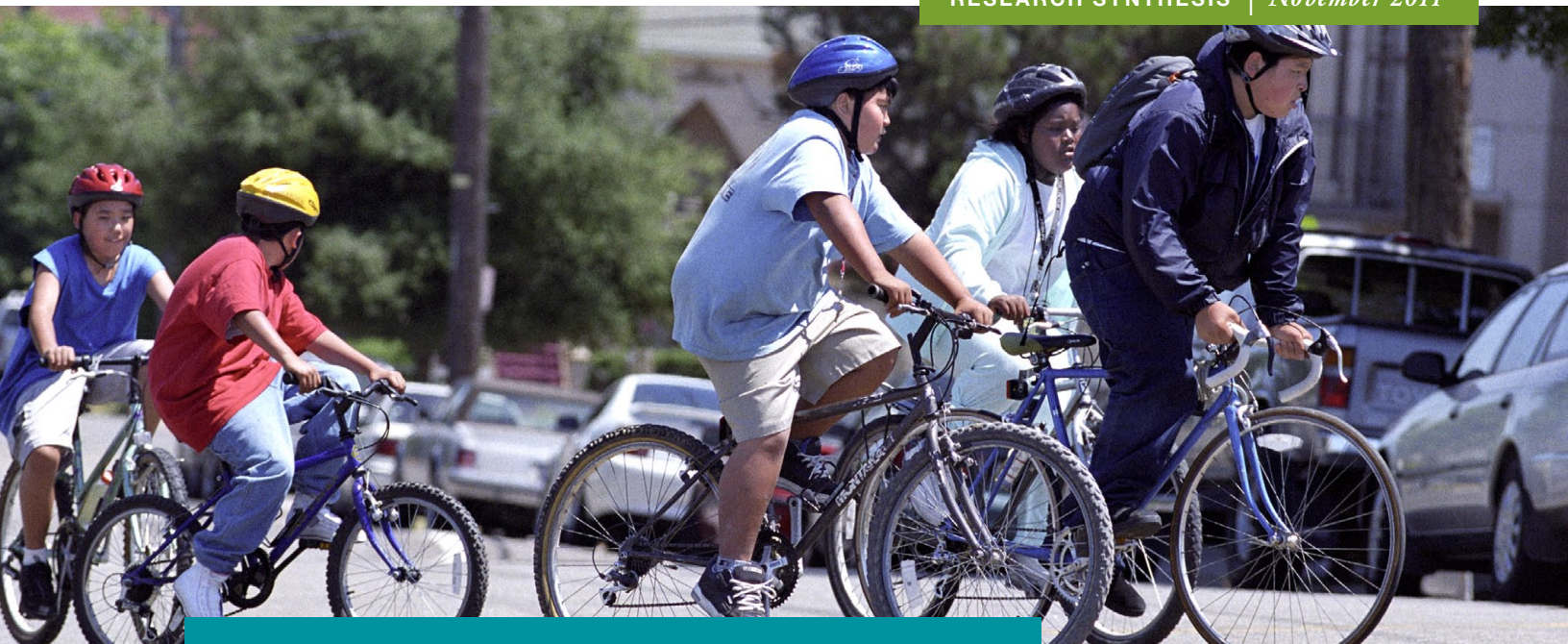


Active Living Research

Building Evidence to Prevent Childhood Obesity and Support Active Communities
www.activelivingresearch.org

RESEARCH SYNTHESIS | November 2011



Do All Children Have Places to Be Active?

Disparities in Access to Physical Activity Environments in
Racial and Ethnic Minority and Lower-Income Communities

INTRODUCTION

Childhood obesity is one of the country's most significant health problems. During the past four decades, the obesity rate for children ages 6 to 11 has more than quadrupled, and it has more than tripled among teens ages 12 to 19.^{1,2} Currently, more than 23 million young people are overweight or obese.^{3,4} Many efforts to prevent childhood obesity aim to make it easier for children to be active in their communities, because physical activity provides numerous benefits for children. More active children have a lower risk of obesity and diabetes,⁵ higher academic performance,^{6,7} and are more on-task and less disruptive in school.⁸⁻¹⁰ To ensure that efforts to support physical activity among children are as effective as possible, it is important to know how they impact children of all racial, ethnic and economic backgrounds.



Neighborhoods and communities can support activity both physically, by having sidewalks, bicycle lanes and parks, and socially, by being safer, cleaner and having less traffic. This synthesis examines the growing body of evidence indicating that racial and ethnic minority, and lower-income, communities do not provide as many built and social environmental supports for physical activity. It also summarizes research on racial, ethnic and economic disparities in obesity and physical activity rates among children.

Although this synthesis focuses on how the environment can support activity among children and adolescents, some evidence relating to adults is presented because many environmental factors that affect adults' physical activity have implications for children and youth as well.

Key Research Results

Racial and ethnic minority and lower-income children are more likely to be overweight or obese.

■ **The evidence on racial, ethnic, and socioeconomic differences in physical activity rates vary.** For instance, while some self-report studies show that African-American and Mexican-American youth are less active than White youth, other, objective data indicate that they are more likely to meet activity recommendations than their White peers.¹¹⁻¹³ What is clear however is that high obesity rates and low physical activity rates are problems for children of all backgrounds^{14, 15} but that, overall, lower-income and racial and ethnic minority youth are more likely to be overweight or obese.¹⁶⁻¹⁸

Communities with predominantly racial and ethnic minority and lower-income residents lack features that support walking

■ **Adults who live in walkable neighborhoods—those that are densely populated and have mixed land use and well-connected streets—tend to be more physically active than those who don't.**^{19, 20} There is less evidence of such an association among young people.^{21, 22} Urban neighborhoods are more likely to be walkable, and tend to have more African-American, Hispanic and lower-income residents.²³⁻²⁵ But the urban communities with more racial and ethnic minority and lower-income residents generally lack specific features that support walking, such as clean and well-maintained sidewalks, trees and nice scenery.²⁶⁻³² Such deficits may undermine the generally favorable effects of walkable neighborhood design.

Lower-income groups and racial and ethnic minorities have limited access to well-maintained or safe parks

■ **The presence of parks, open space and other recreational facilities is consistently linked with higher physical activity levels among children and adolescents.**³³⁻³⁵ However, many studies show that lower-income groups and racial and ethnic minorities have limited access to well-maintained or safe parks³⁶⁻⁴² and recreational facilities.⁴³⁻⁴⁵ The low leisure-time physical

activity rates and high risk of obesity among racial or ethnic minority children, and those living in lower-income areas, can be partially explained by their generally poor access to parks and private recreation facilities.^{46, 47} There is, however, very little evidence of a relationship between playgrounds and activity among youth,⁴⁸ or of racial, ethnic, or socioeconomic disparities in access to safe playgrounds.⁴⁹

Lower-income groups and racial and ethnic minorities are more likely to live in areas with higher crime rates and more physical and social disorder.

■ **Crime, perceptions of safety, neighborhood disorder, traffic and other aspects of the social environment are associated with less physical activity among children and adolescents.**^{50, 51} Many studies find that people with lower incomes, and racial and ethnic minorities, are more likely to live in areas with high crime rates;⁵²⁻⁵⁵ perceive their neighborhoods as less safe,⁵⁶⁻⁶⁰ and report physical and social disorder in their neighborhoods, such as broken windows, litter, graffiti, loitering and public drinking.⁶¹⁻⁶⁵ These environmental variables may be why, in some cases, a higher proportion of lower-income and racial and ethnic minority children tend to be less active than their peers.

Details on Key Research Results

Racial and ethnic minority and lower-income children are more likely to be overweight or obese.

■ **The evidence on racial, ethnic, and socioeconomic differences in physical activity rates vary.** For instance, while some self-report studies show that African-American and Mexican-American youth are less active than White youth, other, objective data indicate that they are more likely to meet activity recommendations than their White peers.⁶⁶⁻⁶⁸ What is clear however is that high obesity rates and low physical activity rates are problems for children of all backgrounds^{69, 70} but that, overall, lower-income and racial and ethnic minority youth are more likely to be overweight or obese.⁷¹⁻⁷³

Details

Although childhood obesity rates have increased among children of all backgrounds, lower-income and racial and ethnic minority children continue to have the highest rates.^{74, 75} More than 23 percent of lower-income adolescents ages 12 to 17 are obese, compared with roughly 14 percent of those from higher-income families.⁷⁶ Mexican-American children ages 6 to 11, African-American adolescents ages 12 to 19, and American-Indian youth ages 12 to 19 have higher obesity rates than their White peers.⁷⁷ Thirty percent of American Indian and Alaska Native teens ages 12 to 19 are obese, the highest rate of any ethnic age group.⁷⁸

Children's and adolescents' physical activity also varies by race, ethnicity and socioeconomic status, but it is not clear that these differences indicate systematic disparities. Self-reports reveal that African-American, Hispanic and lower-income children ages 9 to 13 get less leisure-time

physical activity (e.g. play, recreational sports) than do White or higher-income children of the same age.⁷⁹ However, objective data indicate that African-American and Mexican-American children ages 6 to 19 were more likely to meet recommended physical activity levels (at least 60 minutes of activity per day, 5 days per week) than were White children. The same data show no disparities based on socioeconomic status.^{80, 81}

