

Poverty and Obesity in the U.S.

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High-income countries have greater rates of obesity than middle- and low-income countries (1). Countries that develop wealth also develop obesity; for instance, with economic growth in China and India, obesity rates have increased by several-fold (1). The international trend is that greater obesity tracks with greater wealth (2,3).

The U.S. is one of the wealthiest countries in the world and accordingly has high obesity rates; one-third of the population has obesity plus another third is overweight. The situation is predicted to worsen; rising childhood obesity rates forewarn of worsening statistics (4). While it is agreed that both individual factors such as genetic susceptibility and behavior are important in life-long weight gain, evidence is ill-defined with respect to the nature of the environmental influences that impact obesity (5).

In 2010, 15.1% of Americans lived in poverty based upon family income census data (6). With the economic downturn, the number of people in the U.S. living in poverty rose to 46 million people—the greatest number in more than 50 years (6).

Are poverty and obesity associated? Poverty rates and obesity were reviewed across 3,139 counties in the U.S. (2,6). In contrast to international trends, people in America who live in the most poverty-dense counties are those most prone to obesity (Fig. 1A). Counties with poverty rates of >35% have obesity rates 145% greater than wealthy counties.

How is poverty linked to obesity? It has been suggested that individuals who live in impoverished regions have poor access to fresh food. Poverty-dense areas are often-times called “food deserts,” implying diminished access to fresh food (7). However, 43% of households with incomes below the poverty line (\$21,756) are food insecure (uncertain of having, or unable to acquire, sufficient food) (7). Accordingly, 14% of U.S. counties have more than 1 in 5 individuals use the Supplemental Nutrition Assistance Program. The county-wide utility of the program, as expected, correlates with county-wide poverty rates ($r = 0.81$) (7). Thus, in many poverty-dense regions, people are in hunger and unable to access affordable healthy food, even when funds avail. The double-edged sword of hunger and poor availability of healthy food is, however, unlikely to be the only reason as to why obesity tracks with poverty.

There is evidence of the association between sedentariness, poor health, obesity, diabetes, other metabolic diseases, and premature death (8). Sedentary individuals move 2 h per day less than active individuals and expend less energy, and they are thereby prone to obesity, chronic metabolic disease, and cardiovascular death (9). More than half of county-to-county variance in obesity can be accounted for by variance in sedentariness (Fig. 1B). Overall, the poorest counties have the greatest sedentariness (Fig. 1C) and obesity.

Several reasons may explain why people living in poor counties are less active. One reason may be that violence tracks with poverty, thereby preventing people from being active out-of-doors. Similarly, parks and sports facilities are less available to people living in poor counties (5), and people who live in poverty-dense regions may be less able to afford gym membership, sports clothing, and/or exercise equipment. There are multiple individual and environmental reasons to explain why poverty-dense counties may be more sedentary and bear greater obesity burdens. What is unknown is whether reversing poverty would reverse sedentariness and obesity. It is an urgent matter to address—both rates of childhood obesity and poverty are concomitantly on the rise (1,2).

The link between obesity, inactivity, and poverty may be too costly to ignore because obesity-associated chronic disease already accounts for 70% of U.S. health costs. For instance, counties with greatest rates of poverty have greatest diabetes rates too (Fig. 1D). In 2009, 27% of people living in the U.S. with annual household incomes below \$25,000 were uninsured (no private or government health insurance). This cohort represents, 15,483,000 people, ~5 million with obesity and ~1 million with diabetes (10). With expanded health care provision in the U.S., the potential incremental health care costs of diabetes alone for these individuals approximates \$9 billion/year, or \$9,000 per new diabetes patient/year (11). There are, however, additional economic factors that may impact the cost-return equation, for instance, 1) potential savings associated with diabetes prevention, 2) the opportunity to develop and deliver high-quality and low-cost diabetes care to poverty-dense communities, 3) the health cost savings associated with the prevention of diabetes complications in patients with diabetes, and 4) the potential lost tax revenues associated with disability (12). Add these figures to the health care costs of other chronic obesity-associated diagnoses such as hypertension, hyperlipidemia, sleep disorders, arthritis, cardiovascular disease, and asthma and the projected health care costs of poverty increase.

Halting U.S. diabetes epidemic and curtailing its health cost may necessitate addressing poverty.

ACKNOWLEDGMENTS

No potential conflicts of interest relevant to this article were reported.

