Illustrating GIS Tools in Population Based Epidemiologic Research

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Geographic Information Systems (GIS)

Computer based system of hardware, software, and data used to create, manage, store, display, and analyze spatial and attribute data.

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Sources of Data

- Study on cardiovascular health in 4 California cities

- 8,419 adults surveyed

- Home addresses geocoded and linked to census data to describe neighborhood social environment (e.g., poverty concentration)

- Addresses of goods and services geocoded to describe neighborhood physical environment (e.g., proximity/density alcohol outlets)
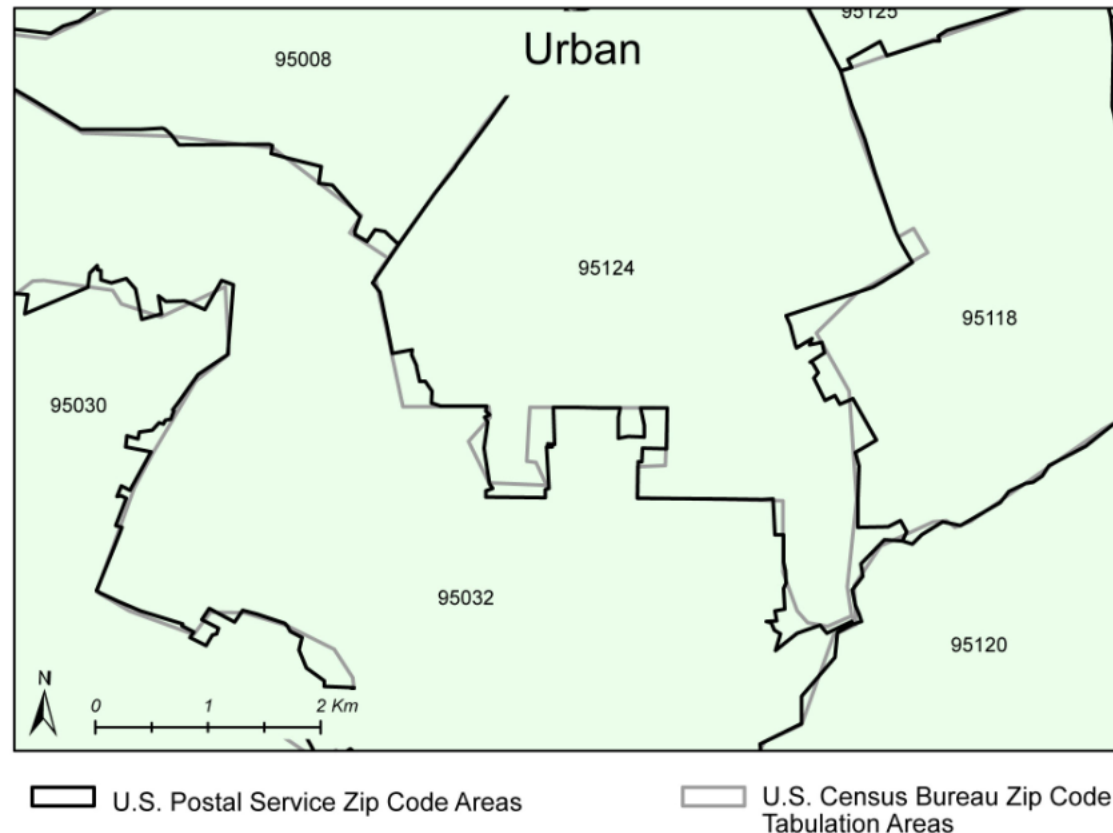
GIS Examples