These objective data for African-American children are surprising, and run counter to most self-reports showing that African-American youth are less active. This discrepancy may be because self-reports tend to capture only recreational physical activity,⁸² whereas objective measures (e.g. accelerometers) generally capture all types of physical activity. Past research suggests that self-reports may not thoroughly capture the kinds of activity in which racial or ethnic minority people engage, thus underestimating their activity levels.⁸³ It also is possible that African Americans have begun to be more active than Whites, in response to the increased national focus on preventing obesity in high-risk populations.⁸⁴

Finally, although African-American children ages 6 to 19 are more likely to meet activity recommendations than their peers⁸⁵ this activity level may not last until adulthood. Based on cross-sectional data, these children also have the largest decline in activity as adults.⁸⁶

The evidence also varies regarding disparities in the physical activity rates of children in different socioeconomic groups. One review finds some evidence that higher-income adolescents are more physically active than lower-income ones, but the findings are inconsistent: 42 percent of the reviewed studies find no association or show an opposite relationship.⁸⁷ Other studies provide evidence that lower-income and racial and ethnic minority youth walk more than higher-income or White youth, respectively. A national study of more than 14,000 children shows that Hispanics and African Americans were the most likely to walk or bike to school—27.7 percent and 15.5 percent did so, respectively, compared with just 9.4 percent of Whites. Additionally, lower-income children were twice as likely to walk to school as their higher-income peers, perhaps because children whose families cannot afford cars rely more on public transit and walking.⁸⁸ Lower-income neighborhoods also tend to be more densely populated than higher-income ones, so children may live closer to school and thus be more likely to walk or bicycle.

Communities with predominantly racial and ethnic minority and lower-income residents lack features that support walking.

■ **Adults who live in walkable neighborhoods—those that are densely populated and have mixed land use and well-connected streets—tend to be more physically active than those who don't.**^{89, 90} There is less evidence of such an association among young people.^{91, 92} Urban neighborhoods are more likely to be walkable, and tend to have more African-American, Hispanic and lower-income residents.^{93–95} But the urban communities with more racial and ethnic minority and lower-income residents generally lack specific features that support walking, such as clean and well-maintained sidewalks, trees and nice scenery.^{96–102} Such deficits may undermine the generally favorable effects of walkable neighborhood design.

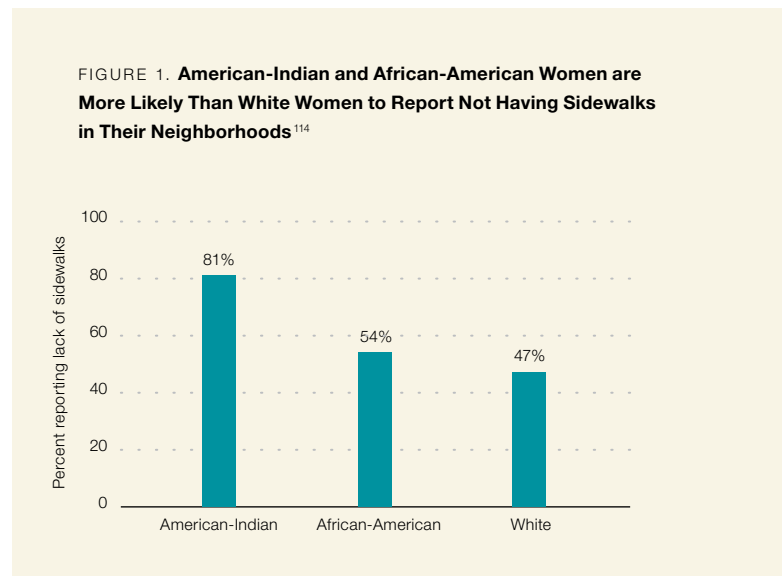
Details

People living in walkable neighborhoods are more active than those who live in less walkable, suburban areas.¹⁰³⁻¹⁰⁵ However, walkability may not have as much influence on lower-income, African-American or Hispanic populations as it does on higher-income or White ones.¹⁰⁶ For example, survey data on more than 10,000 adults in Atlanta show that neighborhood design did not have as strong an association with the walking behavior of black men as it did with that of White men.¹⁰⁷ Data on over 3,000 Atlanta youth indicate that urban design factors (i.e. land use mix, street connectivity and population density) were more strongly related to walking behavior among White and higher-income youth, and less related to walking among non-Whites and lower-income youth.¹⁰⁸ However, another national study shows that children and teens were more likely to walk and bike to school in areas with higher population density, regardless of their race, ethnicity or socioeconomic status.¹⁰⁹ Overall, the data attempting to connect urban design to activity among youth are inconsistent.

Lower-income, African-American and Hispanic populations tend to live in areas that are fairly walkable,¹¹⁰ so the lack of a strong connection between urban design and their walking behavior is initially surprising. To more accurately identify the environmental factors related to physical activity among lower-income people and racial and ethnic minorities, it is important to look beyond overall neighborhood design and consider the role of street-level features and aesthetic amenities of the neighborhood environment that make walking easier, safer and more appealing. Such factors include sidewalk availability, cleanliness and quality; the presence of street trees and other appealing scenery; and local historical, cultural, or architectural landmarks. For instance studies indicate that the presence and quality of sidewalks are significantly related to higher physical activity levels among youth.¹¹¹ A survey of roughly 1,100 adolescents in Portugal shows a significant positive relationship between how active they were and their neighborhood aesthetics.¹¹²

In general there are fewer of the street-level features described above, and they are of poorer quality, in lower-income and some racial and ethnic minority neighborhoods. For example, a nationally representative study of nearly 3,000 women finds that 81 percent of American Indian-Alaskan Native women and 54 percent of African-American women reported a lack of neighborhood sidewalks, compared with 47 percent of White women.¹¹³

FIGURE 1. **American-Indian and African-American Women are More Likely Than White Women to Report Not Having Sidewalks in Their Neighborhoods**¹¹⁴



GIS data for more than 2,000 census tracts and observations of 76 commercial block faces in New York City show that lower-income neighborhoods were significantly less likely to have street trees and clean streets than were more affluent ones.¹¹⁵ Observations of 73 predominantly poor and Hispanic neighborhoods near elementary schools in Austin, Texas find that although they had well-connected streets and sidewalks, those sidewalks were generally poorly maintained.¹¹⁶ There is also some evidence of a connection between the lack of supportive street-level features and lower physical activity rates among some racial and ethnic minority groups. For example, a study of almost 1,800 adults in North Carolina shows that American Indian respondents were significantly less likely to report either having sidewalks and streetlights, or engaging in any activity, than were Whites.¹¹⁷

Finally, neighborhood aesthetics such as appealing scenery and decorative architecture may also be important correlates of physical activity among lower-income and racial and ethnic minority populations. However some research indicates that these populations are less likely to live in areas with such features.^{118, 119} A survey of over 1,800 U.S. adults indicates that enjoyable scenery was the factor most strongly associated with physical activity among lower-income respondents, yet they were nearly 16 percent less likely than higher-income respondents to report having attractive scenery in their neighborhoods.¹²⁰ A study in New York City finds that lower-income neighborhoods were less likely to have buildings designated as historical, cultural, or architectural landmarks.¹²¹ Observations in Birmingham, Ala., Houston, and Los Angeles reveal that African-American and Latino neighborhoods were less likely to have well-maintained yards than White neighborhoods,¹²² contributing to poor aesthetic quality.

Lower-income groups and racial and ethnic minorities have limited access to well-maintained or safe parks.

