

Childhood Obesity and the Built Environment in Los Angeles County

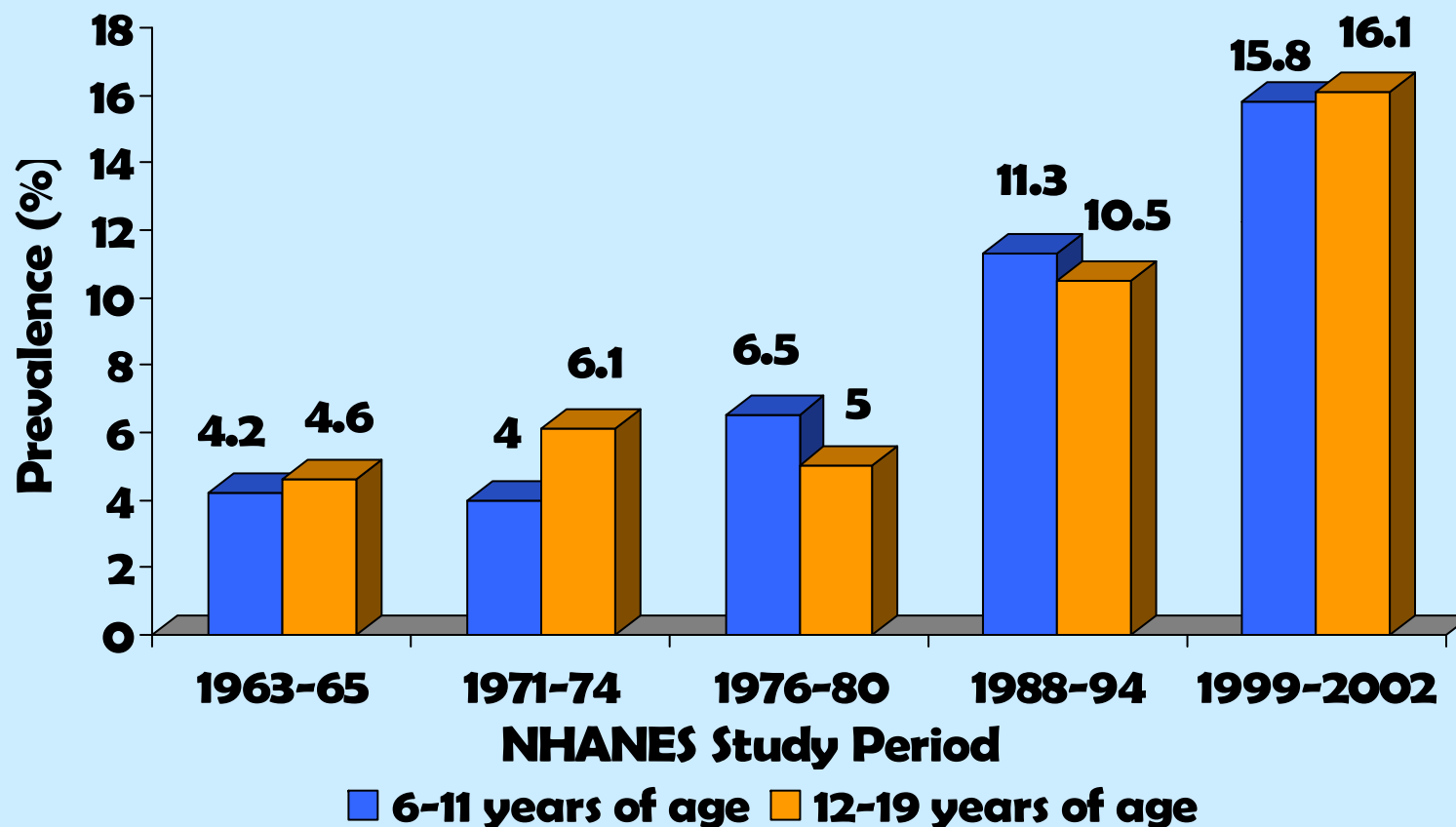
A photograph of two young girls sitting on a grassy hill under a blue sky with clouds. They are both holding a small tree sapling in a black plastic nursery pot. The girl on the left is wearing a red shirt and denim shorts, and the girl on the right is wearing a black top and a colorful headband. They appear to be engaged in a community or environmental activity.

**David Kwan, MPH
Epidemiology Unit
Office of Health Assessment & Epidemiology
Los Angeles County Department of Public Health**

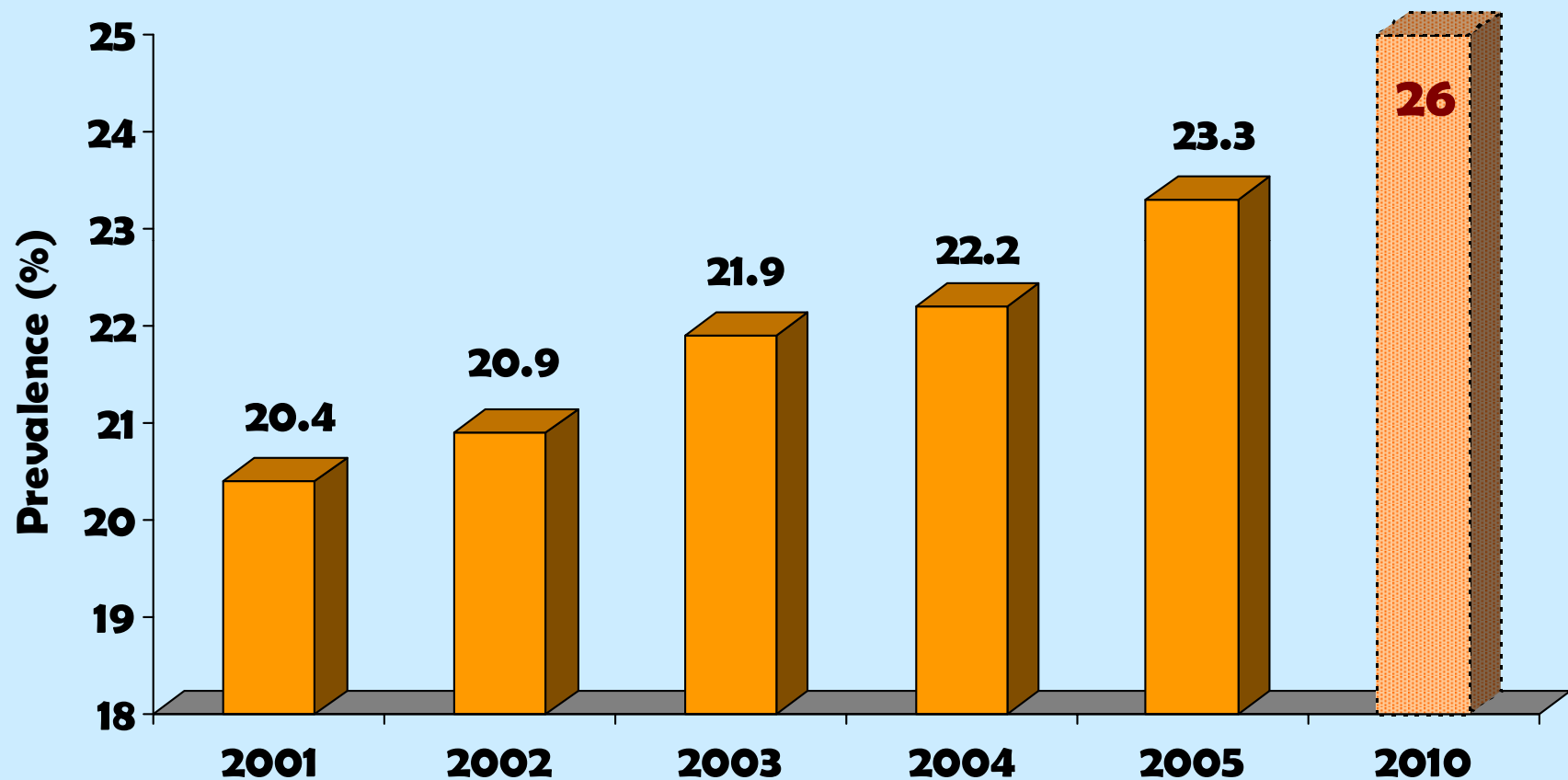
Obesity

- Los Angeles county adult population gained approximately **44 million** pounds of cumulative weight between 1997 to 2005
 - Based on self-reported weight, LA County Health Survey
 - ❖ Over 5,000 Hummer H2 in added weight alone!
- Grown to epidemic proportions
 - ❖ Requires a full-scale community response
 - ❖ No longer just an individual health issue