- Urban/rural comparison of neighborhood boundaries

- Geographic representation of study participants

- Inclusion/exclusion criteria

- Calculating density/distance variables

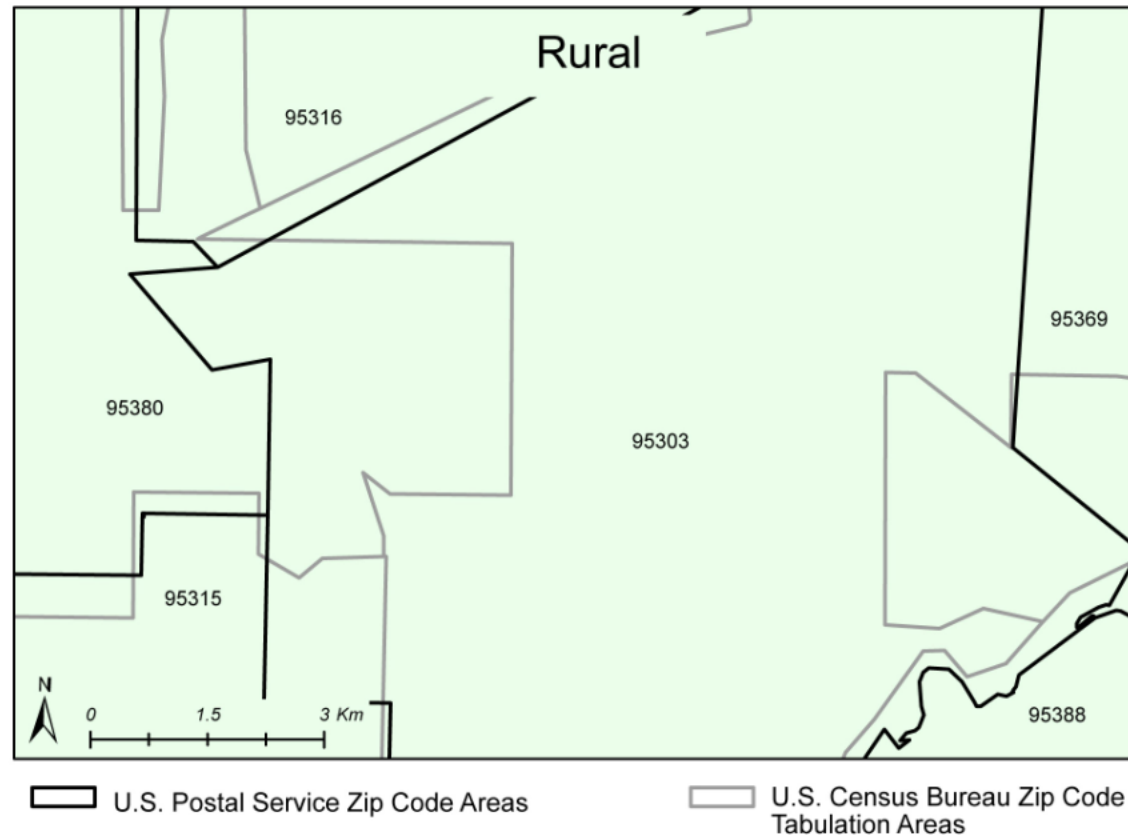- Change over time in neighborhoods

- Disseminating findings

Urban Comparison of Postal Service Zip Code Boundaries with Census Bureau Zip Code Boundaries, 2000
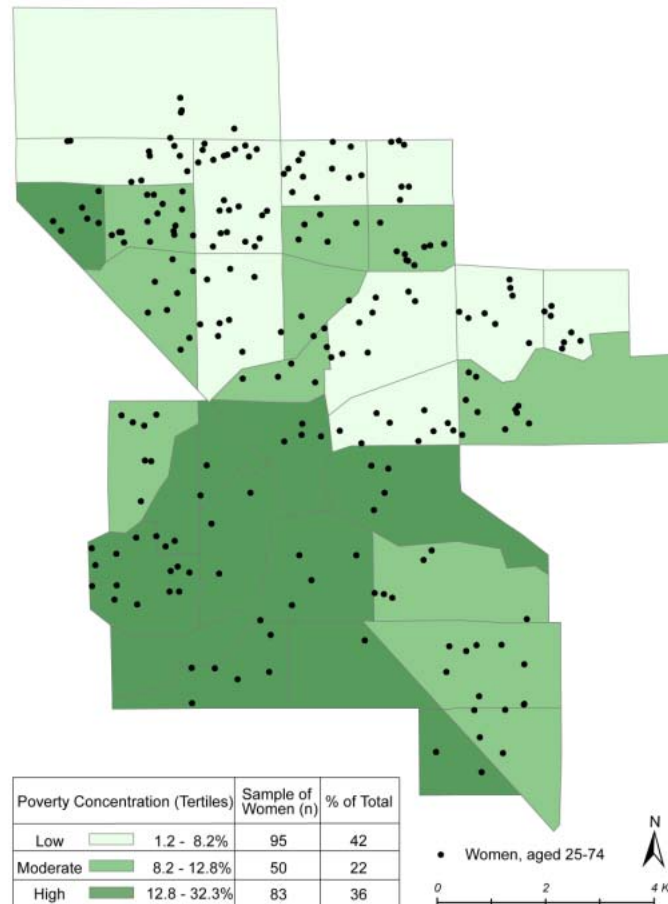