■ **The presence of parks, open space and other recreational facilities is consistently linked with higher physical activity levels among children and adolescents.**^{123–125} However, many studies show that lower-income groups and racial and ethnic minorities have limited access to well-maintained or safe parks^{126–132} and recreational facilities.^{133–135} The low leisure-time physical activity rates and high risk of obesity among racial or ethnic minority children, and those living in lower-income areas, can be partially explained by their generally poor access to parks and private recreation facilities.^{136, 137} There is, however, very little evidence of a relationship between playgrounds and activity among youth,¹³⁸ or of racial, ethnic, or socioeconomic disparities in access to safe playgrounds.¹³⁹

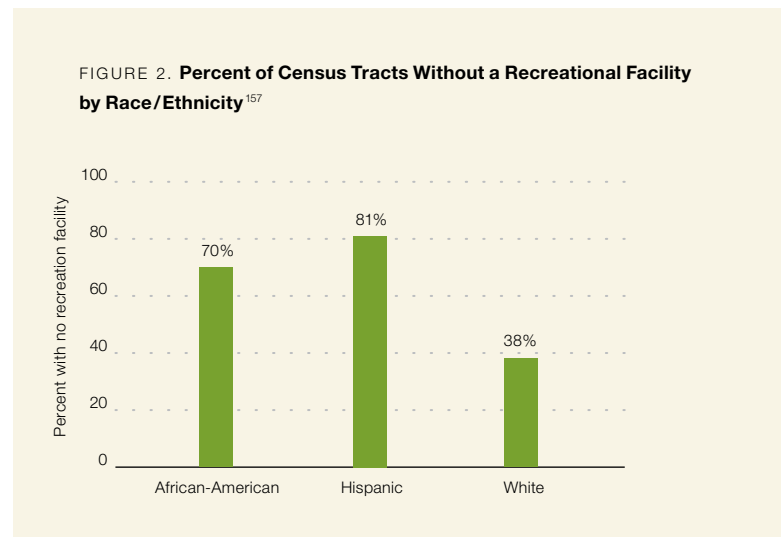
Details

Research consistently shows that children and adolescents are more active when they have access to and live near parks, open space and other spaces for recreation.^{140, 141} For example, one study finds that adolescent girls who live closer to specific park amenities such as walking paths, running tracks, playgrounds and streetlights are more likely to get moderate to vigorous physical activity than those who do not.¹⁴²

However, lower-income and mostly racial and ethnic minority neighborhoods tend to have fewer parks and other physical activity resources, and less green space. A two-year assessment of more than 200 communities across the nation indicates that those with higher poverty rates and those that were predominantly African-American were significantly less likely to have parks and green spaces.¹⁴³ A number of smaller studies demonstrate racial, ethnic and income disparities in allocation of park funding¹⁴⁴ and in park proximity or access,^{145, 146} quality and safety,^{147, 148} and quantity and size.^{149, 150, 151} For example, case studies of eight parks and surveys of 324 children ages 7 to 14 in Los Angeles indicate that the inner city had significantly less park space per capita than more affluent suburban neighborhoods. Inner city park facilities were also less clean and well maintained.¹⁵²

Economic and racial disparities also exist for other types of recreational facilities, including both public and private ones. A national sample of more than 20,000 adolescents and nearly 43,000 census-block groups shows that public, private, indoor and outdoor recreational facilities were all less common in lower-income or African-American neighborhoods than in higher-income or White ones.¹⁵³ This study also finds that adolescents in mostly lower-income and racial and ethnic minority areas were half as likely as those in mostly White and more affluent areas to live close to at least one public or private recreational facility.¹⁵⁴ Evidence from another national study¹⁵⁵ focusing on commercial facilities such as physical fitness facilities, membership sports and recreational clubs, dance facilities and public golf courses in more than 28,000 zip codes finds that neighborhoods with a higher proportion of African Americans, Hispanics or other racial minorities had significantly fewer such facilities. Further, the study shows that moving from a neighborhood of nearly all African Americans to a nearly all-White neighborhood would increase the likelihood of being near at least one private facility or public golf course by almost five times.

Another study, which examined 685 census tracts in Maryland, New York and North Carolina, shows lower-income neighborhoods were more than four times as likely to have no recreational facilities as higher-income ones. Seventy percent of African-American and 81 percent of Hispanic neighborhoods lacked recreational facilities, compared with just 38 percent of White neighborhoods.¹⁵⁶



Having poor access to parks and private recreational facilities can partially explain the low leisure-time physical activity rates and high risk of obesity among racial or ethnic minority children, and those living in lower-income areas.^{158, 159} A national study of more than 20,000 adolescents finds that youth living in census-block groups with seven recreational facilities were 32 percent less likely to be overweight and 26 percent more likely to be highly active than were those who lived in one with no recreational facilities.¹⁶⁰ The same study shows significant racial, ethnic and economic disparities in the distribution of recreational facilities, and that these disparities were significantly associated with disparities in physical activity and obesity.

Having access to parks, especially safe ones, may be particularly important for increasing physical activity and preventing obesity among certain disadvantaged groups. A study conducted in Los Angeles finds that inner-city children visited parks more often and valued parks more than children from affluent suburbs.¹⁶¹ These findings suggest that for lower-income urban children, who tend to lack spacious back yards or other private play areas, parks are a particularly important resource for recreation and physical activity. And having access to safe parks may be especially important for preventing inactivity among lower-income youth. A survey of more than 4,000 adolescents in California shows that youth living in unsafe or lower-income neighborhoods were less likely to report inactivity when their neighborhoods had safe parks. This association is not found among higher-income youth.¹⁶²

Although limited, there is evidence regarding how playgrounds impact physical activity among children, and regarding racial and ethnic disparities in playground access. A study conducted in San Diego, Boston and Cincinnati shows that playgrounds were more prevalent in neighborhoods

that were more supportive of youth physical activity in other ways—walkable neighborhoods were more likely to have at least five playgrounds than were less walkable ones.¹⁶³ Also, observations of African-American children in grades 2 to 8 in New Orleans find that when new playgrounds were opened and properly supervised, 84 percent of children increased their physical activity and reduced time spent watching television or playing video games.¹⁶⁴ Unfortunately, some lower-income and racial and ethnic minority communities may be less likely to have playgrounds in which children are safe from injury. For instance, objective ratings of equipment and supervision quality at 154 Boston playgrounds indicate that those in areas with more lower-income or African-American residents were less safe.¹⁶⁵

Lower-income groups and racial and ethnic minorities are more likely to live in areas with higher crime rates and more physical and social disorder.

■ **Crime, perceptions of safety, neighborhood disorder, traffic and other aspects of the social environment are associated with less physical activity among children and adolescents.**^{166, 167} Many studies find that people with lower incomes, and racial and ethnic minorities, are more likely to live in areas with high crime rates;¹⁶⁸⁻¹⁷¹ perceive their neighborhoods as less safe;¹⁷²⁻¹⁷⁶ and report physical and social disorder in their neighborhoods, such as broken windows, litter, graffiti, loitering and public drinking.¹⁷⁷⁻¹⁸¹ This may be why lower-income and racial and ethnic minority children tend to be less active than their peers.

Details

Having safe places to be active may be particularly important for lower-income and racial and ethnic minority populations. For example, self-reports from more than 2,000 adolescents in California find that youth living in unsafe neighborhoods and lower-income youth were more likely to be active if they had access to a safe park. The same finding does not hold among youth in safe neighborhoods or those who were more affluent.¹⁸² A review of ten studies finds that being safe from crime could be particularly helpful in supporting activity among African Americans.¹⁸³ Although the review only considers studies on adults, the findings could have implications for youth because of the influence adults have on children's and adolescents' physical activity.

Neighborhood physical disorder, such as broken windows, litter and graffiti, and social disorder, such as loitering and public drinking, can make it uncomfortable for people to be physically active outdoors.¹⁸⁴⁻¹⁸⁶ Several studies indicate that such neighborhood disorder is related to activity among children and adolescents.¹⁸⁷⁻¹⁹⁰ For example, a study of roughly 1,300 Chicago-area youths ages 11 to 16 found that those in neighborhoods with more social disorder were less physically active.¹⁹¹

Traffic conditions also can impact children's walking and biking behavior. One review concludes that dangerous traffic and intersections were associated with less physical activity among children.¹⁹² For example, a study of 912 Australian elementary school students found that the presence of an objectively measured busy road barrier (e.g. highway, freeway, or arterial road) between home and school was related to lower rates of walking or biking to school.¹⁹³

Lower-income people and racial and ethnic minorities tend to live in areas with higher crime rates¹⁹⁴⁻¹⁹⁷ and to perceive more crime in their neighborhoods.¹⁹⁸⁻²⁰³ They also are more likely to face physical and/or social disorder such as trash, graffiti, unattended dogs, abandoned buildings, loitering and public drinking,²⁰⁴⁻²⁰⁷ and are more exposed to traffic dangers and nuisances, than

are other people.^{208–211} For example, objective national data show that African-American and Latino adolescents are more likely to live in high-crime areas than are White teens. This study also finds that neighborhoods with more serious crime generally had residents who were less active overall.²¹²

In particular, loose dogs, which can pose a danger to walkers, cyclists and joggers, are a more common complaint in lower-income or racial and ethnic minority neighborhoods. One study of nearly 1,200 South Carolina residents finds that lower-income respondents were significantly more likely than higher-income ones to report that unattended dogs are a big problem for walking and outdoor activity (39% as compared to 28%).²¹³

More research is needed regarding the association between youth physical activity and crime and perceptions of safety, as studies so far have been inconsistent.^{214–218} Although some studies indicate that crime and perceptions of safety are related to lower physical activity levels, much of the research is inconclusive or shows no relationship.

Conclusion

Neighborhoods that are densely populated and have mixed land use and well-connected streets, known as walkable neighborhoods, generally support physical activity. Many such neighborhoods are home to mostly racial or ethnic minority, or lower-income, people. However, racial and ethnic minority and lower-income youth have higher rates of obesity and related health problems, and by some measures get less recreational physical activity, than their peers. In light of this seeming paradox, it is important to consider that neighborhoods fitting the definition of walkability may have other features that can discourage activity, especially among certain populations. For instance, racial and ethnic minority and lower-income people:

- are more likely to live in neighborhoods with fewer and lower-quality sidewalks, and fewer aesthetic amenities like scenery that make walking safer, easier and more appealing;
- tend to live in neighborhoods with fewer parks and other recreation resources; and
- experience more danger from crime and traffic than others do, and face more barriers from neighborhood physical and social disorder.