Obesity Prevalence Among Children & Adolescents in the United States



Childhood Obesity in LA County, 2001-2005



Source: California Physical Fitness Testing Program, applying CDC/NHANES 2000 Growth Chart Algorithm

Health Consequences of Childhood Obesity

- Obese children and adolescents have 70-80% chance of becoming obese adults
- Obese children are more likely to suffer from stigmatization, low self-esteem, and depression
- Obese children are at risk for developing serious medical conditions.
 - ❖ Diabetes
 - ❖ Asthma
 - ❖ Orthopedic problems
 - ❖ Liver problems
 - ❖ Obstructive sleep apnea
 - ❖ High blood pressure

...our children's health in crisis...

- “growing pediatric health crisis”
 - Surgeon General Richard Carmona, 2003.
- “The tsunami of childhood obesity has not yet hit the shore – it takes many years for the complications to develop...

...imagine heart attack and kidney failure becoming relatively common condition of young adulthood.”
 - David Ludwig of Children's Hospital Boston, 2005.
- “Our children did not create this problem. Adults did.”
 - Surgeon General Richard Carmona, 2003.

<http://www.surgeongeneral.gov/news/testimony/obesity07162003.htm>

Purpose

- Assess childhood obesity in Los Angeles County
- Identify aspects of our built environment that may be positively or negatively associated with childhood obesity among cities and communities
- Inform decision-makers of the built environment
 - ❖ Community leaders
 - ❖ Local planners, developers, city & state officials
 - ❖ Concerned public

Our Neighborhoods, the Built Environment

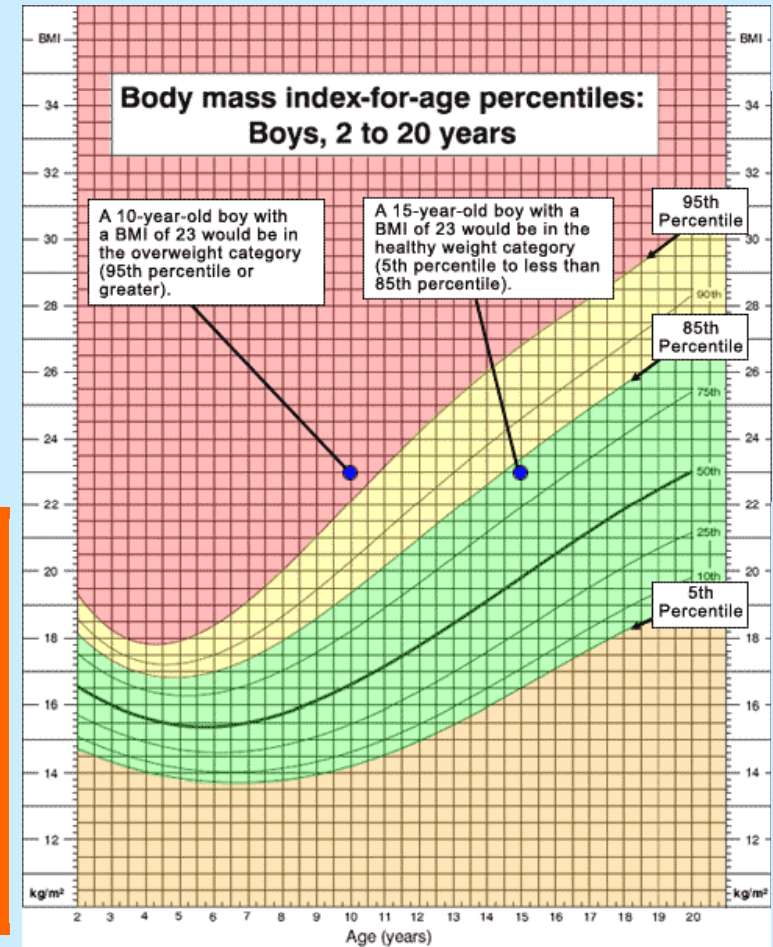
- Influences of the built environment
 - ❖ Food establishment
 - ❖ Park availability
 - ❖ Safety
 - ❖ Socioeconomic factors
- Association with childhood obesity

Childhood Obesity Estimation

- **Body Mass Index (BMI)**
 - ❖ **California Department of Education
Physical Fitness Testing Program (PFT), 2005**
Also referred to as Fitnessgram (Coopers Institute)
 - **Mandatory test of 5th, 7th, and 9th grade public schools**
- **National Center for Health Statistics (NCHS)
BMI-for-Age Growth Charts [2 to 20 yrs old]**
 - ❖ **SAS code for calculating percentiles, z-scores, &
eliminating biologically implausible values**

Childhood Obesity Definition

- CDC/NCHS 2000 Growth Charts
 - ❖ BMI-for-Age Percentiles



Percentile	CDC	AMA Workgroup
$\geq 95^{\text{th}}$	Overweight	Obese
85^{th} to $< 95^{\text{th}}$	At Risk	Overweight
5^{th} to $< 85^{\text{th}}$	Ideal	Ideal
$< 5^{\text{th}}$	Underweight	Underweight

Built Environment Factors

- Park Acreage (Per Capita)
 - ❖ Rand McNally/Thomas Bros., 2006
- Fast Food Establishments (Per Capita)
 - ❖ Dunn & Bradstreet, 2006
 - (Courtesy of California Nutrition Network CNNGIS.ORG)*
- Violent Crime (Per Capita), 2003-'04
 - ❖ Proxy for neighborhood safety; from LAPD, LA County Sheriffs, and California Dept of Justice

