FAIRFAX COUNTY COMMUNITYSCAPE: OBESOGENIC ENVIRONMENTS

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Project Introduction

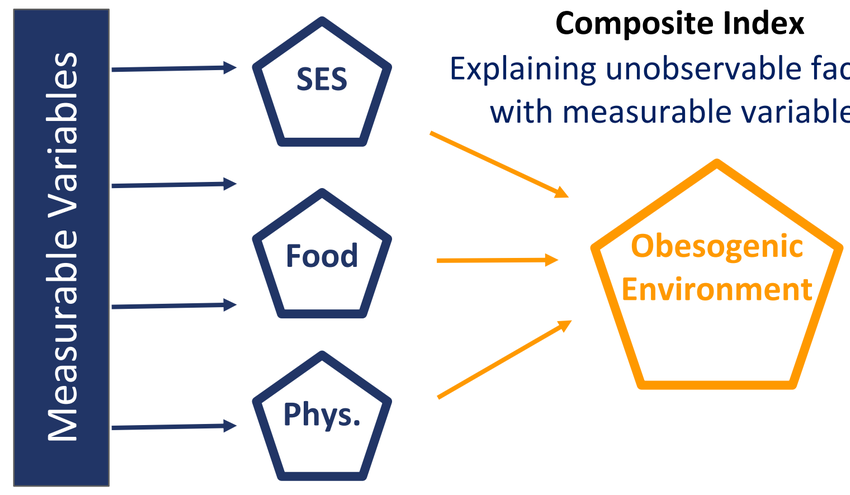
Fairfax County and Inova Health System would like to identify where obesity risk factors for vulnerable populations are high, offering health officials and policymakers an actionable resource to inform policy.

Objective: Create an obesogenic index to measure obesity risk quantitatively in Fairfax County and establish a baseline for measuring change.

Framework

Obesogenic Environment

"The sum of influences that" the social determinants of health "have on promoting obesity in individuals or populations." (Swinburn et al. 1999)



Data Sources

OpenStreetMap (OSM): Geospatial locations of physical features

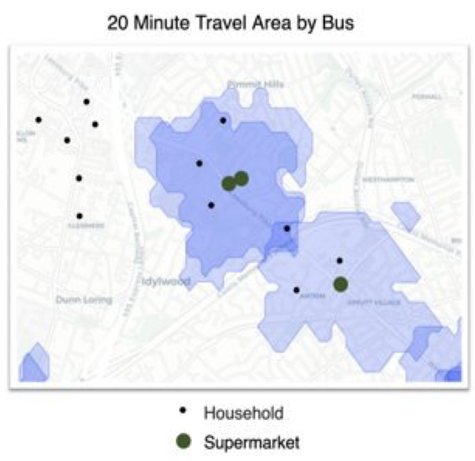
American Community Survey (ACS): Demographics, Financial Conditions, Employment Status, Transportation, Synthetic Population.

Fairfax County Housing Stock: Domicile Locations, Housing Conditions

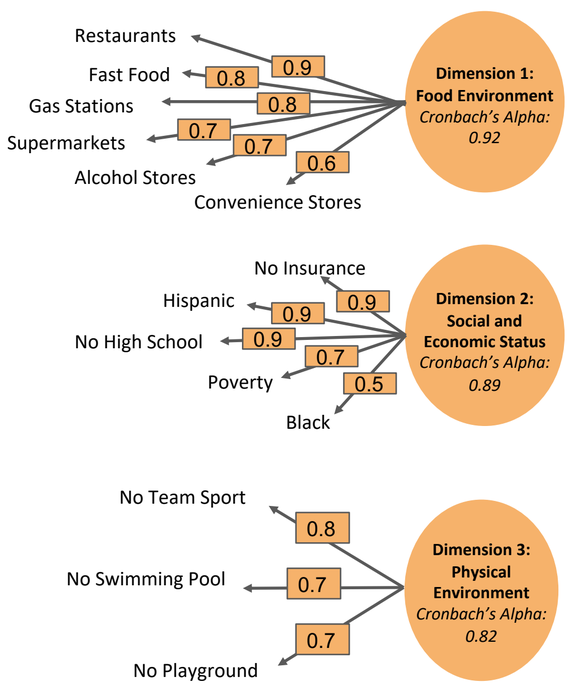
Methods

Variable Construction

1. ACS & Fairfax variable exploration → selection
2. Distance-time mutation from OSM data and travel-time isochrones

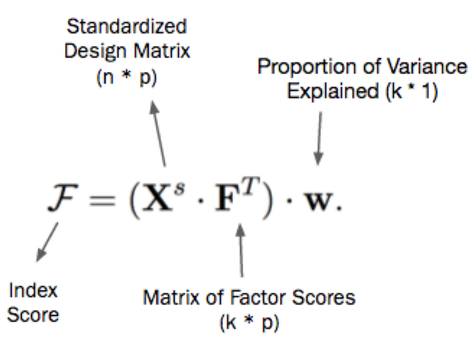


Factor Analysis



Index Construction

1. Standardize features
2. Factor loading weights
3. Proportions variance weights
4. Weighted sum score
5. Normalize score scale (0, 1)



Results

Regions at high risk (darker color) of exposure to obesogenic environments:
Supervisor Districts: Mason, Providence, Lee.
High School Districts: Justice, Annandale, Falls Church.
Census Tracts: Arlington and Dulles Airport adjacent.

