

2016

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### Recommended Citation

Ansello, E. (2016). Neighborhood Walkability and Health. *Age in Action*, 31(1).

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## Neighborhood Walkability and Health

By

Edward F. Ansello, PhD

Environments can foster well-being. We know that built environments can impede or enable participation in work, leisure, and other community activities for individuals with disabilities. A just-published study from Canada gives more evidence that community characteristics called “walkability” can also contribute to physical health, affecting rates of overweight, obesity, and diabetes for populations.

A team of Canadian researchers (Creatore, Glazier, et al.) has published their findings in the *Journal of the American Medical Association* (May 2016) of an elegantly designed study of almost 8,800 neighborhoods in Ontario that they assessed for walkability, correlating these rankings with prevalence of overweight and obesity and incidence (new cases) of diabetes over the 12-year period from 2001-2012. Higher neighborhood walkability was associated with decreased prevalence of overweight and obesity and decreased incidence of diabetes 2.

The research team defined walkability using a validated index with standardized scores ranging from 1 to 100, lowest walkability to highest. “The index includes (four) equally weighted components: population density (number of persons per square kilometer), residential density (number of occupied residential dwellings per square kilometer), walkable destinations (number of retail stores, services, e.g., libraries, banks, community centers, and schools within a 10-minute walk), and street connectivity (number of intersections with at least (three) converging roads or pathways).”

They then calculated baseline walkability scores for “dissemination areas” within the study region. “Dissemination areas are the smallest geographic unit for which Canadian census data are available and are relatively uniform in terms of population size (approximately 400-700 persons). Dissemination areas are generally composed of several adjacent city blocks.... Only residential areas that were developed before 2001 and classified by Statistics Canada as urban areas (which includes suburban areas) were included in this study. Fringe areas on the outskirts of a city that were largely rural or undeveloped were excluded.”

The researchers assigned these dissemination areas to one of five quintiles according to their walkability rankings, from 1 (least walkable) to 5 (most walkable). There were about 1750 dissemination areas (neighborhoods) in each quintile, with similar population numbers in each neighborhood (513-561 residents). Neighborhoods were similar in such varied characteristics as ability to speak English or French, percent of youth with less than high school education, and age distribution.

The researchers accessed robust self-reported health data of 30-64 year old residents available in Canada’s universal health care system databases; these contained annual provincial health care surveys of about three million individuals/year and the biennial Canadian Community Health Survey of about 5,500 individuals/cycle. Data from these surveys included such health-related behaviors as smoking, daily consumption of fruits and vegetables, levels of activity during

leisure times, and transportation modalities. They correlated these data with the annual prevalence of overweight and obesity, and incidence of diabetes in the various neighborhoods indexed for walkability, while adjusting for age, sex, income, and ethnicity.

The results are instructive. The median walkability index was 16.8, ranging from 10.1 in quintile 1 to 35.2 in quintile 5. Resident characteristics were similar across neighborhoods, but poverty rates were higher in the higher walkability areas. In 2001, the adjusted prevalence of overweight and obesity was substantial but still lower in quintile 5 than in quintile 1 (43.3% vs 53.5%;  $P < .001$ ). Between 2001 and 2012, the prevalence of overweight and obesity increased in the three less walkable neighborhoods (5.4% change in quintile 1, 6.7% in quintile 2, and 9.2% in quintile 3), but did not change significantly in the two areas of higher walkability (2.8% in quintile 4 and 2.1% in quintile 5). In 2001, the adjusted diabetes incidence was lower in quintile 5 than in other quintiles, declining by 2012 from 7.7 to 6.2 per 1000 persons in quintile 5 and from 8.7 to 7.6 in quintile 4. In contrast, diabetes incidence did not change significantly in the less walkable areas (−0.65 in quintile 1; −0.5 in quintile 2; and −0.9 in quintile 3.)

Rates of walking or cycling and public transit use were significantly higher and that of automobile use lower in quintile 5 than in quintile 1 at each time point, although daily walking and cycling frequencies increased only modestly from 2001 to 2011 in highly walkable areas.

The authors are scrupulous in assessing their findings. Among their comments:

*“This study found that urban neighborhoods that were characterized by more walkable urban design were associated with a stable prevalence of overweight and obesity and declining diabetes incidence during a 12-year period. By 2012, rates of each of these conditions were significantly lower in these highly walkable neighborhoods compared with less walkable areas, in which levels of obesity continued to increase.*

*The observed patterns are not easily explained by other confounders. The analysis accounted for differences in the ethnic composition and socioeconomic characteristics of each residential area. There was no indication that highly walkable areas were undergoing rapid shifts in wealth compared with less walkable neighborhoods, although there was a modest decrease in poverty in these areas, with a concomitant increase in education level. Although there is evidence that low-income neighborhoods have higher levels of obesity and diabetes, the changes in poverty observed during this period were likely too small to explain a decline in diabetes incidence of this magnitude. Furthermore, poverty levels remained 9% higher in the most vs least walkable areas at the end of the study period, and changes in socioeconomic status were accounted for in the analysis.*

*Although residents living in more walkable areas may be expected to be more health conscious, they reported that they were no more likely to engage in leisure-time physical activity, nor did they report having a better-quality diet or smoking less. There were also no significant differences across quintiles with respect to access to parks, fitness clubs, or health care. Recent studies suggest that individuals who regularly engage in walking and cycling or who use public transit may be more likely to achieve the 30 or more recommended minutes of moderate to vigorous physical activity per day. In contrast, driving has been linked to a higher likelihood of obesity, similar to other sedentary behaviors. However, although the relationships observed are*

*plausible from an etiologic perspective, rates of walking or cycling increased only modestly during the study. Thus, it is not possible to directly ascribe population-level changes in overweight, obesity, and diabetes to transportation choices. Further research is needed to understand whether the relationship between walkability and obesity-related outcomes is causal and, if so, whether transportation patterns mediate such effects.”*

This study is notable for several reasons, not the least of which are its very large sample size, being population based, and the consistency of findings using different data sources.

Of course, in self-reported data we tend to enhance our levels of “good” behaviors. But one can assume that amounts of over-reporting were likely similar across all five quintiles. Population level interventions may also be playing a role in the findings. Media campaigns have been promoting more walking, physical exercise, and cycling. There are reports from the National Health and Nutrition Examination Survey (NHANES) in the United States and some European studies that the rises in obesity are slowing. Public awareness initiatives from sources as diverse as the First Lady in the White House to Major League Baseball have pushed more active daily lifestyles.

Finally, two observations: First, we should note that percentages of overweight and obese residents were high to begin with, in all five quintiles. This, unfortunately, reflects today’s developed societies but the apparent benefit of neighborhood walkability suggests that it may be an important health-related consideration in the lives of everyday people. Second, it remains to be determined if the “walkability” benefits fully require actual walking; most of the elements in the walkability index reflect components in the environment, so these may be relevant across the continuum of impairments, meaning that walkable neighborhoods themselves may have positive impact on the daily lives of people with physical or intellectual disabilities.