Rural Comparison of Postal Service Zip Code Boundaries with Census Bureau Zip Code Boundaries, 2000
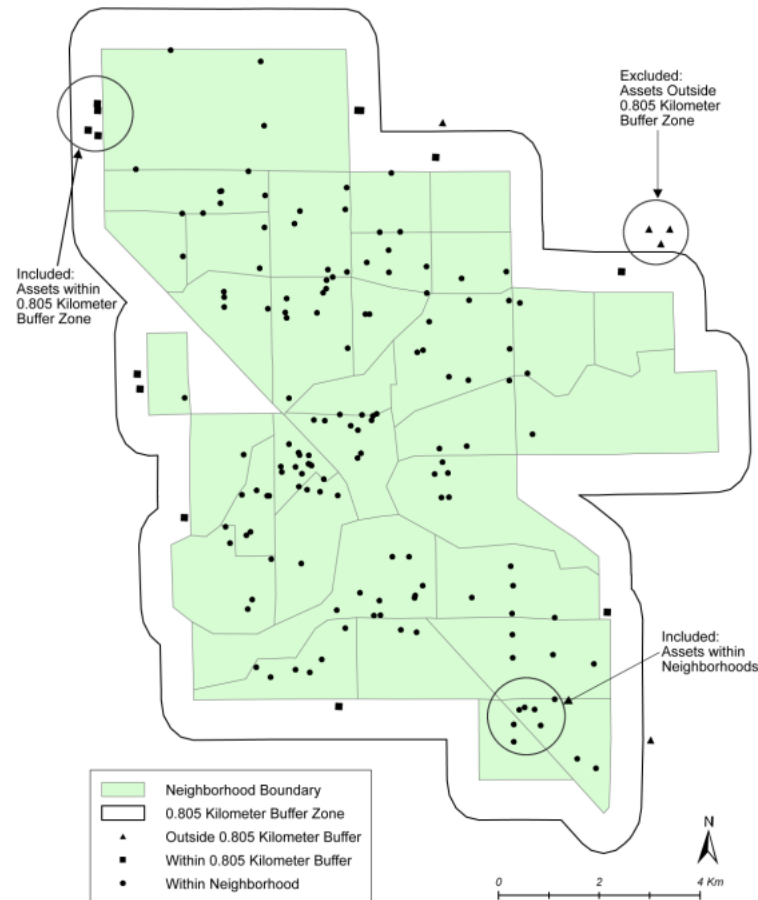
Geographic Representation of Study Participants by Neighborhood-Level Poverty Concentration
Women Aged 25-74, Modesto, CA, 1979-1980

Poverty Concentration (Tertiles)		Sample of Women (n)	% of Total
Low	1.2 - 8.2%	95	42
Moderate	8.2 - 12.8%	50	22
High	12.8 - 32.3%	83	36

