BEHAVIOR, ENVIRONMENT AND HEALTH IN GEOGRAPHICALLY DIVERSE WORK SITE POPULATIONS

Exploring Community Context in Type 2 Diabetes

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background – Study Area

29 work sites, in 22 counties, in 14 states (6 sites in one county)

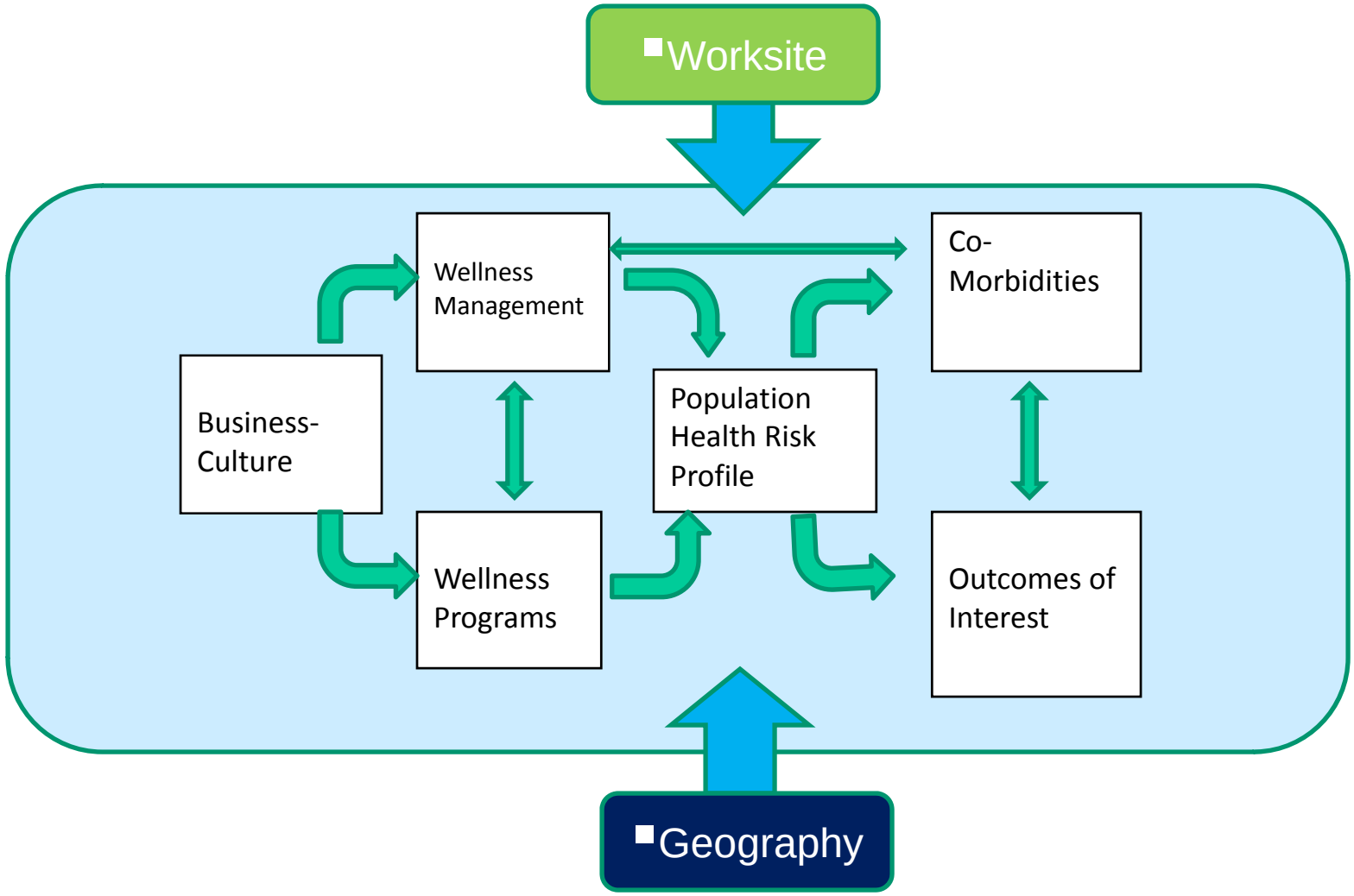
background – PPG study summary

- Worksite Disease Circulatory Prevention (2004 – 2007)
- Predicting Hypertension, Obesity, Diabetes
- Data from: 2002 – 2007
- Study Area: 29 work sites in 14 states
- Individual Focus
  - personal history
  - age
  - behavior

background – PPG study summary

- Multi-factorial models tested
  - population risk
  - social determinants of health
- Variance predictions in work site occurrence of episodes of care
- Variables considered and preliminary results