Socioeconomic Factor

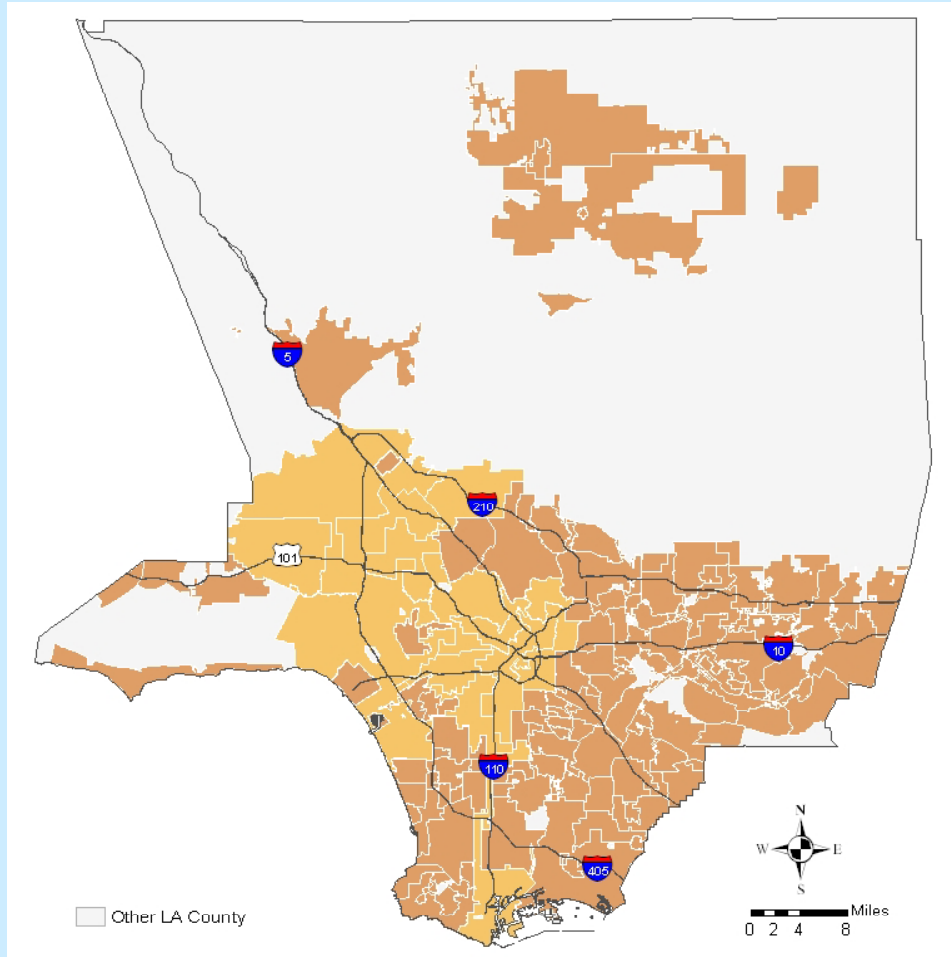
- Economic Hardship Index
 - ❖ Nelson A. Rockefeller Institute of Government
 - ❖ Census 2000
 - Housing occupancy
 - Poverty
 - Employment
 - Educational attainment
 - Dependents
 - Median household income (per capita)

Geographic Denominator

U.S. Census Bureau: Census 2000

- Incorporated Place (City)
 - ❖ Census tract units
- Census Designated Place (Community)
 - ❖ Census tract units
- City of Los Angeles Council Districts
 - ❖ Census block units

City & Community Geography



Putting It All Together

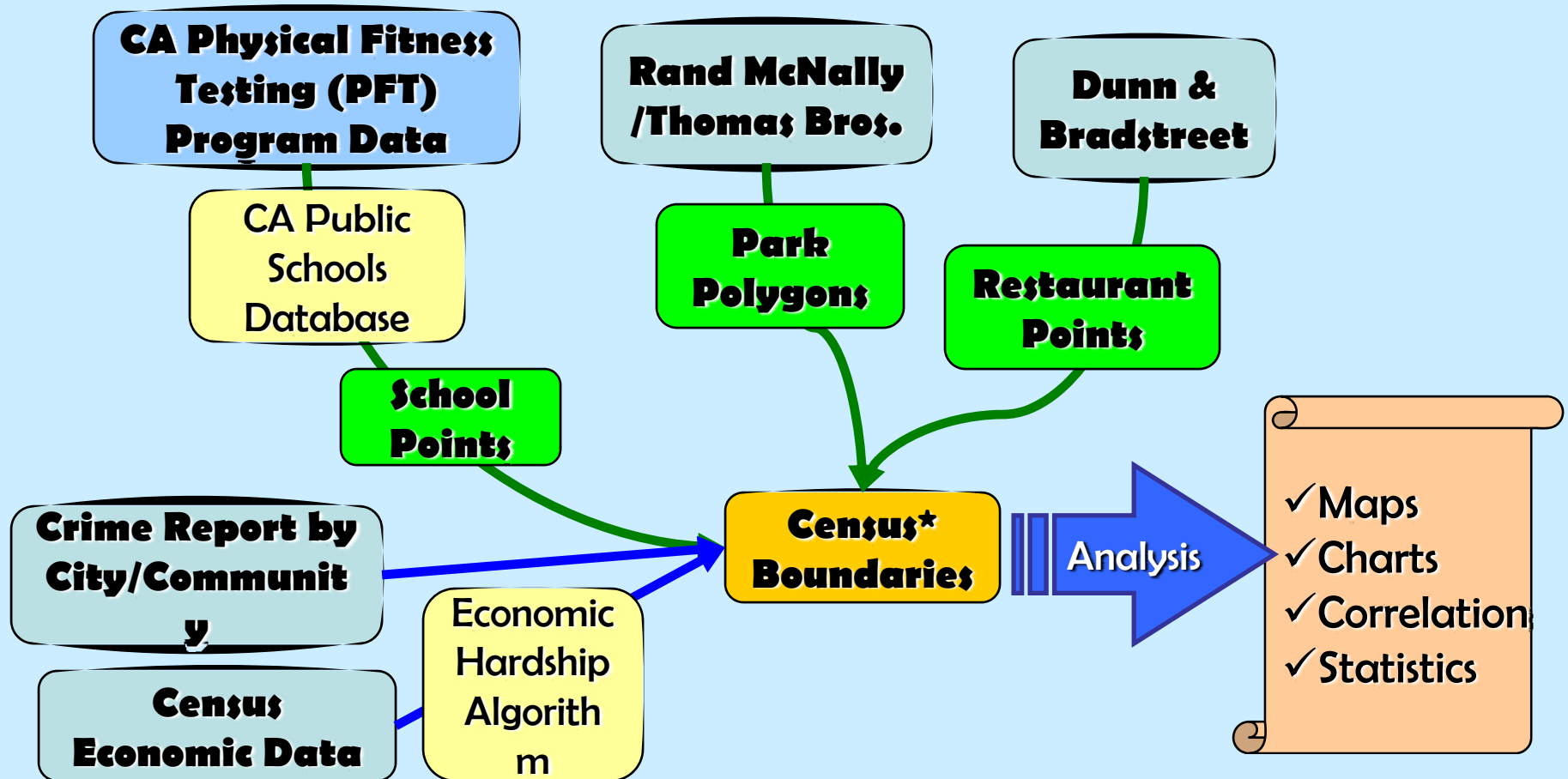
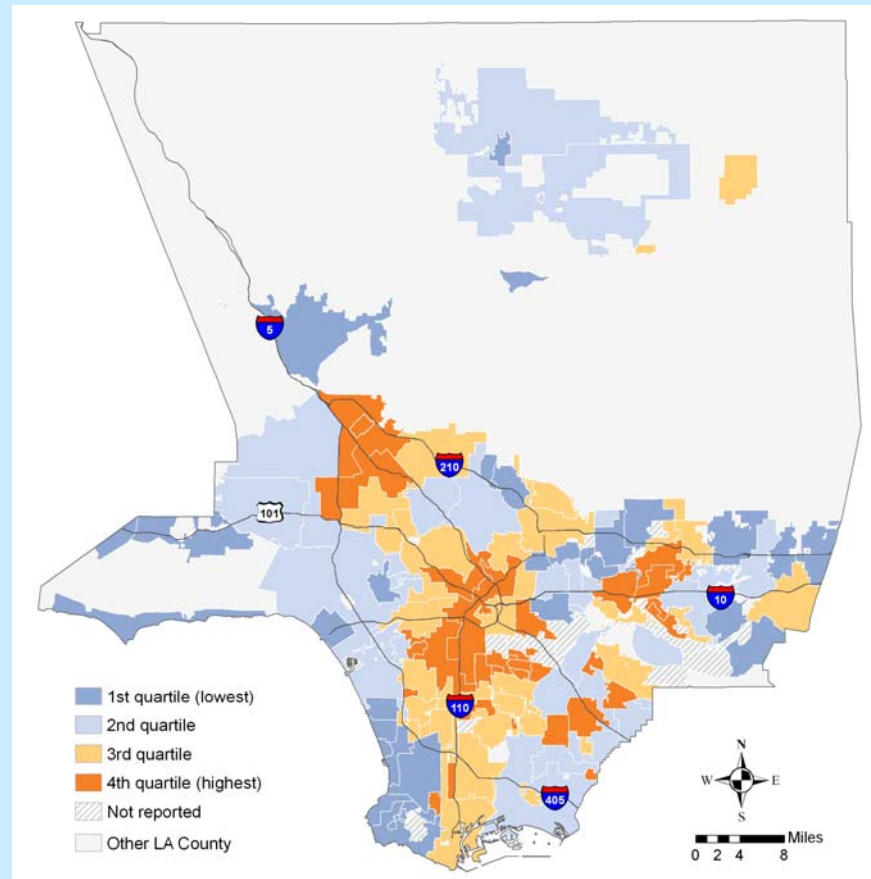
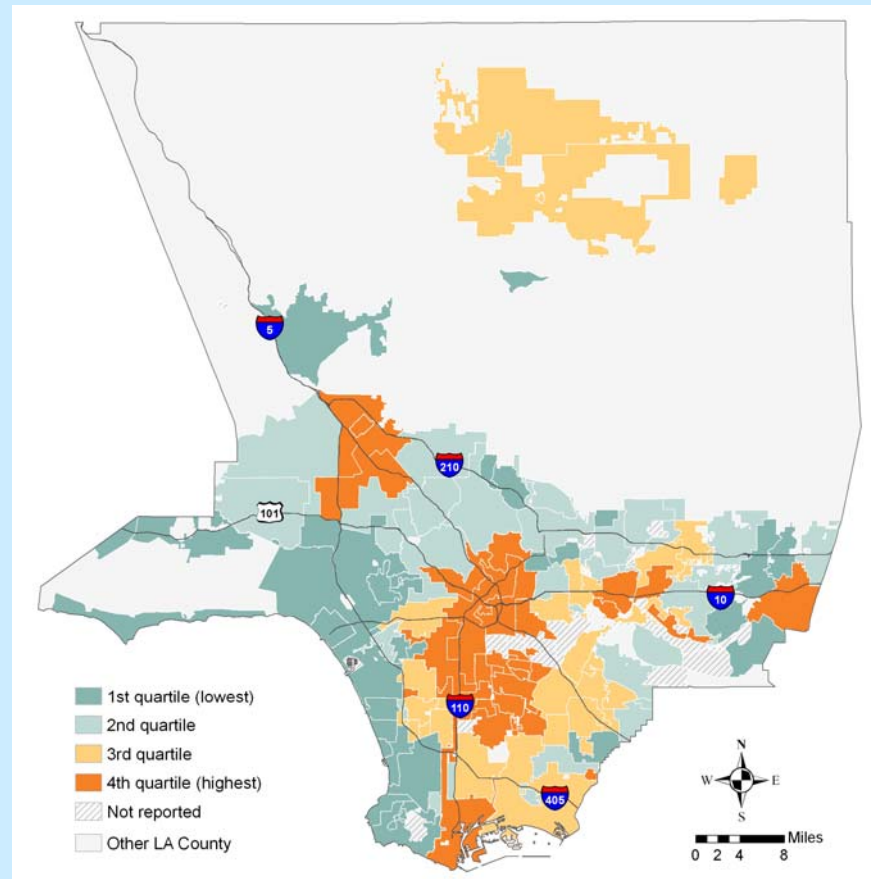


