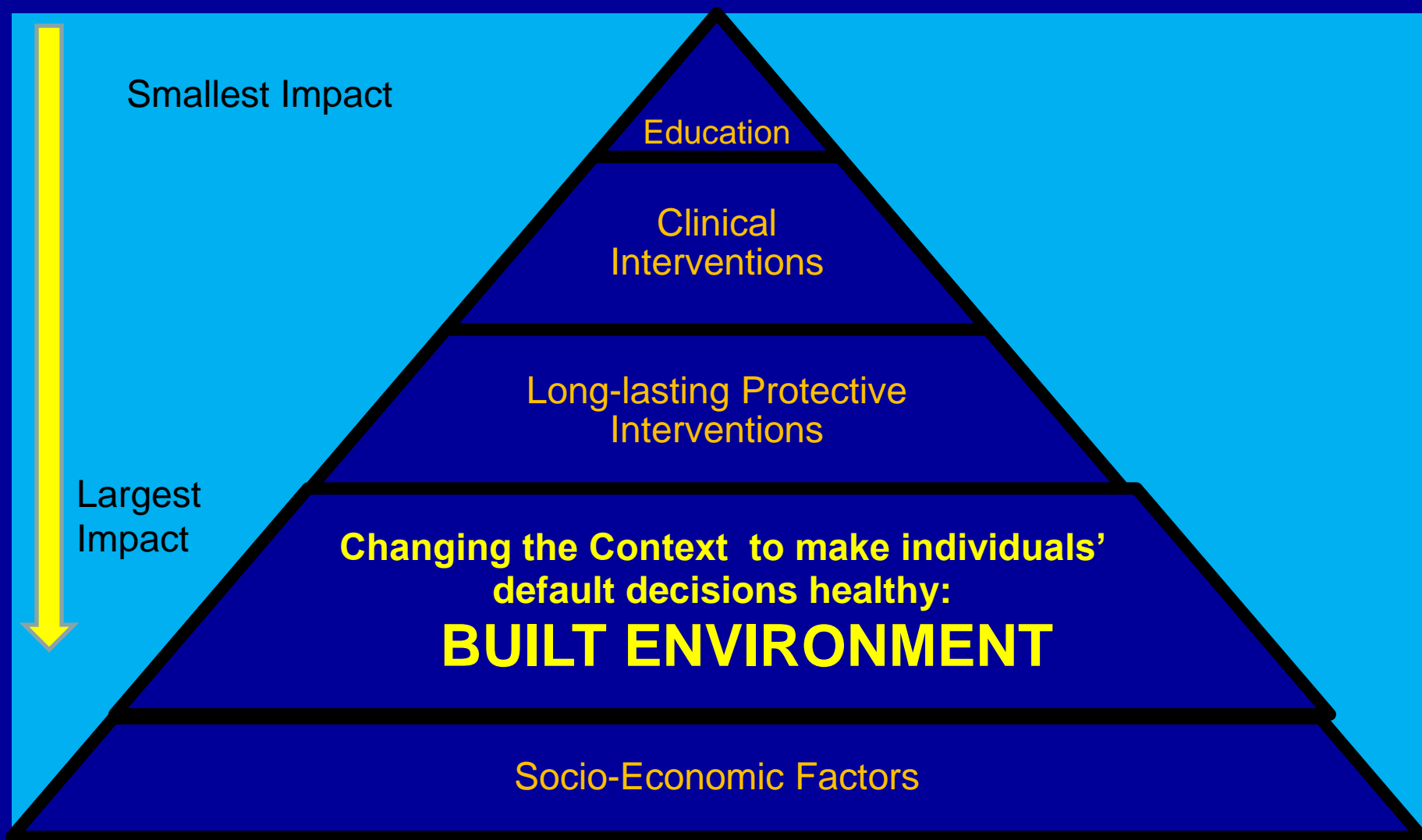
# What is Health?

- *“a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”*
  - World Health Organization

- Physical health
- Mental health
- Well-being
- Livability



# Approaches to Influence Health

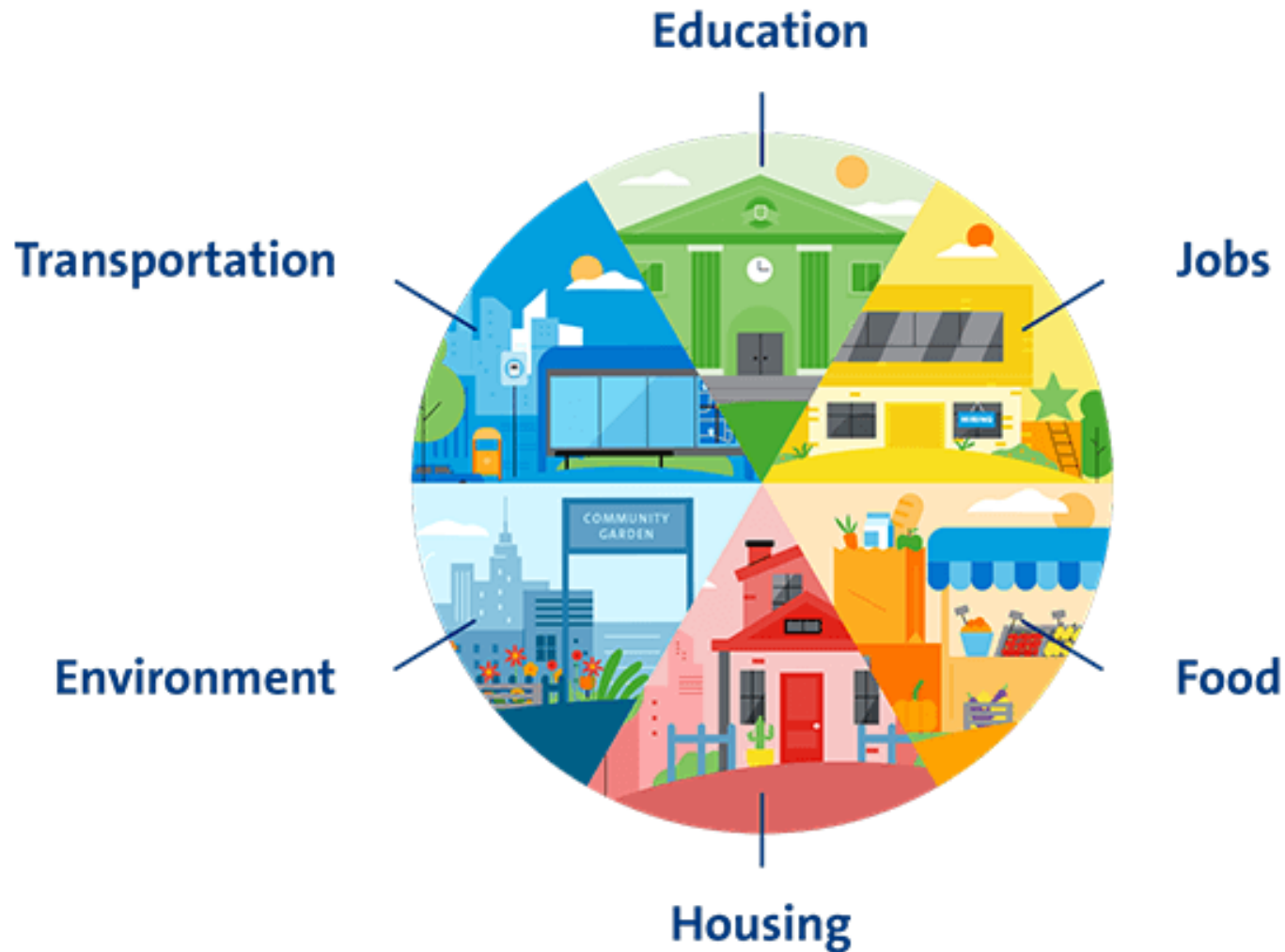


# Factors that Affect Health

- Physical fitness
- Diet and nutrition
- Social connectedness
- Clean environment
- Genetics