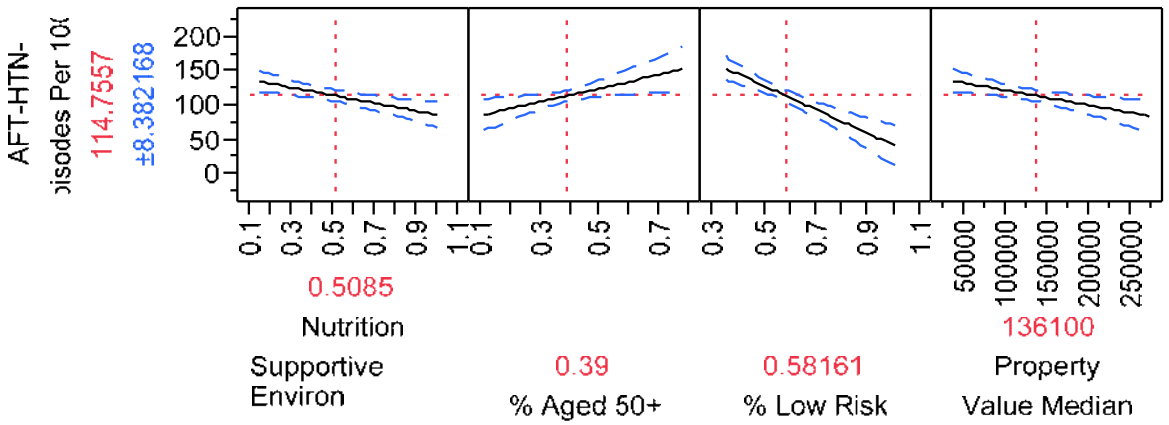
Variables and domains tested

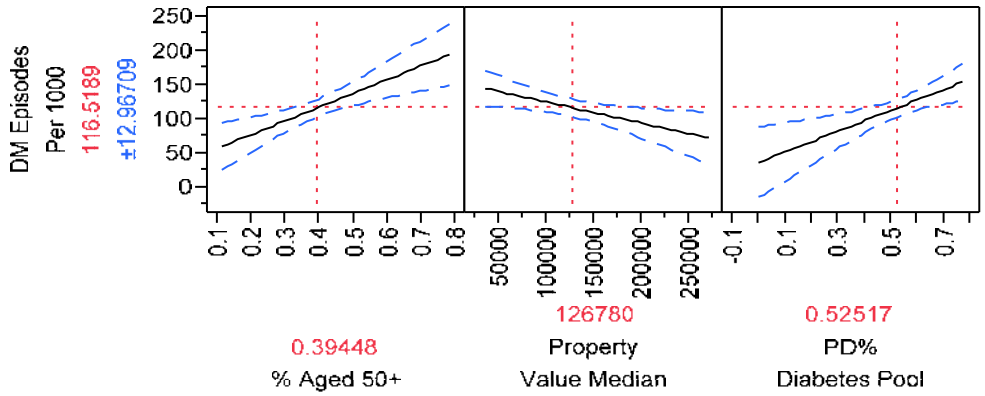


Preliminary Results

A. Colombi: Environmental and Population Risk factors predicting Hypertension, and Diabetes in working populations.
3rd World Congress on Controversies to Consensus in Diabetes, Obesity and Hypertension Prague, Czech Republic May 13-17

81% of the variance in Hypertension episodes of care/1000 active members in 29 worksites was predicted by: worksite percent Aged50+, Percent at Low Risk, Nutrition Supportive Environment Score , and by the Community median property value .





63% of the variance in Diabetes - Episodes of Care /1000 (active and retired) members was predicted by worksite percent Aged50+, Percent in pre-diabetes risk pool , and by the Community median property value .

