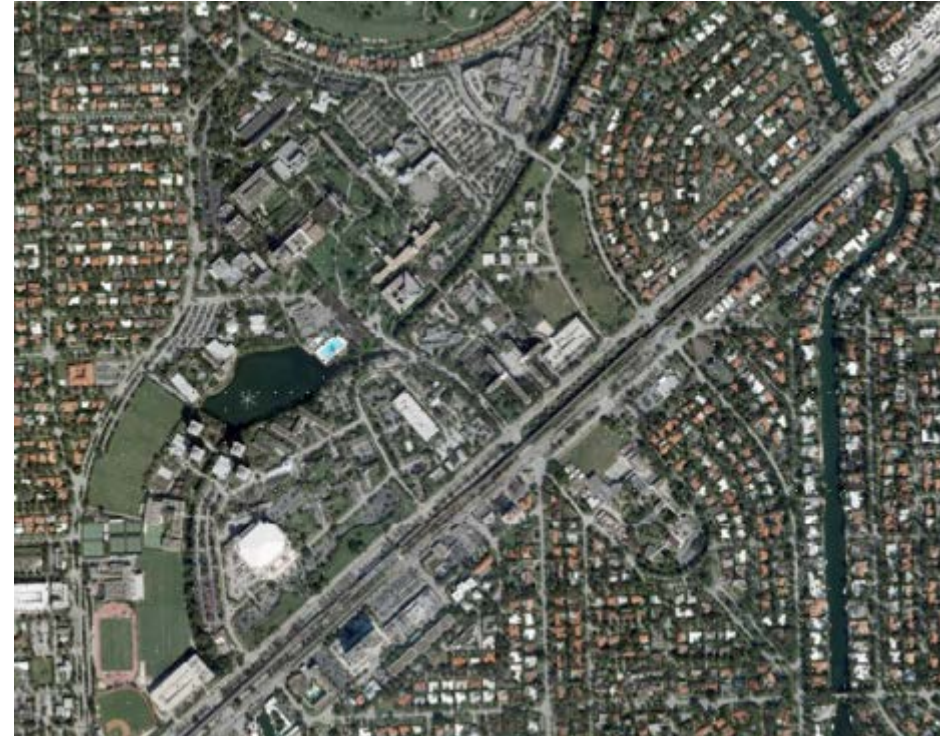


Definitions: Built Environment

- The built environment includes our homes, schools, workplaces, parks/recreation areas, business areas and roads.
- It extends overhead in the form of electric transmission lines, underground in the form of waste disposal sites and subway trains, and across the country in the form of highways.
- The built environment encompasses all buildings, spaces and products that are created or modified by people.
- It impacts indoor and outdoor physical environments (e.g., climatic conditions and indoor/outdoor air quality), as well as social environments (e.g., civic participation, community capacity and investment) and subsequently our health and quality of life.



Text: "Creating Healthy Communities, Healthy Homes, Healthy People: Initiating a Research Agenda on the Built Environment and Public Health," Shobha Srinivasan, PhD, Liam R. O'Fallon, MA and Allen Dearry, PhD

September 2003, Vol 93, No. 9 | *American Journal of Public Health* 1446-1450

© 2003 American Public Health Association
Image: UM & Coral Gables, www.bing.com

Built Environment & Health: History

19th century

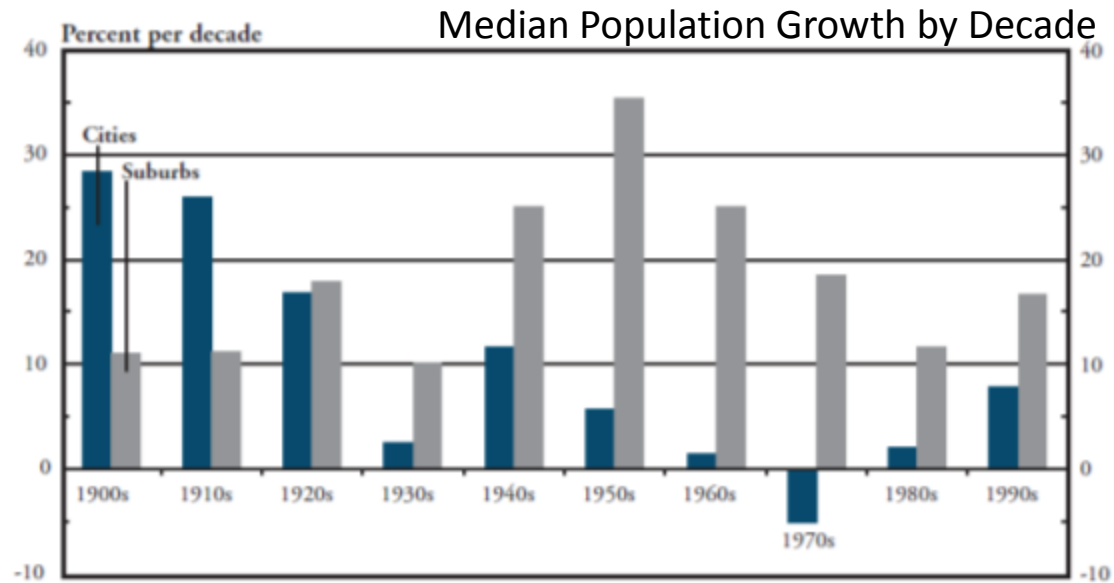
Industrial revolution & immigration moves population to cities; unsanitary conditions lead to infectious disease epidemics

20th century

Public health policy implemented through zoning that restricts population density; and separates commerce, industry and residences

21st century

Primary public health problems are chronic diseases rather than infectious diseases, and half of Americans live in suburban rather than urban or rural settings