Figure 1: Childhood Obesity in LA County



Q	Prevalence
1	2.8 – 16.1
2	16.2 – 23.8
3	23.9 – 27.7
4	27.8 – 40.9

Figure 2: Economic Hardship in LA County



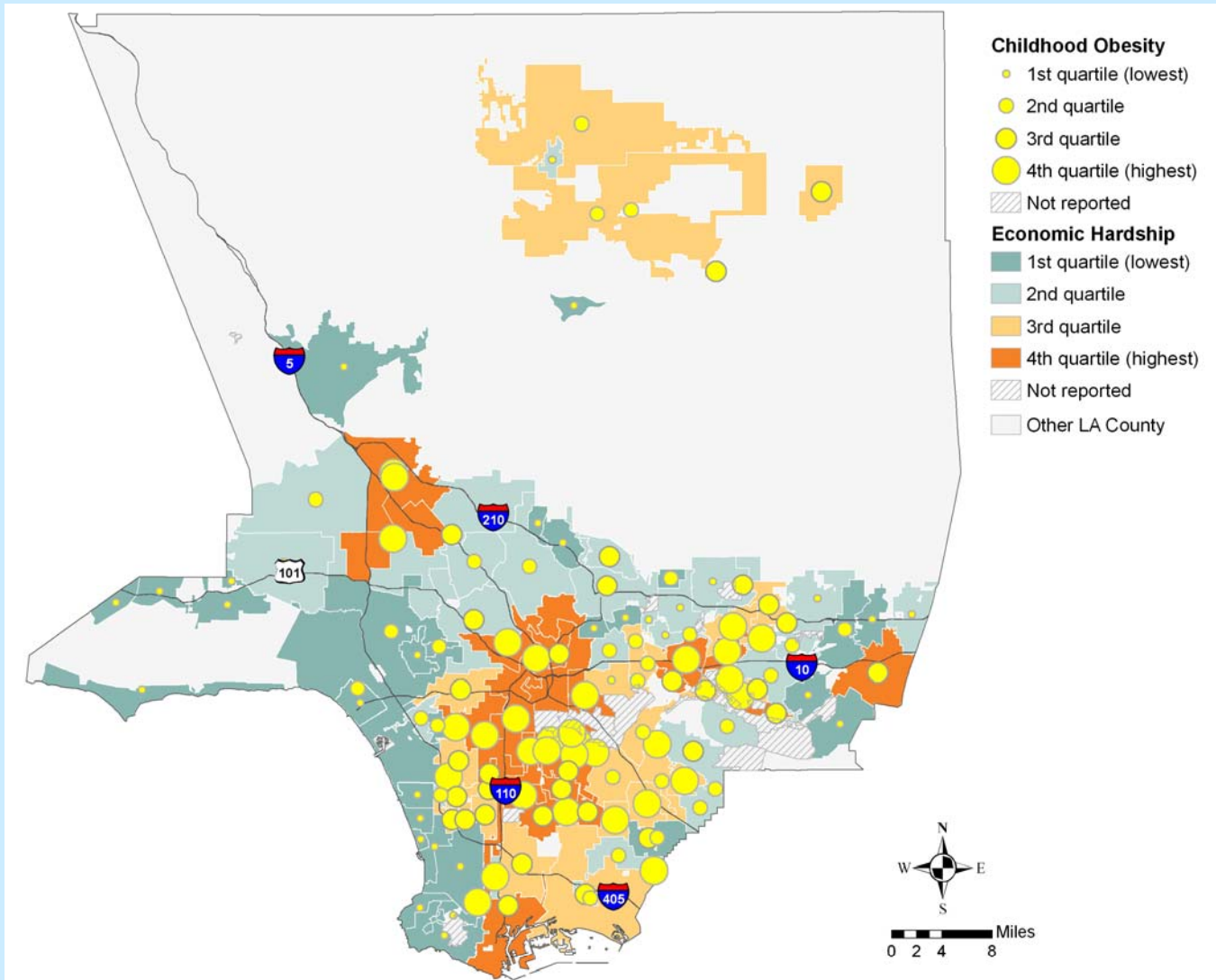
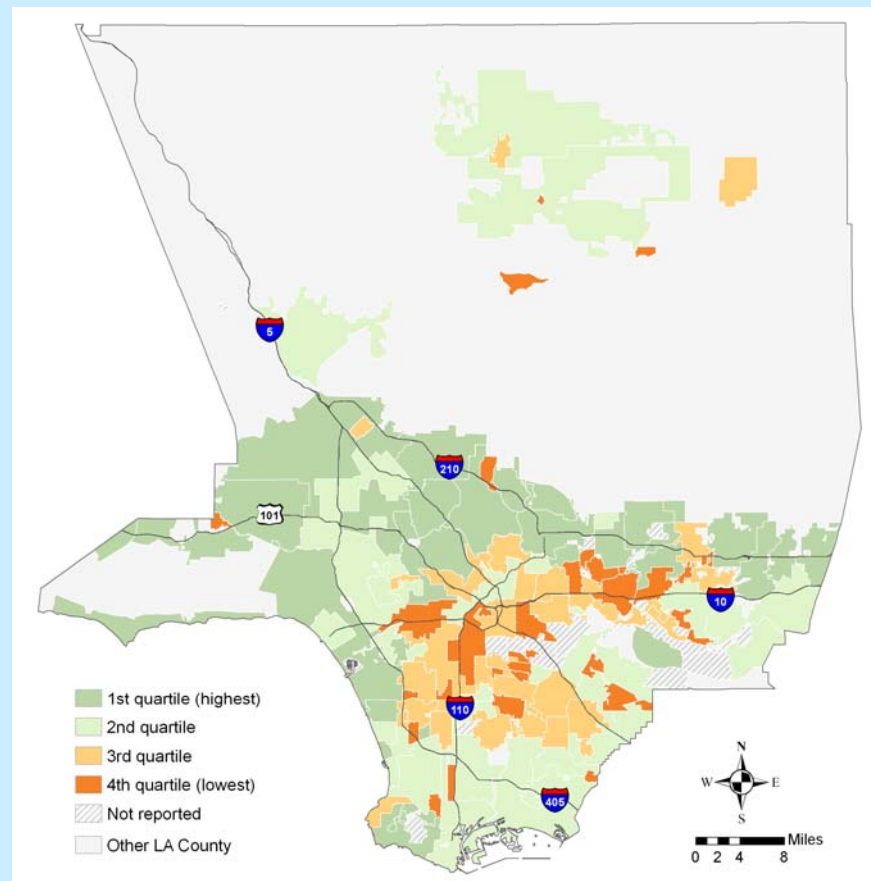