…and then GIS

Goal

Conduct an exploratory analysis to investigate if there is any relationship between community context and the findings of the PPG study.

objectives

- Convert PPG Study results into a geospatial format
- Compile a context geospatial data library for the study area
- Develop method (try, fail, try again) and shape analysis

strategy

- Explored three variables from the PPG Study
  - Summarized Obesity Prevention Activities per work site
  - Percentage of Obese Population (BMI 30+) per work site
  - Diabetes Medical Episodes of care per 1,000 members per work site
- Considered a framework of four domains
  - Air Pollution Environment
  - Food Environment
  - Public Health Environment
  - Socioeconomic Environment

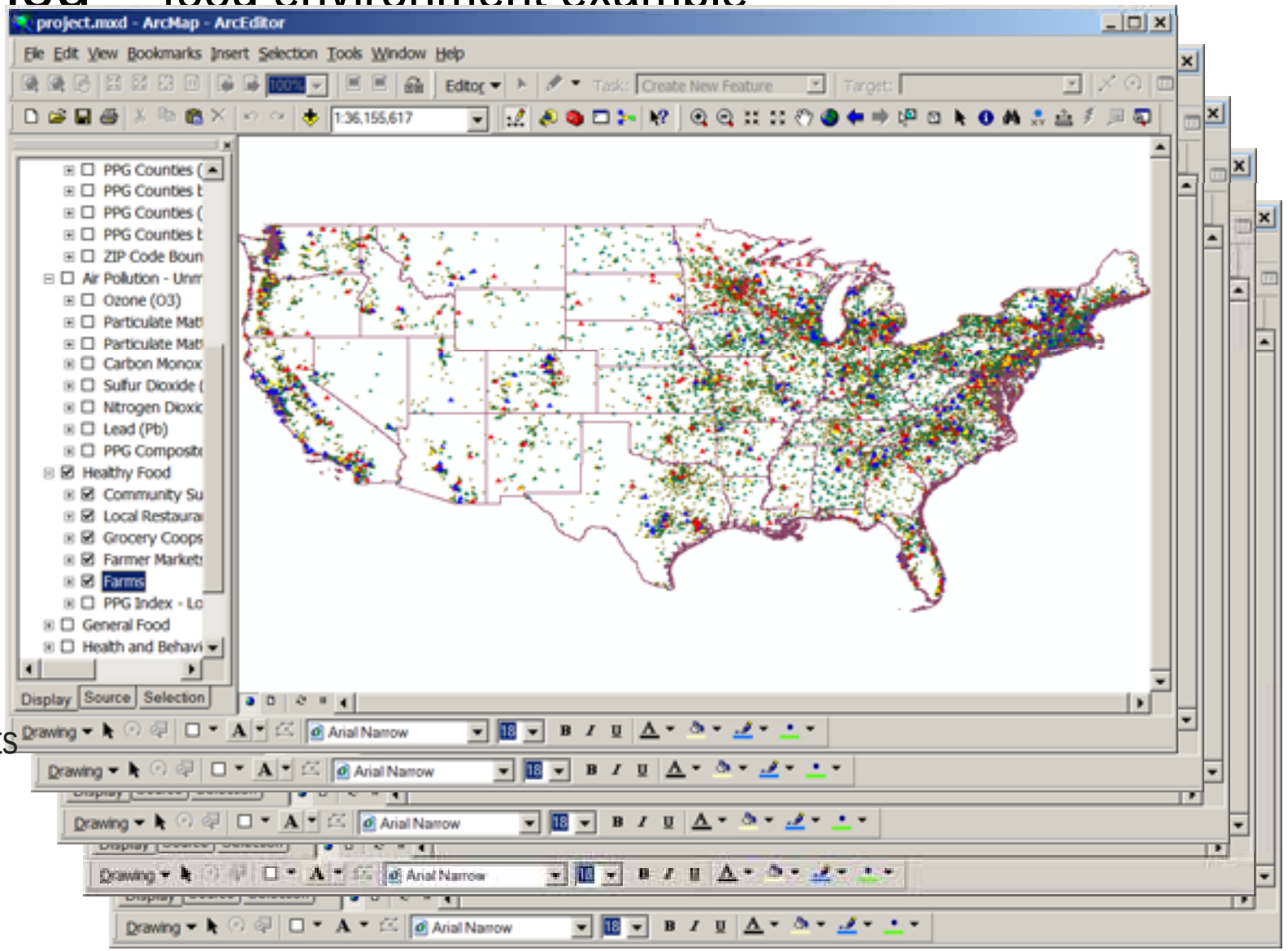
method – data sources and providers

- Map Extent – PPG sites data (~15 layers)
- Map Extent – Nationwide data (~50 layers)
  - Air Pollution NAAQS – EPA (‘06)
  - Local Food – LocalHarvest (‘10)
  - General Food – USDA Food Environment Atlas (‘10)
  - Health/Behavior – UW County Health Ranking (‘10)
  - Socioeconomic/Demographic – ESRI (2009)
  - Base – USDOT Atlas (2008)