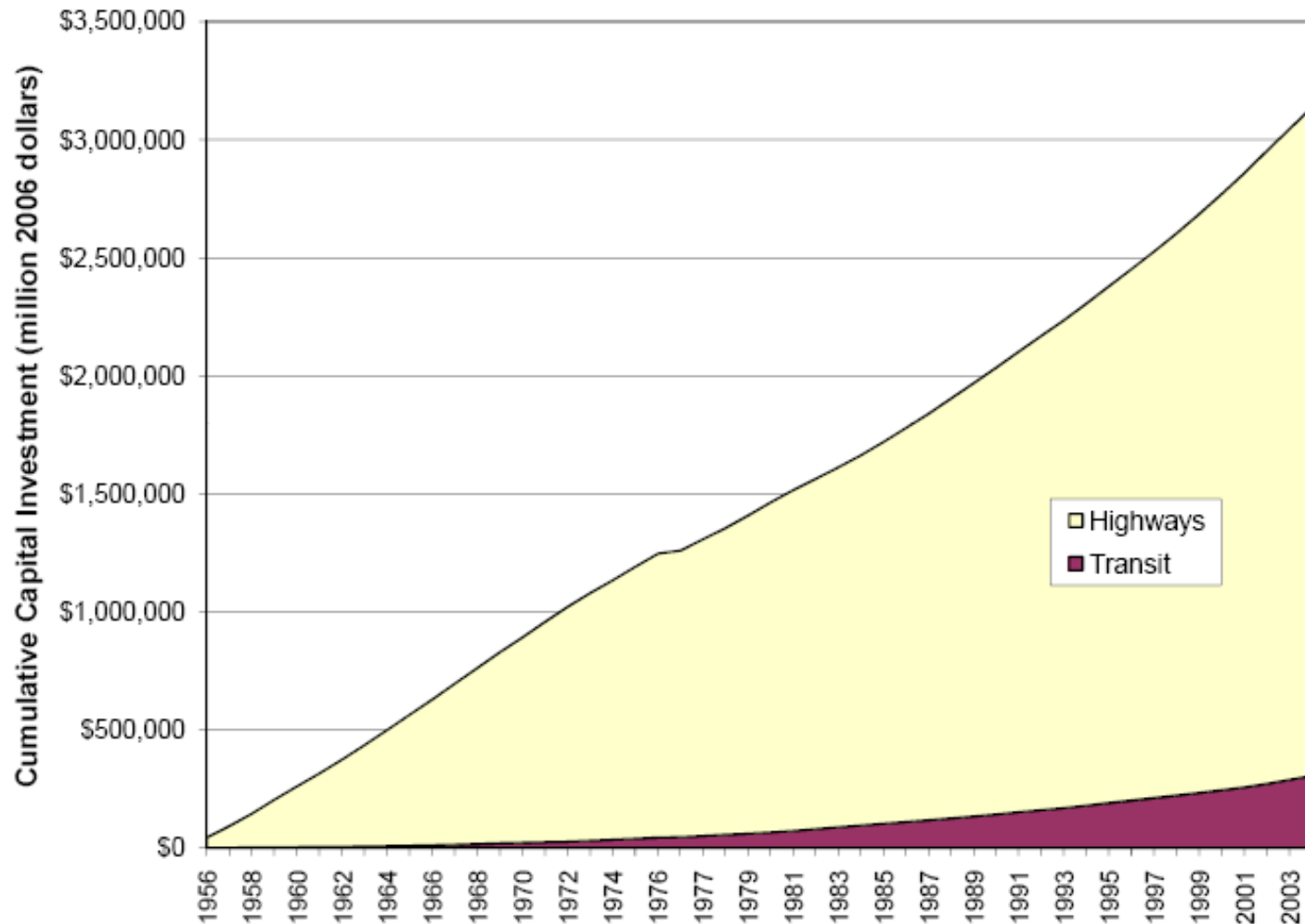


Image, South Street NYC, Fordham University
Text: Wendy Collins Perdue, JD, Lesley A. Stone, JD, and Lawrence O. Gostin, "The Built Environment and Its Relationship to the Public's Health: The Legal Framework," *American Journal of Public Health*, September 2003, Vol 93, No. 9: 1390-4.

Jordan Rappaport, "The Shared Fortunes of Cities and Suburbs," *Federal Reserve Bank Of Kansas City Economic Review*, Third Quarter 2005. <http://www.kc.frb.org/publicat/ECONREV/PDF/3q05rapp.pdf>

Highway vs. Mass Transit Expenditures

Cumulative Government Capital Investment in Transit & Highways since 1956



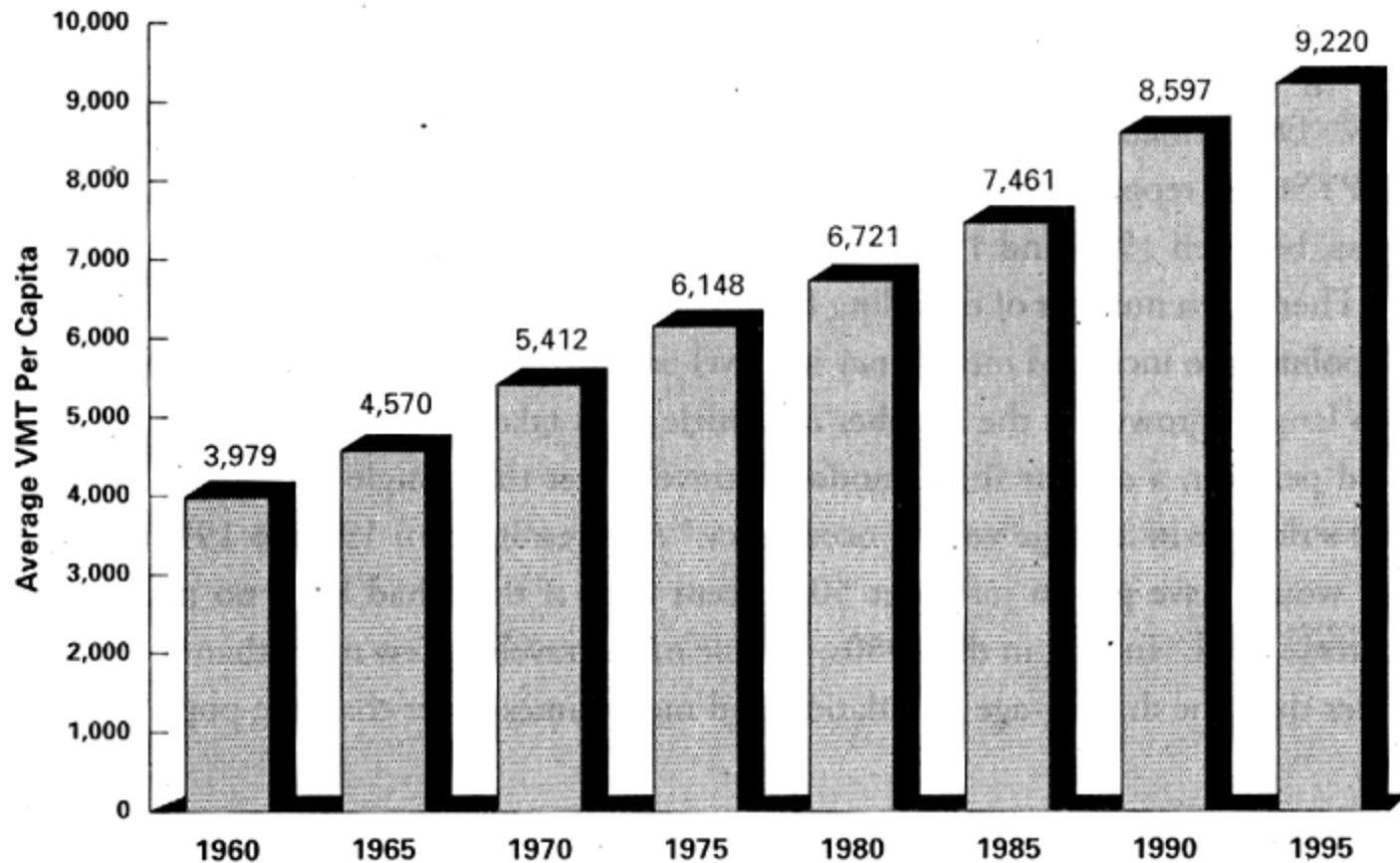
¹ U.S. Congressional Budget Office. *Trends in Public Spending on Transportation and Water Infrastructure, 1956 to 2004*, August 2007. Data obtained from supplementary tables downloaded from www.cbo.gov/ftpdocs/85xx/doc8517/SupplementalTables.xls, 17 December 2007.