• Women, aged 25-74

N

0   2   4 Km

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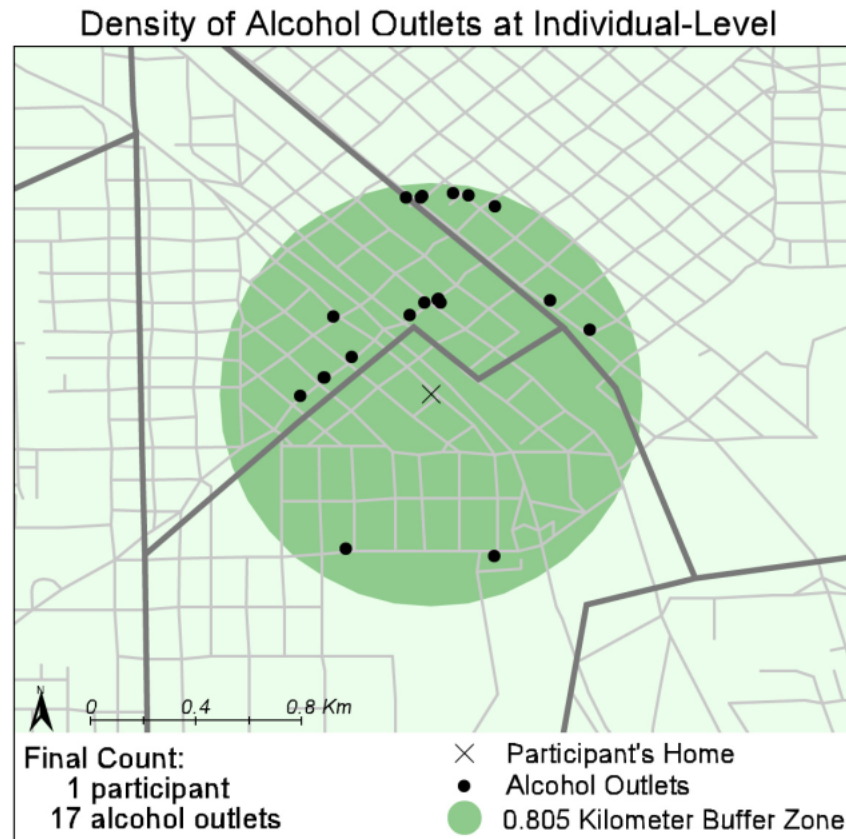
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Determining Boundaries for Inclusion of Selected