method - overall

- For each of the 4 domains we created Spatial Composite Indices.
- Each of the 4 Indices was overlaid and compared with each of the 3 main variables from the PPG study.
- Next we discuss the *food environment domain* as an example

method – food environment example



CSAs

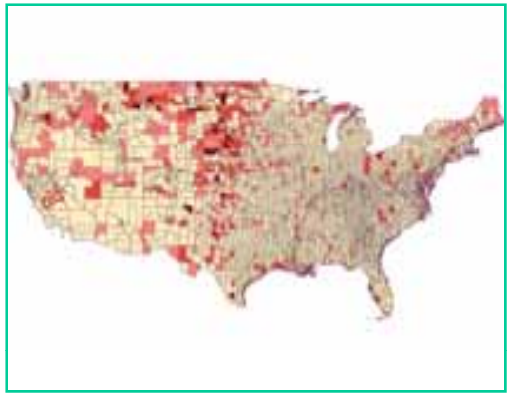
Local Restaurants

Grocery Coops

Farmer Markets

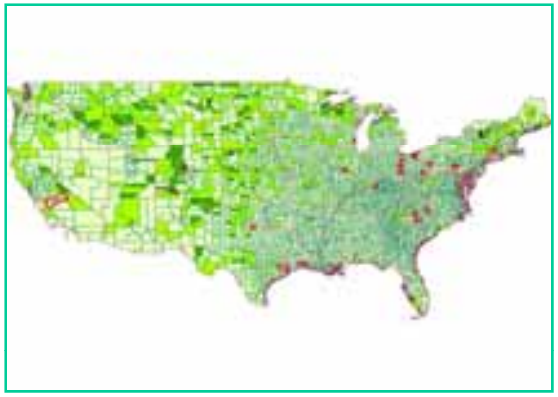
Farms

method – food environment example

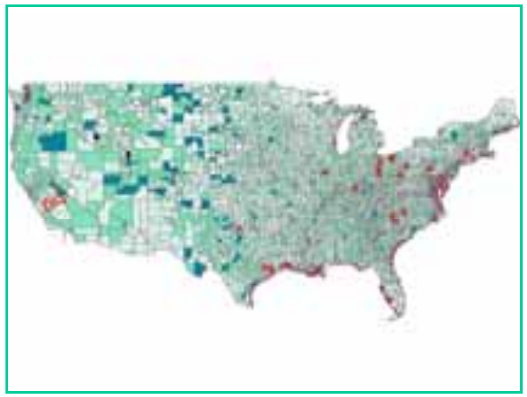


Grocery Stores /1,000 pop

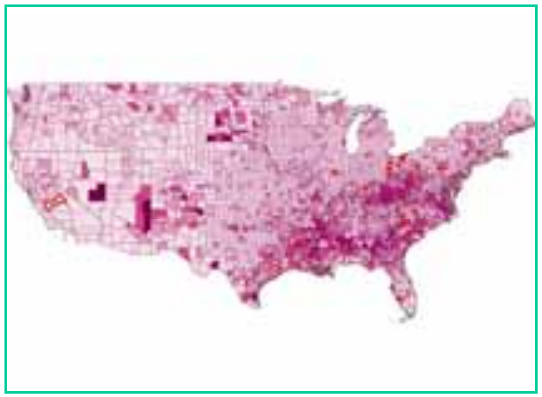
Convenience Stores /1,000 pop



Restaurants /1,000 pop