Miles per Capita

Figure 2-2

Vehicle Miles Traveled (VMT) Per Capita, 1960–1995

Source: Bureau of Transportation Statistics, U.S. Department of Transportation, *National Transportation Statistics 1998*, Washington, DC: 1998, Table 4-12; U.S. Bureau of the Census, "Historical National Population Estimates," Washington, DC: April 2, 1998.



VMT
more than
doubles in
one
generation:
4570 in 1965
9220 in 1995

Mortality

R A N K	Cause and Number of Deaths									
	Under 1	1-3	4-7	8-15	16-20	21-24	Other Adults			65+
							25-34	35-44	45-64	
1	Perinatal Period	Congenital Anomalies	MV Traffic Crashes	MV Traffic Crashes	MV Traffic Crashes	MV Traffic Crashes	MV Traffic Crashes	Malignant Neoplasms	Malignant Neoplasms	
2	Congenital Anomalies	MV Traffic Crashes	Malignant Neoplasms	Malignant Neoplasms	Homicide	Homicide	Suicide	Heart Disease		
3	Heart Disease	Accidental Drowning	Congenital Anomalies	Suicide	Suicide	Suicide	Homicide	MV Traffic Crashes		
4	Homicide	Homicide	Accidental Drowning	Homicide	Malignant Neoplasms	Accidental Poisoning				
5	Septicemia	Malignant Neoplasms	Exposure to Smoke/Fire	Congenital Anomalies	Accidental Poisoning					
6	Influenza/ Pneumonia	Exposure to Smoke/Fire	Homicide	Accidental Drowning						
7	Nephritis/ Nephrosis	Heart Disease								
8	MV Traffic Crashes									

For every age group from 3 through 33, crashes were the **#1** cause of death

Travel to School

A survey by the Centers for Disease Control and Prevention (CDC) found that even children living close to school were not walking or biking in large numbers.



Miami Palmetto Senior High School, 247,765 sq.ft. building/ 23 acres:
3,349 students grades 9-12 <http://mpsh.dadeschools.net/overview.htm>

Children 5-15 living within 1 mile of school

2002- 31% walked or biked.

1969- 90% walked or biked
(2)

Post World War II

Number of Schools
declined 70%

Average School Size grew
fivefold, from 127 to
653 students (3)

2002 Study-

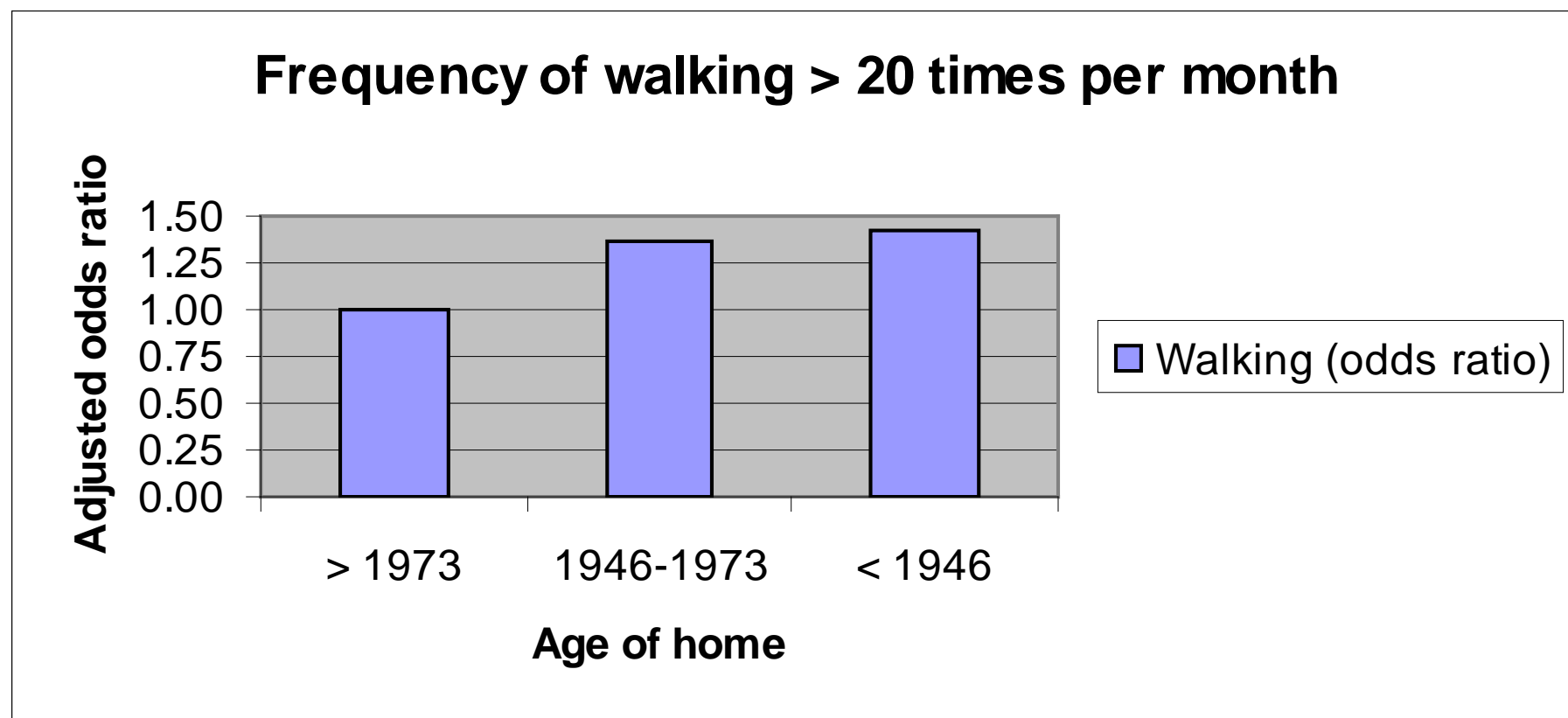
Schools built before 1983:
16% of students walk

