



Invited Commentary

Invited Commentary: Built Environment and Obesity Among Older Adults—Can Neighborhood-level Policy Interventions Make a Difference?

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Obesity is more prevalent and its consequences severe among middle-aged and older adults. Efforts to understand and address neighborhood-level causes of obesity in this population offer the potential to enhance health and reduce the costs of obesity for everyone. The accompanying paper by Li et al. (*Am J Epidemiol*. 2009;169(4):401–408) presents new data on the apparently significant interaction between neighborhood and individual characteristics on 1-year change in body weight and waist circumference. Despite methodological limitations in measurement, this paper supports the importance of future research that considers the complex relation between people and where they live. Efforts to design neighborhood-level policy interventions to effectively address the problem of obesity will require greater interdisciplinary collaboration.

aged; obesity; residence characteristics

Much has been written in the general US media about the epidemic of obesity, with a primary focus on children. Indeed, middle-aged and older adults are also increasingly overweight or obese (1). The prevalence of obesity in adults aged 60 years or older increased about 35% between 1990 and 2000 (1, 2). By 2005–2006, 31% of older adults were obese (3) compared with the Healthy People 2010 goal of 15% (4). As with children, subgroup differences point to health disparities in the burden of obesity within the population of older adults: older black adults and older adults with less than a high school education have the highest prevalence of obesity (5). In addition to increasing risk of death (6), obesity exacts a large societal toll in health care costs that may become progressively higher as adults age (7, 8). Because obesity among middle-aged and older adults is a serious problem, more research is needed to understand how to intervene.

Public health policy strategists have looked to the tobacco example for guidance on how to address the obesity problem. Tackling smoking with a public health tool kit included aiming policy and practice to individual behaviors (e.g., smoking initiation and cessation), to public policy (e.g., tobacco subsidies), and to business practices (e.g., corporate marketing). For obesity, individual behavior interventions target diet and physical activity. For public policy, there is a call for population-wide environmental/policy interven-

tions targeting the built environment to prevent obesity (9). “Built environment” is actually an umbrella term that encompasses 3 integral urban planning concepts: urban design, land use, and transportation systems (10). A movement among planners and architects promotes patterns of the built environment that limit sprawl (i.e., low-density development that outpaces population growth). For example, the Congress for the New Urbanism advocates intergenerational, mixed-use, pedestrian-friendly neighborhood design. The New Urbanists, also called the Smart Growth movement, advocate similar principles that limit sprawl to make cities and towns “more livable” (11). A growing body of research provides support for an association between smart growth mixed-use neighborhoods and reduced prevalence of obesity (12).

Other studies support the association of the built environment with physical activity (13, 14) and diet (15). One group of studies specifically focuses on older adults and establishes associations between the built environment and physical activity (16–22). These studies suggest that neighborhoods with proximate destinations, parks and green space, and compact development support physical activity among older adults.

There are gaps in this literature; principally, the majority of the existing research is cross-sectional, limiting predictive capacity. Research on factors contributing to childhood

and adult obesity has highlighted the role of environmental factors, such as access to fast-food outlets (23, 24). The evidence for fast-food density and eating-out behavior specific to the older adult population is more limited. Studies of general adult populations support an association between eating meals outside the home and excess energy intake and, in turn, weight gain (25, 26). Implications for interventions and policy are unclear until longitudinal research confirms that increasing access to transportation, green space, and multiuse development prevents obesity in older neighborhood residents (27).

The paper by Li et al. (28) in this issue of the *Journal* provides provocative longitudinal data on the role of built environment and obesity among middle-aged and older adults. The authors used prospective cohort data from the Portland Neighborhood and Health Study to examine the independent and joint association of neighborhood and individual characteristics with 1-year change in body weight and waist circumference among 1,145 residents of 120 neighborhoods in Portland, Oregon, aged 50–75 years. Neighborhood was operationalized as census block group. The authors found no overall association between built environment characteristics (a walkability index including land-use mix, street connectivity, public transit stations, and green and open spaces and density of fast-food outlets) and change in weight or waist circumference. However, the authors reported a significant interaction between built environment and individual eating-out and physical activity behaviors. Specifically, among people who reported frequent visits to fast-food restaurants, residence in a neighborhood with a high density of fast-food restaurants was associated with a significant increase in weight and waist circumference. In addition, among people with a change in their level of vigorous physical activity, residence in a neighborhood with high walkability was associated with a significant decrease in weight and waist circumference. When neighborhood was used as the unit of analysis, after adjustments for age, gender, education, household income, race/ethnicity, smoking, health status, body mass index, body weight, and waist circumference at the individual level and for residential density, median household income, percentage of non-Hispanic black residents, and percentage of Hispanic residents at the neighborhood level, the absolute magnitude of change ranged from 1.2 kg to 1.4 kg in weight and from 1.6 cm to 2.0 cm in waist circumference. Evaluation of both diet and physical activity, use of multilevel modeling, consideration of cross-level interactions, and focus on middle-aged and older adults are important strengths of this research.