# Determinants of Health





# Built Environment

- The man-made or modified structures that provide people with spaces for living, working, and recreation
  - Buildings such as houses, stores, schools, offices, hotels, factories
  - Transportation systems such as roads, bridges, railroads, public transit, sidewalks, bike trails
  - Parks, playgrounds, gardens
  - Utility systems for water, electricity, communication, waste management

# Who Designs and Builds the Built Environment

- Architects
- Urban planners
- Transportation planners
- Landscape architects
- Developers
- Civil engineers
- School planners
- Park planners
- Others

# Community Design and Health

## **Related to land use**

- Physical activity, heart disease
- Water quantity and quality
- Access to healthy food

## **Related to automobile dependency**

- Air pollution and asthma
- Car crashes
- Pedestrian injuries
- Climate change contribution

## **Related to social processes**

- Mental health impact
- Social capital
- Environmental justice

# Physical Activity

A sedentary lifestyle increases the risk of

- overall mortality (2 to 3-fold)
- cardiovascular disease (3 to 5-fold)
- some types of cancer, including colon and breast cancer

The effect of low physical fitness is comparable to that of hypertension, high cholesterol, diabetes, and even smoking.



# Determinants of Physical Activity

More likely to exercise if:

- Walking trails, parks and gyms accessible
- Sidewalks present and scenery enjoyable
- Many people exercising
- Friends available with whom to exercise

Less likely to exercise if:

- Too little time
- Too tired
- Unmotivated
- Perceived traffic, crime or danger
- Long distance to exercise location



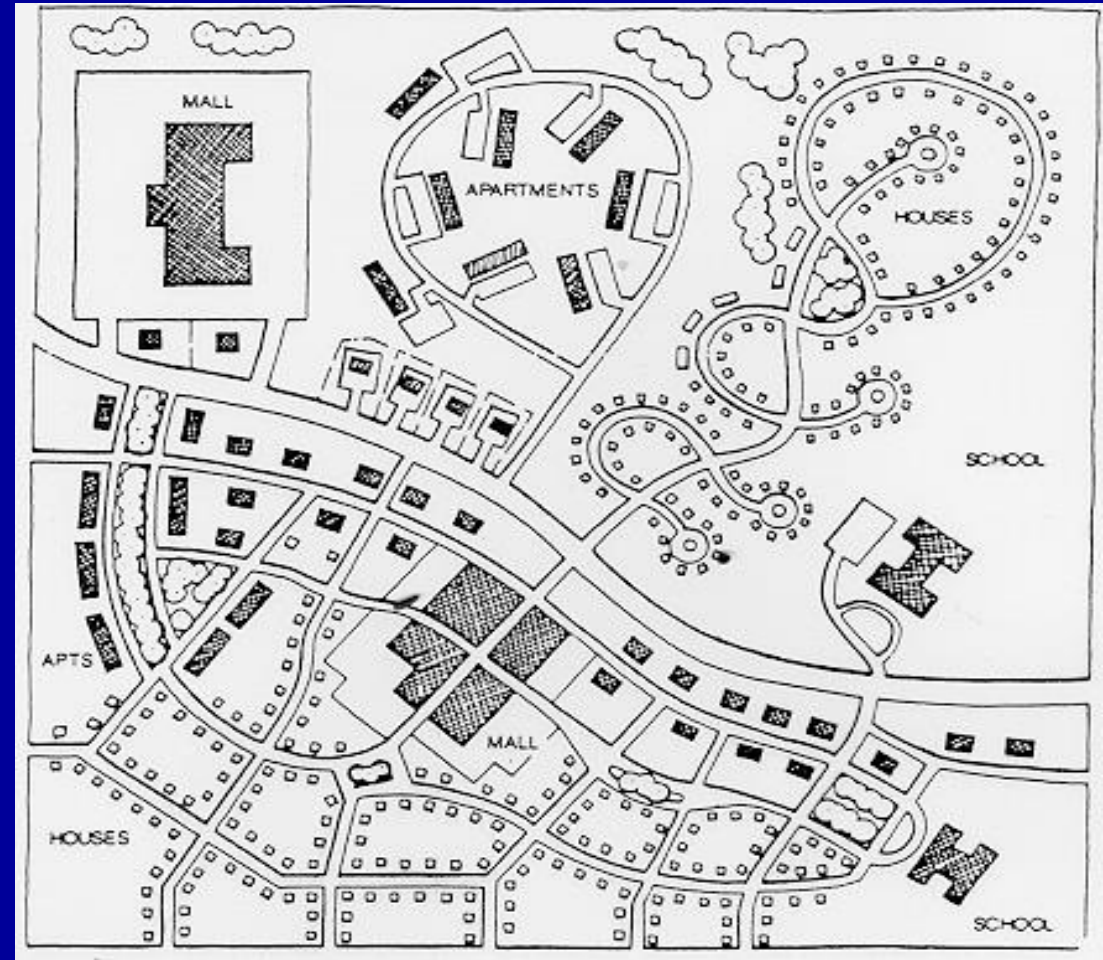
□ Source: Brownson RC et al, *AJPH* 91:1995, 2001  
□ HealthStyles Survey, 1999