Fast Food Stores /1,000 pop



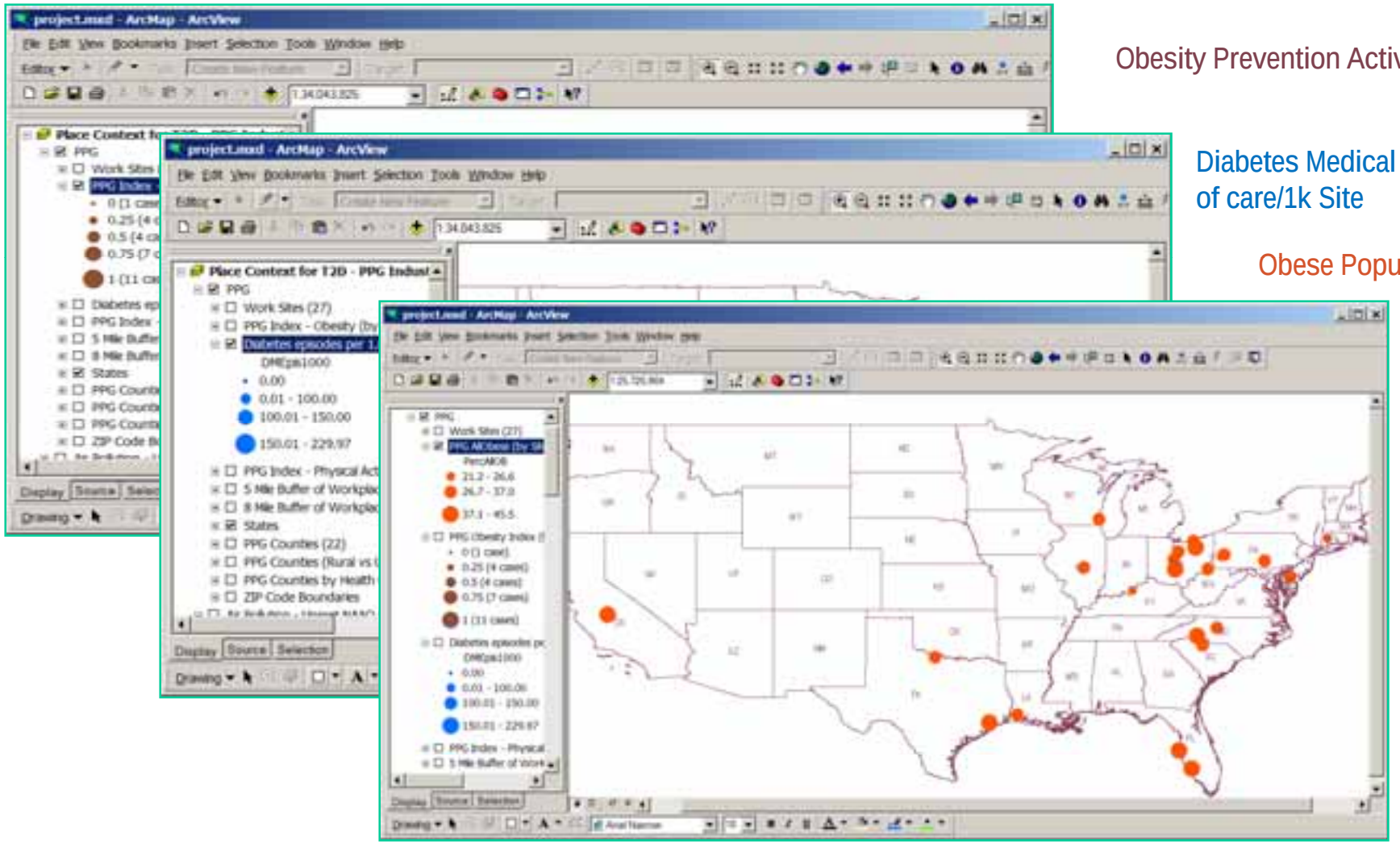
Perc No Car HHold > 1ml grocery

Perc Low Income People > 1ml grocery

method – food environment example

- Spatial Composite Index of Local Food per 10,000 population
  - summarize all local food layers
- Spatial Composite Index of Food Availability per 1,000 population
  - restaurants, groceries, convenient stores
- Spatial Composite Index of Food Accessibility per 1,000 population
  - no car households and low income individuals > 1ml
- Spatial Composite Index of Unhealthy Food per 1,000 population
  - convenience and fast food stores