So while walkable neighborhoods do tend to support physical activity, not all such neighborhoods are equally supportive. And although lower-income and racial and ethnic minority children are more likely to live in areas that are considered walkable, their neighborhoods are also more likely to have some of the features that we know discourage activity.

We do not yet know for certain if these youths are less active and more likely to be obese because they live in areas with fewer and poorer sidewalks, fewer parks and open spaces, and more crime and traffic. But an abundance of research makes it seem likely. In light of this growing evidence, policymakers should pursue strategies that improve walkability; access to parks, green space and recreational facilities; and neighborhood safety, and researchers should examine the precise impact such strategies have.

Areas Where Additional Research is Needed

- The majority of the research examining the relationship between the built environment and physical activity is cross-sectional. There is a need for research using more rigorous methodological approaches to better determine the influence of environmental factors on physical activity.
- There may be specific challenges related to increasing physical activity among racial and ethnic minority and lower-income populations at high risk for obesity, and they may require unique environmental and policy changes. Research is needed to determine whether, how and to what extent environmental and policy changes work in disadvantaged neighborhoods in particular, alone or in combination with other interventions.
- Much of the research examining the built environment, physical activity and obesity focuses on adults. More studies are needed to investigate how neighborhood environments, including access to recreational facilities, relate to physical activity and obesity among children and youth, especially those in high-risk groups.
- Additional research should explore the relative importance of crime, traffic safety, physical disorder and aesthetics, and how these factors might interact in shaping physical activity among youth in disadvantaged communities.
- Considering the environmental challenges faced by disadvantaged populations, additional research is needed to test the applicability and reliability of existing measures of the built environment for these populations, and develop more appropriate measures as needed.
- A better understanding of the disparities in the placement, availability and management of public parks and playgrounds will be critical to addressing those disparities.
- The majority of available research on physical activity and obesity is on African-American and Latino groups. More data are needed for other high-risk populations, including American Indians/Alaska Natives and some Asian Pacific Islander groups.
- Racial, ethnic and socioeconomic disparities in environmental supports for physical activity are less understood in rural communities. More studies should focus on rural environments and populations.
- Evidence on the association between crime and disorder (both actual and perceived) and youth physical activity is inconsistent. Given that racial and ethnic minority and lower-income communities report more crime and disorder, more research, using more comprehensive models and improved measures, is needed on social environmental variables in children and adolescent physical activity.
- Findings from research on physical activity using objective measures are sometimes inconsistent with findings from studies based on self-reports. Research is needed to examine the reasons for this discordance.

Policy Implications

As policymakers prioritize efforts to help support physical activity among people in lower-income communities and communities of color, they should also engage people from the community in their planning and decision making. Based on these overarching assumptions, policymakers should:

- Increase opportunities for children and families to be physically active by expanding and maintaining safe parks, protecting open spaces and implementing safe routes to school.
- Prioritize lower-income communities and communities of color when maintaining and creating new neighborhood parks and pocket parks, open spaces and other destinations for recreational physical activity.
- Improve sidewalk availability and quality to enhance the walkability of urban and other neighborhoods.
- Collaborate with public health, law enforcement, planners, and civic groups to develop strategies that can simultaneously improve neighborhood safety, reduce problems with social and physical disorder, and encourage physical activity.
- Increase policing in high-crime areas, pedestrian walkways and parks, and implement alternative policing strategies, such as neighborhood watch groups.
- Develop joint-use agreements that allow community members to use school-owned recreational facilities. In turn, communities can offer facilities to schools, such as swimming pools.

Additional Resources and References

American Academy of Pediatricians Committee on Environmental Health Policy Statement: www.aappolicy.aappublications.org/cgi/content/full/pediatrics;123/6/1591

Environmental Justice Resource Center at Clark Atlanta University: <http://aappolicy.aappublications.org/cgi/reprint/pediatrics;123/6/1591.pdf>

Institute of Medicine: Built Environment and Physical Activity Special Report: www.iom.edu/Reports/2005/Does-the-Built-Environment-Influence-Physical-Activity-Examining-the-Evidence---Special-Report-282.aspx

Let's Move Campaign: www.letsmove.gov/

National Collaborative on Childhood Obesity Research Measures Registry: www.nccor.org/measures

NIH Office of Minority Health: <http://minorityhealth.hhs.gov>

NIH National Institute on Minority Health and Health Disparities: www.nimhd.nih.gov

PolicyLink: www.policylink.org

Trust for Public Land: Park Equity and Public Health Toolkit: www.tpl.org/tier2_kad.cfm?folder_id=3548

United States National Physical Activity Plan: http://actrees.org/site/resources/research/trust_for_public_land_launches_park_equity_an.php

Endnotes

- 1 Ogden CL, Carroll MD, Curtin LR, Lamb MM and Flegal KM. "Prevalence of High Body Mass Index in US Children and Adolescents, 2007–2008." *Journal of the American Medical Association*, 303(3): 242–249, 2010.
- 2 Ogden CL, Flegal KM, Carroll MD and Johnson CL. "Prevalence and Trends in Overweight Among US Children and Adolescents, 1999–2000." *Journal of the American Medical Association*, 288(14): 1728–1732, 2002.
- 3 Ogden CL et al., 242–249.
- 4 *Statistical Abstract of the United States: 2006*. U.S. Census Bureau, 2005. www.census.gov/prod/2005pubs/06statab/pop.pdf (accessed May 2009) (No authors given.)
- 5 Budd GM and Hayman LL. "Addressing the Childhood Obesity Crisis: a Call to Action." *MCN American Journal of Maternal and Child Nursing*, 33: 111–118, quiz 9–20, 2008.
- 6 Basch CE. "Healthier Students Are Better Learners: A Missing Link in Efforts to Close the Achievement Gap." *Equity Matters: Research Review No. 6*. New York: The Campaign for Educational Equity, 2010. Available online: www.equitycampaign.org/ia/document/12557_EquityMattersVol6_Web03082010.pdf (accessed May 2009).
- 7 Taras H. "Physical Activity and Student Performance at School." *Journal of School Health*, 75(6): 214–218, 2005.
- 8 Gibson CA, Smith BK, Dubose KD, et al. "Physical Activity Across the Curriculum: Year One Process Evaluation Results." *International Journal of Behavioral Nutrition and Physical Activity*, 5: 36, 2008.
- 9 Mahar MT, Murphy SK, Rowe DA, et al. "Effects of a Classroom-Based Program on Physical Activity and On-Task Behavior." *Medicine and Science in Sports and Exercise*, 38(12): 2086–2094, December 2006.
- 10 Sibley BA, Ward RM, Yazvac TS, et al. "Making the Grade with Diet and Exercise." *AASA Journal of Scholarship and Practice*, 5(2): 38–45, 2008.
- 11 *Selected Health Risk Behaviors and Health Outcomes by Race/Ethnicity—National YRBS: 2009*. Centers for Disease Control, 2009, http://www.cdc.gov/HealthyYouth/yrbs/pdf/us_disparityrace_yrbs.pdf (accessed December 2009).
- 12 Whitt-Glover MC, Taylor WC, Floyd MF, et al. "Disparities in Physical Activity and Sedentary Behaviors among US Children and Adolescents: Prevalence, Correlates, and Intervention Implications." *Journal of Public Health Policy*, 30(Sup): S309–S334, 2009.
- 13 Troiano RP, Berrigan D, Dodd KW, et al. "Physical Activity in the United States Measured by Accelerometer." *Medicine and Science in Sports and Exercise*, 40(1): 181–188, 2008.
- 14 Barlow S and the Expert Committee. "Expert Committee Recommendations on the Assessment, Prevention, and Treatment of Child and Adolescent Overweight and Obesity: Summary Report." *Pediatrics*, 120, S254–S288, 2007.
- 15 *Preventing Childhood Obesity: Health in the Balance*. Institute of Medicine Report, 2005. http://books.nap.edu/openbook.php?record_id=11015 (accessed December 2009).
- 16 Ogden CL et al., 242–249.
- 17 Centers for Disease Control. "Prevalence among Low-Income, Preschool-Aged Children—United States, 1998–2008." *Morbidity and Mortality Weekly Report*, 58(28): 769–773, 2009.
- 18 Miech RA, Kumanyika SL, Stettler N, et al. "Trends in the Association of Poverty with Overweight among US Adolescents, 1971–2004." *Journal of the American Medical Association*, 295: 2385–2393, 2006.
- 19 Saelens BE and Handy S. "Built Environment Correlates of Walking: A Review." *Medicine and Science in Sports and Exercise*, (40): 550–566, 2008.
- 20 Heath GW, Brownson RC, Kruger J, Miles R, Powell KE, Ramsey LT and the Task Force on Community Preventive Services. "The Effectiveness of Urban Design and Land Use and Transport Policies and Practices to Increase Physical Activity: A Systematic Review." *Journal of Physical Activity and Health*, 3:S55–S76, 2006.
- 21 Salmon J and Timperio A. "Prevalence, Trends and Environmental Influences on Child and Youth Physical Activity." *Medicine and Sports Science*, 50:183–199, 2007.
- 22 Davison KK and Lawson C. "Do Attributes of the Physical Environment Influence Children's Level of Physical Activity?" *International Journal of Behavioral Nutrition and Physical Activity*, 3: 1–17, 2006.
- 23 Cutts BB, Darby KJ, Boone CG, et al. "City Structure, Obesity, and Environmental Justice: An Integrated Analysis of Physical and Social Barriers to Walkable Streets and Park Access." *Social Science & Medicine*, 69(9): 1314–1322, 2009.
- 24 Lovasi GS, Hutson MA, Guerra M, Neckerman KM. "Built Environments and Obesity in Disadvantaged Populations." *Epidemiologic Review*, 31: 7–20, 2009.
- 25 Ewing R, Brownson RC, Berrigan D. "Relationship Between Urban Sprawl and Weight of United States Youth." *American Journal of Preventive Medicine*, 31(6): 464–474, 2006.
- 26 King AC, Castro C, Eyster AA, et al. "Personal and Environmental Factors Associated with Physical Inactivity among Different Racial-Ethnic Groups of US Middle-Aged and Older-Aged Women." *Health Psychology*, 19(4): 354–364, 2000.
- 27 Heath GW et al., S55–S76.
- 28 Davison KK and Lawson C, 1–17.
- 29 Neckerman KM, Lovasi GS, Davies S, et al. "Disparities in Urban Neighborhood Conditions: Evidence from GIS Measures and Field Observation in New York City." *Journal of Public Health Policy*, 30(S1): S264–S285, 2009.
- 30 Owen N, Humpel N, Leslie E, et al. "Understanding Environmental Influences on Walking: Review and Research Agenda." *American Journal of Preventive Medicine*, 27(1), 2004, http://ipenproject.org/pdf_file/owenwalkreview.pdf (accessed December 2009).
- 31 Humpel N, Owen N, Leslie E. "Environmental Factors Associated with Adults' Participation in Physical Activity: A Review." *American Journal of Preventive Medicine*, 22(3): 188–199, 2002.
- 32 Brownson RC, Baker EA, Housemann RA, et al. "Environmental and Policy Determinants of Physical Activity in the United States." *American Journal of Public Health*, 91(12): 1995–2003, 2001.