# Walkable Community Designs: Connectivity and Physical Activity

Suburban  
Development



Traditional  
Neighborhood



Drawing by Duany Plater Zyberk,  
in ITE Journal 1989;59:17-18

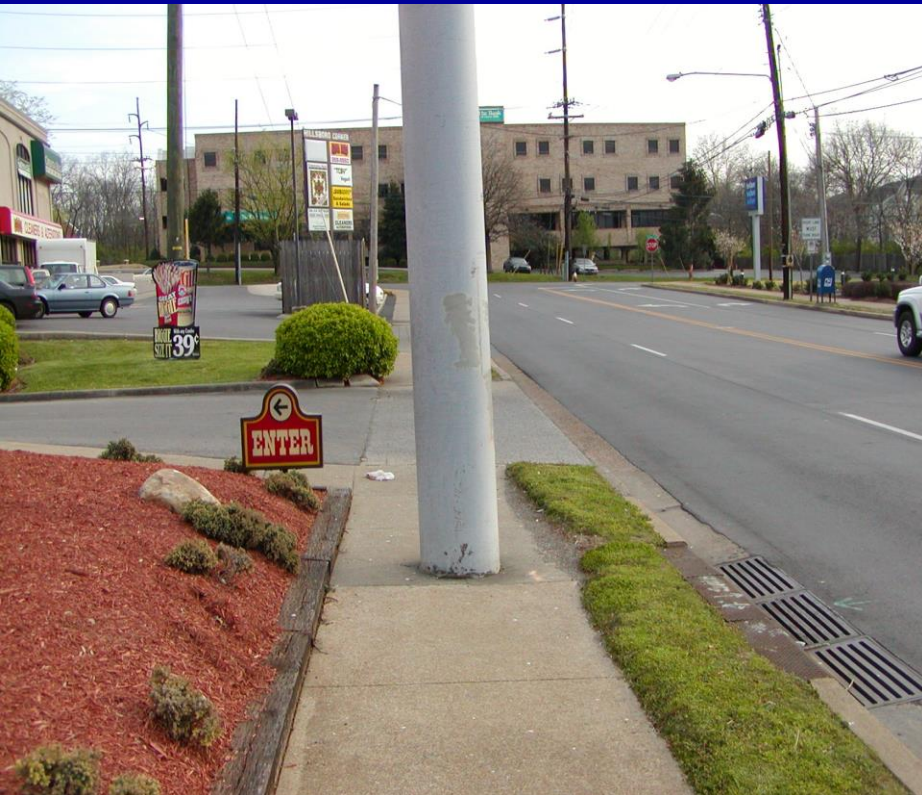




Durham, NC



# Transportation Design to Discourage Physical Activity



# Transportation Design to Encourage Physical Activity



Cooper River Bridge, Charleston, SC

## \* CANINE CONSTITUTIONAL



Tom Rowell / Olycom

A brisk walk in the park keeps Narey B in shape between dog shows. His owner, Columbus resident Cathy Stumbo, got up early

to give her 3-year-old Doberman his regular workout. They typically log 18 miles in Berliner Park.

# Transportation Planning and Land Use Choices

## Will 23 lanes be enough?

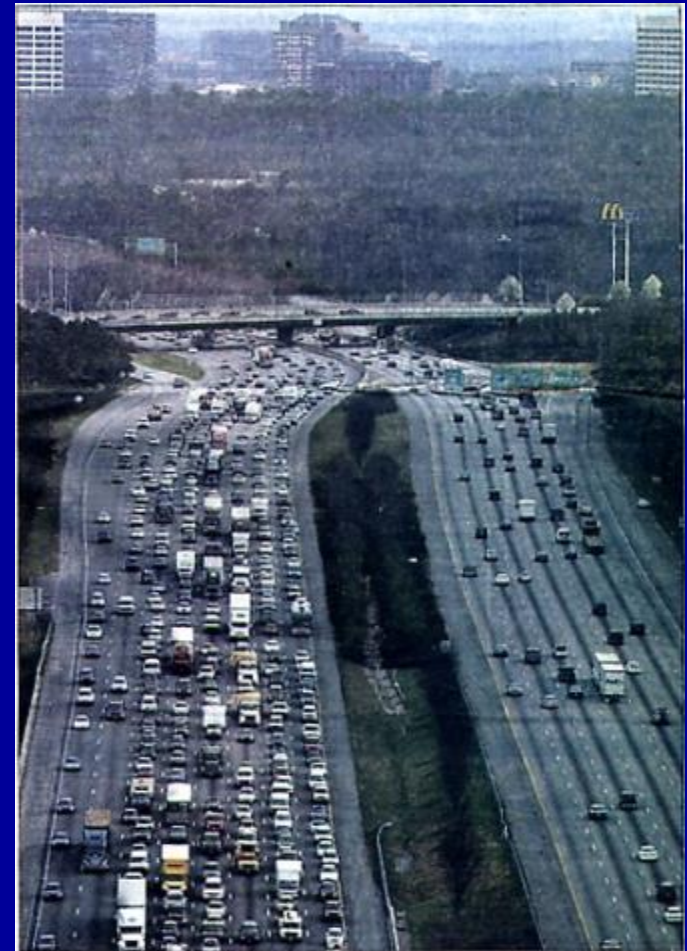
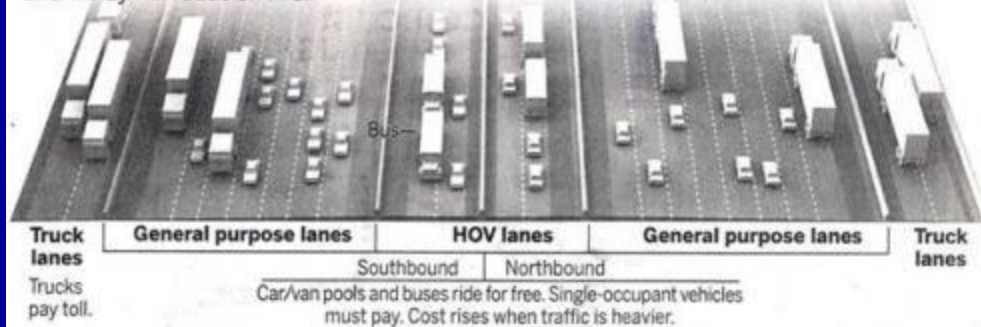
Proposal would put I-75 among country's biggest

By ARIEL HART  
ahart@ajc.com

It's wider than an aircraft carrier. Far wider than the carving on Stone Mountain. Wider than the White House stretched end to end, twice.

It's the planned I-75, all 23 lanes, coming soon to Cobb County. As currently conceived it's 388 feet across, wider than a football field is long.

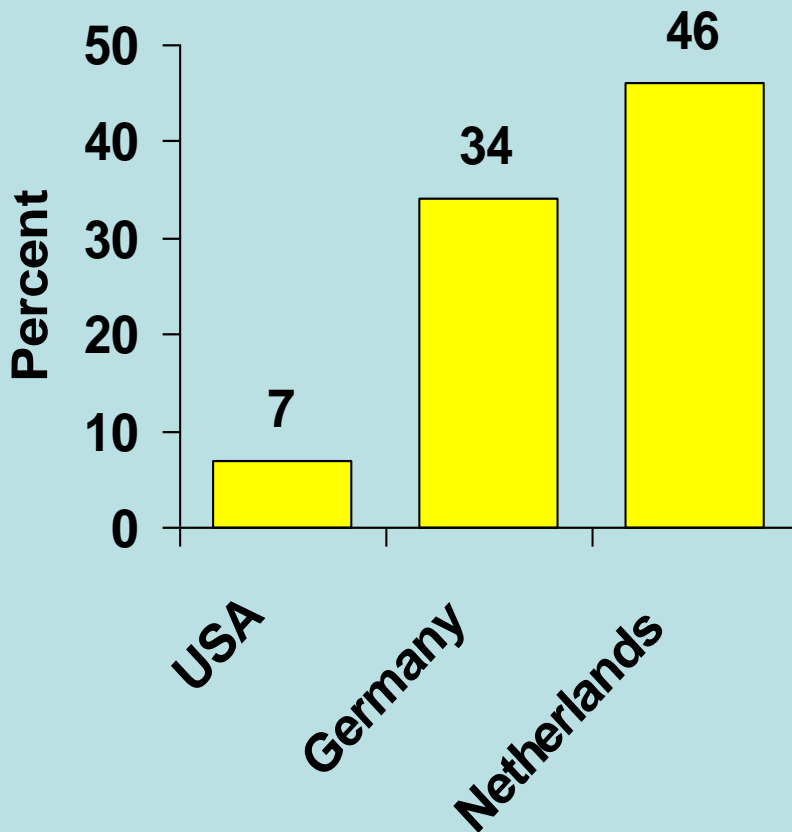
**23 LANES:** The state Department of Transportation is planning to expand I-75 (below) and I-575 in Cobb and Cherokee counties. The 23-lane stretch would be between Delk and Windy Hill roads on I-75.