Assets (grocery stores, social organizations, health clinics)
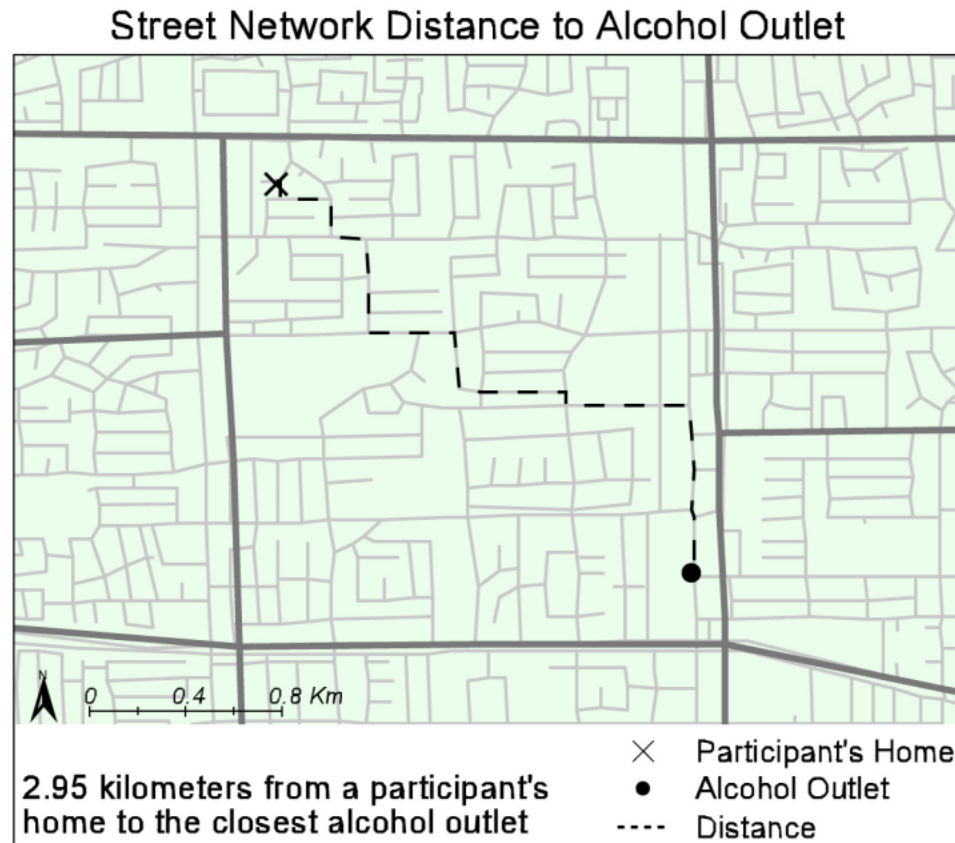## Half-mile Buffer Zone, Modesto, CA,1989-1990
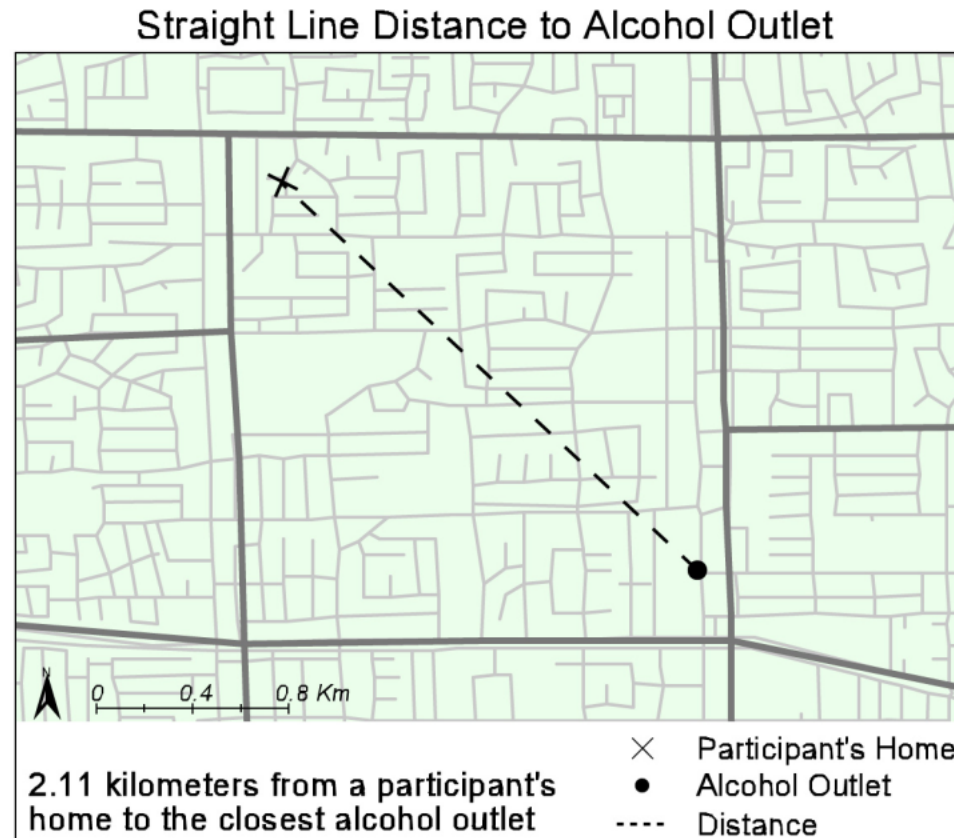
Density of Alcohol Outlets:
Individual-Level