Figure 3: Park Acreage Per Capita



Q	Acres / 1,000
1	0 – 0.6
2	0.7 – 1.6
3	1.7 – 5.6
4	5.7 - 1,472.0

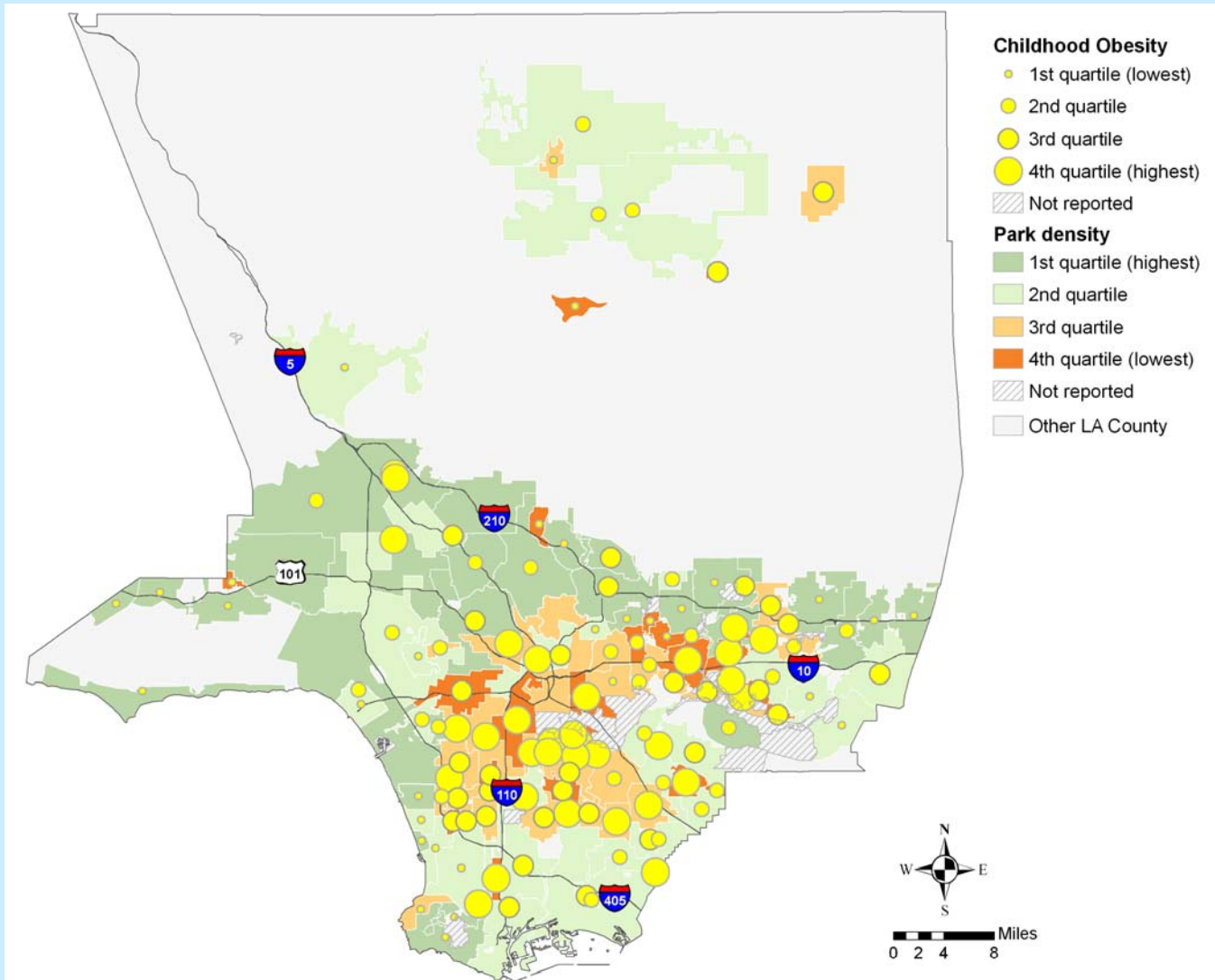
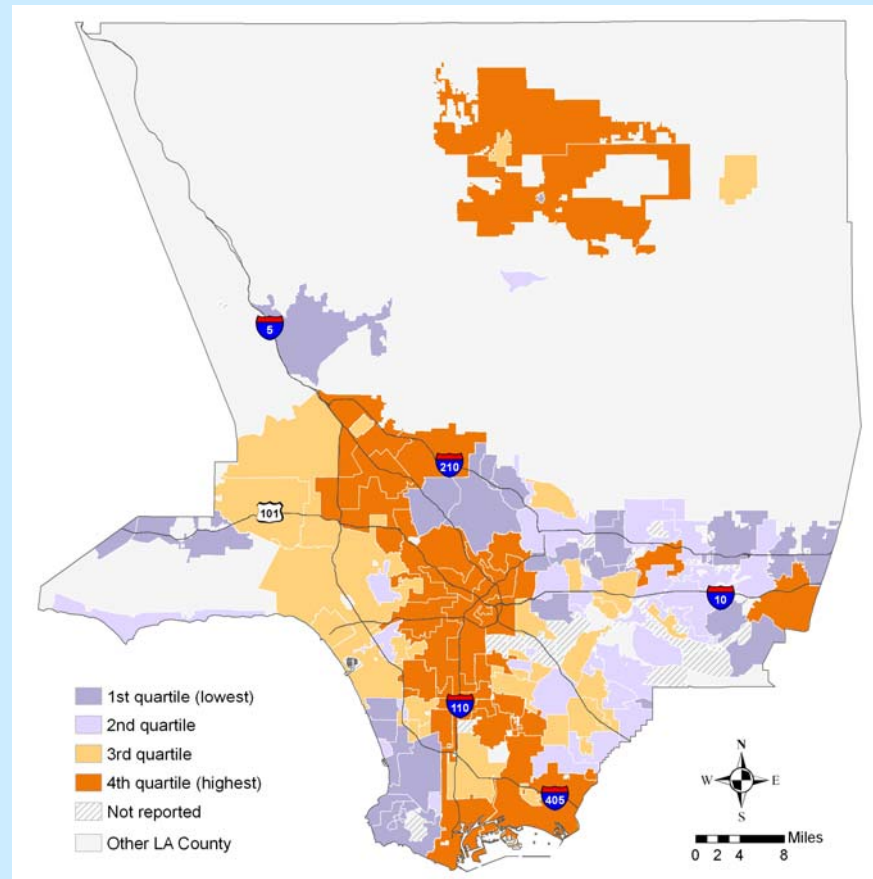