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DOI: 10.2337/db11-1118

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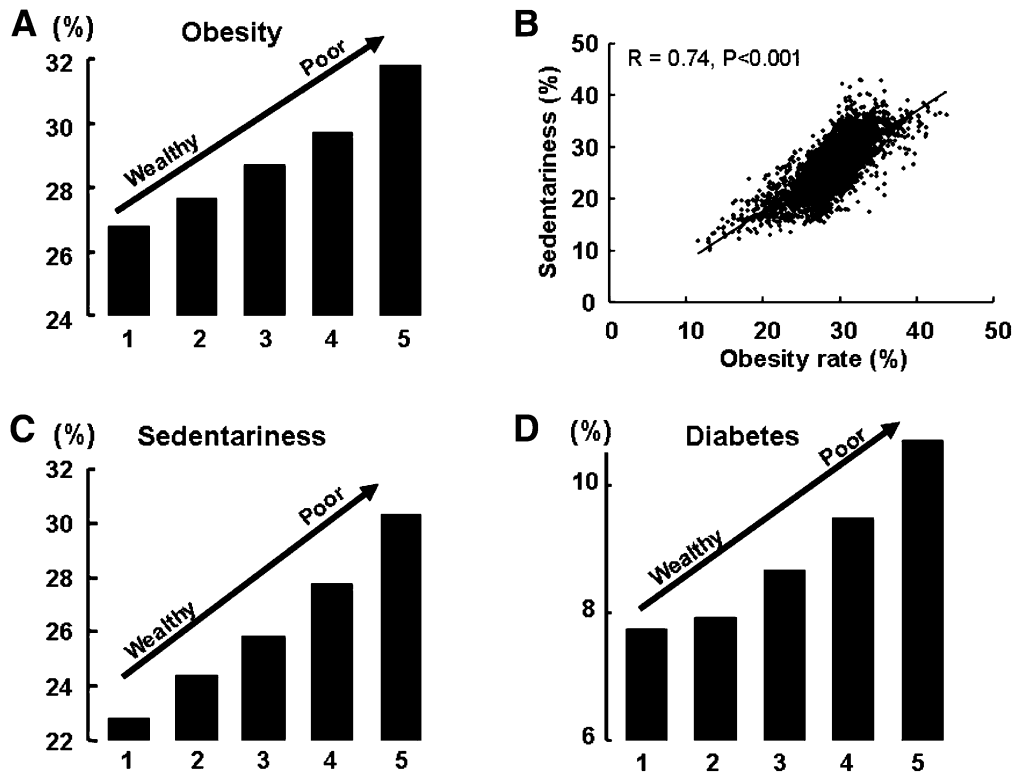


FIG. 1. Data from 3,139 counties in the U.S. Quintiles are cohorts of counties ranked by the percentage of people living with poverty. Quintile 1, the wealthiest quintile, includes 630 U.S. counties with a mean county poverty rate of 8.2% (median household income, \$56,259). Quintile 5, the poorest quintile, includes 629 counties with a mean poverty rate of 25% (median household income, \$32,679). **A:** County age-adjusted obesity rates by poverty quintile. **B:** County obesity rates vs. county leisure-time sedentary rates (sedentary adults are those who report no physical activity or exercise other than at their regular job). **C:** County sedentary rates. **D:** Age-adjusted diabetes rate by poverty quintile.

REFERENCES

- James WP. The epidemiology of obesity: the size of the problem. *J Intern Med* 2008;263:336–352
- Low S, Chin MC, Deurenberg-Yap M. Review on epidemic of obesity. *Ann Acad Med Singapore* 2009;38:57–59
- Misra A, Khurana L. Obesity and the metabolic syndrome in developing countries. *J Clin Endocrinol Metab* 2008;93(Suppl 1):S9–S30
- <http://www.cdc.gov/> (accessed July 30, 2011)
- Hill JO, Peters JC. Environmental contributions to the obesity epidemic. *Science* 1998;280:1371–1374
- U.S. Census Bureau. *Income, Poverty and Health Insurance in the United States 2010*. Washington, DC, 2010
- http://www.ers.usda.gov/briefing/foodsecurity/stats_graphs.htm#food_insecurity (accessed July 30, 2011)
- Thorp AA, Owen N, Neuhaus M, Dunstan DW. Sedentary behaviors and subsequent health outcomes in adults: a systematic review of longitudinal studies, 1996–2011. *Am J Prev Med* 2011;41:207–215
- Hamilton MT, Hamilton DG, Zderic TW. Role of low energy expenditure and sitting in obesity, metabolic syndrome, type 2 diabetes, and cardiovascular disease. *Diabetes* 2007;56:2655–2667
- Diabetes statistics [Internet], 2011. Alexandria, VA, American Diabetes Association. Available from <http://www.diabetes.org/diabetes-basics/diabetes-statistics/>. Accessed July 30, 2011
- Levine JA, Koeppe GA. Federal health-care reform: opportunities for obesity prevention. *Obesity (Silver Spring)* 2011;19:897–899
- Chin MH. Quality improvement implementation and disparities: the case of the health disparities collaboratives. *Med Care* 2010;48:668–675