Schools built after 1983:
4% of students walk
(4)



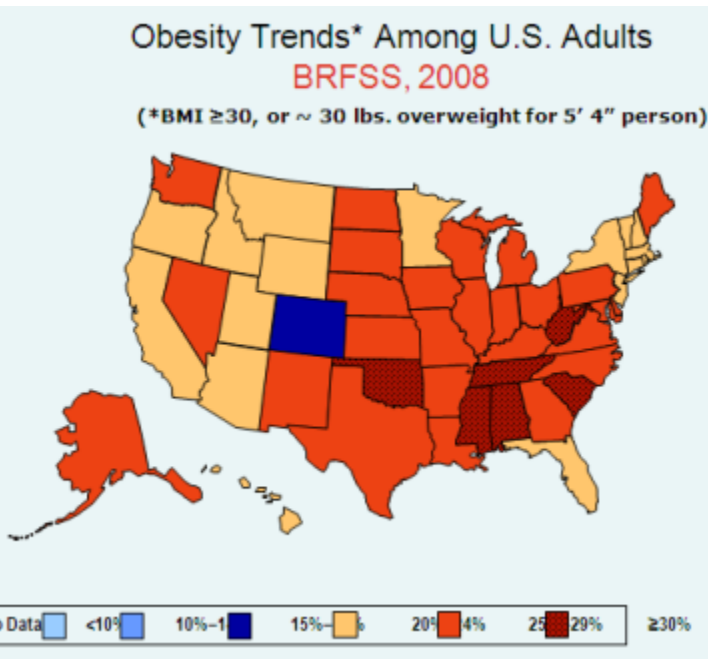
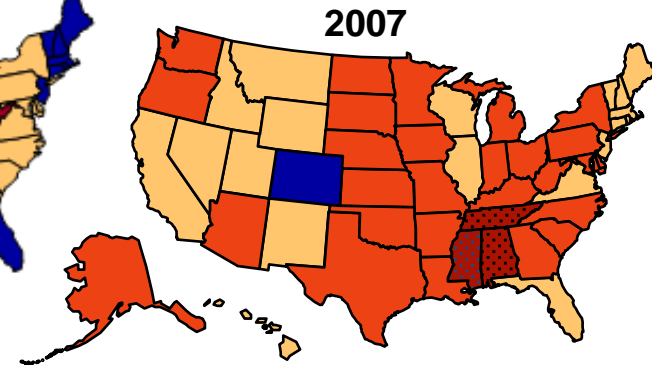
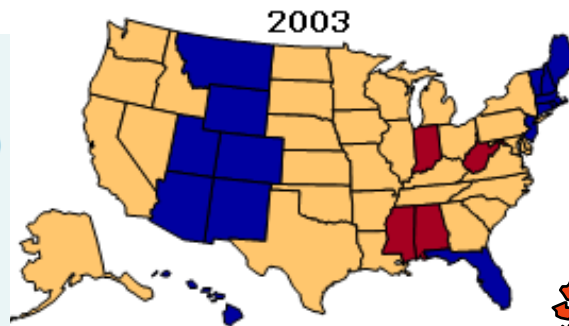
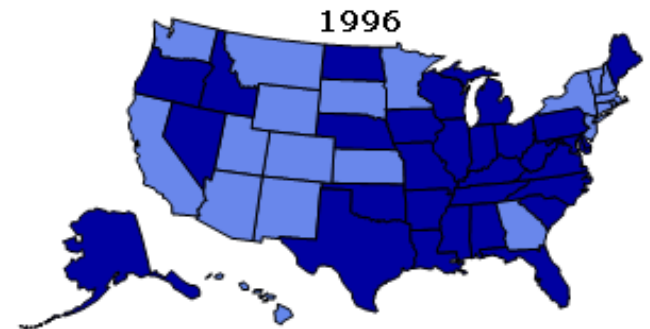
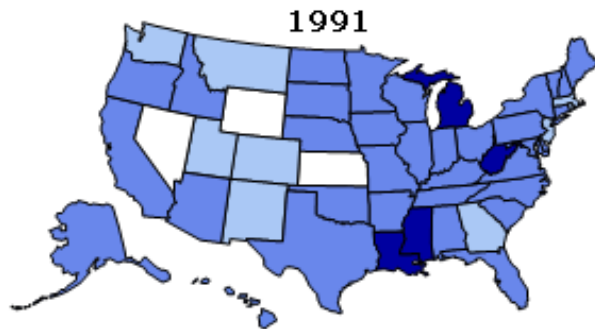
Age of Home & Physical Activity

Adults who lived in homes built before 1946 and from 1946 to 1973 were significantly more likely to walk 1+ miles ≥ 20 times per month than those who lived in homes built after 1973. This association was present among people living in urban and suburban counties, but absent among those living in rural counties. The association was also found in models that controlled for gender, race/ethnicity, age, education, income, and any health-related activity limitation. Other forms of leisure-time physical activity were not independently associated with home age.