Figure 4: Violent Crime Per Capita



Q	Incidence / 100
1	5.3 – 5.9
2	6.0 – 10.1
3	10.2 – 15.3
4	15.4 – 52.1

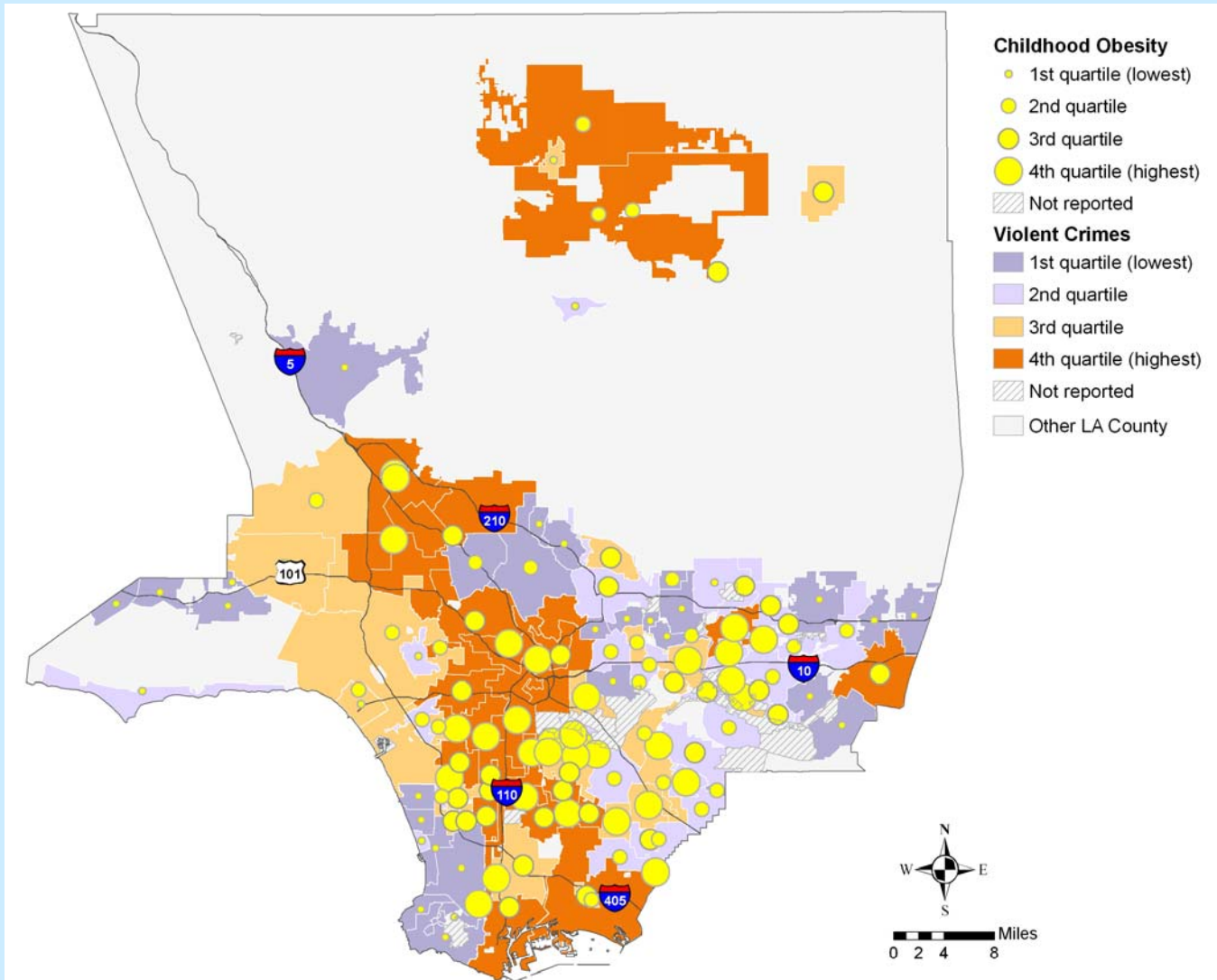
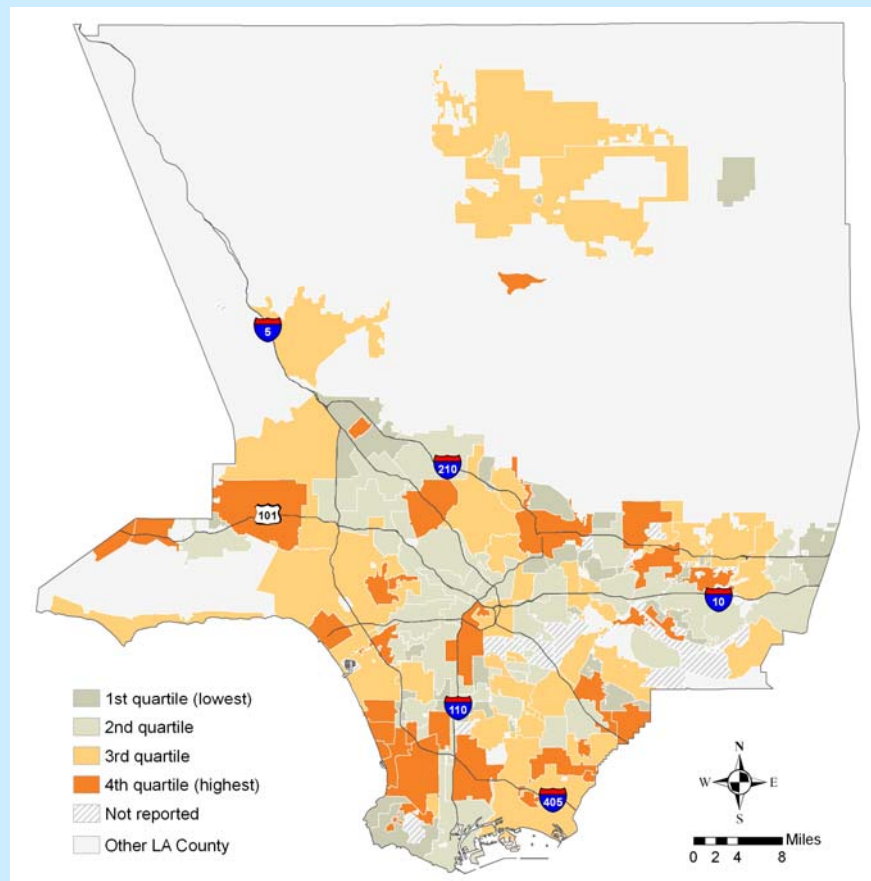


