Research shows that built environment is the strongest predictor of adolescent obesity, related health behaviors

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New research shows that the built environment, not social and economic environments, is a strong predictor of adolescents' body mass index

(BMI), overweight and obesity status, and eating behaviors, according to a new study in *Obesity*. This study provides the first quasi-experimental empirical evidence of these environments on adolescents' BMI, overweight, obesity and related behaviors.

"Our research suggests that strategies for addressing childhood and adolescent obesity should focus on improving built environments more comprehensively," said Maria J. Prados, Ph.D., Center for Economic and Social Research, University of Southern California Dornsife College of Letters, Arts and Sciences, Los Angeles, Calif. Prados is the corresponding author of the study.

Childhood and adolescent obesity have been identified as one of the most serious health issues of the 21st century. "Adolescents represent an important target for potential health policy interventions because they are at an age when their health behaviors, preferences and interactions with the environments are evolving," Prados explained.

Literature reviews assessing the influence of environments on childhood obesity suggest that the majority of existing evidence has come from observational studies. These studies often have found somewhat varying results with respect to whether environments matter and for whom.

Studies that are suited to address causality, such as the Moving to Opportunity housing experiment and other quasi- and natural experiment studies, have not directly or simultaneously assessed the independent roles of built, social and economic environments on obesity. Instead, they have either focused only on a narrow set of environmental characteristics such as supermarkets, restaurants and peers or examined the effects of place as a whole. Moreover, these well-designed studies have primarily been among adults.

These new findings, said Prados, "add a new dimension to the growing

evidence that place matters by applying a more comprehensive approach to characterizing environments."

Previous research by the study's authors utilized a natural experiment, the plausibly exogenous assignment of military service members and adolescents in their families to different places to assess place effects on obesity and obesity-related behaviors. This work assessed the role of a narrow set of environmental factors such as neighborhood physical activity opportunities or food environment or assessed the combined influence of the environment as a whole showing that adolescents whose military parents were assigned to counties with higher obesity rates were more likely to present with overweight or obesity.

The current study builds on the previous work by using the same natural experiment to simultaneously assess the role of built, social and economic environments in adolescent obesity and related behaviors. This experiment relies on the routine assignment of military personnel (and their families) to different installations based on the needs of the Army.

Researchers analyzed data from the Military Teenagers Environments, Exercise and Nutrition Study, a cohort study of adolescents in military families. Data was collected on adolescents' BMI, overweight, obesity and self-reported diet and exercise. Forty-eight percent of the analysis sample (1,111 adolescents) was female, with an age range of 12 to 14 years old and 41% of participants being non-Hispanic white, 22% non-Hispanic Black, 23% Hispanic and 14% other.

Three indices for the built, social and economic environments characterized 35 county-level environments based on 19 indicators. Significant heterogeneity existed in the two measures of exposure to the civilian environment: 61% of families had been assigned to the military installations for more than 2 years and 54% were not living on military bases but in the surrounding community.

Results revealed that exposure to higher (i.e., more healthful) built environment index scores for more than 2 years was associated with lower probability of obesity, and lower overweight or obesity status, but not with BMI z scores. All else equal, after more than 2 years of exposure, the likelihood of adolescent obesity is estimated to be 3.6 percentage points higher in a county with a built environment index at the 25th percentile relative to a county at the 75th percentile of the built environment distribution.

Results were similar for adolescents not living on military bases. More advantageous built environments were also associated with lower consumption of unhealthy foods but not with physical activity. Social and economic environments were not associated with any outcomes.

"An interesting finding is that it was specifically the built environment that mattered—features like how close the adolescent lives to fast-food restaurants versus park and recreation facilities. Less important were the social and economic environmental factors like crime, social support, household income, household education—and while very important for adolescents' health, these factors were not directly tied to obesity risk or eating behaviors in this study, and these factors are also harder to modify. The built environment, on the other hand, can be improved with policy change and economic investment like incentivizing grocery stores to come to food deserts, limiting fast-food outlets near school zones, enacting complete street policies to ensure pedestrians and cyclists are safe on the road, supporting municipalities to build more safe playgrounds and parks, and enacting joint use agreements so families can access public facilities like school fields and courts on the weekend," said Amanda Staiano, Ph.D., associate professor, Louisiana State University's Pennington Biomedical Research Center. Staiano was not associated with the research.

Staiano added that "while the recent release of the American Academy

of Pediatrics clinical practice guidelines reminds us that evidence-based treatment is a critical tool in our fight against childhood obesity, putting concerted effort into improving the built environment is also essential both for obesity prevention and to assist those families who have obesity and are trying to develop healthier habits. Improving the built environment will require input and action from many stakeholders—urban planners, elected officials, research scientists, concerned community members—to create healthier spaces for our kids to play, learn and live."

The study's authors add that further research is needed to understand whether social and economic environments may be more consequential among adolescents and adults in civilian populations.

Other authors of the study include Ashlesha Datar, Center for Economic and Social Research, University of Southern California Dornsife College of Letters, Arts and Sciences, Los Angeles, Calif., and Nancy Nicosia, Rand Corp., Boston, Mass.

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