Findings from the 2007 Active Living Research Conference

Implications for Future Research

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Introduction

Regular physical activity has many health benefits, including its effects in reducing or preventing obesity; improving insulin sensitivity and glucose uptake by skeletal muscle; improving blood lipid profile and blood pressure; and reducing depression, sleep disorders, and other comorbidities. Although these benefits have been documented mostly in adults, regular physical activity in children could suppress the development of excess body fat, abnormalities in blood pressure, and other comorbidities during the growing years.[1]

About 25 million U.S. children and adolescents are overweight or obese,[2] a condition that disproportionately affects low-socioeconomic and ethnic minority populations. Disparities in cardiovascular disease risk factors (e.g., type 2 diabetes, hypertension, dyslipidemia, and obesity) and other comorbidities continue to plague our nation's poor and its communities of color. To reverse the growing childhood obesity epidemic, the Robert Wood Johnson Foundation (RWJF) seeks to examine environmental and policy strategies that could be implemented in low-income populations and communities of color through several research programs: Active Living Research (ALR); Healthy Eating Research; Bridging the Gap[3]; Salud America!, a research network to prevent obesity among Latino children[4]; and the African American Collaborative Obesity Research Network (AACORN),[5] whose mission is to improve the translation of obesity-related research to address weight-related issues in African American communities.

This commentary highlights the findings of several of the papers presented at the 2007 ALR conference and published in this special issue of the *American Journal of Preventive Medicine,*[6–12] and also notes their implications for future research.

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The Active Living Research Program supports research that examines how environments and policies influence physical activity in children and their families through investigator-initiated studies and analyses. The Institute of Medicine (IOM) identified policy and environmental changes as seminal strategies for controlling the childhood obesity epidemic, and concluded that children and youth should be provided safe places to play, opportunities for regular physical activity, and support of their families' efforts to integrate physical activity into their daily routines.[13] Unfortunately for children and families in disadvantaged and low-income communities, such opportunities are limited. Several of the papers in this supplement illustrate this limitation and show that the safety and structural design of the built environment influence children's and adults' physical activity. Miles[6] found that disordered neighborhood environments influence parents' readiness to encourage their children to be physically active. Zhu and Lee[7] reported that low-income Hispanic children were more likely to live in unsafe neighborhoods with poor street-level walkability. Black women with higher levels of fear of crime and violence were less likely to walk outdoors.[8] A positive association was found between access to safe parks and physical activity of adolescents living in urban areas.[9] Individuals with physical disabilities who live in neighborhoods with fewer favorable environmental features for the disabled were less likely to be physically active.[10] Taken together, these studies illustrate the powerful influences of the built environment in shaping the physical activity levels of diverse population groups, providing evidence that policy-based approaches are needed to curtail the childhood obesity epidemic, particularly in low-income populations and communities of color, as well as to promote physical activity among individuals with physical challenges.

Policies and legislation to improve the built environment are promising means of controlling the childhood obesity epidemic. Strong urban policies were associated with higher levels of leisure-time physical activities such as walking and bicycling.[11] Legislative efforts that address obesogenic environments to prevent childhood obesity were indicated as viable approaches in the paper by Boehmer et al.[12]

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Implications for Future Research

At least three areas of study hold considerable promise for research: epidemiologic issues; measurement of obesity-related influences: physical activity and food environments; and interventions. The findings in this special issue call attention to inequalities in access to safe physical activity facilities in low-SES and high-minority communities; these communities in turn are associated with lower physical activity levels of children and adolescents which contribute to disparities in the prevalence rates of overweight and obesity. Other studies have reported similar results or have confirmed the association of the built environment with child and adolescent physical activity.[14,15] Despite these efforts, there is little evidence of a relationship between the built environment and BMI or weight status of youth[15] or of other health outcomes (e.g., blood pressure and blood lipids), and most research has been cross-sectional. Future research should focus on high-quality longitudinal epidemiologic studies, especially in populations at highest risk for obesity, to better our knowledge of how body weight status is influenced by the design of communities, parks, schools, homes, and neighborhoods; by public policies; and by societal factors.