Figure 5: Fast Food Restaurants Per Capita



Q	Outlets / 100
1	0 – 3.5
2	3.6 – 5.3
3	5.4 – 7.2
4	7.3 – 55.3

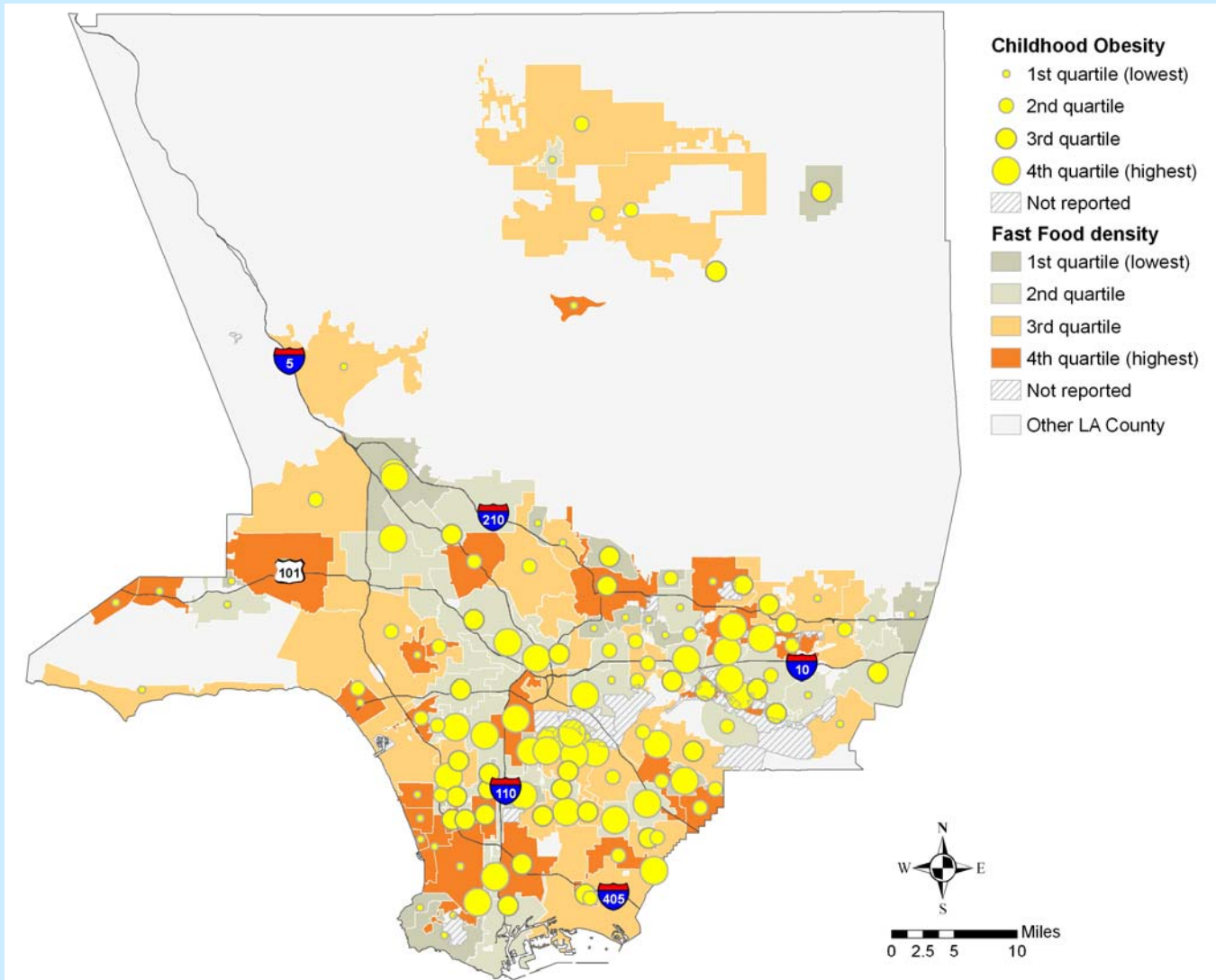


Figure 6: Spearman's Correlation Plot

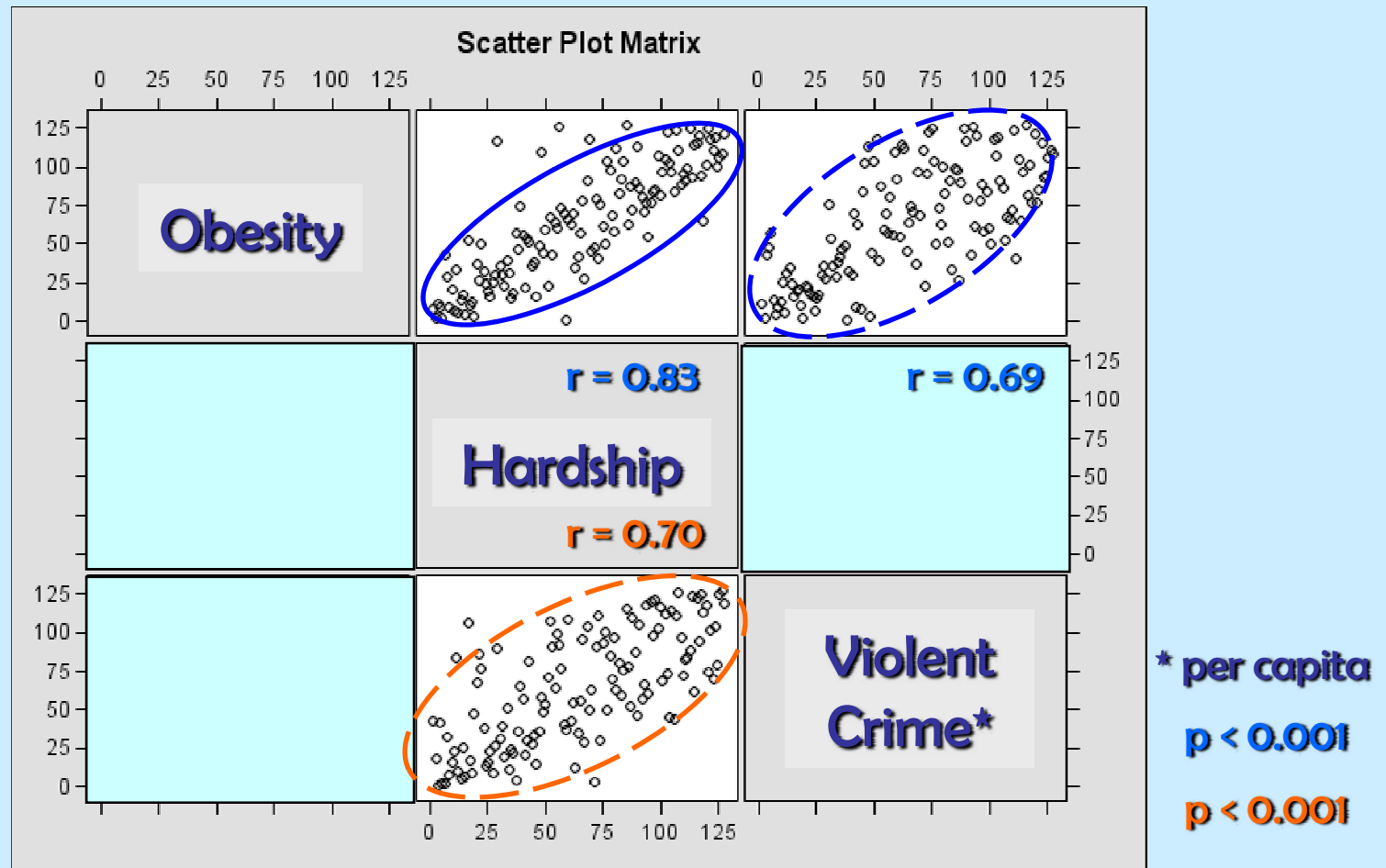
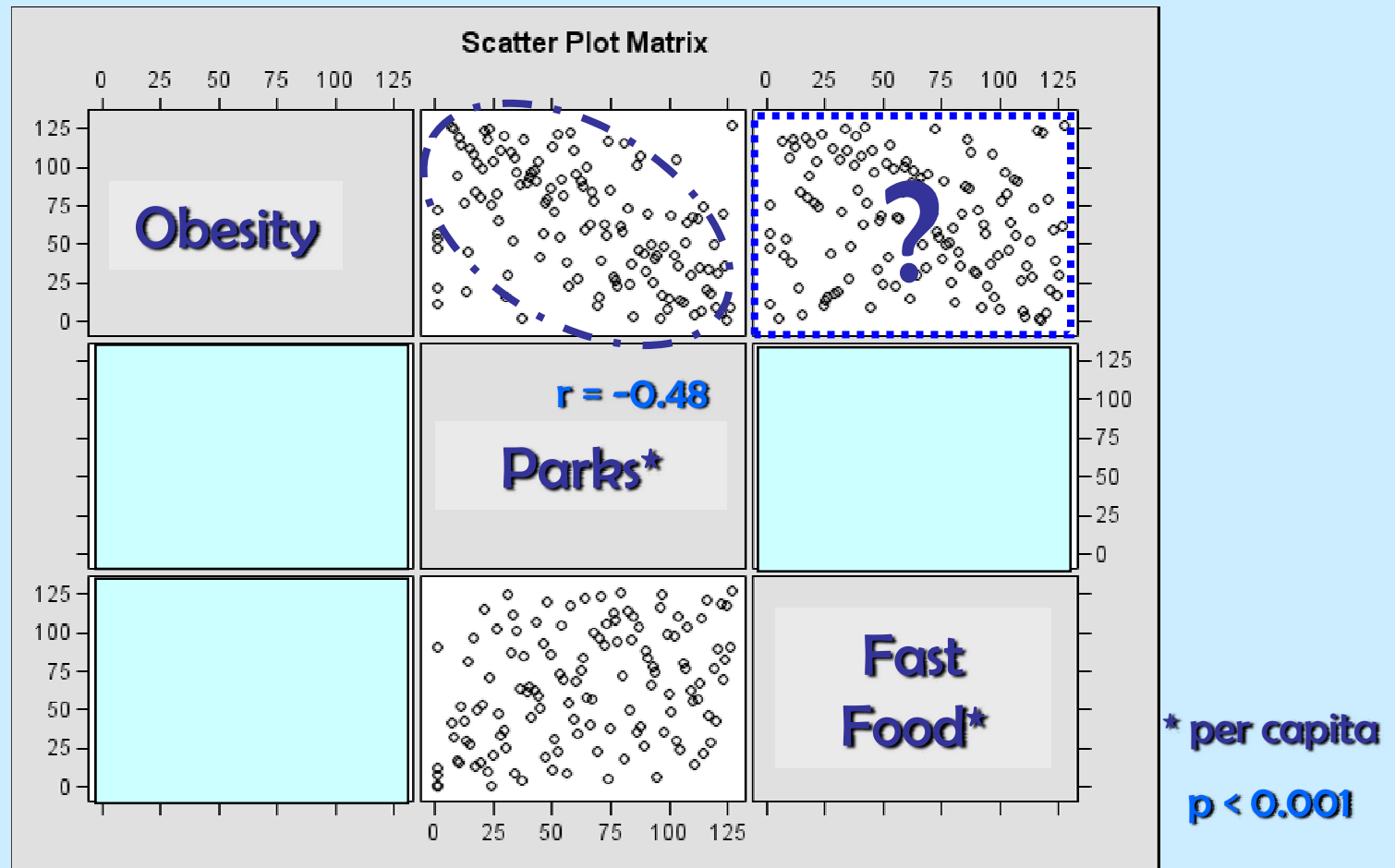


Figure 6: Spearman's Correlation (cont.)



Findings

Childhood obesity is significantly associated with

- Economic hardship
- Park acreage per capita

- Violent crime associated to both economic hardship and childhood obesity
- No association with fast food density
 - ❖ Ancillary analysis suggests different geographic pattern with “healthy” food outlets

Limitations

- Public school students only, grades 5, 7, & 9 (ages ~ 11-15 years)
- SES based on Census 2000, not 2005
- Geographic Units
 - ❖ Cities/Communities are large area, within which exist different distribution
 - ❖ Park area definition and quantification concerns
- Not representative of access and exposure to built environment factors
 - ❖ Fast food paradox
- Cross-sectional study: association, not causation

Next Steps

- Requesting 2007 PFT data from state
 - ❖ Observe time trends
 - ❖ Assess prevalence within race/ethnic groups

- Collect information of policy changes, campaigns targeting childhood obesity

- Identify other potential sources of data for risk factors