- 33 Active Living Research. *Parks, Playgrounds, and Active Living Research Synthesis*, February 2010. www.activelivingresearch.org/files/Synthesis_Mowen_Feb2010.pdf (accessed December 2009).
- 34 Kaczynski A and Henderson K. "Environmental Correlates of Physical Activity: A Review of Evidence About Parks and Recreation." *Leisure Sciences*, 29(4): 315–354, 2007.
- 35 Davison KK and Lawson C, 1–17.
- 36 Gordon-Larsen P, Nelson MC, Page P, Popkin BM. "Inequality in the Built Environment Underlies Key Health Disparities in Physical Activity and Obesity." *Pediatrics*, 117(2): 417–424, 2006.
- 37 Loukaitou-Sideris A and Stieglitz O. "Children in Los Angeles Parks: A Study of Equity, Quality and Children's Satisfaction with Neighborhood Parks." *Town Planning Review*, 74(4): 467–488, 2002.
- 38 Active Living Research. *Parks, Playgrounds, and Active Living Research Synthesis*.
- 39 Powell L, Slater S, Chaloupka F. "The Relationship between Community Physical Activity Settings and Race, Ethnicity and Socioeconomic Status." *Evidence-Based Preventive Medicine*, 1(2): 135–144, 2004.
- 40 Wolch J, Wilson JP, Fehrenbach J. *Parks and Park Funding In Los Angeles: An Equity Mapping Analysis*. University of Southern California, 2002. <http://www.usc.edu/dept/geography/ESPE> (accessed December 2009).
- 41 Loukaitou-Sideris A and Stieglitz O, 467–488.
- 42 Babey SH, Haster TA, Yu H, Brown R. "Physical Activity among Adolescents: When Do Parks Matter?" *American Journal of Preventive Medicine*, 34(4): 345–348, 2008.
- 43 Moore LV, Diez Roux AV, Evenson KR, et al. "Availability of Recreational Resources in Minority and Low Socioeconomic Status Areas." *American Journal of Preventive Medicine*, 34(1): 16–22, 2008.
- 44 Gordon-Larsen P et al., 417–424.
- 45 Powell L et al., 135–144.
- 46 Babey SH, Hastert TA, Brown ER. *Teens Living In Disadvantaged Neighborhoods Lack Access to Parks and Get Less Physical Activity*. UCLA Health Policy Research Brief, March 2007 (accessed December 2009).
- 47 Gordon-Larsen P et al., 417–424.
- 48 Grow H, Saelens B, Kerr J, et al. "Where Are Youth Active? Roles of Proximity, Active Transport, and Built Environment." *Medicine & Science in Sports & Exercise*, 40(12): 2017–2079, 2008.
- 49 Cradock AL, Kawachi I, Colditz GA, et al. "Playground Safety and Access in Boston Neighborhoods." *American Journal of Preventive Medicine*, 28: 357–363, 2005.
- 50 Salmon J and Timperio A, 183–99.
- 51 Davison KK and Lawson C, 1–17.
- 52 Gordon-Larsen P, McMurray RG, Popkin BM. "Determinants of Adolescent Physical Activity and Inactivity Patterns." *Pediatrics*, 105:e83, 2000. DOI:10.1542/peds.105.6.e83, www.californiaafterschool.org/Pages/articles/Gordon-Larsen_Determinants_of_Adolescent_Physical_Activity_and_Inactivity_Patterns.pdf (accessed December 2009).
- 53 Neckerman KM et al., S264–S285.
- 54 Zhu X and Lee C. "Walkability and Safety Around Elementary Schools: Economic and Ethnic Disparities." *American Journal of Preventive Medicine*, 34(4): 282–290, 2008.
- 55 Cutts BB et al., 1314–1322.
- 56 Brownson RC et al., 1995–2003.
- 57 Weir LA, Etelson D, Brand DA. "Parents' Perceptions of Neighborhood Safety and Children's Physical Activity." *Preventive Medicine*, 43(3): 212–217, 2006.
- 58 Boslaugh SE, Luke DA, Brownson RC, et al. "Perceptions of Neighborhood Environment for Physical Activity: Is It 'Who You Are' Or 'Where You Live'?" *Journal of Urban Health*, 81(4): 671–81, 2004.
- 59 Gielen AC, DeFrancesco S, Bishai D, et al. "Child Pedestrians: The Role of Parental Beliefs and Practices in Promoting Safe Walking in Urban Neighborhoods." *Journal of Urban Health*, 81(4): 545–55, 2004.
- 60 Wilcox S, Bopp M, Oberrecht L, et al. "Psychosocial and Perceived Environmental Correlates of Physical Activity in Rural and Older African American and White Women." *Journal of Gerontology B: Psychological Sciences and Social Sciences*, 58(6): P329–P337, 2003.
- 61 Franzini L, Taylor W, Elliot MN, et al. "Neighborhood Characteristics Favorable to Outdoor Physical Activity: Disparities by Socioeconomic and Racial/Ethnic Composition." *Health and Place*, 16: 267–274, 2010.
- 62 Sampson RJ and Raudenbush SW. "Seeing Disorder: Neighborhood Stigma and the Social Construction of 'Broken Windows.'" *Social Psychology Quarterly*, 67: 319–342, 2004.
- 63 Wilson DK, Kirtland KA, Ainsworth BE, et al. "Socioeconomic Status and Perceptions of Access and Safety for Physical Activity." *Annals of Behavioral Medicine*, 28(1): 20–28, 2004.
- 64 Balfour JL and Kaplan GA. "Neighborhood Environment and Loss of Physical Function in Older Adults: Evidence from the Alameda County Study." *American Journal of Epidemiology*, 155(6): 507–515, 2002.
- 65 Brownson RC, Baker EA, Housemann RA, et al. "Environmental and Policy Determinants of Physical Activity in the United States." *American Journal of Public Health*, 91(12): 1995–2003, 2001.
- 66 *Selected Health Risk Behaviors and Health Outcomes by Race/Ethnicity — National YRBS: 2009*. Centers for Disease Control, 2009. www.cdc.gov/HealthyYouth/yrbs/pdf/us_disparityrace_yrbs.pdf (accessed December 2009).
- 67 Whitt-Glover MC et al., S309–S334.
- 68 Troiano RP et al., 181–188.
- 69 Barlow S and the Expert Committee, S254–S288.
- 70 *Preventing Childhood Obesity: Health in the Balance*. Institute of Medicine Report, 2005. http://books.nap.edu/openbook.php?record_id=11015 (accessed December 2009).
- 71 Ogden CL et al., 242–249.
- 72 Centers for Disease Control, 769–773.
- 73 Miech RA et al., 2385–2393.
- 74 Ogden CL et al., 242–249.
- 75 Miech RA et al., 2385–2393.