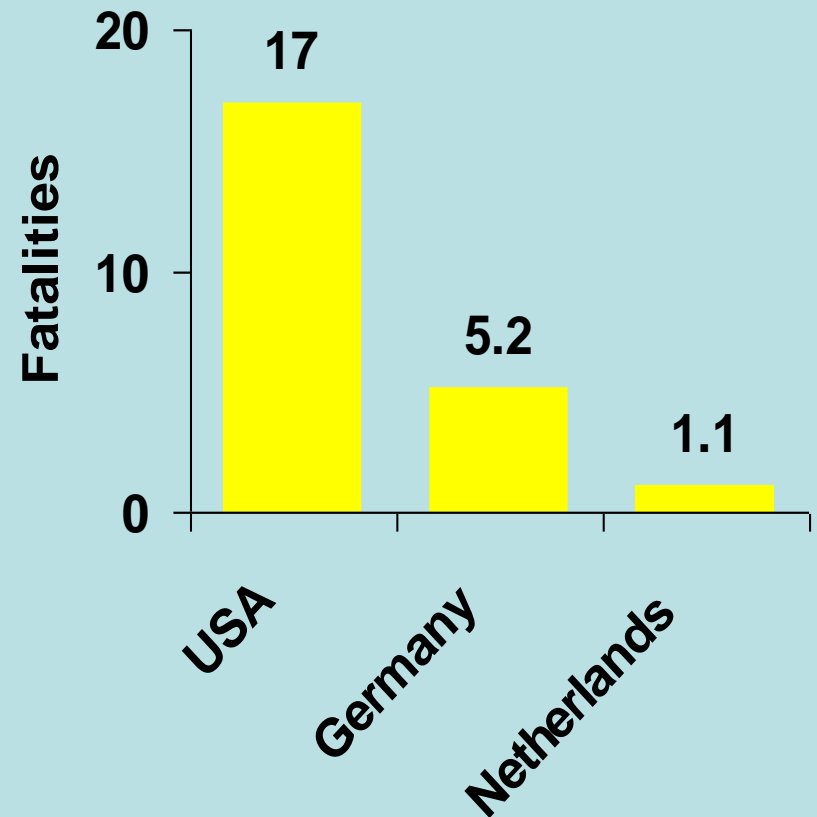
LOUIE FAVORITE / STAFF  
Traffic heads north on I-75, just north of I-285, on Thursday. A proposal for the interstate is enough to make a road builder weep with joy, and make others wonder whether it's overkill.

# Walking and Bicycling: International Comparisons

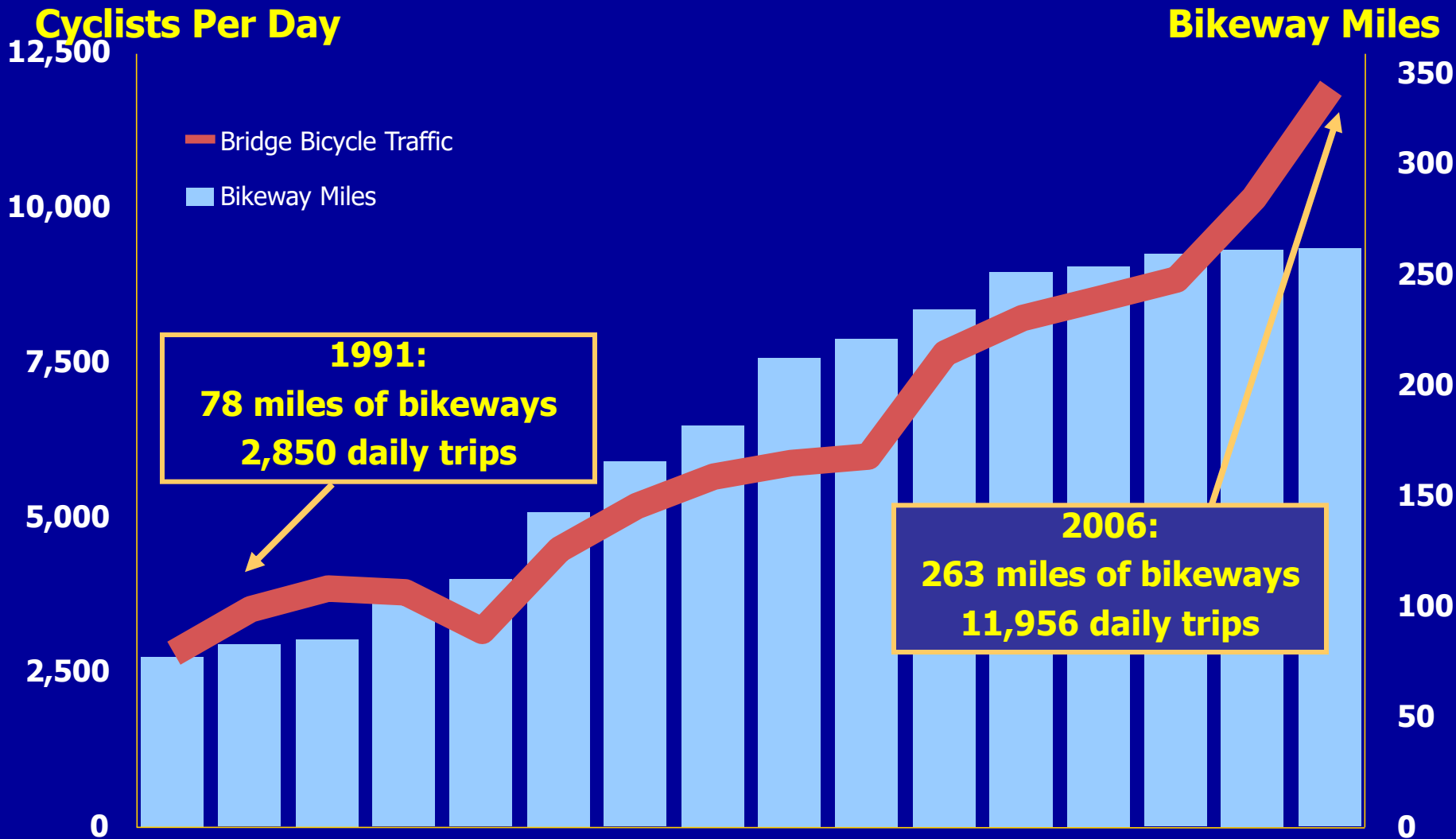
■ Percent of trips by walking and biking, 1995