 - ❖ Afterschool fitness/sports programs

- Suggestion from my HealthGIS colleagues?
 - ❖ Cluster analysis? Spatial statistics?

“We shape our buildings



and thereafter



they shape us.”

www.theaerialphotographer.com

- Winston Churchill

Angeles National Forest



COUNTY OF LOS ANGELES
Public Health

Department of Public Health Headquarters



Oblique Imagery of 313 N. Figueroa St.

Oblique Imagery
from LAR-IAQ

Downtown L.A.



DK's
behind
the
wheel!!

geodata.csun.edu

A Team Effort...the Best You Can Ask For!

Epidemiology Unit

- **Margaret Shih, MD, PhD** - our fearless leader
- **Aida Angelescu, MS*** - artistic geographer
- **Alex Ho, MPH*** - full-proof epidemiologist
- **Mike Jackson, MBA, MPH** - savvy economist

Data Collection & Analysis Unit

- **Louise Rollin, MA** - code-breaking demographer

**Recipients of LA County's Outstanding Public Health Employee Awards*

Thanks also to...

- CA Dept. of Education
- CA Nutrition Network & Matt Stone
- Trust for Public Land

- Kristen Kurland
- John Pearson

Stay Tuned!



- **Cities & Communities Health Report, 2nd Edition**

- ❖ Official Press Release on October 29, 2007

- ❖ 1st Edition: Heart Disease & Stroke – Years of Life Lost

Tel: (213) 240-7785

eMail: epi@ph.lacounty.gov

eMail: dkwan@ph.lacounty.gov