- 76 Ibid.
- 77 Ogden CL et al., 242–249.
- 78 Indian Health Service Reporting System. Unpublished FY 2007 data.
- 79 *Selected Health Risk Behaviors and Health Outcomes by Race/Ethnicity — National YRBS: 2009.*
- 80 Troiano RP et al., 181–188.
- 81 Whitt-Glover MC et al., S309–S334.
- 82 Ibid.
- 83 Ainsworth BE, Irwin ML, Addy CL, et al. "Moderate Physical Activity Patterns of Minority Women: The Cross-Cultural Activity Participation Study." *Journal of Womens Health Gender Based Medicine*, 8(6): 805–813, 1999.
- 84 Whitt-Glover MC et al, S309–S334.
- 85 Ibid.
- 86 *Summary Health Statistics for US Adults: 2007.* Table 31. Centers for Disease Control, 2009, www.cdc.gov/nchs/data/series/sr10/sr10_240.pdf (accessed December 2009).
- 87 Stalsberg R and Pedersen AV. "Effects of Socioeconomic Status on the Physical Activity in Adolescents: A Systematic Review of the Evidence." *Scandinavian Journal of Medicine and Science in Sports*, 20(3): 368–383, 2010.
- 88 McDonald NC. "Critical Factors for Active Transportation to School among Low-Income and Minority Students: Evidence from the 2001 National Household Travel Survey." *American Journal of Preventive Medicine*, 34(4): 341–344, 2008.
- 89 Saelens BE and Handy S, 550–566.
- 90 Heath GW et al., S55–S76.
- 91 Salmon J et al., 183–199.
- 92 Davison KK and Lawson C, 1–17.
- 93 Cutts BB et al., 1314–1322.
- 94 Lovasi GS et al., 7–20.
- 95 Ewing R et al., 464–474.
- 96 King AC et al., 354–364.
- 97 Heath GW et al., S55–S76.
- 98 Davison KK and Lawson C, 1–17.
- 99 Neckerman KM et al., S264–S285.
- 100 Owen N et al., 2004.
- 101 Humpel N, Owen N, Leslie E. "Environmental Factors Associated with Adults' Participation in Physical Activity: A Review." *American Journal of Preventive Medicine*, 22(3): 188–199, 2002.
- 102 Brownson RC, Baker EA, Housemann RA, et al. "Environmental and Policy Determinants of Physical Activity in the United States." *American Journal of Public Health*, 91(12): 1995–2003, 2001.
- 103 Saelens BE and Handy S, 550–566.
- 104 Davison KK and Lawson C, 1–17.
- 105 Ferreira K, van der Horst W, Wendel-Vos S, et al. "Environmental Correlates of Physical Activity In Youth: A Review and Update." *Obesity Review*, 8: 129–154, 2008.
- 106 Lovasi GS et al., 7–20.
- 107 Frank LD, Andresen MA, Schmid TL. "Obesity Relationships with Community Design, Physical Activity, and Time Spent in Cars." *American Journal of Preventive Medicine*, 27: 87–96, 2004.
- 108 Kerr J, Frank LD, Sallis JF, Saelens BE, et al. "Urban Form Correlates of Pedestrian Travel in Youth: Differences by Gender, Race-Ethnicity and Household Attributes." *Transportation Research Part D: Transport and Environment*, 12:177–182, 2007, doi: 10.1016/j.trd.2007.01.006.
- 109 McDonald NC, 341–344.
- 110 Lovasi GS et al., 7–20.
- 111 Davison KK and Lawson C, 1–17.
- 112 Mota J, Almeida M, Santos P, et al. "Perceived Neighborhood Environments and Physical Activity In Adolescents." *Preventive Medicine*, 41: 834–836, 2005.
- 113 King AC et al., 354–364.
- 114 Ibid.
- 115 Neckerman KM et al., S264–S285.
- 116 Zhu X and Lee C, 282–290.
- 117 Huston SL, Evenson KR, Bors P, et al. "Neighborhood Environment, Access to Places for Activity, and Leisure-Time Physical Activity in a Diverse North Carolina Population." *American Journal of Health Promotion*, 18(1): 58–69, 2003, www.activelivingresearch.org/alr/files/AJHP_9_Huston.pdf (accessed December 2009).
- 118 Brownson RC et al., 1995–2003.
- 119 Neckerman KM et al., S264–S285.
- 120 Brownson RC et al., 1995–2003.
- 121 Neckerman KM et al., S264–S285.
- 122 Franzini L et al., 267–274.
- 123 Active Living Research. *Parks, Playgrounds, and Active Living Research Synthesis.*
- 124 Kaczynski A and Henderson K, 315–354.
- 125 Davison KK and Lawson C, 1–17.
- 126 Gordon-Larsen P et al., 417–424.
- 127 Loukaitou-Sideris A and Stieglitz O, 467–488.
- 128 Active Living Research. *Parks, Playgrounds, and Active Living Research Synthesis.*
- 129 Powell L et al., 135–144.
- 130 Wolch J et al., *Parks and Park Funding In Los Angeles: An Equity Mapping Analysis.*
- 131 Loukaitou-Sideris A and Stieglitz O, 467–488.
- 132 Babey SH et al., 345–348.

- 133 Moore LV, Diez Roux AV, Evenson KR, et al. "Availability of Recreational Resources in Minority and Low Socioeconomic Status Areas." *American Journal of Preventive Medicine*, 34(1): 16–22, 2008.
- 134 Gordon-Larsen P et al., 417–424.
- 135 Powell L et al., 135–144.
- 136 Babey SH et al., March 2007.
- 137 Gordon-Larsen P, et al., 417–424.
- 138 Grow H et al., 2017–2079.
- 139 Cradock AL et al., 357–363.
- 140 Davison KK and Lawson C, 1–17.
- 141 Salmon J and Timperio A, 183–99.
- 142 Cohen DA, Ashwood JS, Scott MM, et al. "Public Parks and Physical Activity among Adolescent Girls." *Pediatrics*, 118: e1381–e1389, 2006, <http://Pediatrics.aappublications.org/cgi/content/full/118/5/e138>.
- 143 Powell L et al., 135–144.
- 144 Wolch J et al., *Parks and Park Funding In Los Angeles: An Equity Mapping Analysis*.
- 145 Loukaitou-Sideris A and Sideris A. "What Brings Children to the Park?" *Journal of the American Planning Association*, 76(1): 89–107, 2010.
- 146 Babey SH et al., March 2007.
- 147 Loukaitou-Sideris A and Stieglitz O, 467–488.
- 148 Loukaitou-Sideris A and Sideris A, 89–107.
- 149 Wolch J et al., *Parks and Park Funding In Los Angeles: An Equity Mapping Analysis*.
- 150 Loukaitou-Sideris A and Stieglitz O, 467–488.
- 151 Cutts BB et al., 1314–1322.
- 152 Loukaitou-Sideris A and Stieglitz O, 467–488.
- 153 Gordon-Larsen P et al., 417–424.
- 154 Ibid.
- 155 Powell L et al., 135–144.
- 156 Moore LV et al., 16–22.
- 157 Ibid.
- 158 Babey SH et al., March 2007.
- 159 Gordon-Larsen P et al., 417–424.
- 160 Ibid.
- 161 Loukaitou-Sideris A and Stieglitz O, 467–488.
- 162 Babey SH et al., 345–348.
- 163 Grow H et al., 2017–2079.
- 164 Farley TA, Meriwether RA, Baker ET, et al. "Safe Play Spaces to Promote Physical Activity in Inner-City Children: Results from a Pilot Study of an Environmental Intervention." *American Journal of Public Health*, 97: 1625–1631, 2007.
- 165 Cradock AL et al., 357–363.
- 166 Salmon J and Timperio A, 183–199.
- 167 Davison KK and Lawson C, 1–17.
- 168 Gordon-Larsen P, McMurray RG, Popkin BM. "Determinants of Adolescent Physical Activity and Inactivity Patterns." *Pediatrics*, 105: e83, 2000. DOI:10.1542/peds.105.6.e83, www.californiaafterschool.org/Pages/articles/Gordon-Larsen_Determinants_of_Adolescent_Physical_Activity_and_Inactivity_Patterns.pdf (accessed December 2009).
- 169 Neckerman KM et al., S264–S285.
- 170 Zhu X and Lee C, 282–290.
- 171 Cutts BB et al., 1314–1322.
- 172 Brownson RC et al., 1995–2003.
- 173 Weir LA et al., 212–217.
- 174 Boslaugh SE et al., 671–681.
- 175 Gielen AC et al., 545–555.
- 176 Wilcox S et al., P329–P337.
- 177 Franzini L et al., 267–274.
- 178 Sampson RJ and Raudenbush SW, 319–342.
- 179 Wilson DK et al., 20–28.
- 180 Balfour JL and Kaplan GA, 507–515.
- 181 Brownson RC et al., 1995–2003.
- 182 Babey SH et al., 345–348.
- 183 Casagrande SS, Whitt-Glover MC, Lancaster KJ, Odoms-Young AM, Gary TL. "Built Environment and Health Behaviors among African Americans: A Systematic Review." *American Journal of Preventive Medicine*, 36(2): 174–181, 2009.
- 184 Miles R. "Neighborhood Disorder, Perceived Safety, and Readiness to Encourage Use of Local Playgrounds." *American Journal of Preventive Medicine*, 34: 275–281, 2008.
- 185 Brownson RC et al., 1995–2003.
- 186 King AC et al., 354–364.
- 187 Molnar BE, Gortmaker, SL, Bull FC, et al. "Unsafe to Play? Neighborhood Disorder and Lack of Safety Predict Reduced Physical Activity among Urban Children and Adolescents." *American Journal of Health Promotion*, 18(5): 378–386, 2004.
- 188 Franzini L et al., 267–274.
- 189 Miles R, 275–281.
- 190 Carver A, Salmon J, Campbell K, et al. "How Do Perceptions of Local Neighborhood Relate to Adolescents' Walking and Cycling?" *American Journal of Health Promotion*, 20(2): 139–147, 2005.
- 191 Molnar BE et al., 378–386.
- 192 Davison KK and Lawson C, 1–17.