Although progress is being made in the measurement of environmental influences on physical activity and diet, there is much room for improvement. At present, there is considerable reliance on self-reported measures and relatively few direct or objective measures of diet and physical activity. An NIH-wide initiative, the Gene and Environment Initiative (GEI), is addressing this gap by developing technologies or biomarkers that are reliable and feasible for use in diverse populations, and have low respondent burden. The National Heart, Lung, and Blood Institute (NHLBI) and other NIH institutes are supporting research that employs GIS, GPS, and other technologies as tools to advance the science that measures environmental influences on obesity.

Interventions in childhood obesity prevention must draw from strong studies that are experimental (randomized) or quasi-experimental. To date, most intervention studies that examined the effects of the built environment and obesity risk factors have been cross-sectional, in large part due to the difficulty in controlling environmental changes. But in addition to intervention studies, well-designed longitudinal studies of naturally occurring processes are needed to evaluate the effects of environmental changes that are ongoing throughout the country. These potential studies include examining how improving neighborhood walkability, the quality of parks, and transportation systems (e.g., sidewalks, crosswalks) would affect weight status and other health outcomes (e.g., blood lipids), as well as how such improvements would affect weight-related behaviors such as physical activity and dietary intake.

Childhood obesity prevention involves maintaining energy balance at a healthy weight while protecting overall health, growth and development, and nutritional status.[13] The importance of policy and environmental factors on the food and energy intake of children and adolescents is being addressed by many NIH institutes and other federal and state agencies, as well as by the RWJF Healthy Eating Research Project. Future research to prevent childhood obesity must address the combined influences of personal, social, environmental, and societal factors on both energy intake and energy expenditure. Research is particularly needed among low-socioeconomic populations and in communities of color that are at highest risk for obesity. Issues to be addressed include the relative contribution of the environment (e.g., home, school, and neighborhood) to total physical activity and energy intake of children, and how much physical activity is needed in these environments to suppress excess weight gain or improve cardiovascular health outcomes, especially of youth at high risk for obesity.

Because childhood obesity is a major public health problem with multiple etiologic factors, comorbidities, and associated high healthcare costs, numerous health organizations and foundations—including the IOM, American Academy of Pediatrics, American Medical Association, American Heart Association, RWJF, and the NIH—have called for collective efforts to combat the problem from multiple fronts, including promoting innovative, cutting-edge research that can identify effective or promising interventions.[6] In August 2007, NHLBI, with support from other institutes at NIH, convened a Working Group to advise NIH on research areas that could advance knowledge in effective obesity prevention and treatment in childhood and to identify priorities for future research directions. The report from this Working Group may be useful to researchers interested in combating childhood obesity.[16]

Other NIH institutes recently held two workshops related to the environment and obesity: (1) Measures of food and built environments: enhancing research relevant to policy on diet, physical activity, and weight, led by the National Cancer Institute; and (2) Beyond individual behavior: multidimensional research in obesity linking biology to society, led by the National Institutes of Child Health and Development. Other national collaborative research efforts to combat the obesity epidemic in both adults and children include the activities of the NIH Obesity Research Task Force.[17] In particular, the Environment and Behavior Subcommittee of the task force focuses on collaboration across NIH to identify and promote a research agenda for behavioral and environmental obesity prevention and treatment. Research to eliminate disparities in obesity as well as in the built environment is a goal of the

recently formed Federal Collaboration on Health Disparities Research.[18] These collaborative efforts to build an evidence base for more effective interventions for obesity control increasingly focus on the promise and the challenges of environmental and policy research. The papers in this special issue confirm that there is a strong foundation of evidence on which to build future research.

In the coming years, we at the NHLBI will follow this issue closely and continue to encourage highly innovative investigator-initiated research; participation in special initiatives focusing on the environment, obesity, and cardiovascular health outcomes; and the development of new investigators, through our training, career, and fellowship awards, and through our research project mechanisms.

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