Obesogenic Environments

Supervisor Districts

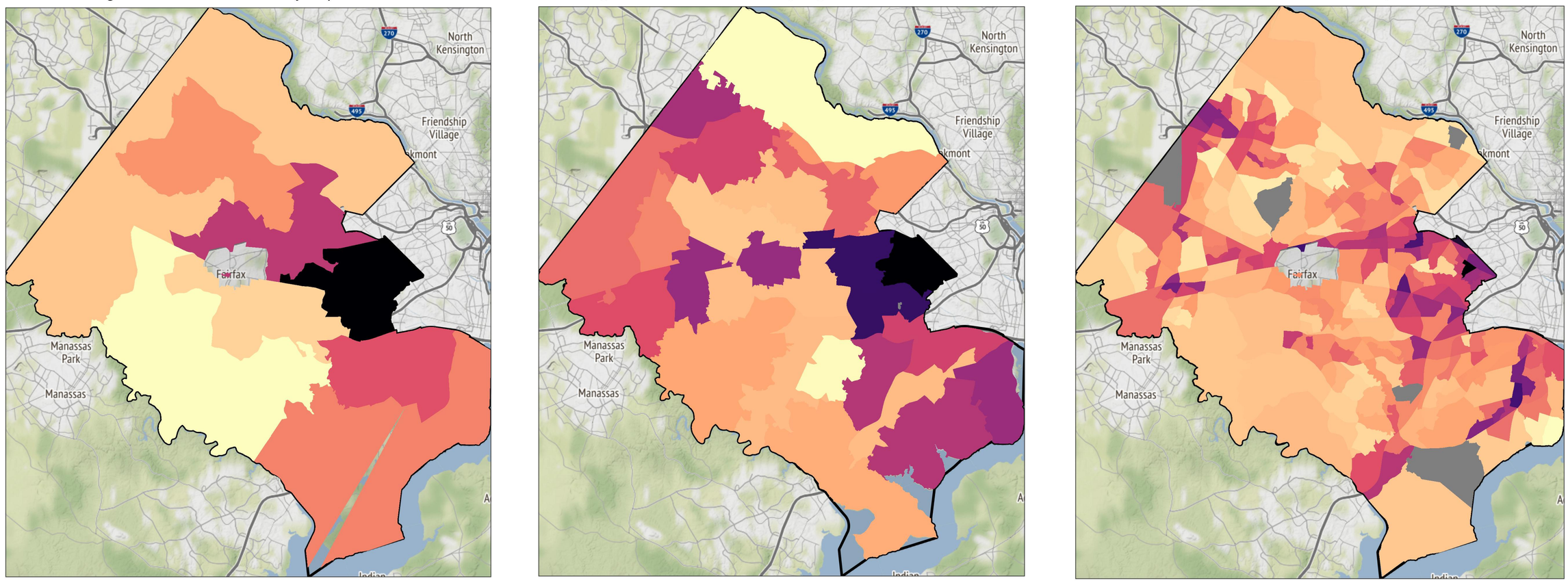
Obesogenic Environment Index by Supervisor District

High School Districts

Obesogenic Environment Index by High School Attendance Area

Census Tracts

Obesogenic Environment Index by Census Tract



Limitations

1. Quality of OSM data
2. Quality of TravelTime application programming interface (API)
3. Index weights and validation

Conclusions

1. Interdisciplinary method for index construction provides new measurement for health inequities
2. Low-income racial and ethnic minority groups have high risk, especially Hispanics
3. Policy intervention and resource allocation requires analysis at multiple geographic units

Next Steps

1. Overlaying findings with Inova health data to better understand patient population
2. Conduct sensitivity analysis (robustness of index)
3. Compare current policy initiatives with maps to enhance existing measures and to create evidence-based policy

Resources

1. Centers for Disease Control and Prevention (2019). Social determinants of health. Available at https://www.cdc.gov/socialdeterminants/index.htm (7/31/2019).
2. Swinburn, B., Egger, G., & Raza, F. (1999). Dissecting Obesogenic Environments: The Development and Application of a Framework for Identifying and Prioritizing Environmental Interventions for Obesity. *Preventive Medicine, 29,* 563-70. doi:10.1006/pmed.1999.0585

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