

Development of a County-Level Childhood Obesogenic Environment Index across the United States



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Background

- Childhood obesity has become a major threat to public health in the United States (U.S.) and other developed countries.
- 18.5% of children aged 2 to 19 are classified as obese and 32% are classified as overweight or obese.
- Researchers and practitioners have placed increased focus on what has been termed the “obesogenic environment”.
- In this study, obesogenic environments were defined as the sum of physical elements within communities that promote sedentarism, restrict physical activity, and encourage unhealthy eating practices among children.
- Despite substantial research into environmental influences on childhood obesity, no study has created a comprehensive obesogenic environment index for children that can be applied at a large geographic scale.

Purpose

The purposes of this study were to:

1. Describe the development of a childhood obesogenic environment index (COEI) at the county level across the U.S.
2. Compare COEI scores by region and rurality across the U.S.

Methods

Obesogenic Environment Index Composition and Scoring:

- A comprehensive search of review articles (n=2) and input from experts (n=12) were used to identify community-level variables associated with youth physical activity, healthy eating, or overweight/obesity for potential inclusion in the index.
- Based on strength of associations in the literature, expert ratings, expertise of team members, and data source availability, 10 variables were identified.

COEI Variables	
Grocery stores and superstores*	Births at baby-friendly facilities*
Farmers markets*	Exercise opportunities*
Fast food restaurants	School proximity*
Fast-casual restaurants	Walkability*
Convenience stores	Violent crime

*Variable was reverse scored such that higher values for all variables indicated a more obesogenic environment.

- Data for each variable for all counties in the U.S. (n=3,142) were collected from publicly-available sources.
- For each variable, all counties were ranked and a percentile assigned to each county ranging from 0-100.
- Positive environmental variables (e.g., grocery stores, exercise opportunities) were reverse scored such that higher values for all variables indicated a more obesogenic environment.
- Finally, for each county, a total obesogenic environment index score was generated by calculating the average percentile for all 10 variables.

Classifying Counties and Regions

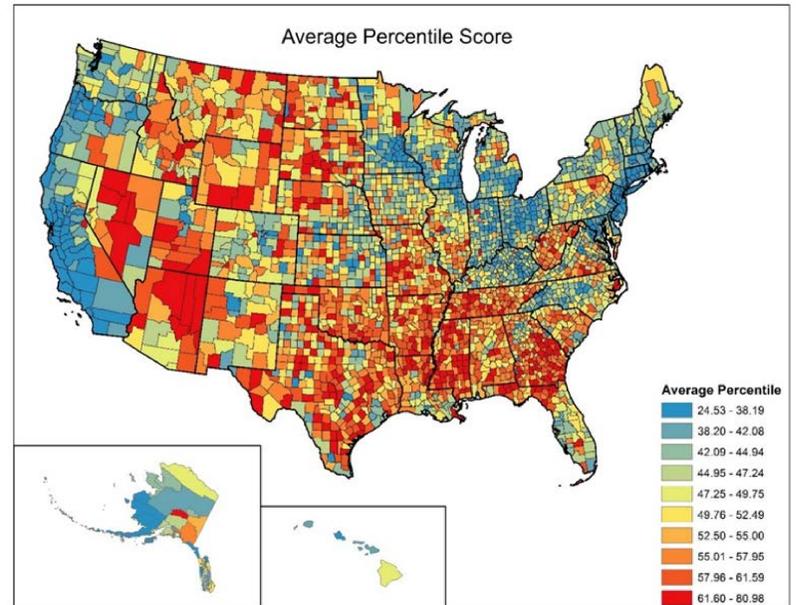
- Urban Influence Codes (UIC) were utilized to determine rurality classification.
- Of the original twelve UIC categories, we divided counties into three groups: metropolitan, micropolitan, and small adjacent/remote rural (hereafter referred to simply as rural).
- Census regions, defined and retrieved from the U.S. Census Bureau, were utilized to identify four U.S. regions: Northeast, Midwest, South, and West.

Analyses

- ANOVAs were conducted to test for differences by region and rurality.

Results

- The average COEI percentile ranged from 24.5-81.0 (M=50.02, SD=9.01) across U.S. counties.



- When examined by U.S. region, there were significant differences between the Northeast, Midwest, South, and West (F=130.43, p<.0001).
- On average, obesogenic counties in the South had a higher (worse) COEI score compared to the Northeast, Midwest, and West.

COEI by Region	
Region	Average Percentile (SD)
Northeast	43.2 (6.9)
Midwest	48.1 (8.5)
South	53.0 (8.3)
West	48.4 (9.8)

- When examined by county rurality, there were significant differences between metropolitan, micropolitan, and rural counties (F=175.86, p<.0001).
- Metropolitan counties had significantly lower (better) obesogenic environment index scores, compared to micropolitan and rural counties.

COEI by County Rurality	
Rurality	Average Percentile (SD)
Metropolitan Counties	46.5 (8.4)
Micropolitan Counties	50.3 (8.1)
Rural Counties	52.9 (8.8)

Conclusions

- This study combined numerous key physical activity and healthy eating environmental variables to create a comprehensive and novel childhood obesogenic environment index for every county in the United States.
- The COEI can be applied to benchmark obesogenic environments and identify geographic disparities and intervention targets at the local, state, or national level.
- Additional research is needed to explore the additive and multiplicative interaction between the obesogenic environment and other area-level socioeconomic factors that predict childhood obesity.
- Future research should also explore how diverse variables comprising the policy environment (e.g., mandatory recess, menu labeling) differ by region and rurality and contribute to differential rates of childhood obesity.