■ Pedestrian fatalities per 100 million trips, 2000



# Increasing Bicycle Use, Portland, OR



**Year:** 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006

Bridge Bicycle Traffic 2,850 3,555 3,885 3,830 3,207 4,520 5,225 5,690 5,910 6,015 7,686 8,250 8,562 8,875 10,192 11,956

Bikeway Miles 78 83 86 103 113 144 166 183 213 222 235 252 254 260 262 263

# Public Transit and Physical Activity



- Transit users walk a median of 19 minutes daily to and from transit
- 29% of transit users exceed 30 minutes of walking daily to and from transit

Besser LM, Dannenberg AL  
*Amer J Prev Med* 29:273, 2005

USDOT 2001 National Household  
Travel Survey; 3312 transit users

# Asthma and Air Pollution

- Natural experiment during 1996 Summer Olympic games in Atlanta
- Peak morning traffic decreased 23% and peak ozone levels decreased 28%
- Asthma-related emergency room visits by children decreased 42%
- Children's emergency visits for non-asthma causes did not change during same period





# Water Quality and Quantity

- Water run-off from roads and parking lots can pollute water supplies with possible impact on human health
- Increased erosion and stream siltation causes environmental damage and may affect water treatment plants
- Land use and built environment decisions impact water scarcity and flooding



# Deaths and Injuries to Motor Vehicle Occupants and Pedestrians

- Leading cause of deaths among persons 1-34 years old in United States
- Annual toll from motor vehicle crashes in United States:
  - 43,000 deaths
  - 2.4 million nonfatal injuries
  - \$100 billion in costs



# Mental Health Issues that may Relate to Community Design

- Depression
  - Relieved by physical activity and social interaction
- Stress
  - Aggravated by long commutes
- Attention Deficit-Hyperactivity Disorder
  - Greenspace may improve function in ADHD
- Violent Behavior – Impulse Control
  - Example: road rage

# Social Capital

- Defined as social networking, civic engagement, trust and reciprocity
- Decreased by long commutes



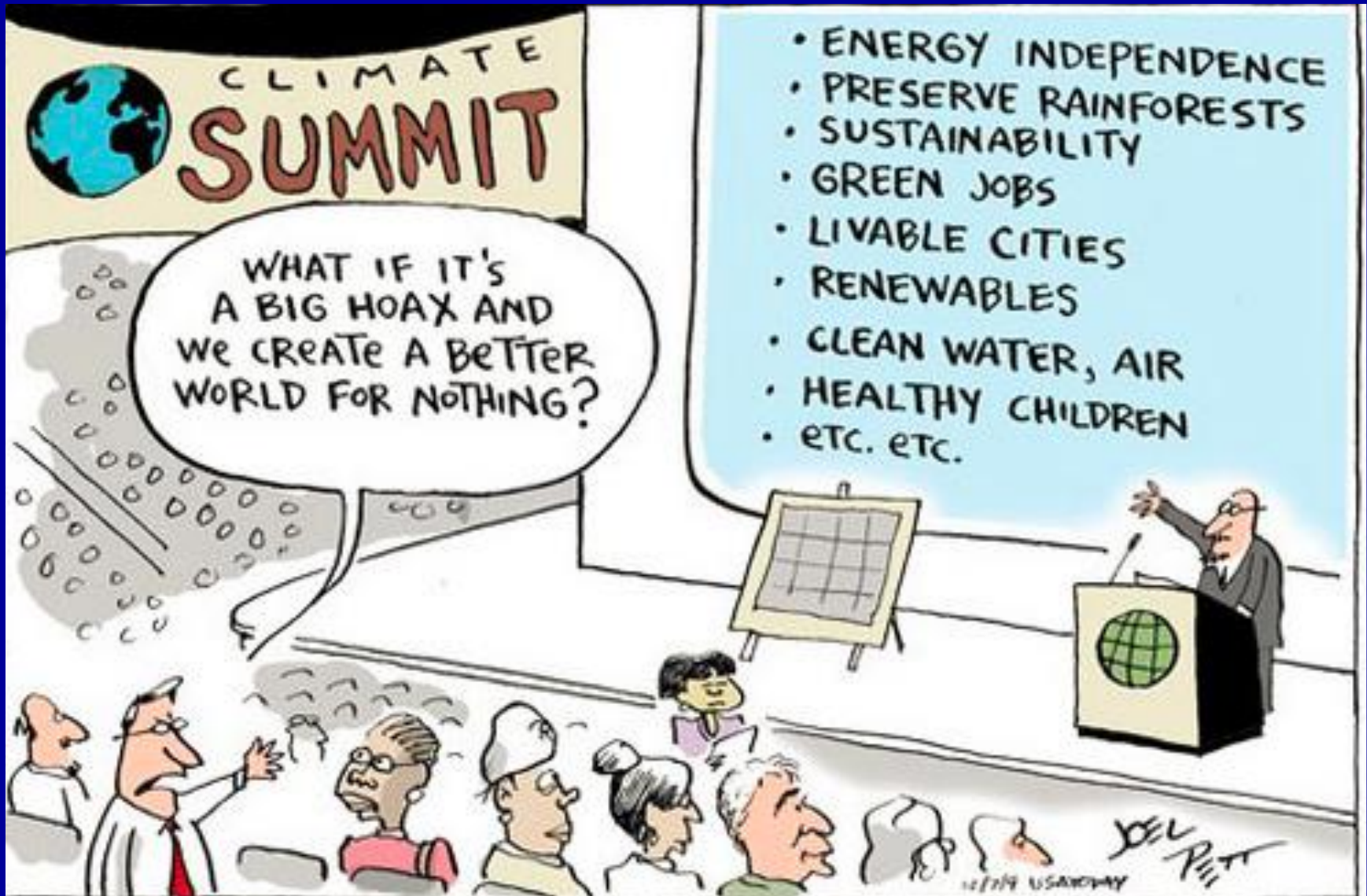
# Gentrification and Displacement

- Remake of urban, working class communities
- Displacement of low-income people
- Driven by developers, landlords, businesses
- Supported by government policies/subsidies
- Occurs in areas with inexpensive land

<https://www.preventioninstitute.org/publications/healthy-development-without-displacement-realizing-vision-healthy-communities-all> (2017)



# Climate Change Co-benefits



# Benefits of Nature

## Climate benefits

- Carbon sequestration
- Habitat resiliency

## Other environmental benefits

- Biodiversity
- Energy and material flows



## Health benefits

- Protection from disasters
- Recreation
- Venues for physical activity
- Psychological benefits
- Increased appeal of urban living
- Other ecosystem services

# Contact with Nature

Living in a building with nearby trees was associated with:

- Knowing and greeting neighbors
- Acknowledging and helping neighbors
- Less psychological aggression
- Less violent behavior

Kuo & Sullivan 2001





# Earthquake Preparedness

- **BUILDING DESIGN CAN SAVE LIVES**



- Enhanced building codes
- Seismic retrofitting
- Early warning systems
- Vulnerability assessments
- Emergency response systems

# Smart Growth and Healthy Community Design

- Higher density, more contiguous development
- Preserved green spaces
- Mixed land uses with walkable neighborhoods
- Limited road construction, balanced by transportation alternatives
- Architectural heterogeneity
- Economic and racial heterogeneity
- Development and capital investment balanced between central city and periphery
- Effective, coordinated regional planning

# What Smart Growth “Is” And “Is Not”

**More transportation choices and less traffic**

**Not against cars and roads**

**Vibrant cities, suburbs, and towns**

**Not anti-suburban**

**Wider variety of housing choices**

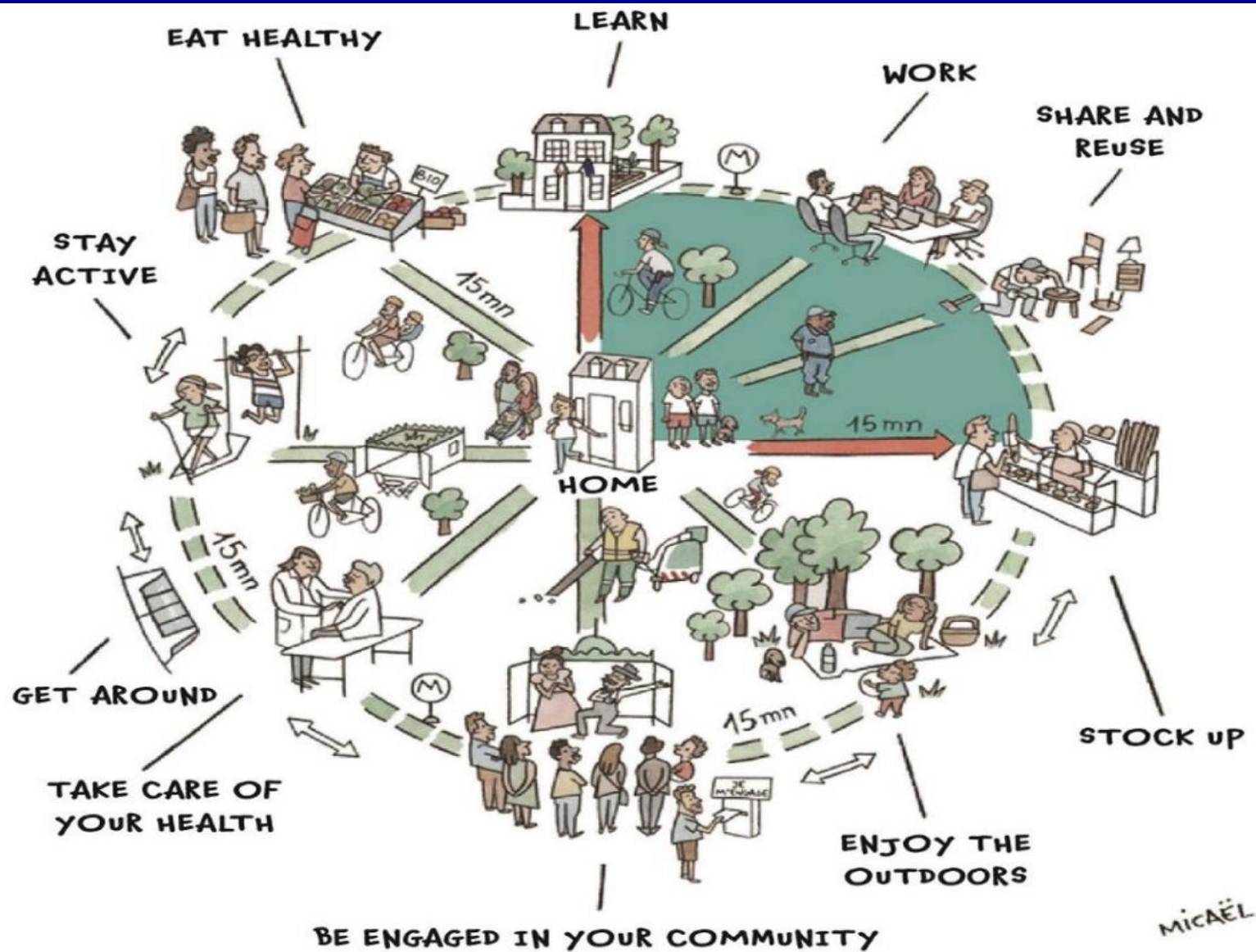
**Not about telling people where or how to live**

**Well-planned growth that improves quality-of-life**

**Not against growth**

Slide credit:

# The 15 Minute City



# Envisioning Change



# Safe Routes to School

- Design safe sidewalks and crossings to encourage children to walk or bike to school



# Complete Streets

- Design roads to accommodate pedestrians, bicyclists, transit, and motor vehicles



# Designing Parks and Greenspace

- Place parks in easy walking distance of housing





# Rail to Trail Conversions

- Convert abandoned rail lines to trails for recreation and transportation



# Shared Use Agreements

Schools that share their grounds with community members on evenings and weekends increase places available for physical activity



# Accessory Dwelling Units

- Zoning laws can allow or encourage granny flats to provide housing for an elderly parent or a student



# Bike and Scooter Share Programs

- Encourage bicycling & scooters for short trips
- Trend toward more e-bikes and e-scooters
- Available in hundreds of cities



# Transit-Related Design

Transit-oriented development encourages walking and transit use



Trails can be built along active transit rail lines

# www.Walkscore.com



Walk Score®

Find a Walkable Place to Live.

[Rankings](#) | [Walkable Neighborhoods](#) | [How It Works](#) | [Walk Score On Your Site](#) | [Blog](#)

Type an Address:

2800 East Roy Street Seattle WA

Go

Walk Score

**74**  
Out of 100

**Very Walkable**  
2800 E Roy St Seattle

Overview

Customize Map

Commute

Capitol Hill

**Restaurants**

Cafe Flora 0.1mi

**Coffee**

My Coffee House 0.09mi

**Groceries**

Village Mart 0.13mi

**Shopping**

Missi Lu 0.11mi

**Schools**

The Valley School 0.31mi

**Parks**

Prentis I Frazier P 0.3mi

**Books**

City of Seattle: Ma 0.92mi

**Bars**

Bottleneck Lounge 0.45mi

**Entertainment**

Washington Ensemble 0.52mi

**Post Offices**

Postal Plus 0.8mi



**Public Transportation**

Transit Score: **60**

Good Transit

9 nearby routes: 9 bus, 0 rail, 0 other

.1 mi - 11

.28 mi - 43

.1 mi - 84

.28 mi - 48

.15 mi - 8

.51 mi - 12

**Compare Your Walk Score**

Seattle top 10%: 99

Your score: 74

60% of Seattle residents have a higher Walk Score.