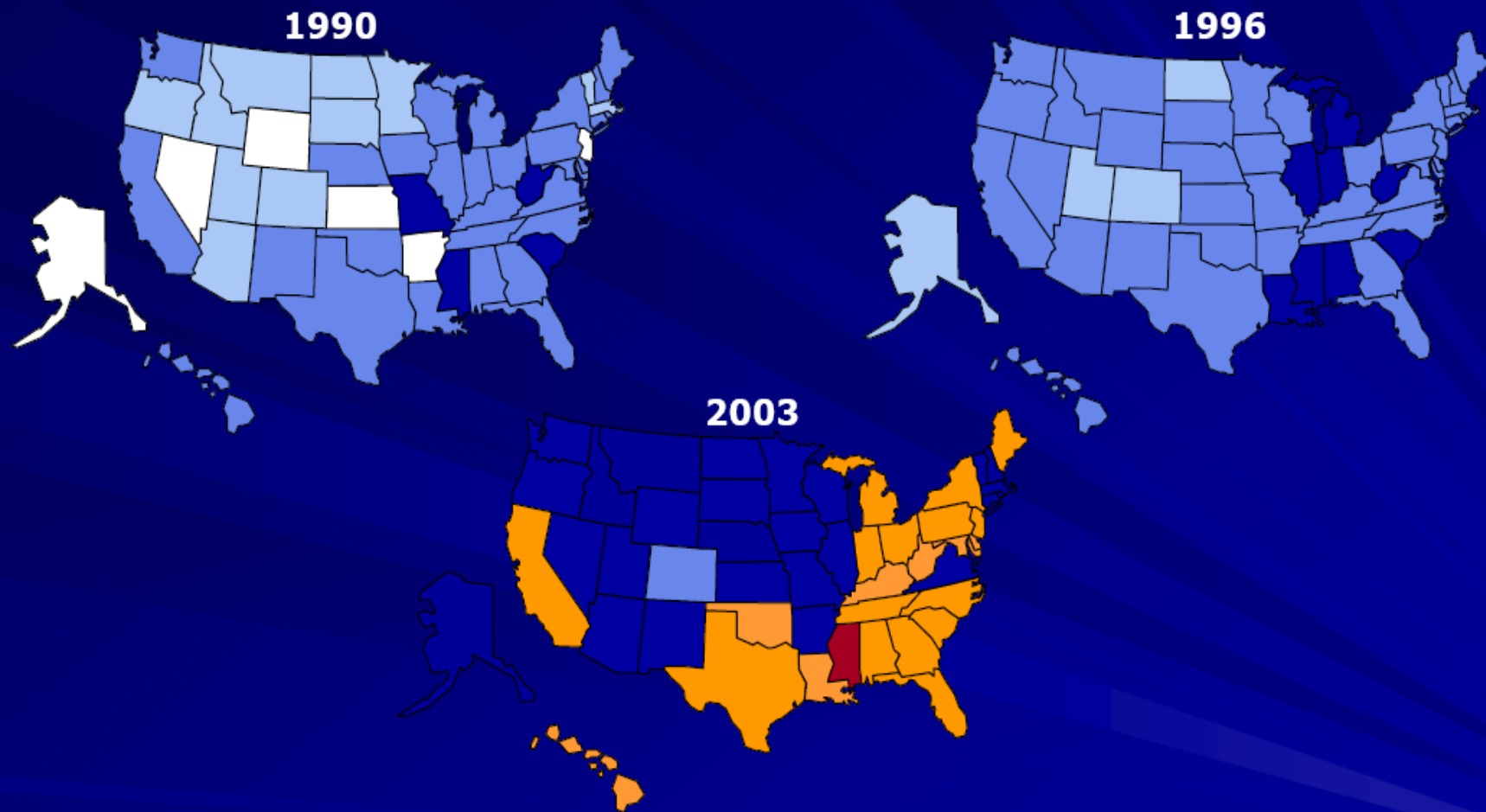


Obesity (BMI ≥ 30) Trends Among U.S. Adults

Behavioral Risk Factor Surveillance System (BRFSS),
1991, 1996, 2003, 2007 & 2008



Diabetes Trends Among U.S. Adults – BRFSS 1990, 1996, and 2003



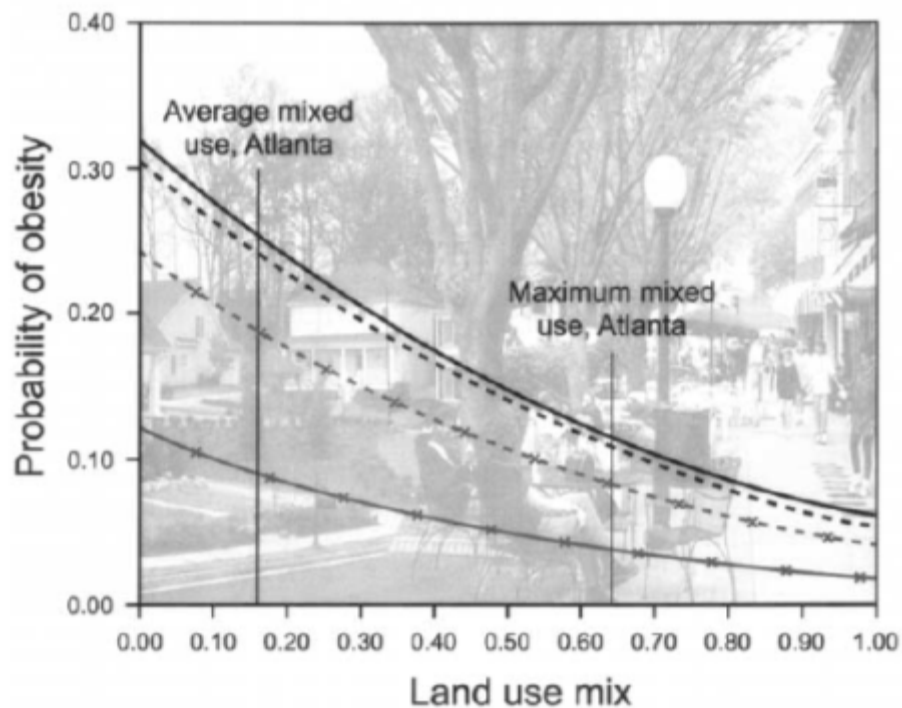
■ No Data ■ <4% ■ 4%–6% ■ 6%–8% ■ 8%–10% ■ >10%