Li et al. (28) use a conceptual model that highlights the person-environment dynamic. While their research makes an important contribution, concerns about key measures in their data limit our ability to draw conclusions from their results. We note 4 missing or problematic measures that dilute their findings. First, age-related loss of function may make older adults particularly vulnerable to challenges in the built environment, may modify eating-out and physical activity behaviors, and is also linked to changes in weight (29–31). M. Powell Lawton, one of the founding thinkers in environmental gerontology, emphasized the dy-

namic interplay between an individual's functional status and living environment, which he termed "competence-environmental press" (32, 33). Although Li et al.'s population was young-old, with a mean age of 62 years (standard deviation, 7), even modest decrements in physical function are linked to changes in behavior (31). Failure to assess functional status and include it in this analysis may have influenced the findings.

Second, the measure of physical activity did not allow for specific consideration of the activity type (e.g., walking vs. housework) or purpose (e.g., for transportation vs. for recreation vs. for occupation). This distinction is important because research supports a positive relation between residential neighborhood walkability and walking trips for errands, whereas evidence for an association with overall physical activity or recreational walking is weak (34). Third, the measure of neighborhood walkability did not differentiate study neighborhoods based on residential density, a correlate of walkability (refer, for example, to Berke et al. (16)), raising concerns that the operationalization of walkability was not truly consistent with the concept of interest. The failure to appropriately measure neighborhood and individual constructs is a critical limitation.

Finally, the analysis cannot address the question of whether the eating-out and physical activity behaviors were related to the neighborhood environment in which the participants lived. The measures did not specify whether the behaviors were conducted within the neighborhood. For example, it cannot be inferred whether the group that experienced the lowest weight gain—those neighborhood residents living in a walkable neighborhood who changed their level of vigorous physical activity—were engaging in physical activity in their neighborhood. Given that there is no overall influence of neighborhood built environment on change in body weight or waist circumference, this limitation is especially relevant.

Where do we go from here? Future efforts should include developing conceptual models reflecting the complex relation between people and where they live. Ignoring the highly individualized routines people follow in their daily lives may underestimate the total effect of context on individuals. It will be important that qualitative and participatory research techniques incorporate perspectives for understanding specific local contexts. In previous research, we conducted focus groups of older adults and learned about the importance of walking to places away from home to socialize with friends (35). Fast-food outlets might be the best option in certain settings. Older adults frequently choose to congregate in fast-food restaurants because of convenience of location, affordability, special offers, and ability to linger in a safe, comfortable place (36). Limiting the density of fast-food restaurants through regulation may have unanticipated negative outcomes related to older adult health and well-being if alternative gathering spots are not developed. Understanding the need to gather and socialize can inform the design of communities, identifying the need for alternatives to fast-food outlets for this purpose.

New technologies are emerging that can be enormously helpful in advancing this area of research. The choice of geographic scale is often arbitrary, based on administrative

boundaries as it was in this research (28), and not necessarily relevant to the lived experience. Technology, such as a global positioning system (GPS), provides a tool to better understand individual exposure to social and built environments (37, 38). Use of technology to objectively evaluate context-specific behavior would add much to our understanding of the mechanisms through which built environment may shape behavior, and vice versa (39). This will allow for much richer causal models linking environment to health.

Perhaps unlike other sorts of epidemiologic research, this body of research needs to be replicated in different locations because of unique histories, geographies, and politics. A focus on local contexts can improve our ability to examine specific, positive environmental exposures. For example, Li et al. (28) studied people in Portland, Oregon. In 1995, the regional metropolitan government charged with transportation and urban design planning for the 3-county metropolitan area—known as Metro—adopted the 2040 Growth Concept, a long-range plan designed to guide growth and development. A primary goal of the plan is to support the development of accessible, mixed-use neighborhoods that combine housing, employment, and retail, cultural, and recreational activities in a walkable environment that is also well served by public transit.

Although the longitudinal nature of this research is an improvement over cross-sectional studies, it is still not possible to determine whether healthier people choose environments that are more supportive. Future research needs to evaluate whether changes in the built environment, such as those that have taken place in Portland over the past 13 years as a result of the 2040 Growth Concept, are associated with changes in behavior. For example, recent baseline findings from a quasi-experimental longitudinal evaluation of a pedestrian-friendly state government subdivision design code, the Residential Environments Project (RESIDE), underscore the importance of evaluating changes in behavior in response to changes in urban form while adjusting for self-selection into neighborhoods (40).

Successful strategies to enhance the built environment have the potential to improve health and prevent obesity. Research on the influence of the built environment is a great example of a collaboration between social epidemiologists (public health scientists studying contextual factors) and practitioners (city planners and urban design specialists). Other epidemiologists have natural collaborators in the clinical scientists (e.g., cancer epidemiologists with oncologists). Social epidemiologists need to partner with public policy or practitioners in housing and education to generate research results that can be translated smoothly into practice.

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