# Walkscore can be Added to Real Estate Listings to Assist Homebuyer Decisions

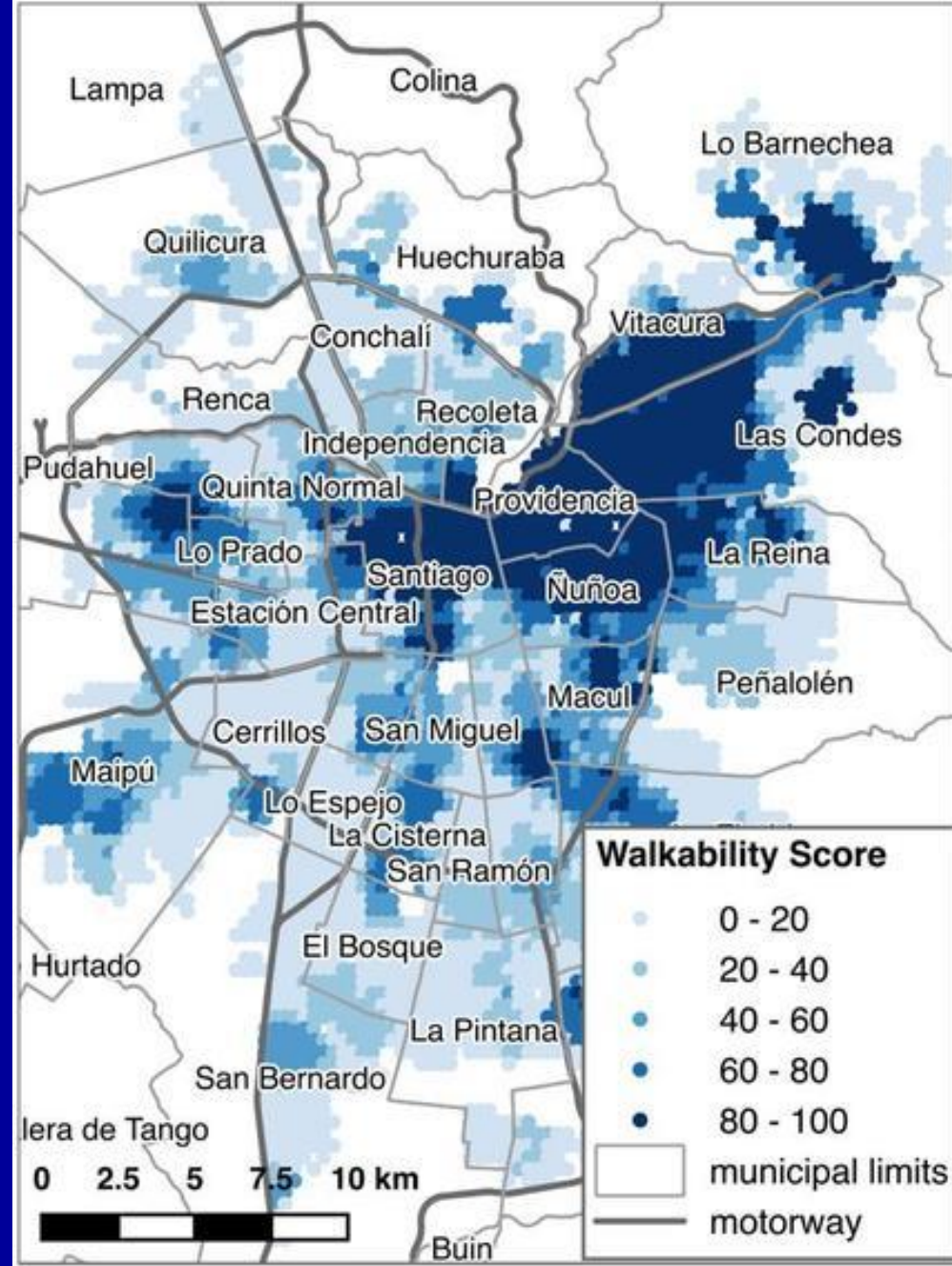


Walkscore 0-10  
Few destinations



Walkscore 80-90  
Many destinations

# Walkability Scores for Santiago

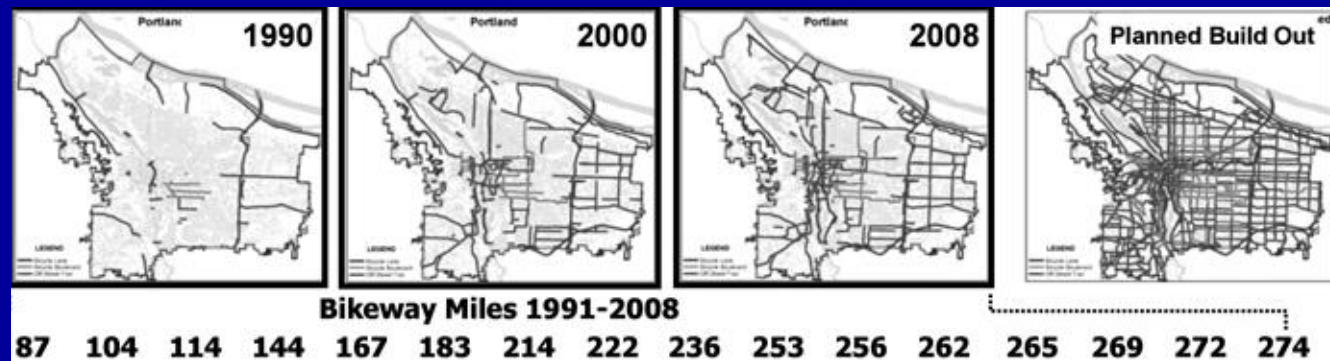




# Costs and Benefits of Bicycling Investments in Portland, Oregon

- By 2040, investments of \$138-\$605 million will result in:
  - Health care cost savings of \$388-\$594 million
  - Fuel savings of \$143-\$218 million
- Benefit-cost ratios are between 3.8 and 1.2 to 1

Gotschi T. *J Phys Activ Health* 2011, 8(Suppl 1), S49-S58



# Health Impact Assessment

- A tool to increase partnerships and communication between public health professionals and planners and other decision-makers
- HIAs ideally lead to better informed decisions



# Health Impact Assessment Definition

- HIA is a systematic process that uses an array of data sources and analytic methods and considers input from stakeholders to determine the potential effects of a proposed policy, plan, program, or project on the health of a population and the distribution of those effects within the population. HIA provides recommendations on monitoring and managing those effects.

