

# Fat Neighborhoods: Spatial Epidemiology Meets Urban Form

The rates of obesity and diabetes are on the rise. Existing intervention programs have mostly failed, and the growing obesity epidemic represents the next public health crisis. Ceasing to view rising obesity rates as a failure of biology, some researchers are turning their attention to the physical and food environments. A spatial analysis of obesity rates in Seattle shows that obesity rates follow predictable geographic patterns. Obesity rates in well-off neighborhoods are low, but residents of the more disadvantaged areas are far more likely to be diabetic or obese. One hypothesis is that the link between poverty and obesity involves physical and financial access to healthy foods.

A number of foundations and agencies, from Robert Wood Johnson to the Centers of Disease Control and Prevention and the National Institutes of Health, have begun to explore the potential links among the built environment, active living, and healthy diet. We expend less energy than we used to, because there is less need for physical labor and the opportunities for exercise have diminished. At the same time, the very low cost of refined grains and added sugars and fats has provided us with easy access to low-cost, energy-dense diets. Healthier foods not only cost more, they are harder to find in low-income and deprived neighborhoods. Social scientists have used geographic mapping techniques to delineate “food deserts,” areas where healthier foods are scarce.

## Studying walking and food

Several groups at the University of Washington are involved in probing possible relationships between the built environment, activity, and nutrition. One project carried out at the Urban Form Lab in the College of Architecture and Urban Planning and the UW Health Promotion Research Center found that health-enhancing levels of walking (the most popular form of exercise) were associated with proximity to food sources. Called the Walk and Bike Communities Project (WBC), the study, funded by the Centers for Disease Control and Prevention, examined physical activity in relation to individual residential environments within the King County Urban Growth Boundary. It was based on a telephone survey of 600+ randomly selected respondents that assessed health behaviors, likely

walking and biking destinations, and potential neighborhood barriers to active living. Researchers then analyzed individual behaviors in relation to more than 200 objectively measured GIS-based environmental variables thought to influence physical activity levels. Health-supportive levels of walking in the neighborhood were positively associated with the presence of nearby groceries and markets, restaurants (other than fast food), bars and taverns, and retail stores. They were negatively associated with the presence of office buildings and schools.

In other words, when people walk, they often walk to a restaurant or to get food. The strong and consistent predictive power of land use patterns on walking habits may have to do with the evolution of eating habits. Shopping and eating patterns may reflect changing life styles, smaller households, time constraints that lead to frequent eating out, changing eating habits that favor deli over frozen foods, increased cultural diversity, and changing product lines found in contemporary grocery stores/markets. The provision of food and other daily necessities near homes could effectively promote walking and help make neighborhoods more active.

## Access to healthy food

However, physical access to food is only a part of the story. The lack of financial access may be another barrier to healthier diets. There is little information, within King County or elsewhere, as to what types of foods are available within walking distance of homes. The quality and cost of available foods tend to vary by location, neighborhood socioeconomic status, and spending power. Environmental links between incomes, physical activity, and diet quality may involve food prices and diet costs.

In a collaboration between the Center for Public Health Nutrition and the Urban Form Lab, UW researchers studying nutrition, physical activity, and the built environment, together with Public Health - Seattle & King County and local health departments, propose to analyze the relationships between eating behavior and the built environment, using some of the methods developed for the WBC project. Growing evidence suggests that the national obesity epidemic is a socioeconomic phenomenon. Disparities in physical and financial access to healthy diets

*Anne Vernez Moudon  
Adam Drewnowski*

## Authors

Anne Vernez Moudon, Dr es Sc, is a professor of architecture in the Landscape Architecture and Urban Design and Planning in the UW College of Architecture and Urban Planning.

Adam Drewnowski, PhD, is director of the Center for Public Health Nutrition, a professor of epidemiology in the UW School of Public Health and Community Medicine, and an adjunct professor of medicine in the Medical School.

*Continued on page 20.*

may help explain why higher obesity rates are observed among food-insecure, lower-income, and some minority groups. Higher rates of obesity and type 2 diabetes are linked not only to individual measures of low socioeconomic position (SEP), but also to area-based indices of neighborhood deprivation and poverty. However, few studies have focused on the geographic distribution of obesity rates. Data are lacking on the geographic and economic disparities in retail food access or on the effect of SEP variables on diet quality, dietary energy density, and energy cost. Obesity researchers have yet to take full advantage of the new GIS-based approaches to the study of the food environment.

The UW researchers plan to inventory the geographic distribution of food environments at a very fine scale and to capture the range of quality and costs of the food supply available in King County. These environmental data will allow detailed analyses and modeling of eating behavior and obesity rates in relation to access to different types of foods. The use of parcel-level GIS data will help focus on lower-income populations with lower mobility rates (the old and the young, as well as those with fewer cars), who must rely on the food supply close to their homes.

This collaboration between nutritionists, public health scientists, and architects will identify those features of the built environment that are linked to heightened obesity risk. One goal is to develop new ways to audit or assess the neighborhood food environment. The inventory instrument would complement the two audit instruments for scoring neighborhood walkability already developed by the WBC project. One, the Survey Audit, is a simple tool that can be used by non-experts. The other, the GIS Inventory Audit, provides a more precise and unobtrusive approach to measuring walkability. Such instruments have the potential to serve as part of surveillance systems monitoring environmental support of physical activity and healthy diet availability.

The use of GIS offers many exciting ways to map the health-enhancing dimensions of neighborhoods. Surface modeling functions can create continuous surfaces showing the spatial patterns of likelihood of walking or accessing healthy foods. The mapping process can also simulate the effects of “before and after” intervention scenarios on the probability of supporting healthy behaviors, for particular segments of or for the general population. These tools can assist Public Health - Seattle & King County and local health departments in identifying target neighborhoods for investment and intervention. 🍷