Mixed-Use & Obesity

Disconnected



Connected



Probability of obesity in relation to land use mix

Lawrence D. Frank, Martin A. Andresen and Thomas J. Schmid, "Obesity Relationships with Community Design, Physical Activity, and Time Spent in Cars," *American Journal of Preventative Medicine*, Vol. 27 (2):2004: 87-96

Walkability & Body Mass Index

- Smith et al (2008) tracked the body mass index of nearly half a million residents of Salt Lake County, Utah, in relation to the average age of neighborhood housing; and the proportion of residents who walked to work.
- Residents in neighborhoods built before 1950 walked more.
- Men living in walkable neighborhoods weighed 10 pounds less than men living in less walkable neighborhood. The average woman weighed six pounds less.



Ken R. Smith, Barbara B. Brown, Ikuho Yamada, Lori Kowaleski-Jones, Cathleen D. Zick, Jessie X. Fan, "Walkability and Body Mass Index Density, Design, and New Diversity Measures," *American Journal of Preventive Medicine*, Volume 35, Issue 3, September 2008, Pages 237-244

Image, Kate Glicksberg, *The New York Times*, July 31, 2008, "This Old (Healthy) House,"
Tara Parker-Pope
<http://well.blogs.nytimes.com/2008/07/31/this-old-healthy-house/>

Mixed-Use

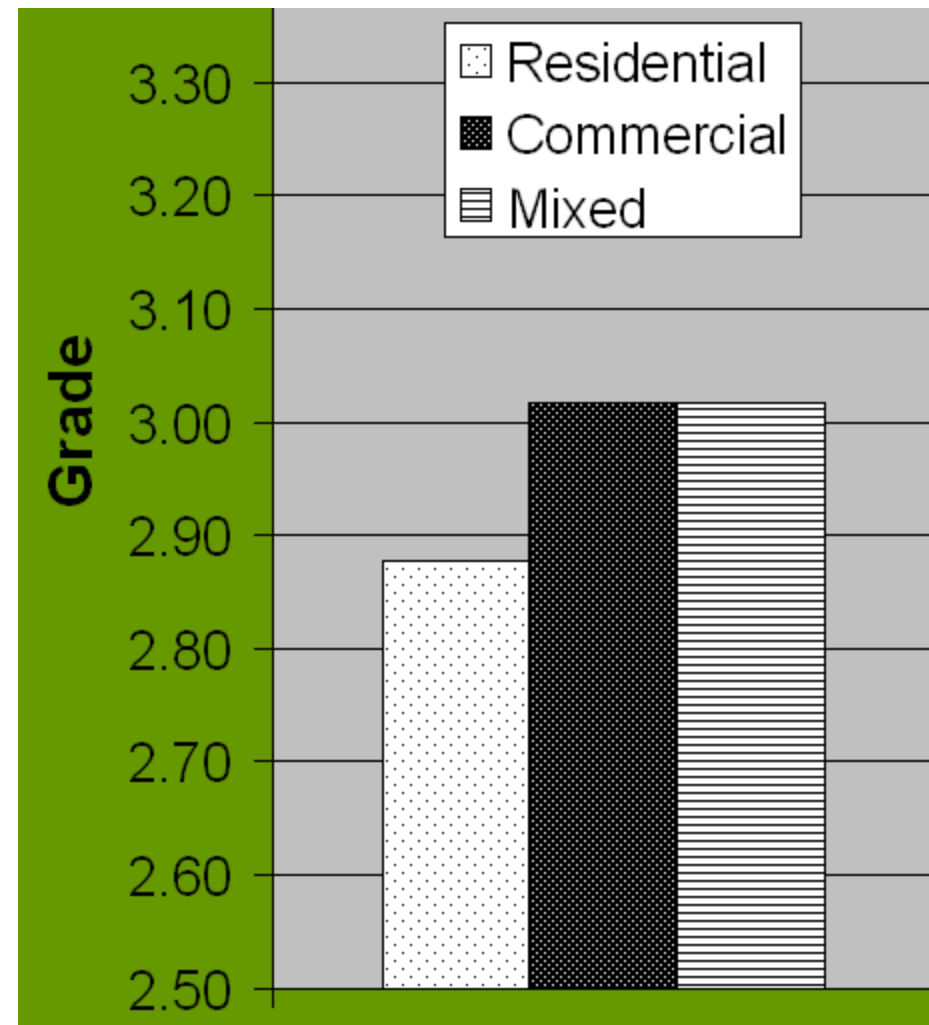
Archival data on universe of 2857 public school children living in East Little Havana



José Szapocznik, Joanna Lombard, Frank Martinez, Craig A. Mason, Deborah Gorman-Smith, Elizabeth Plater-Zyberk · Scott C. Brown, Arnold Spokane, "The Impact of the Built Environment on Children's School Conduct Grades: The Role of Diversity of Use in a Hispanic Neighborhood," *American Journal of Community Psychology*, Volume 38, Numbers 3-4 / December, 2006: 299-310.

Mixed Use & Conduct Grades-ELH

- A child living in a Residential block was 1.74 times more likely to have conduct grades in the lowest 10% than a child living in Mixed Use blocks.
- 38% of the cases where youth were in the lowest 10% of conduct grades are associated with the specific risk of living in a Residential block, above and beyond the risks associated with living in a Mixed Use block.



Physical Activity & Health

Investigators reported that their most significant finding was that fitness increased with even minimal levels of activity. Moving from being totally sedentary to an activity level of approximately 72.2 minutes per week—a little over 10 minutes per day—resulted in improved cardiorespiratory fitness.

These shifts in activity level can surely be achieved through walking programs and other small changes in activity behaviors among the sedentary.