National Academies Committee on HIA, 2011

# Steps in Conducting an HIA

- **Screening**
  - Identify projects/policies for which HIA useful
- **Scoping**
  - Identify which health impacts to include
- **Assessment**
  - Identify how many and which people may be affected
  - Assess how they may be affected
- **Recommendations**
  - Identify changes to promote health or mitigate harm
- **Reporting** of results to decision-makers
- **Evaluation** of impact of HIA on decision process

# HIAs of Projects and Policies

- Housing redevelopment
- Highway corridor redevelopment
- Pedestrian/bicycle trail development
- Highway bridge replacement
- Transit line
- Community transportation plan
- Local area and comprehensive plans
- After-school programs
- Living wage ordinance
- Paid sick leave policy
- Coal-fired power plant
- Low income home energy subsidies
- Oil and gas leasing policies

# HIA of Trinity Plaza Housing Redevelopment

## San Francisco Health Department

- 360 unit low-income apartments to be demolished to build new 1400 unit market-rate condominiums
- HIA found effects on housing affordability, stress, displacement of residents, food insecurity, and segregation
- After negotiation, developer received building permit and agreed to build one-for-one replacement units for low-income families being displaced



# New and Evolving Tools

- Geographic information systems
- Handheld Global Positioning System devices
- Health impact assessment
- Built environment indicators such as density, diversity, distance to transit, walkability
- Seniors taking pictures to document barriers

# 8-80 Cities Philosophy

- If you create a city that's good for an 8 year old and good for an 80 year old, you will create a successful city for everyone. This is an 8-80 City.



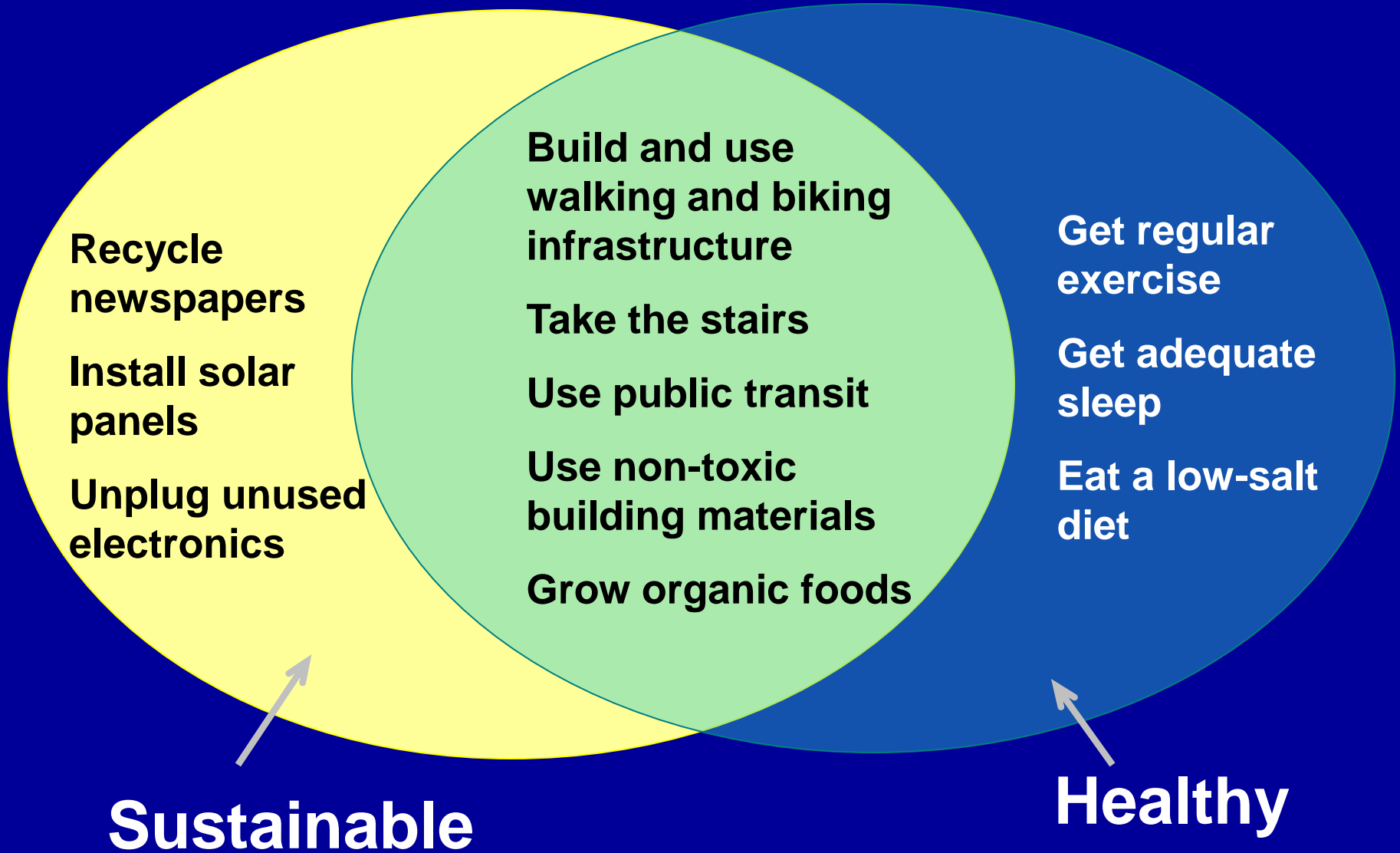


# Sustainability

- “Meeting the needs of the present without compromising the ability of future generations to meet their own needs”

Brundtland Commission, 1987

# Sustainable and Healthy Actions



# UN Sustainable Development Goals

**1** NO  
POVERTY



**2** ZERO  
HUNGER



**3** GOOD HEALTH  
AND WELL-BEING



**4** QUALITY  
EDUCATION



**5** GENDER  
EQUALITY



**6** CLEAN WATER  
AND SANITATION



**7** AFFORDABLE AND  
CLEAN ENERGY



**8** DECENT WORK AND  
ECONOMIC GROWTH



**9** INDUSTRY, INNOVATION  
AND INFRASTRUCTURE



Most of these goals include both Health and Built Environment issues

<https://sdgs.un.org/goals#>

# UN Sustainable Development Goals



Most of these goals include both Health and Built Environment issues

# Challenges in Health and the Built Environment

- Climate change
  - Land use choices
  - Transportation
  - Water infrastructure
  - Energy efficient designs
  - Renewable energy sources
  - Building design for resilience



# Making Healthy Places: Designing and Building for Well-Being, Equity, and Sustainability, 2<sup>nd</sup> Edition

## Making Healthy Places

SECOND EDITION

Edited by NISHA BOTCHWEY,  
ANDREW L. DANNENBERG,  
and HOWARD FRUMKIN

Nisha Botchwey, PhD, MCRP, MPH  
Andrew Dannenberg, MD, MPH  
Howard Frumkin, MD, DrPH

Island Press, 2022

DESIGNING AND BUILDING FOR  
WELL-BEING, EQUITY, AND SUSTAINABILITY

<https://islandpress.org/books/making-healthy-places-second-edition>

# University of Washington

## Courses and Degrees

- UrbDP/EnvH 538:
  - Health and Built Environment
- UrbDP/EnvH 536:
  - Health Impact Assessment
- Master of Urban Planning and Master of Public Health Concurrent Degree Program
  - Fulfill all requirements for both degrees in 3 years; thesis on topic combining these fields

# Public health and the built environment are highly interconnected