- 193 Timperio A, Ball K, Roberts R, et al. "Personal, Family, Social, and Environmental Correlates of Active Commuting to School." *American Journal of Preventive Medicine*, 30(1): 45–51, 2006.
- 194 Gordon-Larsen P, et al. "Determinants of Adolescent Physical Activity and Inactivity Patterns."
- 195 Neckerman KM et al., S264–S285.
- 196 Zhu X and Lee C, 282–290.
- 197 Cutts BB et al., 1314–1322.
- 198 Brownson RC et al., 1995–2003.
- 199 Boslaugh SE et al., 671–681.
- 200 Wilcox S et al., P329–P337.
- 201 Gielen AC et al., 545–555.
- 202 Weir LA et al., 212–217.
- 203 Loukaitou-Sideris A and Sideris A, 89–107.
- 204 Sampson RJ and Raudenbush SW, 319–342.
- 205 Wilson DK et al., 20–28.
- 206 Balfour JL and Kaplan GA, 507–515.
- 207 Brownson RC et al., 1995–2003.
- 208 *Report to The Nation On Child Pedestrian Safety, 2002*. National Safe Kids Campaign. www.safekids-centralvalley.org/images/Report_Ped_ReporttoTheNation_Oct2002.pdf (accessed December 2009).
- 209 Corless J and Ohland G. *Caught in the Crosswalk: Pedestrian Safety in California*. Surface Transportation Policy report, 1999. www.transact.org/ca/caught99/default.htm (accessed December 2009).
- 210 Neckerman KM et al., S264–S285.
- 211 Zhu X and Lee C, 282–290.
- 212 Gordon-Larsen P, et al., "Determinants of Adolescent Physical Activity and Inactivity Patterns."
- 213 Wilson DK et al., 20–28.
- 214 Davison KK and Lawson C, 1–17.
- 215 Salmon J and Timperio A, 183–199.
- 216 Molnar BE et al., 378–386.
- 217 Weir LA et al., 212–217.
- 218 Gomez JE, Johnson BA, Selva M, Sallis JF. "Violent Crime and Outdoor Physical Activity among Inner-City Youth." *Preventive Medicine*, 39: 876–881, 2004, doi: 10.1016/j.ypmed.2004.03.019.

This synthesis was prepared by Wendell C. Taylor, Ph.D., M.P.H, associate professor at The University of Texas Health Science Center at Houston School of Public Health and Deborah Lou, Ph.D., Active Living Research. Peer review was provided by Myron F. Floyd, Ph.D., North Carolina State University; Melicia C. Whitt-Glover, Ph.D., Gramercy Research Group; and Gina S. Lovasi, Ph.D., M.P.H., Mailman School of Public Health at Columbia.

For updates and a Web-based version of this synthesis, visit www.activelivingresearch.org.

Active Living Research, a national program of the Robert Wood Johnson Foundation, stimulates and supports research to identify environmental factors and policies that influence physical activity for children and families to inform effective childhood obesity prevention strategies, particularly in low-income and racial and ethnic communities at highest risk. Active Living Research wants solid research to be part of the public debate about active living.

Active Living Research
San Diego State University
3900 Fifth Avenue, Suite 310
San Diego, CA 92103-3138
www.activelivingresearch.org

Table of Studies

The following table provides a brief summary of the studies cited in this synthesis, including sample characteristics, methods, and strengths and weaknesses.

TABLE 1. **Studies Cited in this Synthesis**

Study	Sample Characteristics	Methods	+ Strengths / – Weaknesses
Babey, et al., 2008	4,010 adolescents aged 12–17 in California	Self-reports	<p>+ Large sample size representative of state; sample diverse in race, ethnicity, and language</p> <p>– Relies on self-reported data; examined only parks and open spaces and did not include other recreational facilities that may be relevant to youth physical activity</p>
Boslaugh, et al., 2004	1,073 African-American and White adults in St. Louis, Mo.	Self-administered questionnaires and 2000 census for neighborhood-level data	<p>+ Examines both individual and neighborhood characteristics; includes racial composition in analysis; sample included substantial proportion of African-Americans and lower-income persons</p> <p>– Reliance on self-reported data; convenience sample limits generalizability; environmental variables used limited to those available in census</p>
Brownson et al., 2001	Nationally representative sample of 1,818 adults with oversampling of low-income individuals	Cross-sectional analysis of telephone survey data; self-report	<p>+ Nationally representative sample; significant proportion of low-income persons</p> <p>– Reliance on self-reported telephone survey data; some survey items not tested for reliability; no objective environmental data; study was cross-sectional</p>
Cradock et al., 2005	154 playgrounds and 591 census block groups in Boston	Cross-sectional analysis of observed playground data and GIS data	<p>+ Survey developed with input from community stakeholders; assesses playground safety and access city-wide; direct observation</p> <p>– Playground age not known; limitations to how playground safety was classified; study did not account for all playgrounds; other potential influences on children's play and access to safe equipment were not assessed; distance calculation may not be entirely accurate</p>

TABLE 1. continued

Study	Sample Characteristics	Methods	+ Strengths / – Weaknesses
Cutts et al., 2009	City-wide census block groups in Phoenix, Ariz.	Case study assessing local park access and walkability of census block groups using GIS method	<p>+ Analyzes social factors on a macro-level along with structural factors</p> <p>– Measures used as proxies are not able to provide evidence of systemic differences in quality and safety of walkable neighborhoods; analysis does not fully consider aesthetics</p>
Franzini et al., 2010	632 parents of fifth-grade children in Birmingham, Ala., Houston, Texas, and Los Angeles, Calif.	Survey and neighborhood observation data to analyze associations between physical environment and social processes and neighborhood-level racial/ethnic and socioeconomic composition	<p>+ Richness of data allowing for comparison of several block-face characteristics; use of multilevel modeling; findings point to levers for intervention</p> <p>– Neighborhood observation limited to block-face on which child resided (therefore not random); no data collected on physical activity-related resources outside of block-face; cultural and social norms not assessed</p>
Gielen et al., 2004	732 parents of students from four urban elementary schools	Self-administered surveys	<p>+ Large and diverse sample; findings can inform parent education programs for child safety</p> <p>– Limited measurement items; low response rates; sample may not reflect school population</p>
Gordon-Larsen et al., 2006	20,745 adolescents in grades seven to 12 enrolled in Add Health, a longitudinal, nationally-representative school-based study, and 42,857 census block groups	Randomized telephone survey with a follow-up mail survey; cross-sectional, self-report data	<p>+ Nationwide adolescent population analyses of relationship between socioeconomic status, distribution of recreational facilities and recommended physical activity; examined association of physical activity to overweight status</p> <p>– Cross-sectional study, did not assess quality or facility type; did not assess actual use of facilities by youth</p>
Huston et al., 2003	1796 North Carolina adults	Cross-sectional analysis of randomized household telephone survey data; self-report	<p>+ Examines diverse set of environmental variables; American Indians included in analysis; assesses contribution of streets to leisure physical activity</p> <p>– Causality cannot be inferred; relied on self-reports; only assessed leisure-time physical activity; generalizability may be limited; data on income and neighborhood characteristics were limited; some groups may be underrepresented due to reliance on phone survey</p>