Density of Alcohol Outlets at Individual-Level

Final Count:
1 participant
17 alcohol outlets

× Participant's Home
• Alcohol Outlets
● 0.805 Kilometer Buffer Zone

Density of Alcohol Outlets:
Neighborhood-Level

Density of Alcohol Outlets at Neighborhood-Level

Final Count:
7 participants
5 alcohol outlets

× Participants' Homes
• Alcohol Outlets
▨ Neighborhood

Distance to Alcohol Outlets: Street Network Distance

Street Network Distance to Alcohol Outlet

0   0.4   0.8 Km

2.95 kilometers from a participant's home to the closest alcohol outlet

×   Participant's Home
●   Alcohol Outlet
----   Distance

Distance to Alcohol Outlets:
Straight Line Distance

Straight Line Distance to Alcohol Outlet

2.11 kilometers from a participant's home to the closest alcohol outlet

× Participant's Home
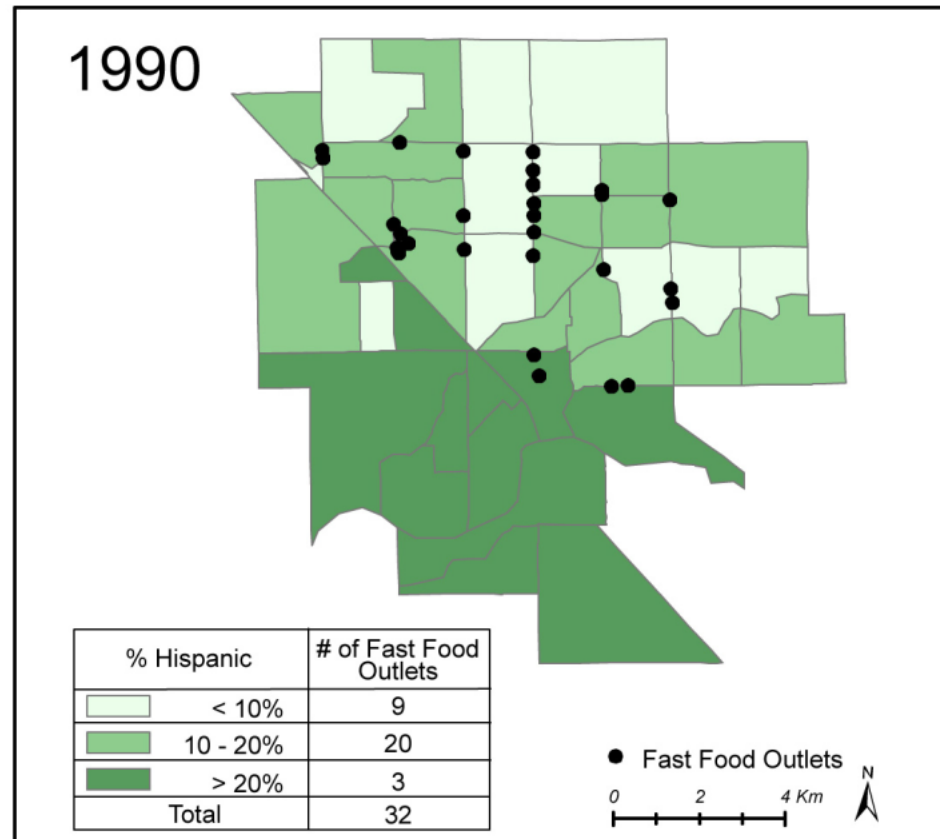• Alcohol Outlet
---- Distance

1980: Number of Fast Food Outlets by Percent Hispanic Concentration, Modesto, CA
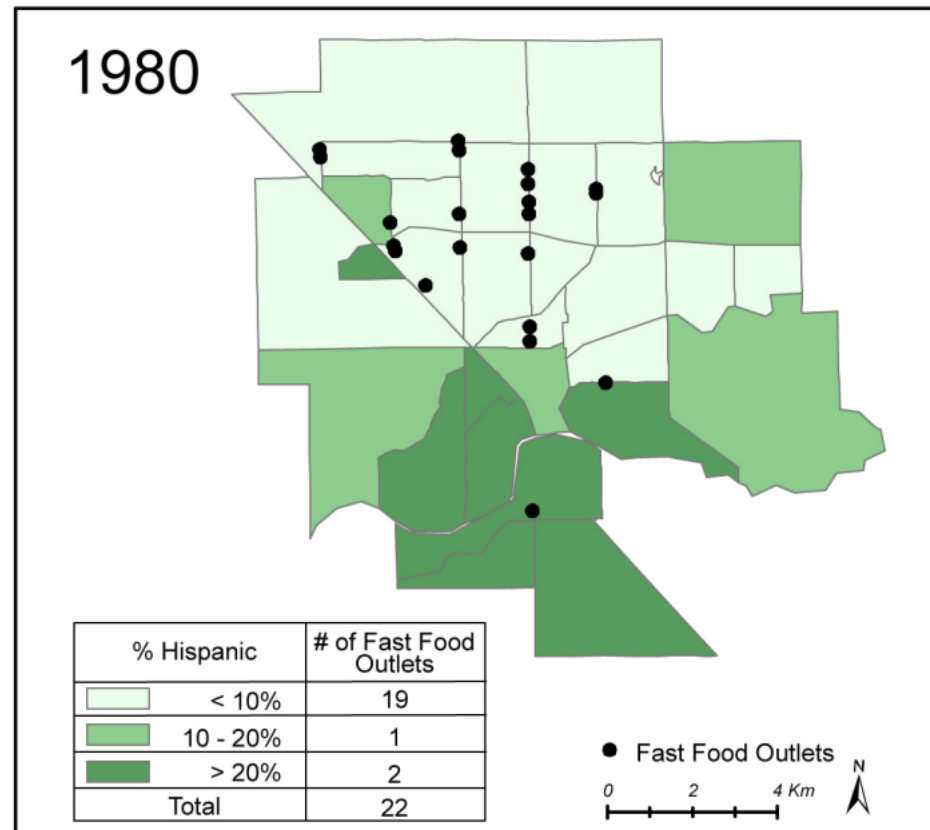
1990: Number of Fast Food Outlets by Percent Hispanic Concentration, Modesto, CA