method – 3 PPG variables



Obesity Prevention Activities /Site

Diabetes Medical Episodes of care/1k Site

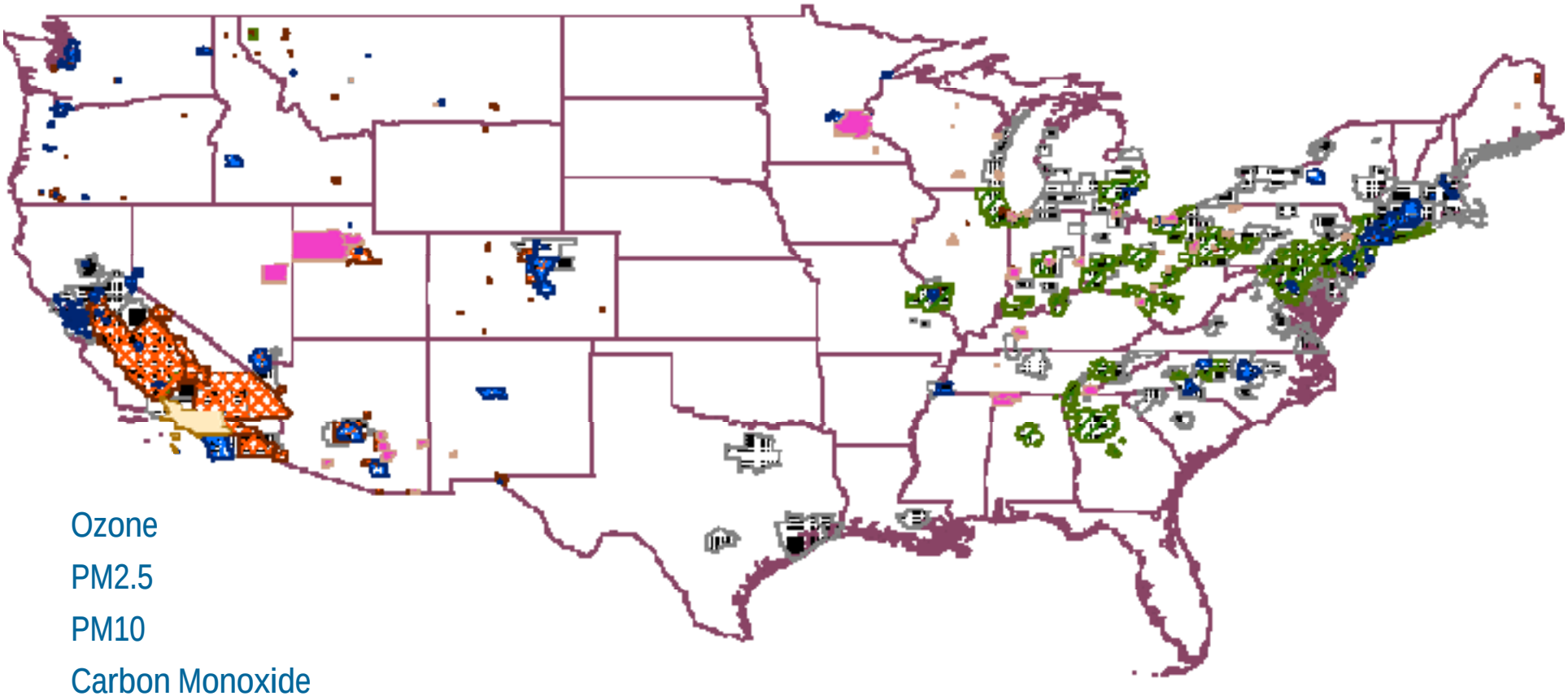
Obese Population /Site

method – food environment example

Summary Results

- 90% of PPG sites with highest Obesity Index are in counties where 3 conditions are met at once
    - availability of local food is at its lowest compared to PPG sites
    - availability of general food is at its lowest compared to PPG sites
    - availability of unhealthy food is at its highest compared to PPG sites

method – air pollution environment example (NAAQS)