Prior research has confirmed an inverse association between cardiorespiratory fitness and the development of cardiovascular disease risk factors in young and middle-aged adults. Fitness is inversely associated with cardiovascular and total mortality in men and women across the life span.



http://www.bta4bikes.org/at_work/walknbikecmte.php

Mercedes R. Carnethon, "Physical Activity and Cardiovascular Disease: How Much Is Enough?" *American Journal of Lifestyle Medicine*, Vol. 3, No. 1 Suppl, 44S-49S (2009)



Built Environment & Hypertension

Residents of sprawling counties were more likely to walk less, weigh more, and have hypertension than residents of compact counties. Difference in weight between least and most sprawling counties was 6.3 lb

Reid Ewing, Tom Schmid, Richard Killingsworth, Amy Zlot, Stephen Raudenbush, "Relationship Between Urban Sprawl and Physical Activity, Obesity, and Morbidity," American Journal of Health Promotion, Sept/Oct 2003: Vol. 18 Issue 1:47-57.

Sprawl Index

- *Residential density was defined in terms of gross and net densities and proportions of population living at different densities; seven variables made up the metropolitan density factor.*
- *Land use mix was defined in terms of the degree to which land uses are mixed and balanced within subareas of the region; six variables made up this factor.*
- *Degree of centering was defined as the extent to which development is focused on the region's core and regional subcenters; six variables made up this factor.*
- *Street accessibility was defined in terms of the length and size of blocks; three variables made up this factor.*

Built Environment & Chronic Conditions

Sprawl significantly predicts chronic medical conditions and health-related quality of life-

An increase in sprawl from one standard deviation less to one standard deviation more than average implies 96 more chronic medical problems per 1000 residents, which is approximately similar to an aging of the population of 4 years.

Roland Sturm*, D.A. Cohen, "Suburban Sprawl and Physical and Mental Health", *Public Health*, 118(7), 2004:488-496.

Table 2 Descriptive statistics for sample.				
Outcome	Sample mean	Standard deviation	Worst site mean	Best site mean
Number of chronic medical conditions	1.26	1.64	1.77 (West Palm Beach)	0.93 (Chicago)
Physical health-related quality of life (PCS-12)	46.8	6.16	44.8 (West Palm Beach)	47.9 (Portland)
Any mental health disorder	0.14	0.35	0.09 (Minneapolis, Rochester)	0.21 (Boston)
Age	47	17.3	Lowest: 42.6 (Los Angeles)	Highest: 56.4 (West Palm Beach)
Over 65 years old	19.4	39.5	Lowest: 0.11 (Los Angeles, Miami)	Highest: 0.43 (West Palm Beach)
White	0.71	0.45	Lowest: 0.22 (Miami)	Highest: 0.90 (Seattle)
Median family income in \$	41,900	52,074	29,300 (Syracuse)	62,400 (Minneapolis)
Percent less than high school education	0.13	0.34	0.27 (Riverside)	0.06 (Seattle, San Francisco)
Percent college graduates	0.27	0.45	0.15 (Riverside, Little Rock)	0.45 (San Francisco)
Overall sprawl	96.1	26.8	14.2 (Riverside- San Bernadino)	177.8 (New York City)
N	8476		Site with fewest observations: West Palm Beach, n = 130	Site with most observations: Syracuse, n = 359

8686 participants in 38 US metropolitan areas

Built Environment & Physical Functioning

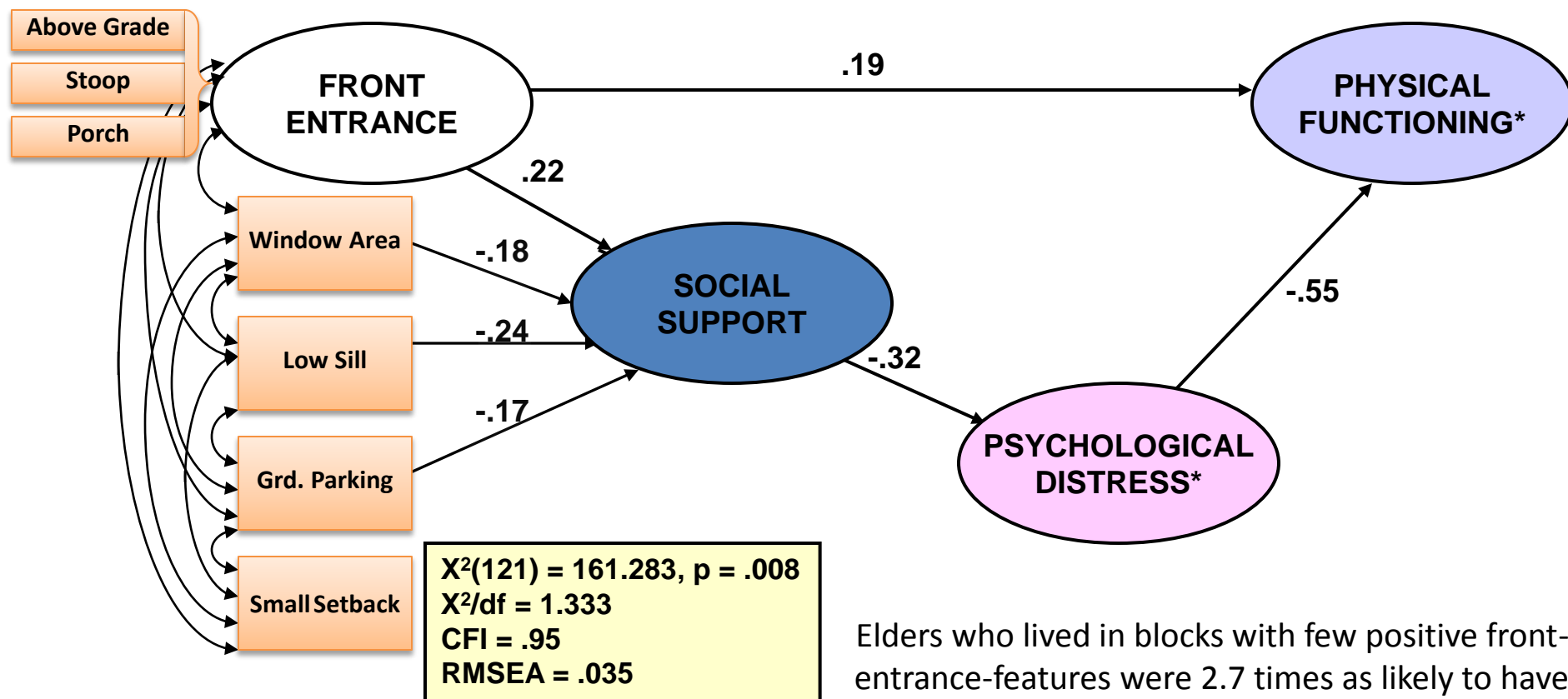
PRE-BASELINE
(2000-2002)

BASELINE

12 MONTHS

24 MONTHS

*Controls for age,
gender, and income



Elders who lived in blocks with few positive front-entrance-features were 2.7 times as likely to have poor physical functioning, compared to elders residing on blocks with greater numbers of positive front-entrance qualities.