% Hispanic	# of Fast Food Outlets
< 10%	9
10 - 20%	20
> 20%	3
Total	32

● Fast Food Outlets

0   2   4 Km

2000: Number of Fast Food Outlets by Percent Hispanic Concentration, Modesto, CA

% Hispanic	# of Fast Food Outlets
< 10%	3
10 - 20%	21
> 20%	23
Total	47

• Fast Food Outlets

0 2 4 Km
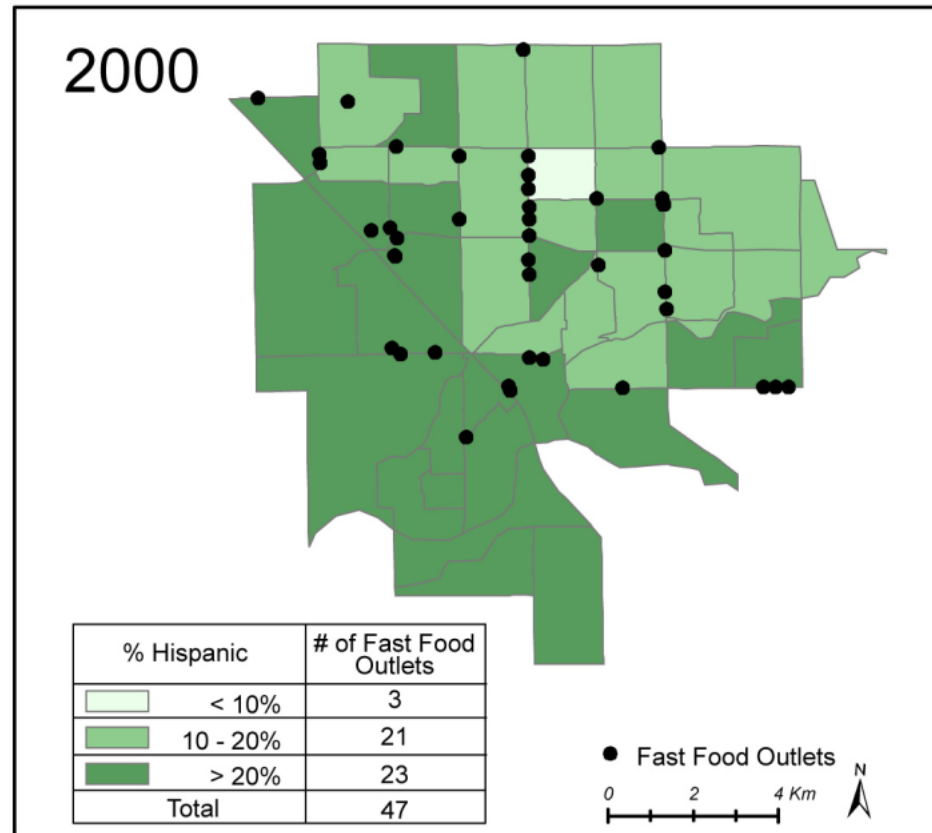
Web-based Dissemination
Neighborhood Physical Activity Resources