Ozone

PM2.5

PM10

Carbon Monoxide

Sulfur Monoxide

Nitrogen Dioxide

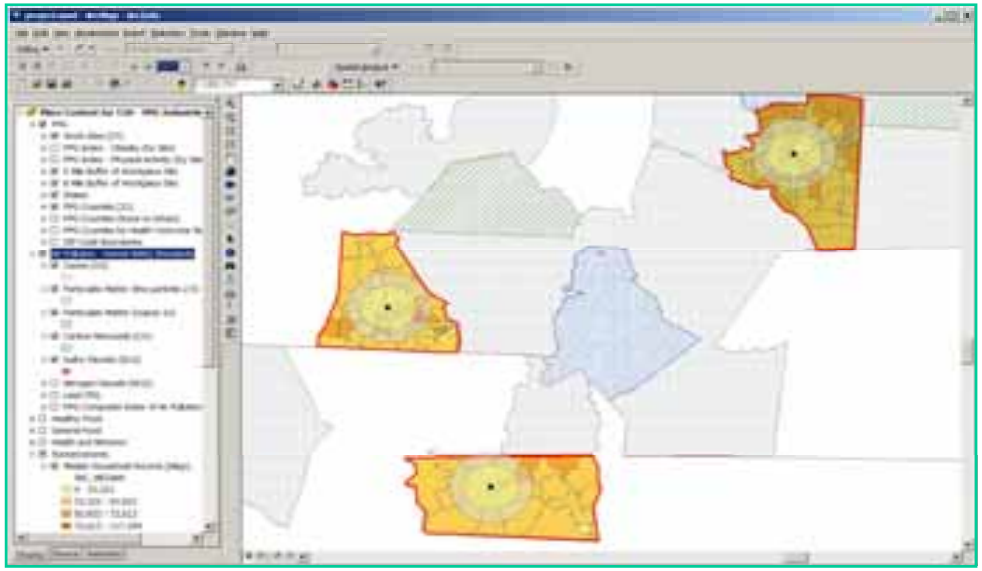
Lead

method – air pollution environment example

- Composite Index Air Pollution Intensity (CIAPI) - values 1 to 7

- 74% of sites with highest obesity are in places with highest numbers of unmet NAAQ standards

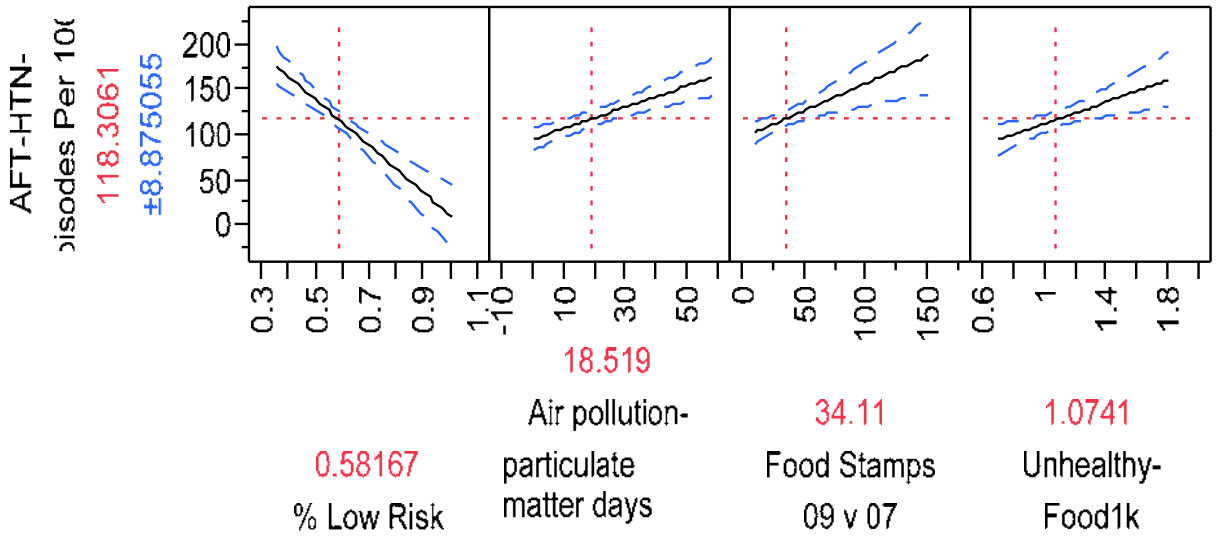
- Not counting sites adjacent to non attainment areas (NCarolinas)



afterthoughts

- Did we meet objectives?
- Did we stumble into un-anticipated ones?
- Did we uncover much?
- Were we able to come to conclusions?
- Next?

Hypertension Episodes of Care/ 1000 Active Full time Employees- Prediction Profiler Inclusive of geospatial factors



book report at:

http://web.dcp.ufl.edu/juna/temp/ppg.pdf

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