Built Environment & Physical Activity

Regular physical activity is important for health, and inadequate physical activity is a major, largely preventable public health problem.

Built environments that facilitate more active lifestyles and reduce barriers to physical activity are desirable because of the positive relationship between physical activity and health. (8)

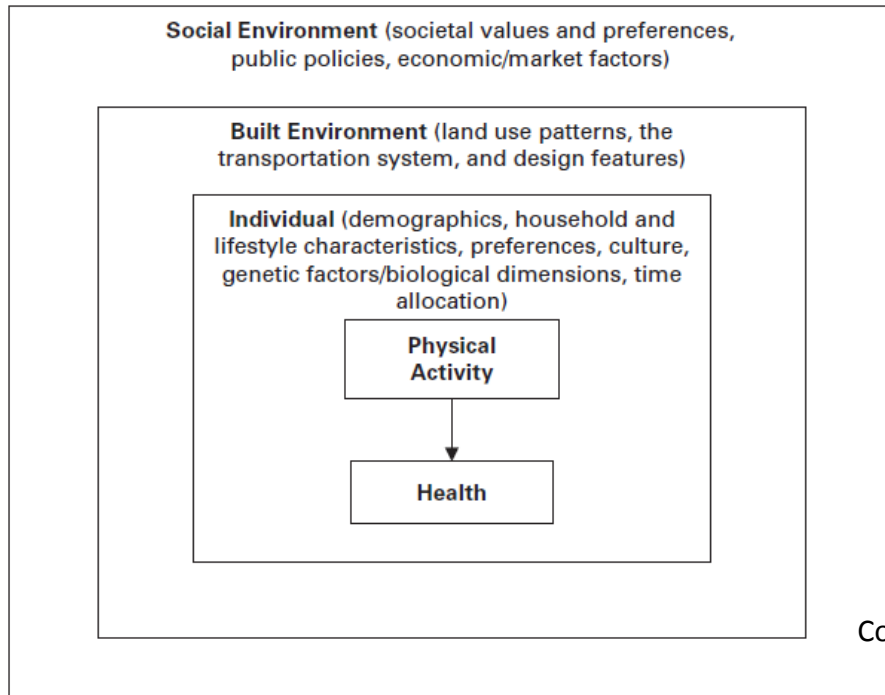


FIGURE ES-1 Overview of conceptual model for the study.

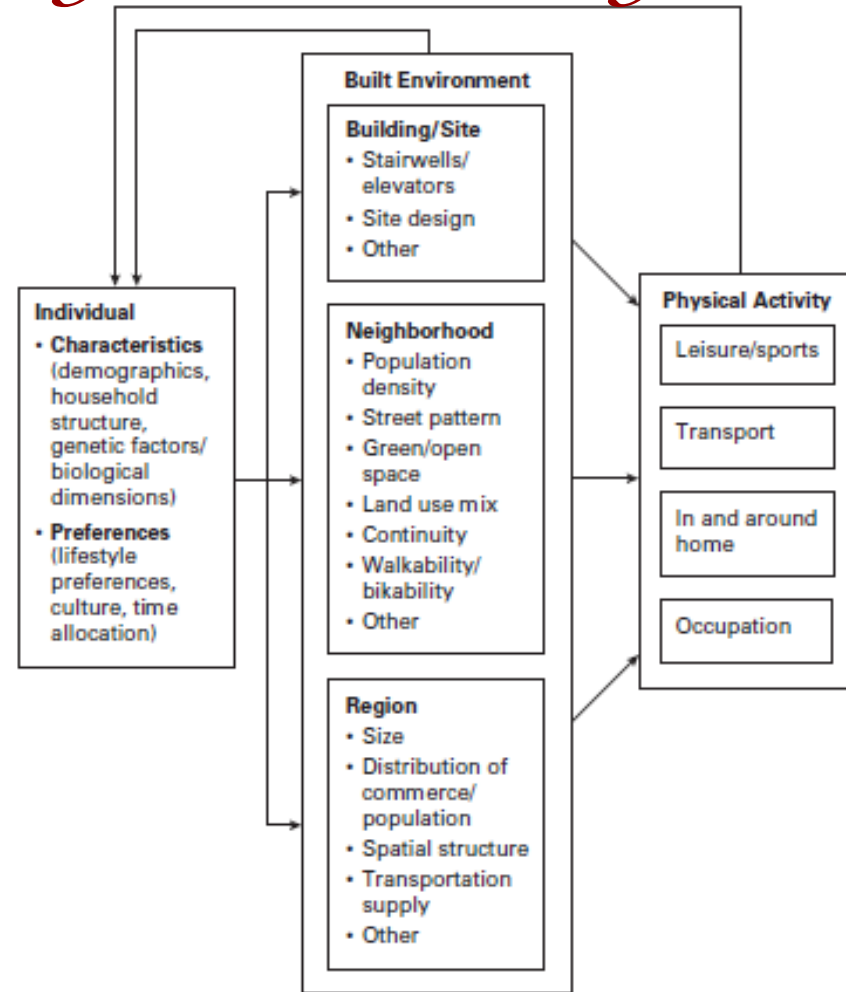


FIGURE 1-2 Detail on areas of interest to this study.

Committee on Physical Activity, Health, Transportation, and Land Use, *Does The Built Environment Influence Physical Activity? Examining The Evidence*, Transportation Research Board Institute of Medicine of The National Academies, Transportation Research Board Special Report 282, National Academy of Sciences, 2005.