TABLE 1. continued

Study	Sample Characteristics	Methods	+ Strengths / – Weaknesses
King et al., 2000	Nationally representative sample of 2,912 U.S. women	Telephone interview data	<p>+ Study was first effort to evaluate the relationship between neighborhood environments and physical activity levels in a population-based sample</p> <p>– Possible under sampling of some minority and low-income groups and oversampling of certain types of ethnic groups; interviews conducted in English only; limited ability to compare determinants of physical activity among groups who are intermittently active as opposed to regularly active; potential lack of validity of physical activity variables; number of environmental variables were limited</p>
Loukaitou-Sideris and Sideris 2010	348 parents and 897 middle-school students in Los Angeles and San Fernando Valley; 100 parks	Survey and observation data	<p>+ Large number of parks in sample; use of multi-method approach</p>
Loukaitou-Sideris and Stieglitz 2002	Eight parks in Los Angeles metropolitan area; 324 children	Quantitative data and spatial analysis of parks and survey data	<p>+ Addresses local context and park design in light of children's different needs</p> <p>– Findings may not be generalizable to other cities</p>
Lovasi et al., 2009	Literature review of 45 peer-reviewed articles using three public health and transportation databases (Transportation Research Information Services; ISI Web of Knowledge; U-M Medsearch)	Descriptive comparison of key literature based upon study results showing relationships between racial, ethnic, and socioeconomic disparities in the built and food environments and obesity and physical activity	<p>+ Focuses on U.S. studies directly related to lower-income individuals, African Americans, and Hispanics/Latinos; examines known or established environmental correlates of activity</p> <p>– Lack of agreement on methods for assessing built environment characteristics and their consequences; omission of some resources; inconsistency in quality of environmental measurement</p>
Molnar et al., 2004	Individual-level data on 1,378 youth ages 11 to 16 and their caregivers in Chicago; neighborhood-level data on 8,782 residents; videotapes of 15,141 block-faces.	Observation and longitudinal survey data	<p>+ Multilevel design examined physical activity among adolescents living in different neighborhood types; uses both perceived and observed neighborhood data</p> <p>– Outcome variable measured by recall; does not assess perceived safety at school or effect of traffic on physical activity</p>

TABLE 1. continued

Study	Sample Characteristics	Methods	+ Strengths / – Weaknesses
Moore, Diez-Roux 2008	Survey of recreational resources from 685 census tracts in Maryland, North Carolina, and New York City	Analysis of densities of recreational resources per area estimated using kernel density method	<p>+ Examined types and numbers of available resources in three diverse regions</p> <p>– Lack of data on resource quality; findings may not be generalizable; data not collected on resources located in certain facilities</p>
Neckerman 2009	2,172 census tracts in New York city	GIS and field observations	<p>+ Variety of objective measures plus detailed field observation data; controlled for neighborhood walkability</p> <p>– Limited to one city; GIS data lacks validity and reliability info; field data limited in size and scope and lacks inter or intra-rater reliability; disparities considered by neighborhood poverty level only</p>
Powell et al., 2007	409 communities drawn from nationally representative school-based, cross-sectional samples of 8th, 10th, and 12th-grade students from ImpactTeen study	Observational data on outdoor physical activity-related settings and census data	<p>+ Expands on existing research by using nationally-based, objective data</p> <p>– Data on usage levels of physical activity settings not collected; focuses on only one potential barrier to physical activity; sample may not be nationally representative; aggregate nature of data has several limitations</p>
Weir et al., 2006	307 lower-income and middle class parents of children aged 5–10 years old in New York	Cross-sectional analysis of self-administered questionnaire data	<p>+ Study sheds light on possible factors limiting inner-city children's physical activity</p> <p>– Weather not factored into analysis; study is cross-sectional; findings may not be representative; relies on parental reports from small sample</p>
Wilcox et al., 2003	Convenience sample of 102 African-American or White women aged 50 years or older living in Fairfield County, S.C.	Cross-sectional analysis of self-reported data on associations between individual, social, and environmental factors and physical activity	<p>+ Contributed to evidence on rural populations; demonstrated importance of considering multilevel influences on behavior.</p> <p>– Sample not representative; health status and living arrangements not assessed; physical activity score used does not allow for quantifying leisure-time physical activity from various sources; physical environment was self-reported</p>

TABLE 1. continued

Study	Sample Characteristics	Methods	+ Strengths / – Weaknesses
Wilson et al., 2004	1,194 adults in a southeastern US county (ages 18–96)	Randomized phone survey; cross-sectional analysis linked to GIS data on trails, sidewalks, public recreation facilities, and violent crime incidents	<p>+ Analysis included both perceived and objective measures of environmental supports for physical activity</p> <p>– Survey response rate was modest (54%); generalizability may be limited do to sampling frame and weather effect; possible under-representation of certain groups (African-American, very poor, and rural residents) due to unlisted phone numbers; low reliability of some measures</p>
Wolch et al., 2002	324 Los Angeles parks	Census and municipal and government data; data from applications for Prop. K funding	<p>+ Used geospatial analysis to assess distribution of parks and recreation funding and resources</p>
Zhu & Lee 2008	73 elementary school areas in Austin, Texas	Cross-sectional analysis of GIS and field audit data	<p>+ New aspects of economic and ethnic disparities were explored in terms of walkability and safety around public elementary schools; findings offered some insights into the design and policy interventions that target walking-to-school behaviors</p> <p>– GIS data collected at different times and had different levels of accuracy; different units of analyses used for neighborhood- and street-level measures; potential difference between field audits and resident self-reports; walkability was inferred</p>

TABLE 2. Studies Not Cited in this Synthesis

Study	Sample Characteristics	Methods	+ Strengths / – Weaknesses
Abercrombie LC, Sallis JF, Conway TL, et al. "Income and Racial Disparities in Access to Public Parks and Private Recreation Facilities." <i>American Journal of Preventive Medicine</i> , 34(1): 9–14, 2008	351 private recreation facilities and 465 public parks in 833 block groups in Maryland	GIS and census data	<p>+ Objective measure of resource availability; substantial number of block groups with diverse population; multiple sources to identify private and public recreation facilities; adjusted for potential confounding variables</p> <p>– Inability to distinguish trails from parks; possible incomplete inventory of private facilities; no data on facility quality or fees for use; did not consider service area size</p>
Joassart-Marcelli P. "Leveling the Playing Field? Urban Disparities in Funding for Local Parks and Recreation in the Los Angeles Region." <i>Environment and Planning A</i> , 42(5) 1174–1192, 2010	Parks and recreation expenditures in Los Angeles Consolidated Metropolitan Statistical Area	Analysis of municipal, state, federal, and nonprofit expenditure data on parks and recreation; 2000 Census data	<p>+ First study to systematically analyze funding allocations for local parks and recreation facilities within a metropolitan area</p> <p>– Study does not assess link between park spending and health outcomes and is limited to one metro area</p>
Estabrooks PA, Lee RE, Gyurcsik NC. "Resources for Physical Activity Participation: Does Availability and Accessibility Differ by Neighborhood Socioeconomic Status?" <i>Annals of Behavioral Medicine</i> , 25(2):100–104, 2003	32 census tracts in small Midwestern U.S. city	Multivariate analyses performed on GIS data to determine whether resource availability and accessibility varied by neighborhood SES; univariate analyses used to determine whether number of pay-for-use and free-for-use facilities differed by neighborhood SES	<p>+ Comprehensive assessment of availability and accessibility of physical activity resources in a representative Midwestern U.S. city</p> <p>– Did not examine whether differences in resource availability and accessibility was related to actual physical activity or whether these differences could possibly explain SES differences in physical activity; other secondary resources related to physical activity (e.g. churches) not considered; census tracts may not reflect true neighborhood boundaries and thus may not be accurate indicator of distribution of resources.</p>
Powell LM, Slater S, Chaloupka FJ, Harper D. "Availability of Physical Activity-Related Facilities and Neighborhood Demographic and Socioeconomic Characteristics: A National Study." <i>American Journal of Public Health</i> , 96(9): 1676–1680, 2006	28,050 zip code areas throughout U.S.	Census and GIS data	+ National study

TABLE 2. continued

Study	Sample Characteristics	Methods	+ Strengths / - Weaknesses
Romero A.J. "Low-income Neighborhood Barriers and Resources for Adolescents' Physical Activity." <i>Journal of Adolescent Health</i> , 36(3), 253–259, 2005	74 low-income youth aged 10 to 16 years in mid-sized southwestern U.S. city	Questionnaires administered to youth during class and at local community centers afterschool	<p>+ Provides empirical evidence on perception of quality, cost, and safety and its impact on youth physical activity in low-income settings</p> <p>– Small sample size; study is cross-sectional</p>
Sister C, Wolch J, Wilson J. "Got Green? Addressing Environmental Justice in Park Provision." <i>GeoJournal</i> (75): 229–248, 2010. Available online: www.springerlink.com/content/g127727338182817/	1,674 park service areas (PSA's) in Los Angeles metropolitan region	Delineation of PSA's by assigning every resident in region to his/her closest park	<p>+ Methodology developed with input diverse set of stakeholders; able to quantify the number of residents potentially served in every PSA, providing estimate of potential congestion</p> <p>– PSA approach may not accurately assess level of park need</p>